UNITED STATES DEPARTMENT OF THE NAVY

NAVAL BASE KITSAP BANGOR
SILVERDALE, WA

COOPERATING AGENCIES:

United States Army Corps of Engineers

National Oceanic and Atmospheric Administration, National Marine Fisheries Service

LAND-WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR

FINAL ENVIRONMENTAL IMPACT STATEMENT

VOLUME 2
APPENDICES A–I

JULY 2016

VOLUME 2: APPENDICES A–I

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LIST OF APPENDICES

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
$\mu g/m^3$	micrograms per cubic meter
AAQS	ambient air quality standards
ACHP	Advisory Council on Historic Preservation
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
AQI	air quality index
BMP	best management practice
BOD	biochemical oxygen demand
CAA	Clean Air Act
CCD	Coastal Consistency Determination
CDP	Census Designated Place
CDF	cumulative distribution functions
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COMNAVREGNWINST	Commander Navy Region Northwest Instruction
CP	current practices
CSDS-5	Commander, Submarine Development Squadron Five
CSL	Cleanup Screening Level
cu m	cubic meter
cu yd	cubic yard
CVN	aircraft carrier
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DAHP	Department of Archaeology and Historic Preservation
dB re 1µPa	decibels referenced at 1 micropascal
dB	decibel
dBA	A-weighted decibel
DDESB	Department of Defense Explosives Safety Board
DEIS	draft environmental impact statement
DO	dissolved oxygen
DoD	Department of Defense
DPS	distinct population segment
dw	dry weight
EA	Environmental Assessment

List of Acronyms and Abbreviations (continued)

EFH	Essential Fish Habitat
EHW-1	Explosives Handling Wharf
EHW-2	Explosives Handling Wharf-2
EIS	environmental impact statement
EISA	Energy Independence and Security Act
ELWS	extreme low water of spring tides
EO	Executive Order
EQ	Extraordinary Quality
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FEIS	final environmental impact statement
FEMA	Federal Emergency Management Agency
FMC	Fishery Management Council
FMP	Fishery Management Plan
FR	*Federal Register*
FRD	Formerly Restricted Data
ft	foot/feet
FY	fiscal year
g	gravitational acceleration
GHG	greenhouse gas
GIS	Geographic Information System
gpd	gallons per day
gpm	gallons per minute
GWP	global warming potential
HAP	hazardous air pollutants
HAPC	Habitat Areas of Particular Concern
HCCC	Hood Canal Coordinating Council
HCDOP	Hood Canal Dissolved Oxygen Program
HDPE	high density polyethylene
HLUC	Historic Land Use Complexes
HPAH	high molecular weight polycyclic aromatic hydrocarbon
Hz	hertz
IHA	Incidental Harassment Authorization
IMP	integrated management practices
IMPLAN	Impact Analysis for Planning
INRMP	Integrated Natural Resources Management Plan
JARPA	Joint Aquatic Resources Permit Application
KB	Keyport/Bangor
kHz	kilohertz
km	kilometer
kph	kilometers per hour
kVA	kilovolt-ampere
kW	kilowatt

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

LAA	likely to adversely affect
LEED	Leadership in Energy and Environmental Design
Leq	equivalent sound level
LOA	Letter of Authorization
LOS	level of service
Lmax	maximum noise levels
LPAH	low molecular weight polycyclic aromatic hydrocarbon
LWI	Land-Water Interface
m	meter
MBTA	Migratory Bird Treaty Act
mg/kg	milligrams per kilogram
mg-N/kg	ammonia
mg/L	milligrams per liter
mgd	million gallons per day
MHHW	mean higher high water
MHWS	mean high water of spring tides
mi	mile
mL	milliliters
MLI	minority and low-income
MLLW	mean lower low water
mm	millimeter
MM	mitigation measures
MMO	marine mammal observer
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
mph	miles per hour
MPN	most probable number
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSF	Magnetic Silencing Facility
MSGP	Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity
MSL	mean sea level
MTCA	Model Toxics Control Act
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAM	not adversely modify
NAVBASE	Naval Base
NAVFAC	Naval Facilities Engineering Command Northwest
Navy	U.S. Department of the Navy
NBK Bangor	Naval Base Kitsap Bangor
NCP	National Oil and Hazardous Substances Contingency Plan
ND	not detected
NE	no effect
NEPA	National Environmental Policy Act

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

NHPA	National Historic Preservation Act
NLAA	not likely to adversely affect
NMFS	National Marine Fisheries Service
NMFSHQ	National Marine Fisheries Service Headquarters
NMSDD	Navy Marine Species Density Database
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of Construction
NOI	Notice of Intent
NOSSA	Naval Ordnance Safety and Security Activity
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NSWCCD	Navy Surface Warfare Center Carderock Division
NTU	Nephelometric Turbidity Units
O_3	ozone
OA	Operational Area
OPNAVINST	Chief of Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl
PCE	Primary Constituent Element
PFC	properly functioning condition
PFMC	Pacific Fishery Management Council
PGA	peak ground acceleration
PM	respirable particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PNPTT	Point No Point Treaty Tribes
PNPTC	Point No Point Treaty Council
ppm	parts per million
ppt	parts per thousand
PSAMP	Puget Sound Ambient Monitoring Program
PSAT	Puget Sound Action Team
PSB	Port Security Barrier
PSCAA	Puget Sound Clean Air Agency
PSD	prevention of significant deterioration
PSTRT	Puget Sound Technical Recovery Team
PSU	practical salinity unit
PTRCIT	Property of Traditional Religious and Cultural Importance to an Indian Tribe

List of Acronyms and Abbreviations (continued)

PTS	permanent threshold shift
Qal	alluvium, colluviums, and fill material
Qva	advanced outwash
Qvgl	Vashon glacio-lacustrine
Qvt	Vashon till
RCW	Revised Code of Washington
RMS	root mean square
ROD	Record of Decision
ROI	Region of Influence
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act
SECNAVINST	Secretary of the Navy Instruction
SEL	Sound Exposure Level
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SL	source level
SLR	sea level rise
SMA	Shoreline Management Act
SMP	Shoreline Management Plan
SMS	Sediment Management Standards
SO_2	sulfur dioxide
SOx	sulfur oxides
SPCC	Spill Prevention, Control, and Countermeasure
SPE	Service Pier Extension
SPL	sound pressure level
sq ft	square feet
sq km	square kilometers
sq m	square meters
sq mi	square miles
SQS	sediment quality standards
SR	State Route
SSBN	OHIO Class Ballistic Missile submarines
SSN	SEAWOLF Class submarine (This document does not address other classes of attack submarines)
SSP	Strategic Systems Program
SUBASE	Naval Submarine Base
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
TL	transmission loss
TMDL	total maximum daily load
TOC	total organic carbon
TPP	Test Pile Program
TPS	Transit Protection System
TRIDENT	TRIDENT Fleet Ballistic Missile

List of Acronyms and Abbreviations (continued)

T-ROC	Thorndyke Resources Operation Complex
TSS	total suspended solids
TTS	temporary threshold shift
U&A	Usual and Accustomed
U.S.	United States
UCNI	Department of Defense Unclassified Controlled Nuclear Information
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGBC	U.S. Green Building Council
USGS	U.S. Geological Survey
VOC	volatile organic compound
W	Watts
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WDOE	Washington Department of Ecology
WDOH	Washington Department of Health
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WRA	Waterfront Restricted Area
WSDOT	Washington State Department of Transportation
WSE	Waterfront Security Enclave
ZOI	zone of influence

APPENDIX A

FISH AND WILDLIFE SPECIES KNOWN OR EXPECTED TO OCCUR ON NAVAL BASE KITSAP BANGOR

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Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
American shad *Alosa sapidissima*	Herrings					
Arrow goby *Clevelandia ios*	Gobies					
Arrowtooth flounder *Atheresthes stomias*	Righteye Flounders				G	
Bay goby *Lepidogobius lepidus*	Gobies					
Bay pipefish *Syngnathus leptorhynchus*	Pipefishes and Seahorses	X				
Big skate *Raja binoculata*	Skates				G	
Bigeye starsnout poacher *Bathyagonus pentacanthus*	Poachers					
Black eelpout *Lycodes diapterus*	Eelpouts					
Black rockfish *Sebastes melanops*	Scorpionfishes/Rockfishes			Candidate	G	X
Blackbelly eelpout *Lycodes pacifica*	Eelpouts					
Blackeye goby *Coryphopterus nicholsii*	Gobies					
Blackfin sculpin *Malacocottus kincaidi*	Fathead Sculpins					
Blackfin starsnout poacher *Bathyagonus nigripinnis*	Poachers					

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Blacktip poacher *Xeneretmus latifrons*	Poachers					
Bluebarred prickleback *Plectobranchus evides*	Pricklebacks					
Bluespotted poacher *Xeneretmus triacanthus*	Poachers					
Bluntnose sixgill shark *Hexanchus griseus*	Cow Sharks					
Bocaccio *Sebastes paucispinis*	Scorpionfishes/Rockfishes		(Puget Sound/ Georgia Basin DPS) Endangered	Candidate	G	X
Brown cat shark *Apristurus brunneus*	Cat Sharks					
Brown Irish lord *Hemilepidotus spinosus*	Sculpins					
Brown rockfish *Sebastes auriculatus*	Scorpionfishes/Rockfishes			Candidate	G	X
Buffalo sculpin *Enophrys bison*	Sculpins	X				
Bull trout *Salvelinus confluentus*	Salmonids					X
Butter sole *Isopsetta isolepis*	Righteye Flounders				G	
Cabezon *Scorpaenichthys marmoratus*	Sculpins				G	
Canary rockfish *Sebastes pinniger*	Scorpionfishes/Rockfishes		(Puget Sound/ Georgia Basin DPS) Threatened	Candidate	G	X

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Chinook (chinook) salmon *Oncorhynchus tshawytscha*	Salmonids	X	(Puget Sound) Threatened	(Puget Sound) Candidate	S	X
Chum salmon *Oncorhynchus keta*	Salmonids	X	(Hood Canal ESU) Threatened	(Hood Canal ESU) Candidate		X
C-O turbot (sole) *Pleuronichthys coenosus*	Righteye Flounders	X				
Coho (silver) salmon *Oncorhynchus kisutch*	Salmonids	X	(Puget Sound/Strait of Georgia ESU) Concern	(Puget Sound) Candidate	S	X
Copper rockfish *Sebastes caurinus*	Scorpionfishes/Rockfishes			Candidate	G	X
Crescent gunnel *Pholis laeta*	Gunnels	X				
Cutthroat trout *Oncorhynchus clarki*	Salmonids	X	Concern			X
Decorated warbonnet *Chirolophis decoratus*	Pricklebacks					
Dolly varden *Salvelinus malma*	Salmonids					X
Dover sole *Microstomus pacificus*	Righteye Flounders	X			G	
Dusky sculpin *Icelinus burchami*	Sculpins					
Dwarf wrymouth *Lyconectes aleutensis*	Wrymouths	X				
English sole *Parophrys vetulus*	Righteye Flounders	X			G	X

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Eulachon *Thaleichthys pacificus*	Smelts	X	(Southern DPS) Threatened			X
Flathead sole *Hippoglossoides elassodon*	Righteye Flounders				G	
Fluffy sculpin *Oligocottus snyderi*	Sculpins	X				
Giant wrymouth *Delopesis gigantea*	Wrymouths	X				
Gray starsnout poacher *Bathyagonus alascanus*	Poachers					
Great sculpin *Myoxocephalus polyacanthocephalus*	Sculpins	X				
Greenstriped rockfish *Sebastes elongatus*	Scorpionfishes/Rockfishes			Candidate	G	X
Grunt sculpin *Rhamphocottus richardsonii*	Grunt Sculpins					
Gunnel Order – Pholidae	Gunnels	X				
High cockscomb *Anoplarchus purpurescens*	Pricklebacks					
Kelp greenling *Hexagrammos decagrammus*	Greenlings and Lingcod	X			G	
Kelp surfperch *Brachyistius frenatus*	Surfperches	X				
Lingcod *Ophiodon elongatus*	Greenlings and Lingcod	X			G	X
Longfin sculpin *Jordania zonope*	Sculpins					

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Longfin smelt *Spirinchus thaleichthys*	Smelts					X
Longnose skate *Raja rhina*	Skates				G	
Longspine combfish *Zaniolepis latipinnis*	Combfishes					
Manacled sculpin *Synchirus gilli*	Sculpins					
Market squid *Loligo opalescens*	Squid	X			CP	
Northern anchovy *Engraulis mordax*	Anchovies	X			CP	
Northern clingfish *Gobiesox maeandricus*	Clingfishes					
Northern lampfish *Stenobrachius leucopsarus*	Lanternfishes	X				
Northern rock sole *Lepidopsetta polyxystra*	Righteye Flounders					
Northern ronquil *Ronquilus jordani*	Ronquils					
Northern sculpin *Icelinus borealis*	Sculpins					
Northern spearnose poacher *Agonopsis vulsa*	Poachers	X				
Pacific butterfish *Peprilus simillimus*	Butterfishes					
Pacific cod *Gadus macrocephalus*	Cods			(S. and Central Sound) Candidate	G	X

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Pacific electric ray *Torpedo californica*	Electric Rays					
Pacific hake (whiting) *Merluccius productus*	Hakes and Relatives		(Pacific-Georgia Basin DPS) Concern	(Georgia Basin) Candidate	G	X
Pacific halibut *Hippoglossus stenolepis*	Righteye Flounders					
Pacific herring *Clupea harengus pallasi*	Herrings	X		Candidate		X
Pacific lamprey *Lampetra tridentata*	Lampreys					X
Pacific sand lance *Ammodytes hexapterus*	Sand Lances	X				X
Pacific sanddab *Citharichthys sordidus*	Lefteye Flounders	X			G	
Pacific sardine *Sardinops sagax*	Herrings	X				
Pacific snake prickleback *Lumpenus sagitta*	Pricklebacks	X				
Pacific spiny lumpsucker *Eumicrotremus orbis*	Lumpfishes					
Pacific staghorn sculpin *Leptocottus armatus*	Sculpins	X				
Pacific tomcod *Microgadus proximus*	Cods	X				
Padded sculpin *Artedius fenestralis*	Sculpins					
Painted greenling *Oxylebius pictus*	Greenlings and Lingcod					

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Pallid eelpout *Lycodapus mandibularis*	Eelpouts					
Penpoint gunnel *Apodichthys flavidus*	Gunnels	X				
Petrale sole *Eopsetta jordani*	Righteye Flounders				G	
Pile surfperch *Rhacochilus vacca*	Surfperches	X				
Pink salmon *Oncorhynchus gorbuscha*	Salmonids	X			S	X
Plainfin midshipman *Porichthys notatus*	Toadfishes	X				
Prickly sculpin *Cottus asper*	Sculpins					
Puget Sound rockfish *Sebastes emphaeus*	Scorpionfishes/Rockfishes				G	
Pygmy poacher *Odontopyxis trispinosa*	Poachers	X				
Quillback rockfish *Sebastes maliger*	Scorpionfishes/Rockfishes			Candidate	G	X
Quillfish *Ptilichthys goodei*	Quillfish					
Red brotula *Brosmophycis marginata*	Viviparous Brotulas					
Red Irish lord *Hemilepidotus hemilepidotus*	Sculpins	X				
Redbanded rockfish *Sebastes babcocki*	Scorpionfishes/Rockfishes				G	

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name / *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Redstripe rockfish *Sebastes proriger*	Scorpionfishes/Rockfishes			Candidate	G	X
Rex sole *Glyptocephalus zachirus*	Righteye Flounders	X			G	
Ribbed sculpin *Triglops pingelii*	Sculpins					
Ribbon snailfish *Liparis cyclopus*	Snailfishes	X				
River lamprey *Lampetra ayresii*	Lampreys					
Rockfish (juv.) *Sebastes* spp.	Rockfish	X			G	
Rock greenling *Hexagrammos lagocephalus*	Greenlings					
Rock sole *Lepidopsetta bilineata*	Righteye Flounders				G	X
Roughback sculpin *Chitonotus pugetensis*	Sculpins					
Roughspine sculpin *Triglops macellus*	Sculpins					
Sablefish *Anoplopoma fimbria*	Sablefishes/Skillfishes				G	
Saddleback gunnel *Pholis ornata*	Gunnels	X				
Sailfin sculpin *Nautichthys oculofasciatus*	Searavens	X				
Sand sole *Psettichthys melanostictus*	Righteye Flounders	X			G	

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Scalyhead sculpin *Artedius harringtoni*	Sculpins					
Sculpin spp. Order – Cottidae	Sculpins	X				
Sharpchin rockfish *Sebastes zacentrus*	Scorpionfishes/Rockfishes				G	
Sharpnose sculpin *Clinocottus acuticeps*	Sculpins					
Shiner surfperch *Cymatogaster aggregata*	Surfperches	X				
Shortfin eelpout *Lycodes brevipes*	Eelpouts					
Shortspine thornyhead *Sebastolobus alascanus*	Scorpionfishes/Rockfishes					
Showy snailfish *Liparis pulchellus*	Snailfishes					
Silvergray rockfish *Sebastes brevispinis*	Scorpionfishes/Rockfishes				G	
Sixgill shark *Hexanchus griseus*	Cow Sharks					
Slender cockscomb *Anoplarchus insignis*	Pricklebacks					
Slender snipe eel *Nemichthys scolopaceus*	Snipe Eels					
Slender sole *Lyopsetta exilis*	Righteye Flounders					
Slim sculpin *Radulinus asprellus*	Sculpins					

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Smooth alligatorfish *Anoplagonus inermis*	Poachers					
Smoothhead sculpin *Artedius lateralis*	Sculpins					
Snake prickleback *Lumpenus sagitta*	Pricklebacks	X				
Sockeye (red) salmon *Oncorhynchus nerka*	Salmonids	X				X
Soft sculpin *Psychrolutes sigalutes*	Fathead Sculpins					
Sole spp. Order – Pleuronectiformes	Righteye Flounders	X				
Southern rock sole *Lepidopsetta bilineata*	Righteye Flounders					
Speckled sanddab *Citharichthys stigmaeus*	Lefteye Flounders	X				
Spiny dogfish *Squalus acanthias*	Dogfish Sharks				G	
Spinycheek starsnout poacher *Bathyagonus infraspinatus*	Poachers					
Spinyhead sculpin *Dasycottus setiger*	Fathead Sculpins					
Splitnose rockfish *Sebastes diploproa*	Scorpionfishes/Rockfishes				G	
Spinynose sculpin *Dasycottus setiger*	Sculpins					
Spotfin sculpin *Icelinus tenuis*	Sculpins					

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Spotted ratfish *Hyrolagus colliei*	Chimeras					
Starry flounder *Platichthys stellatus*	Righteye Flounders	X			G	
Steelhead *Oncorhynchus mykiss*	Salmonids	X	(Puget Sound) Threatened			X
Striped surfperch *Embiotoca lateralis*	Surfperches	X				
Stripetail rockfish *Sebastes saxicola*	Scorpionfishes/Rockfishes				G	
Sturgeon poacher *Agonus acipenserinus*	Poachers	X				
Surf smelt *Hypomesus pretiosus*	Smelts	X				X
Tadpole sculpin *Psychrolutes paradoxus*	Fathead Sculpins					
Threadfin sculpin *Icelinus filamentosus*	Sculpins					
Threespine stickleback *Gasterosteus aculeatus*	Sticklebacks	X				
Tidepool sculpin *Oligocottus maculosus*	Sculpins	X				
Tubesnout *Aulorhynchus flavidus*	Tubesnouts	X				
Vermillion rockfish *Sebastes miniatus*	Scorpionfishes/Rockfishes				G	
Walleye pollock *Theragra chalcogramma*	Cods	X		(S. Puget Sound) Candidate		X

Table A–1. Marine Fish Species Known or Expected to Occur in Hood Canal (continued)

Common Name *Scientific Name*	Common Family Name	Captured in Beach Seine[1]	Federal and State Listed Species		Essential Fish Habitat Species[2]	WDFW Priority Species
			Federal Status	Washington State Status		
Wattled eelpout *Lycodes palearis*	Eelpouts					
White sturgeon *Acipenser transmontanus*	Sturgeons					X
Whitebarred prickleback *Poroclinus rothrocki*	Pricklebacks					
Whitespotted greenling *Hexagrammos stelleri*	Greenlings and Lingcod	X				
Wolf-eel *Anarrhichthys ocellatus*	Wolffishes					
Yelloweye rockfish *Sebastes ruberrimus*	Scorpionfishes/Rockfishes		(Puget Sound/ Georgia Basin DPS) Threatened	Candidate	G	X
Yellowtail rockfish *Sebastes flavidus*	Scorpionfishes/Rockfishes			Candidate	G	X

Sources: University of Washington 2000; Palsson 2007, personal communication; Puget Sound Action Team 2007; REEF 2008; WDFW 2008a, b, c; Bhuthimethee et al. 2009; WDFW 2015.

1. SAIC 2006; Bhuthimethee et al. 2009.
2. CP = Coastal pelagic, DPS = Distinct Population Segment, ESU = Evolutionarily Significant Unit, G = Groundfish, S = Salmon.

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species: Federal Status	Federal and State Listed Species: Washington State Status	PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
Shorebirds and Wading Birds						
Great blue heron *Ardea herodias*	year-round					X
Black-bellied plover *Pluvialis squatarola*	fall and spring migrant and winter resident					
Semipalmated plover *Charadrius semipalmatus*	fall and spring migrant					
Killdeer *Charadrius vociferus*	year-round					
Greater yellowlegs *Tringa melanoleuca*	fall and spring migrant					
Lesser yellowlegs *Tringa flavipes*	fall migrant				X	
Spotted sandpiper *Actitis macularius*	summer resident					
Ruddy turnstone *Arenaria interpres*	fall and spring migrant					
Black turnstone *Arenaria melanocephala*	migrant and winter resident					
Wandering tattler *Tringa incana*	fall and spring migrant					
Sanderling *Calidris alba*	migrant and winter resident					
Western sandpiper *Calidris mauri*	fall and spring migrant					
Least sandpiper *Calidris minutilla*	fall and spring migrant					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Pectoral sandpiper *Calidris melanotos*	fall migrant					
Dunlin *Calidris alpina*	fall and spring migrant					
Short-billed dowitcher *Limnodromus griseus*	fall and spring migrant				X	
Long-billed dowitcher *Limnodromus scolopaceus*	fall and spring migrant					
Wilson's snipe *Gallinago delicata*	fall and spring migrant					
Red-necked phalarope *Phalaropus lobatus*	fall and spring migrant					
Marine Waterfowl						
Red-throated loon *Gavia stellata*	fall and spring migrant, winter resident					
Pacific loon *Gavia pacifica*	winter resident					
Common loon *Gavia immer*	winter resident		Sensitive			
Yellow-billed loon *Gavia adamsii*	winter resident				X	
Pied-billed grebe *Podilymbus podiceps*	year-round					
Horned grebe *Podiceps auritus*	winter resident					
Eared grebe *Podiceps nigricollis*	winter resident					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species: Federal Status	Federal and State Listed Species: Washington State Status	PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
Red-necked grebe *Podiceps grisegena*	winter resident					
Western grebe *Aechmophorus occidentalis*	winter resident		Candidate		X	
Canada goose *Branta canadensis*	year-round					
Brant *Branta bernicla*	fall and spring migrant, winter resident					X
Snow goose *Chen caerulescens*	winter resident					
White-fronted goose *Anser albifrons*	fall and spring migrant					
Trumpeter swan *Cygnus buccinator*	fall and spring migrant, winter resident					
Wood duck *Aix sponsa*	year-round, but less common in winter					X
Gadwall *Anas strepera*	year-round					
Northern pintail *Anas acuta*	winter resident					
Eurasian wigeon *Anas penelope*	winter resident					
American wigeon *Anas americana*	winter resident					
Northern shoveler *Anas clypeata*	year-round					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Mallard *Anas platyrhynchos*	year-round					
Green-winged teal *Anas crecca*	fall and spring migrant, winter resident					
Canvasback *Aythya valisineria*	winter resident					
Greater scaup *Aythya marila*	fall and spring migrant, winter resident					
Lesser scaup *Aythya affinis*	fall and spring migrant, winter resident					
Long-tailed duck *Clangula hyemalis*	winter resident					
Surf scoter *Melanitta perspicillata*	winter resident, and non-breeding flocks in summer					
White-winged scoter *Melanitta fusca*	winter resident, and non-breeding flocks in summer					
Black scoter *Melanitta nigra*	winter resident					
Bufflehead *Bucephala albeola*	winter resident					X
Common goldeneye *Bucephala clangula*	winter resident					X
Barrow's goldeneye *Bucephala islandica*	winter resident					X

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Hooded merganser *Lophodytes cucullatus*	year-round					X
Common merganser *Mergus merganser*	year-round					
Red-breasted merganser *Mergus serrator*	winter resident					
Ruddy duck *Oxyura jamaicensis*	winter resident					
American coot *Fulica americana*	year-round					
Seabirds						
Parasitic jaeger *Stercorarius parasiticus*	fall migrant, follows common tern migration					
Bonaparte's gull *Chroicocephalus philadelphia*	fall and spring migrant					
Ring-billed gull *Larus delawarensis*	fall and spring migrant, summer resident					
Mew gull *Larus canus*	winter resident					
Glaucous-winged gull *Larus glaucescens*	year-round					
Herring gull *Larus argentatus*	winter resident					
Thayer's gull *Larus thayeri*	fall and spring migrant, winter resident					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Caspian tern *Hydroprogne caspia*	non-breeding summer resident				X	
Common tern *Sterna hirundo*	fall migrant					
Brant's cormorant *Phalacrocorax penicillatus*	year-round		Candidate			
Double-crested cormorant *Phalacrocorax auritus*	year-round					
Pelagic cormorant *Phalacrocorax pelagicus*	year-round				X	
Common murre *Uria aalge*	common in winter, but uncommon to absent in summer		Candidate			
Pigeon guillemot *Cepphus columba*	year-round, numbers greater in winter than summer					
Marbled murrelet *Brachyramphus marmoratus*	year-round	Threatened	Threatened			X
Ancient murrelet *Synthliboramphus antiquus*	late-fall to early-winter resident					
Cassin's auklet *Ptychoramphus aleuticus*	rare to uncommon visitor in summer and fall		Candidate			X
Rhinocerous auklet *Cerorhinca monocerata*	summer resident					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Raptors						
Bald eagle *Haliaeetus leucocephalus*	year-round		Sensitive		X	X
Osprey *Pandion haliaetus*	summer resident					
Northern harrier *Circus cyaneus*	winter resident					
Sharp-shinned hawk *Accipiter striatus*	fall migrant					
Cooper's hawk *Accipiter cooperii*	fall migrant			X		
Red-tailed hawk *Buteo jamaicensis*	year-round					
Rough-legged hawk *Buteo lagopus*	winter resident					
Merlin *Falco columbarius*	fall migrant		Candidate			
Peregrine falcon *Falco peregrinus*	fall migrant		Sensitive		X	
Turkey vulture *Cathartes aura*	summer resident					
Great horned owl *Bubo virginianus*	year-round					
Barn owl *Tyto alba*	year-round					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Snowy owl *Bubo scandiacus*	winter resident					
Western screech-owl *Megascops kennicottii*	year-round					
Barred owl *Strix varia*	year-round					
Northern saw-whet owl *Aegolius acadicus*	year-round					
Northern pygmy owl *Glaucidium gnoma*	year-round					
Other Terrestrial Birds						
Ruffed grouse *Bonasa umbellus*	year-round			X		
Blue grouse *Dendragapus obscurus*	year-round			X		
Ring-necked pheasant *Phasianus colchicus*	year-round					
California quail *Callipepla californica*	year-round					
Mountain quail *Oreortyx pictus*	year-round					X
Common nighthawk *Chordeiles minor*	summer resident					
Rock pigeon *Columba livia*	year-round					
Mourning dove *Zenaida macroura*	year-round					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species: Federal Status	Federal and State Listed Species: Washington State Status	PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
Band-tailed pigeon *Patagioenas fasciata*	common summer, uncommon winter resident			X		
Vaux's swift *Chaetura vauxi*	summer resident		Candidate			X
Anna's hummingbird *Calypte anna*	year-round					
Rufous hummingbird *Selasphorus rufus*	summer resident			X	X	
Belted kingfisher *Megaceryle alcyon*	year-round					
Red-breasted sapsucker *Sphyrapicus ruber*	year-round			X		
Hairy woodpecker *Picoides villosus*	year-round					
Downy woodpecker *Picoides pubescens*	year-round					
Northern flicker *Colaptes auratus*	year-round					
Pileated woodpecker *Dryocopus pileatus*	year-round		Candidate			X
Olive-sided flycatcher *Contopus cooperi*	summer resident			X	X	
Willow flycatcher *Empidonax traillii*	summer resident			X	X	

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Hammond's flycatcher *Empidonax hammondii*	summer resident					
Pacific-slope flycatcher *Empidonax difficilis*	summer resident					
Hutton's vireo *Vireo huttoni*	year-round					
Gray jay *Perisoreus canadensis*	year-round					
Steller's jay *Cyanocitta stelleri*	year-round					
American crow *Corvus brachyrhynchos*	year-round					
Common raven *Corvus corax*	year-round					
Purple martin *Progne subis*	summer resident		Candidate			X
Tree swallow *Tachycineta bicolor*	summer resident					
Violet-green swallow *Tachycineta thalassina*	summer resident					
Cliff swallow *Petrochelidon pyrrhonota*	summer resident					
Barn swallow *Hirundo rustica*	summer resident					
Black-capped chickadee *Poecile atricapillus*	year-round					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Chestnut-backed chickadee *Poecile rufescens*	year-round					
Bushtit *Psaltriparus minimus*	year-round					
Red-breasted nuthatch *Sitta canadensis*	year-round					
Brown creeper *Certhia americana*	year-round					
Bewick's wren *Thryomanes bewickii*	year-round					
Winter wren *Troglodytes troglodytes*	year-round					
Marsh wren *Cistothorus palustris*	summer resident					
American dipper *Cinclus mexicanus*	year-round					
Golden-crowned kinglet *Regulus satrapa*	summer resident			X		
Ruby-crowned kinglet *Regulus calendula*	migrant, winter resident					
Swainson's thrush *Catharus ustulatus*	summer resident					
American robin *Turdus migratorius*	year-round					
Varied thrush *Ixoreus naevius*	summer resident					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
European starling *Sturnus vulgaris*	year-round					
Yellow warbler *Dendroica petechia*	summer resident					
Yellow-rumped warbler *Dendroica coronata*	summer resident					
Townsend's warbler *Dendroica townsendi*	summer resident					
MacGillivray's warbler *Oporornis tolmiei*	summer resident					
Common yellowthroat *Geothlypis trichas*	summer resident					
Wilson's warbler *Wilsonia pusilla*	summer resident					
Western tanager *Piranga ludoviciana*	summer resident					
Spotted towhee *Pipilo maculatus*	summer resident					
Song sparrow *Melospiza melodia*	year-round					
White-crowned sparrow *Zonotrichia leucophrys*	summer resident					
Golden-crowned sparrow *Zonotrichia atricapilla*	migrant, summer resident					
Fox sparrow *Passerella iliaca*	winter resident					

Table A–2. Bird Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name *Scientific Name*	Season(s) of Occurrence	Federal and State Listed Species		PIF Bird of Conservation Concern?[1]	USFWS Bird of Conservation Concern?[2]	WDFW Priority Species?[3]
		Federal Status	Washington State Status			
Dark-eyed junco *Junco hyemalis*	year-round					
Red-winged blackbird *Agelaius phoeniceus*	summer resident					
Brewer's blackbird *Euphagus cyanocephalus*	year-round					
Brown-headed cowbird *Molothrus ater*	migrant, summer resident					
Purple finch *Carpodacus purpureus*	year-round			X	X	
House finch *Carpodacus mexicanus*	year-round					
Red crossbill *Loxia curvirostra*	year-round			X		
Pine siskin *Spinus pinus*	year-round					
American goldfinch *Spinus tristis*	year-round					
Evening grosbeak *Coccothraustes vespertinus*	summer resident					
House sparrow *Passer domesticus*	year-round					

Sources: Taber and Raedeke 1983; Opperman 2003; Wahl et al. 2005; Nysewander et al. 2005; Kitsap Audubon Society 2008; Agness and Tannenbaum 2009a; WDFW 2015.

1. Altman 1999a, 1999b.
2. USFWS 2008, Tables 6 and 39.
3. WDFW 2008c.

Table A–3. Mammal Species Known or Expected to Occur on NAVBASE Kitsap Bangor

Common Name	Scientific Name	Season(s) of Occurrence	Federal and State Listed Species		WDFW Priority Species?[1]
			Federal Status	Washington State Status	
Marine Mammals					
Gray whale	*Eschrichtius robustus*	year-round (rare)		Sensitive	X
Minke whale	*Balaenoptera acutorostrata*	spring, summer and fall (rare)			
Humpback whale	*Megaptera novaeangliae*	spring and fall (rare)	Endangered	Endangered	X
Killer whale (Southern Resident)	*Orcinus orca*	year-round (rare)	Endangered	Endangered	X
Killer whale (Transient)	*Orcinus orca*	year-round (rare)			X
Dall's porpoise	*Phocoenoides dalli*	year-round (infrequent)			X
Harbor porpoise	*Phocoena phocoena*	year-round (rare)		Candidate	X
Harbor seal	*Phoca vitulina richardsi*	year-round (common, resident species)			X
Northern elephant seal	*Mirounga angustirostris*	summer and fall (rare)			
California sea lion	*Zalophus californianus californianus*	fall to late spring (common)			X
Steller sea lion	*Eumetopias jubatus*	October to June (seasonal)		Threatened	
Game					
Cougar	*Felis concolor*	year-round			
Bobcat	*Lynx rufus*	year round			
Black bear	*Ursus americanus*	early spring to fall (active), and winter hibernation			
Columbian black-tailed deer	*Odocoileus hemionus columbianus*	year-round			X

Table A–3. Mammal Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name	Scientific Name	Season(s) of Occurrence	Federal and State Listed Species		WDFW Priority Species?[1]
			Federal Status	Washington State Status	
Non-Game					
Virginia opossum	*Didelphis virginiana*	year-round			
Feral dog	*Canis familiaris*	year-round			
Feral cat	*Felis catus*	year-round			
Masked shrew	*Sorex cinereus*	year-round			
Vagrant shrew	*Sorex vagrans*	year-round			
Trowbridge's shrew	*Sorex trowbridgii*	year-round			
Coast mole	*Scapanus orarius*	year-round			
Myotis bats	*Myotis spp.*	year-round			X
Hoary bat	*Lasiurus cinereus*	year-round			
Silver-haired bat	*Lasionycteris noctivagans*	year-round			
Big brown bat	*Eptesicus fuscus*	year-round			
Townsend's big-eared bat	*Corynorhinus townsendii*	year-round	Species of concern	Candidate	X
Snowshoe hare	*Lepus americanus*	year-round			
Mountain beaver	*Aplodontia rufa*	year-round			
Townsend's chipmunk	*Tamias townsendii*	year-round			
Eastern gray squirrel	*Sciurus carolinensis*	year-round			
Douglas squirrel	*Tamiasciurus douglasii*	year-round			
Northern flying squirrel	*Glaucomys sabrinus*	year-round			
Beaver	*Castor canadensis*	year-round			

Table A–3. Mammal Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name	Scientific Name	Season(s) of Occurrence	Federal and State Listed Species		WDFW Priority Species?[1]
			Federal Status	Washington State Status	
Bushy-tailed woodrat	*Neotoma cinerea*	year-round			
Forest deer mouse	*Peromyscus keeni*	year-round			
Deer mouse	*Peromyscus maniculatus*	year-round			
Gapper's red-backed vole	*Clethrionomys gapperi*	year-round			
Long-tailed vole	*Microtus longicaudus*	year-round			
Townsend's vole	*Microtus townsendii*	year-round			
Creeping vole	*Microtus oregoni*	year-round			
Pacific jumping mouse	*Zapus trinotatus*	year-round			
Muskrat	*Ondatra zibethicus*	year-round			
Porcupine	*Erethizon dorsatum*	year-round			
Nutria	*Myocastor coypus*	year-round			
House mouse	*Mus musculus*	year-round			
Norway rat	*Rattus norvegicus*	year-round			
Black rat	*Rattus rattus*	year-round			
Coyote	*Canis latrans*	year-round			
Red fox	*Vulpes vulpes*	year-round			
Raccoon	*Procyon lotor*	year-round			
Ermine	*Mustela erminea*	year-round			
Long-tailed weasel	*Mustela frenata*	year-round			
Mink	*Mustela vison*	year-round			

Table A–3. Mammal Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name	Scientific Name	Season(s) of Occurrence	Federal and State Listed Species		WDFW Priority Species?[1]
			Federal Status	Washington State Status	
Striped skunk	*Mephitis mephitis*	year-round			
Western spotted skunk	*Spilogale gracilis*	year-round			
River otter	*Lutra canadensis*	year-round			

Sources: Osborne et al. 1988; Calambokidis and Baird 1994; Johnson and Cassidy 1997; Osmek et al. 1998; Jeffries et al. 2000; Paulson 2003b; Jeffries 2006, personal communication; Laake 2006, personal communication; Carretta et al. 2007; Agness and Tannenbaum 2009b; WDFW 2015.

1. WDFW 2008c.

Table A–4. Amphibian and Reptile Species Known or Expected to Occur on NAVBASE Kitsap Bangor

Common Name	Scientific Name	Season(s) of Occurrence	Federal and State Listed Species		WDFW Priority Species?[1]
			Federal Status	Washington State Status	
Amphibians					
Northwestern salamander	*Ambystoma gracile*	year-round			
Long-toed salamander	*Ambystoma macrodactylum*	year-round			
Roughskin newt	*Taricha granulosa*	year-round			
Western red-backed salamander	*Plethodon vehiculum*	year-round			
Ensatina	*Ensatina eschscholtzii*	year-round			
Western toad	*Bufo boreas*	year-round	Species of concern	Candidate	X
Pacific treefrog	*Hyla regilla*	year-round			
Northern red-legged frog	*Rana aurora*	year-round			
Bullfrog (Non-native)	*Rana catesbeiana*	year-round			

Table A–4. Amphibian and Reptile Species Known or Expected to Occur on NAVBASE Kitsap Bangor (continued)

Common Name	Scientific Name	Season(s) of Occurrence	Federal and State Listed Species		WDFW Priority Species?[1]
			Federal Status	Washington State Status	
Reptiles					
Western painted turtle	*Chrysemys picta bellii*	year-round			
Slider (Introduced)	*Trachemys scripta*	year-round			
Northern alligator lizard	*Elgaria coerulea principis*	year-round			
Western fence lizard	*Sceloporus occidentalis*	year-round			
Rubber boa	*Charina bottae*	year-round			
Western terrestrial garter snake	*Thamnophis elegans*	year-round			
Northwestern garter snake	*Thamnophis ordinoides*	year-round			
Common garter snake	*Thamnophis sirtalis*	year-round			

Sources: Storm and Leonard 1995; Dvornich et al. 1997; Paulson 2003a; Jones et al. 2005; WDFW 2015.

1. WDFW 2008c.

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APPENDIX B

MARINE FISH LIFE HISTORY, HABITAT CONDITIONS, AND HEARING

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1.0 MARINE FISH LIFE HISTORIES

1.1. ESA-LISTED SALMONIDS

1.1.1. Puget Sound Chinook

1.1.1.1. STATUS

The Puget Sound Chinook salmon evolutionarily significant unit (ESU) was listed as federally threatened under the Endangered Species Act (ESA) in 1999 (64 Federal Register [FR] 14308), with the threatened listing reaffirmed in 2005 (70 FR 37160). Critical habitat was designated for Puget Sound Chinook in 2005 (70 FR 52685). In 2002, average adult Chinook escapement (number of fish surviving to reach spawning grounds or hatcheries) was relatively low, particularly for the mid-Hood Canal stock, for which average escapements were typically below the low escapement threshold of 400 Chinook fish (Washington Department of Fish and Wildlife [WDFW] 2002). In the most recent 5-Year Review, NMFS found that while natural origin recruit escapements have remained fairly constant from 1985–2009, total natural origin recruit abundance and productivity have continued to decline (NMFS 2011).

This Puget Sound Chinook ESU comprises all naturally spawned populations of Chinook salmon from rivers and streams flowing into Hood Canal, and includes 26 artificial propagation programs in Puget Sound, such as the Hamma Hamma and George Adams hatcheries. Within mid-Hood Canal, the Big Beef Creek Chinook salmon hatchery was terminated from this program, with the last of the adults returning to spawn in 2008 (NMFS 2011). Two populations of Chinook, the Mid-Hood Canal population and the Skokomish River population, are included in the ESA-listed Distinct Population Segment (DPS) within Hood Canal drainages, and are considered essential to the recovery of the species.

All Puget Sound Chinook salmon populations are considered well below escapement abundance levels identified as required for recovery to low extinction risk in the recovery plan (NMFS 2011). NMFS (2011) stated that the updated information on abundance, productivity, spatial structure and diversity since the last review does not indicate a change in this ESU's biological risk category. Although a review of 1999–2008 returning spawning abundance data indicated neither of the Hood Canal populations displayed an increasing or decreasing trend in population abundance (NWFSC 2013), these criteria for the ESU overall are in decline (NMFS 2011).

Since the listing of Puget Sound Chinook, reduced viability of these specific stocks was attributed to habitat loss and degradation, hatcheries, and harvest management issues. Additionally, dissolved oxygen (DO) levels in portions of Hood Canal are at a historic low, which is a concern and future threat to recovery of the Hood Canal stocks of this and all other Hood Canal salmonid ESUs (70 FR 76445). DO levels at the waterfront of Naval Base (NAVBASE) Kitsap Bangor are discussed in Section 3.1.1.1.2.

1.1.1.2. LIFE HISTORY

Chinook salmon (*Oncorhynchus tshawytscha*) is the largest of the *Oncorhynchus* species, typically reaching 8 to 10 kg, although Chinook salmon have been documented in excess of 45 kg (Healey 1991; Quinn 2005). Resident Puget Sound Chinook salmon, however, are typically on the smaller end of this scale. Due to their relatively large size, Chinook salmon generally spawn in larger rivers or streams than other salmonids (Healey 1991; Quinn 2005). Chinook salmon can be highly variable between and within given watersheds. They have various in-migration (e.g., spring versus fall) and out-migration (e.g., ocean-type versus stream-type) times that can vary within a given system, stock, or run of fish (WDFW 2002; Healey 1991; Myers et al. 1998; Duffy 2003, 2009; Duffy et al. 2005; Redman et al. 2005; Quinn 2005).

Emergent Chinook fry, like fry of other Pacific salmonids, depend on shaded, nearshore freshwater habitat, with slow-moving currents, where they forage on drift organisms, including insects and zooplankton (Healey 1991). In general, ocean-type parr (the freshwater stage of juvenile salmon, which usually occurs in the first one to two years of life) usually migrate to estuarine areas from April through July with some variability (peak out-migration occurring from May to early July), becoming smolts (juveniles that have transitioned from fresh water to salt water) soon after entering marine waters. Duffy et al. (2005) found that wild ocean-type Chinook out-migrate to Puget Sound waters from March to July, while hatchery Chinook occupy nearshore Puget Sound waters soon after release and in pulses from May to June. Once reaching the marine environment, they then spend a few weeks or longer rearing in the estuary (Duffy 2003, 2009; Duffy et al. 2005).

Table B–1 provides detailed information regarding the in-migration and spawn timing of adult Puget Sound Chinook past NAVBASE Kitsap Bangor, and within the greater Hood Canal region. Adult Chinook salmon enter Hood Canal waters from August to October to begin spawning in their natal streams in September, with peak spawning in October.

Table B–1. Spawn Period Timing and Peak of Adult Hood Canal Stocks of Puget Sound Chinook

Stock	Time period detected in Hood Canal	Spawn time period	Spawn peak
Skokomish stock	Late-August to October	Mid-September to October	Mid-October
Mid-Hood Canal stock	Mid-August to late October	Early September to late October	October

Source: Healey 1991

1.1.1.3. OCCURRENCE

Chinook salmon are one of the least abundant salmonids occurring along the Bangor shoreline (Figure B–1). From 2005 to 2008, a total of 58,667 salmonids were captured in beach seine surveys along the Bangor waterfront (SAIC 2006; Bhuthimethee et al. 2009). During that time period, only 224 of the total number of salmonids captured (approximately 0.4 percent) were juvenile Chinook salmon (Figure B–1).

Offshore tow-netting and beach seine surveys during the 1970s (Schreiner et al. 1977; Prinslow et al. 1980; Bax 1983; Salo 1991), and nearshore beach seine surveys from 2005–2008 (Science Applications International Corporation [SAIC] 2006; Bhuthimethee et al. 2009), determined that Chinook salmon migrating from southern Hood Canal streams and hatcheries occur most frequently along the Bangor waterfront from late May to early July (Table B–2). These studies indicate that peak occurrence in these waters generally occurs from as early as May to as late as July (Table B–2). More recent tagging investigations have shown that juvenile Chinook distribution and movement patterns are not well known (Chamberlin et al. 2011). Juvenile Chinook salmon may have extended intrabasin residence times and utilize these habitats for extended rearing periods, not specifically as a nearshore migratory corridor.

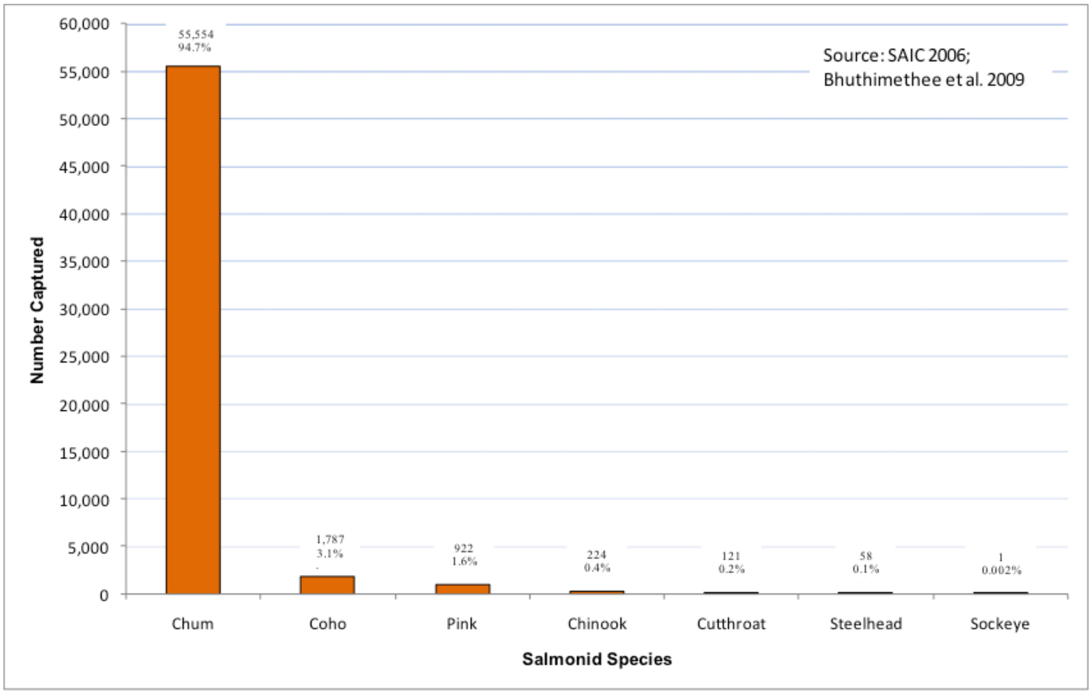

Figure B–1. Salmonids, in Order of Abundance, Captured During 2005–2008 Bangor Beach Seine Surveys

Table B–2. Timing of Puget Sound Chinook Juvenile Presence and Out-migration on NAVBASE Kitsap Bangor

Reference	Time period detected in Hood Canal	Peak out-migration timing
Bax et al. 1978; Bax et al. 1980	February to July	May to early June
Schreiner 1977	May to July	Late June to early July
SAIC 2006	April to September	Mid-June to late June

In an effort to clarify the timing of juvenile salmonid arrival to mid-Hood Canal estuaries, a number of joint investigations by state and federal resource agencies and non-governmental entities were conducted. The findings in Hood Canal tributaries indicated slightly earlier arrivals to the lower portions of these drainages (Weinheimer 2013). Screw traps were deployed from January to July 2012 to capture juvenile salmonids within the lowest 0.5 mile of the Duckabush and Hamma Hamma Rivers. Findings showed that chum arrived as early as January. Within the Duckabush, results indicated the migration reached a median point in April and was 95 percent complete by the first week of June. Within the Hamma Hamma, results indicated the migration reached a median point in March and was 95 percent complete by April 10.

1.1.2. Hood Canal Summer-run Chum Salmon

1.1.2.1. STATUS

The Hood Canal summer-run chum salmon ESU was federally listed as threatened under the ESA in 1999, and the threatened listing was reaffirmed in 2005 (70 FR 37160) (Table B–1). Two populations of Hood Canal summer-run chum salmon within Hood Canal are considered essential to the recovery of the species. In a review of returning spawners data for this ESU through 2007, NWFSC indicated the populations were displaying an increasing trend, with Strait of Juan de Fuca populations increasing at a slightly higher rate than Hood Canal populations (NWFSC 2013). Critical habitat was also designated for Hood Canal summer-run chum ESU in 2005, and the National Marine Fisheries Services (NMFS) recovery plan for this species was adopted on May 24, 2007 (72 FR 29121).

Historically, there were sixteen stocks within the Hood Canal summer-run chum ESU, eight of which are extant (six in Hood Canal and two in the eastern Strait of Juan de Fuca) with the remaining eight extinct (71 FR 47180). Six current summer chum stocks have been identified in Hood Canal: Quilcene, Dosewallips, Duckabush, Hamma Hamma, Lilliwaup, and Union (NMFS 2011). Six additional stocks were identified as recent extinctions: Skokomish, Finch, Tahuya, Dewatto, Anderson, and Big Beef.

The Hood Canal summer-run chum salmon ESU includes all naturally spawned populations of summer-run chum salmon in Hood Canal and its tributaries, as well as populations in Olympic Peninsula rivers between Hood Canal and Dungeness Bay, Washington, and eight artificial propagation programs: Quilcene NFH, Hamma Hamma Fish Hatchery, Lilliwaup Creek Fish Hatchery, Union River/Tahuya, Big Beef Creek Fish Hatchery, Salmon Creek Fish Hatchery, Chimacum Creek Fish Hatchery, and the Jimmycomelately Creek Fish Hatchery summer-run chum hatchery programs (NMFS 2011). However, five Hood Canal summer chum hatchery programs were terminated since the last status review, including: Quilcene National Fish Hatchery, Union River/Tahuya River, Big Beef Creek, Salmon Creek, and Chimacum Creek programs. The last adult fish produced through these terminated programs returned in 2008 (NMFS 2011).

Based on the most recent 5-Year Review, NMFS (2011) found that the overall trend in spawning abundance is generally stable for the Hood Canal population (all natural spawners and natural-origin only spawners) and for the Strait of Juan de Fuca population (all natural spawners). Only the Strait of Juan de Fuca population's natural-origin spawners show a significant positive trend. Productivity from 2005 to 2009 was very low, especially compared to the relatively high productivity observed from 1994 to 2004.

Reduced viability, lower survival, and listing of extant stocks of summer-run chum and recent stock extinctions in Hood Canal are attributed to the combined impacts of three primary factors: (1) habitat loss and degradation, (2) climate change, and (3) increased fishery harvest rates (Hood Canal Coordinating Council [HCCC] 2005). An additional factor cited in WDFW and Point No Point Treaty Tribes (PNPTT) (2000) and HCCC (2005) was impacts associated with the releases of hatchery salmonids, which compete with naturally spawning stocks for food and other resources.

1.1.2.2. LIFE HISTORY

Chum salmon (*Oncorhynchus keta*) have the broadest distribution of all salmonid species (Pauley et al. 1988) and range along the Northeast Pacific coast from Monterey Bay, California, to the Arctic Ocean (Pauley et al. 1988; Salo 1991; Johnson et al. 1997). Chum salmon generally live 3 to 5 years and are relatively large compared to other salmonids, second only to Chinook. Similar to pink salmon, adult chum salmon prefer to spawn in the lower reaches of their natal streams (Pauley et al. 1988; Tynan 1997; Quinn 2005). Sumer-run adults typically migrate from marine waters into Hood Canal from early August through the end of September (Tynan 1997). Summer-run adult salmon typically migrate from the marine waters to spawning grounds from early September through mid-October (Tynan 1997).

Female chum salmon lay between 900 and 8,000 eggs (Pauley et al. 1988) that are extremely sensitive to changes in the environment, with a high degree of mortality (up to 90 percent) in the developing eggs (Pauley et al. 1988). Emerging fry spend only a few days to a few weeks rearing in fresh water before migrating toward marine habitats from March to May (Pauley et al. 1988; Salo 1991; Johnson et al. 1997; Quinn 2005). While in this environment, chum fry stay in very shallow, nearshore habitats and consume a number of epibenthic invertebrates, including gammaridean amphipods, harpacticoid copepods, cumaceans, and mysids (Pauley et al. 1988). Chum salmon utilize estuarine habitats for a few more weeks before migrating to coastal, then offshore waters.

During out-migration, fry move within the nearshore corridor and into and out of sub-estuaries with the tides, most likely in search of food resources (Hirschi et al. 2003). At a migration rate of 4.4 miles per day, the majority of chum emigrants from southern Hood Canal exit the canal to the north 14 days after their initial emergence in seawater (WDFW and PNPTT 2000). Table B–3 provides a summary of the presence and out-migration timing of juvenile summer-run chum from Hood Canal. Juvenile summer-run chum are expected to occur near the proposed project areas from late January through early June.

Table B–3. Timing of Hood Canal Summer-run Chum Juvenile Presence and Out-migration in Hood Canal and along the Bangor Shoreline

Reference	Sampling Location(s)	Time Period Detected in Hood Canal	Peak Out-migration Timing on NAVBASE Kitsap Bangor
Prinslow et al. 1980; Salo et al. 1980; Bax 1983	NAVBASE Kitsap Bangor	February to March	March
WDFW and PNPTT 2000	Estimated emergence from Hood Canal	February to late May	Late March
SAIC 2006	NAVBASE Kitsap Bangor	Late January through early June	Late March

1.1.2.3. OCCURRENCE

Beach seine surveys were conducted along the Bangor waterfront from 2005 to 2008 (SAIC 2006; Bhuthimethee et al. 2009). During that time, 55,554 out of 58,667 total salmonids captured (approximately 94.7 percent) were juvenile chum salmon (Figure B–1). Chum salmon peak abundance along the NAVBASE Kitsap Bangor shoreline generally peaks in late April to early May (Bhuthimethee et al. 2009). However, this peak abundance is strongly influenced by hatchery releases. In 2007, Hood Canal hatcheries released approximately 26 million juvenile chum salmon (Bhuthimethee et al. 2009). Release dates varied from February to May, although at least 23 million of these fish were released from April 1 to April 20. However, because they are visually indistinguishable at smaller sizes, no distinction in the field could be made between hatchery-produced fish and naturally produced ("wild") fish. To gain a better understanding of natural production of these stocks, studies need to be conducted in freshwater systems, away from the influences of hatchery releases.

To observe juvenile salmon out-migration away from the influence of hatcheries, Weinheimer (2013) deployed screw traps from January to July 2012 within the lowest 0.5 mile of the Duckabush and Hamma Hamma Rivers. The estuaries for these two systems are located approximately 12 and 17 miles, respectively, south of NAVBASE Kitsap Bangor. Weinheimer (2013) reported that chum salmon were present in both screw traps in January. Similar to comparing hatchery-produced fish to naturally produced fish, they are visually indistinguishable at smaller sizes, so no distinction in the field could be made between fall-run chum and summer-run chum salmon. Within the Duckabush, findings indicated the migration reached a median point in mid-March, and was 95 percent complete by the first week of April. Within the Hamma Hamma, findings indicated the migration reached a median point in mid-March, and was 95 percent complete by April 9. Genetic studies differentiating fall-run and summer-run chum salmon found that summer-run fish comprised over 90 percent of all chum captured in the Duckabush from January through the first week of April. Within the Hamma Hamma trap, summer-run chum comprised over 90 percent of all chum captured from January through mid-March (Weinheimer 2013).

Summer-run chum adults return to Hood Canal from as early as August and September through the first week in October (Washington Department of Fisheries et al. 1993; WDFW and PNPTT 2000). Approximately one month separates peak spawn timing of the early (summer) and later (fall) runs of chum salmon in Hood Canal (Johnson et al. 1997; Table B–4).

Table B–4. Spawning Period, Peak, and 90-Percent Spawn Timing of Adult Stocks of Hood Canal Summer-run Chum

Stock	Time Period Detected in Hood Canal[1]	Spawn Time Period and Peak	Date at which 90 Percent of Spawning is Complete
Big/Little Quilcene	Early September to Mid-October	Mid-September to Mid-October	10/1 to 10/5
Lilliwaup Creek	Early September to Mid-October	Mid-September to Mid-October	10/10
Hamma Hamma	Early September to Mid-October	Mid-September to Mid-October	10/8 to 10/10
Duckabush	Early September to Mid-October	Mid-September to Mid-October	10/11
Dosewalips	Early September to Mid-October	Mid-September to Mid-October	10/9
Union	Mid-August to Early October	Early September to Early October	9/29 to 9/30

Sources: WDFW 2002; WDFW and PNPTT 2000.

1. Range of timing estimates from WDFW and PNPTT, in Appendix Report 1.2 (WDFW and PNPTT 2000).

1.1.3. Puget Sound Steelhead

1.1.3.1. STATUS

The Puget Sound steelhead was listed in May 2007 under the ESA as a threatened distinct population segment (DPS) (72 FR 26722). Critical habitat was designated for Puget Sound steelhead in 2016 (81 FR 9251). Stocks of the Puget Sound steelhead DPS are mainly winter-run, although a few small stocks of summer-run steelhead also occur (71 FR 15666). Eight stocks of winter-run and three stocks of summer-run Puget Sound steelhead occur in Hood Canal (WDFW 2002). Some stocks of Puget Sound steelhead in Hood Canal (i.e., hatchery supplementation or hatchery releases to non-native streams) may not be considered part of the DPS (71 FR 15668).

The origin and production type of all stocks of Puget Sound steelhead occurring in Hood Canal remain unresolved by the state and tribes (WDFW 2002). The 1996 status review (Busby et al. 1996) and more recent NMFS review for Puget Sound steelhead (Hard et al. 2007) included only three stocks of winter-run steelhead that occur in Hood Canal as native populations: (1) Tahuya winter steelhead, (2) Dewatto winter steelhead, and (3) Skokomish winter steelhead. Official determination for the proposed DPS listing has not been designated, and specifics on all stocks to be included in the DPS listing are forthcoming. In general, abundance of winter-run steelhead stocks in Hood Canal has been low, with most stocks averaging less than 200 adult spawners per year (NMFS 2005a). The status of the listed Puget Sound steelhead DPS has not changed substantially since the 2007 listing. Most populations within the DPS are showing continued downward trends in estimated abundance, some steeply.

The DPS includes all naturally spawned anadromous winter-run and summer-run *O. mykiss* (steelhead) populations, in streams in the river basins of the Strait of Juan de Fuca, Puget Sound, and Hood Canal, Washington, bounded to the west by the Elwha River (inclusive) and to the north by the Nooksack River and Dakota Creek (inclusive), as well as the Green River natural and Hamma Hamma winter-run steelhead hatchery stocks (NMFS 2011). The Hamma Hamma River hatchery program and four other hatchery programs are not considered part of the DPS, with a number of hatchery supplementation programs terminated in the last 10 years. As a result, steelhead supplementation in the Hamma Hamma was discontinued, with the last returning adult steelhead arriving in 2010 (NMFS 2011). Five new steelhead programs propagating native-origin fish for the purposes of preserving and recovering the populations also have been initiated. These programs support recovery of native winter-run steelhead in the White, Dewatto, Duckabush, North Fork Skokomish, and Elwha River watersheds. The new programs warrant consideration for inclusion in the DPS (NMFS 2011).

Freshwater habitat degradation and fragmentation, with consequent effects on connectivity, are among the primary limiting factors and threats facing the Puget Sound steelhead DPS (NMFS 2011). Despite ongoing efforts by multiple parties to improve habitat conditions in Puget Sound, habitat in all ESUs and DPS remains far below that needed to sustain viable populations of listed fish (NMFS 2011). The critical habitat proposed to protect this species places an emphasis on freshwater habitats (78 FR 2726).

1.1.3.2. LIFE HISTORY

Steelhead exhibit the most complex life history of any species of Pacific salmon. Steelhead can be freshwater residents (referred to as rainbow trout) or anadromous (referred to as steelhead), and, under some circumstances, they can yield offspring of the alternate life history form (72 FR 26722). Anadromous forms can spend up to seven years in fresh water prior to smoltification and then spend up to three years in salt water prior to migrating back to their natal streams to spawn (Busby et al. 1996). In addition, steelhead can spawn up to four times and have been documented to live as long as 8 or 9 years (Pauley et al. 1986), whereas other Pacific salmon species generally spawn once and die. Because steelhead grow larger in the productive marine environment, fish that stay in these habitats longer are typically larger. Studies investigating this have found that steelhead range in size from 47 cm (18.5 inches) for a 1-year saltwater resident to 88 cm (34.6 inches) for a 4-year saltwater resident (Maher and Larkin 1954, as cited in Pauley et al. 1986). Steelhead are prevalent throughout streams and tributaries of Puget Sound (Pauley et al. 1986). Both winter and summer steelhead types, or races, occur within Washington State streams and rivers.

Typically adult steelhead return to streams and rivers in the winter or summer and spawn in the spring and summer, with fry emerging in just a few weeks. Upon emergence, steelhead typically rear in the freshwater streams and rivers between 1 and 3 years. Following their downstream migration to marine waters, these fish rear and mature in the ocean for 1 to 3 years before returning to freshwater systems as adults to spawn (Pauley et al. 1989; Quinn 2005). Because steelhead can be repeat spawners, the age and size of returning adults varies considerably.

1.1.3.3. OCCURRENCE

Limited information is available regarding the timing of juvenile out-migration for winter-run steelhead in Hood Canal. WDFW suggests that juvenile out-migration of steelhead stocks in Hood Canal occurs from March through June, with peak out-migration during April and May (Johnson 2006, personal communication). Beach seine surveys from 2005 to 2008 did not catch large numbers of steelhead along the Bangor shoreline (Figure B–1). Steelhead captured during these shoreline surveys occurred most frequently in the late spring and early summer months. A total of 58,667 salmonids were captured in these beach seine surveys (SAIC 2006; Bhuthimethee et al. 2009). During that time period, only 58 of the total number of salmonids captured (approximately 0.1 percent) were juvenile steelhead (Figure B–1). The absence of juvenile steelhead from nearshore surveys is largely due to these juveniles occurring as smolts, much larger than the chum and pink salmon fry that occur along the shoreline. As juvenile steelhead enter nearshore marine waters as smolts, they are already at a size and developmental stage to move further offshore to forage on larger prey items. In the 2013 proposed critical habitat notification, studies reviewed by NMFS indicated that “steelhead migratory behavior strongly suggests that juveniles spend little time (a matter of hours in some cases) in estuarine and nearshore areas and do not favor migration along shorelines” (78 FR 2726).

WINTER-RUN

Most stocks of winter-run steelhead in Hood Canal (Skokomish, Hamma Hamma, Duckabush, Quilcene/Dabob Bay, and Dosewallips) spawn from mid-February to mid-June (WDFW 2002; Table B–5). Information published to date indicates adult spawn timing occurs from mid-February to early June.

SUMMER-RUN

Information on the timing of juvenile out-migration for summer-run steelhead in Hood Canal is not currently available. Spawn timing of summer-run steelhead in Hood Canal is not fully understood; however, spawning is believed to occur from February through April (WDFW 2002).

Table B–5. Migration, Spawning Period, and Peak of Winter-run Stocks of Puget Sound Steelhead

Stock	Time Period Detected in Hood Canal[1]	Spawn Time Period[2]	Peak Spawning
Tahuya winter-run	January through June	Early March to early June	May
Skokomish winter-run	January through mid-July	Mid-February to mid-June	May
Dewatto winter-run	January through June	Mid-February to early June	May
Union winter-run	Not identified	Mid-February to early June	Not identified
Hamma Hamma winter-run	Not identified	Mid-February to early June	Not identified
Duckabush winter-run	Not identified	Mid-February to early June	Not identified
Quilcene/Dabob Bay winter-run	Not identified	Mid-February to early June	Not identified
Dosewallips winter-run	Not identified	Mid-February to early June	Not identified

1. Time period detected in Hood Canal, reported in Busby et al. (1996).
2. Spawn timing reported in WDFW (2002).

1.1.4. Bull Trout

1.1.4.1. STATUS

Currently, all populations of bull trout in the lower 48 states are listed as threatened under the ESA. Bull trout are in the char subgroup of salmonids and have both resident and migratory life histories (64 FR 58910). The Coastal-Puget Sound bull trout DPS reportedly contains the only occurrence of anadromous bull trout in the contiguous United States (64 FR 58912); Hood Canal is one of five geographically distinct regions within this DPS. All Hood Canal bull trout originate in the Skokomish River (WDFW 2004). Critical habitat was originally designated for bull trout in 2005 (70 FR 56212) with a final revision to this habitat published in 2010 (75 FR 63898).

1.1.4.2. LIFE HISTORY

The food sources used by bull trout vary by life form, but in general they are considered opportunistic feeders (64 FR 58911). Both the resident and juvenile forms forage on aquatic and terrestrial insects, macro zooplankton, amphipods, mysids, crayfish, and small fish, whereas adult migratory bull trout primarily consume fish, including trout and salmon species, whitefish, yellow perch, and sculpin (64 FR 58911).

Resident bull trout remain in freshwater streams for their entire life cycle, whereas migratory bull trout, which have the potential to occur along the Bangor shoreline, spawn and rear in streams but migrate to marine waters as juveniles (64 FR 58910). Little information is known about the anadromous life history of this species. The spawning and early juvenile habitat requirements of bull trout are more specific than other salmonids, which may explain their patchy distribution (64 FR 58910). Important habitat features relevant to marine waters include cold water temperature (40 to 48°F), cover/shading, and intact migratory corridors (64 FR 58910). Reasons for declines and listing include habitat loss, degradation, and fragmentation; blocked migratory corridors (by dams or construction); introduced fish species (lake trout, brook trout, brown trout, and hatchery rainbow trout); and incidental harvest (64 FR 58910).

Bull trout in the Skokomish River system are thought to spawn from mid-September to December (WDFW 2004). It is not likely that bull trout migrate through the Bangor waterfront and past the Land-Water Interface (LWI) or Service Pier Extension (SPE) project sites (U.S. Fish and Wildlife Service [USFWS] 2010). For the species as a whole, emergence of fry occurs from early April to May (64 FR 58910).

1.1.4.3. OCCURRENCE

Neither historic nor recent juvenile fish surveys (using beach and lampara seines and tow nets) have captured bull trout (Schreiner et al. 1977; Salo et al. 1980; Bax 1983; SAIC 2006; Bhuthimethee et al. 2009). Not enough is known to fully describe the duration of juvenile out-migration for bull trout in Hood Canal (WDFW 2004).

1.2. ESA-LISTED ROCKFISH

1.2.1. Bocaccio

1.2.1.1. STATUS

Puget Sound bocaccio, a species of rockfish, were federally listed as endangered under the ESA in 2010 (75 FR 22276). Critical habitat for yelloweye rockfish, canary rockfish, and bocaccio of the Puget Sound Georgia Basin was designated in November 2014 (79 FR 68042). WDFW published a revised draft environmental impact statement titled *Puget Sound Rockfish Conservation Plan* on April 6, 2010 (Bargmann et al. 2010). Threats to rockfish in Puget Sound include areas of low DO, commercial and sport fisheries (notably mortality associated with fishery bycatch), reduction of kelp habitat necessary for juvenile recruitment (74 FR 18516), habitat disruption (including exotic species), derelict gear (notably lost or abandoned fishing nets), climate changes, species interactions (including predation and competition), diseases, and genetic changes (Palsson et al. 2009; Drake et al. 2010).

Although rockfish are typically long-lived, recruitment is generally poor as larval survival and settlement depend on a variety of factors including marine currents, adult abundance, habitat availability, and predator abundance (Palsson et al. 2009; Drake et al. 2010). The combination of these factors has contributed to declines in the species within Georgia Basin and Puget Sound in the last few decades (74 FR 18516).

1.2.1.2. LIFE HISTORY

Bocaccio range from Punta Blanca, Baja California, to the Gulf of Alaska, Alaska (Love et al. 2002). They are believed to have commonly occurred in steep-walled habitats in most of Puget Sound prior to fishery exploitations, although they are currently very rare in the region (Love et al. 2002). Information on habitat requirements for most rockfishes is limited despite years of research, and even less is known about bocaccio in Puget Sound (Palsson et al. 2009; Drake et al. 2010). In general, most adult rockfish are associated with high relief, rocky habitats, which are limited in Hood Canal, while larval and juvenile stages of some rockfishes utilize open water and nearshore habitats as they grow. Reviews of rockfish habitat utilization in Puget Sound indicate that nearshore vegetated habitats are particularly important for some species and serve as nursery areas for juveniles (Palsson et al. 2009; Bargmann et al. 2010).

Palsson et al. (2009) indicate that in Puget Sound waters recruitment habitats may include nearshore vegetated habitats, or deep-water habitats consisting of soft and low relief rocky substrates. Much of the information presented below on bocaccio life history and habitat use is derived from other areas where bocaccio occur. Palsson et al. (2009) provides the most comprehensive review of Puget Sound rockfish species distributions and the relative number of occurrences. This review relied heavily on Miller and Borton (1980) data, but also included the review of historical literature, fish collections, unpublished log records, and other sources. Palsson et al. (2009) noted bocaccio were only recorded 110 times in their review of historical studies, with most records associated with sport catches from the 1970s in Tacoma Narrows and Appletree Cove (near Kingston). Only two records occurred for Hood Canal, both in the 1960s.

1.2.1.3. OCCURRENCE

Currently both sport and commercial fishing for rockfish in Hood Canal is prohibited, and no recent scientific surveys of these waters have occurred that document the recent prevalence of bocaccio in these waters. Although there have been no confirmed observations of bocaccio in Puget Sound for approximately 7 years (74 FR 18516), Drake et al. (2010) concluded that it is likely that bocaccio occur in low abundances. As a result, bocaccio have the potential to be affected by the proposed projects and are, therefore, included in the analysis.

1.2.2. Canary Rockfish

1.2.2.1. STATUS

Puget Sound canary rockfish were federally listed as threatened under the ESA in 2010 (75 FR 22276). Critical habitat for yelloweye rockfish, canary rockfish, and bocaccio of the Puget Sound Georgia Basin was designated in November 2014 (79 FR 68042). WDFW's April 2010 *Puget Sound Rockfish Conservation Plan* would be applicable to all rockfish in Puget Sound, including canary rockfish. The same stressors contributing to the decline of bocaccio affect canary rockfish (74 FR 18516; Palsson et al. 2009; Drake et al. 2010).

1.2.2.2. LIFE HISTORY

Canary rockfish range from Punta Blanca, Baja California, to the Shelikof Strait of Alaska, and are abundant from British Columbia to central California. Canary rockfish were once considered fairly common in the greater Puget Sound area (Kincaid 1919; Holmberg et al. 1962), although little is known about their habitat requirements in these waters (Palsson et al. 2009; Drake et al. 2010). Recent reviews of Puget Sound rockfish and their habitats (Palsson et al. 2009; Bargmann et al. 2010; Drake et al. 2010) discuss habitat use by listed rockfish in general terms with little or no distinction between the species. Therefore, as discussed above for bocaccio, adult canary rockfish are considered associated with high-relief, rocky habitats, and larval and juvenile stages likely utilize open water and nearshore habitats. Much of the information presented below on canary rockfish life history and habitat use is derived from research from other areas where canary rockfish are more abundant. After review of historical rockfish records in Puget Sound, Palsson et al. (2009) noted 114 records of canary rockfish prior to the mid-1970s, with most records attributed to sport catch from the 1960s to 1970s in Tacoma Narrows, Hood Canal, San Juan Islands, Bellingham, and Appletree Cove. Within Hood Canal, 14 records occurred: 1 in the 1930s and at least 13 in the 1960s (Miller and Borton 1980).

1.2.2.3. OCCURRENCE

As mentioned for bocaccio, there is a moratorium on both sport and commercial fishing for rockfish in Hood Canal. With the absence of associated catch records, and limited scientific surveys of these waters, the prevalence of rockfish in waters adjacent to NAVBASE Kitsap Bangor remains unknown. Drake et al. (2010) concluded that canary rockfish occur in low and decreasing abundances in Puget Sound. Therefore, canary rockfish have the potential to be affected by the proposed projects and are, therefore, included in the analysis.

1.2.3. Yelloweye Rockfish

1.2.3.1. STATUS

Puget Sound yelloweye rockfish were federally listed as threatened under the ESA in 2010 (75 FR 22276). Critical habitat for yelloweye rockfish, canary rockfish, and bocaccio of the Puget Sound Georgia Basin was designated in November 2014 (79 FR 68042). WDFW's April 2010 *Puget Sound Rockfish Conservation Plan* would be applicable for all rockfish in Puget Sound, including yelloweye rockfish. The same stressors contributing to the decline of bocaccio affect yelloweye rockfish (74 FR 18516; Palsson et al. 2009; Drake et al. 2010).

1.2.3.2. LIFE HISTORY

Yelloweye rockfish are found from Ensenada, Baja California, to the Aleutian Islands in Alaska. They are abundant from southeast Alaska to central California, but extremely rare in Puget Sound. Review of historical rockfish in Puget Sound by Palsson et al. (2009) noted 113 documented yelloweye rockfish records associated with sport catch. Of these records, 14 occurred in Hood Canal waters: 1 in the 1930s and 13 in the 1960s (Miller and Borton 1980). Kincaid (1919) reported yelloweye rockfish used to be relatively common in the deep waters of Puget Sound. Due to the moratorium on both sport and commercial fishing for rockfish in Hood Canal, the absence of associated recent catch records, and no recent scientific surveys of these waters, the prevalence of yelloweye rockfish in these waters remains unknown. As discussed above for canary rockfish, recent reviews of Puget Sound rockfish species and their habitats (Palsson et al. 2009; Bargmann et al. 2010; Drake et al. 2010) suggest little distinction between these rockfish species in terms of habitat use in Puget Sound. Therefore, as discussed above for bocaccio, adult yelloweye rockfish are considered associated with deeper, high-relief, rocky habitats, and larval and juvenile stages may utilize open water and nearshore habitats.

1.2.3.3. OCCURRENCE

As mentioned for bocaccio, there is a moratorium on both sport and commercial fishing for rockfish in Hood Canal. With the absence of associated catch records, and limited scientific surveys of these waters, the prevalence of rockfish in waters adjacent to NAVBASE Kitsap Bangor remains unknown. Drake et al. (2010) concluded that yelloweye rockfish occur in low and decreasing abundances in Puget Sound. Therefore, yelloweye rockfish have the potential to be affected by the proposed projects and are, therefore, included in the analysis.

1.3. Non-ESA-Listed Salmonids

1.3.1. Chum Salmon (Fall-run and Hatchery Fish)

1.3.1.1. LIFE HISTORY

The general life history of fall-run chum salmon is similar to that of summer-run fish. The greatest difference is that fall-run adults spawn a few months later than summer-run adults. Adult fall- and late-fall-run stocks of Hood Canal chum salmon return to their natal streams to spawn between November and January. Consequently, fall-run juvenile salmon out-migrate a little later than do summer-run juvenile salmon. The release of hatchery chum salmon is dependent on hatchery management practices. In general, hatchery releases are timed to occur after summer-run juveniles have past their peak out-migration to minimize competition for limited food resources, such as benthic amphipods. Since fall-run and hatchery origin chum are indistinguishable from the ESA-listed summer-run chum, without genetic analysis, their occurrence is presented in this section at a species level rather than as a seasonally distinguished ESU or run. Similar to pink salmon, the small size of the juvenile chum salmon upon arrival to the marine environment in spring limits their out-migration distribution to the intertidal and shallow subtidal environment for both refuge and available food sources.

1.3.1.2. OCCURRENCE

From the 1970s to mid-2000s, recently hatched out-migrating juvenile chum salmon have been captured along the Bangor shoreline from January through June (Schreiner et al. 1977; Salo et al. 1980; Bax 1983; SAIC 2006; Bhuthimethee et al. 2009), with peak catches from 2006 to 2008 occurring from March to April (SAIC 2006; Bhuthimethee et al. 2009). Relatively small numbers of chum were captured in May and June of 2006, and no chum were captured from July through September, suggesting that the out-migration was completed by July (SAIC 2006).

Chum salmon was documented as the most abundant salmonid along the Bangor shoreline during the 2005 to 2008 surveys, accounting for approximately 94.7 percent of the salmonid catch (Figure B–1) (SAIC 2006; Bhuthimethee et al. 2009). Chum salmon are also the most abundant hatchery fish reared in Hood Canal (SAIC 2006; Bhuthimethee et al. 2009). As with pink salmon, chum salmon released from hatcheries are not marked (fin clipped). Thus, hatchery chum captured in Hood Canal surveys are indistinguishable in the field from naturally spawned chum (SAIC 2006; Bhuthimethee et al. 2009).

1.3.2. Coho Salmon

1.3.2.1. LIFE HISTORY

Like many other salmonids in Washington State, coho salmon (*Oncorhynchus kisutch*) occur as both hatchery-reared and naturally spawned fish. For coho populations in this region, returning adult coho salmon are generally 3-year-olds, and spend approximately 18 months in fresh water and 18 months in marine habitats (Sandercock 1991). Compared to Chinook salmon, coho tend to spawn in smaller streams of modest gradient (Quinn 2005). With some variability, coho salmon generally spawn on a 3-year cycle. Adult coho salmon migrate to their natal streams for spawning from mid-September to mid-November. Following a winter incubation period of 4 to 5 months, the free-swimming fry emerge from the gravel in the spring (Weitkamp et al. 1995). During spring of the second year, Hood Canal coho smolts migrate to sea. Due to the extended period of freshwater rearing time, juvenile coho are larger (2.8 to 3.5 inches [7.1 to 8.9 centimeters]) than some of the other co-occurring salmonids (e.g., chum and pink salmon at 1 to 1.6 inches [2.5 to 4.1 centimeters]) when they reach the waters of Hood Canal (SAIC 2006; Bhuthimethee et al. 2009). As a result, coho are not as dependent on shallow waters for foraging and protection from predators and currents, and occur further offshore from the Bangor shoreline than other salmonids. Maturing coho spend an average of 16 to 20 months rearing in the ocean, then return to fresh water to spawn as 3-year-old adults (Sandercock 1991). Recent tagging investigations have shown that juvenile coho distribution and movement patterns are not well known (Rohde 2013), but that they have extended intrabasin residence times and may utilize nearshore marine for extended rearing periods, not just migratory corridors.

1.3.2.2. OCCURRENCE

Coho salmon captured in beach seine surveys between 2005 and 2006 were the second most abundant salmonid occurring along the Bangor shoreline, accounting for approximately 3.1 percent of the salmonid catch (Figure B–1) (SAIC 2006). There is a run-timing overlap between hatchery and naturally spawning coho during out-migration (Bhuthimethee et al. 2009). In 2006, Hood Canal hatcheries released 1.6 million coho smolts from late April through early June (SAIC 2006). Although these hatchery fish were released at a time when naturally spawned coho also occur, approximately 82 percent of these released fish showed no external hatchery markings (data reviewed in SAIC 2006).

1.3.3. Pink Salmon

1.3.3.1. LIFE HISTORY

Pink salmon (*Oncorhynchus gorbuscha*) are the most abundant salmon along the coast of the northeast Pacific Ocean and are also the smallest at maturity (Bonar et al. 1989; Heard 1991; Quinn 2005). Pink salmon only live for 2 years, with very little variability. In general, large runs of adult pink salmon occur in the fall of odd years (with corresponding large juvenile out-migrations in spring of even years), with much smaller runs occurring in the fall of even years. Adult pink salmon migrate from the ocean to their natal streams from August to September, with spawning occurring in freshwater gravel beds from September through October (Heard 1991). Following their winter emergence from the gravel, 4 to 5 months after spawning, pink salmon fry begin their migration to the marine waters of Hood Canal. Due to their small size (approximately 1.0 to 1.5 inches [2.5 to 3.8 centimeters]) when reaching marine waters, including the NAVBASE Kitsap Bangor region (SAIC 2006; Bhuthimethee et al. 2009), these juveniles out-migrate in the nearshore, seeking food and refuge from predators along the shallow intertidal and shallow subtidal shorelines.

1.3.3.2. OCCURRENCE

Pink salmon generally occur every other year (the majority out-migrate in even years), and were the third most abundant salmonid occurring along the Bangor shoreline in 2005 and 2006. This species accounted for approximately 1.6 percent of the total salmonid catch from 2005 to 2008 (Figure B–1) (SAIC 2006). Though none of the NAVBASE Kitsap Bangor streams support spawning populations of pink salmon, juveniles from southern Hood Canal stream systems migrate in a northerly direction and occur in the vicinity of the project sites.

The Hoodsport Hatchery in southern Hood Canal rears pink salmon for release every other year at the end of the naturally spawned out-migration, usually in April. Currently this hatchery does not mark (fin-clip) pink salmon released in Hood Canal. As a result, recent surveys (2005 through 2008) were not able to distinguish between naturally produced and hatchery-reared pink salmon to determine differences in abundance, occurrence, or run-timing by source (SAIC 2006; Bhuthimethee et al. 2009). Newly emerged pink salmon have been captured along the Bangor shoreline as early as January and as late as June, with a peak occurrence in March to April (Schreiner et al. 1977; Salo et al. 1980; SAIC 2006; Bhuthimethee et al. 2009).

1.3.4. Cutthroat Trout

1.3.4.1. LIFE HISTORY

Spawning for cutthroat trout takes place in freshwater streams. By 2 or 3 years of age, juvenile cutthroat begin to migrate to marine waters. Generally, this migration occurs from March to June, with a peak out-migration in mid-May (Johnson et al. 1999). Upon entering marine waters, juvenile cutthroat form small schools and migrate along the nearshore waters. Some of these fish reside in Puget Sound whereas others enter coastal waters. Upon reaching maturity, cutthroat trout return to their natal streams for spawning, generally from July to December (Johnson et al. 1999). The spawned-out adults return to marine waters in late March or early April (Pacific States Marine Fisheries Commission 1996).

1.3.4.2. OCCURRENCE

Cutthroat trout are considered uncommon along the Bangor shoreline (Schreiner et al. 1977; Bax et al. 1978, 1980; Salo et al. 1980; SAIC 2006), representing less than 1 percent of the salmonids caught in beach seine studies conducted from 2005 to 2008 (Figure B–1) (SAIC 2006; Bhuthimethee et al. 2009). Both juvenile and adult cutthroat trout have been captured along the Bangor shoreline throughout the year, but peak abundance was in May and June from 2005 to 2008 (SAIC 2006; Bhuthimethee et al. 2009). At the Bangor waterfront, adult cutthroat were captured more frequently near the southern periphery and along the northern portion of the waterfront, away from the project sites. This may be the result of adult cutthroat attraction to the fresh water exiting Cattail Lake and Devil's Hole.

1.3.5. Sockeye Salmon

No documented runs of sockeye salmon occur within any of the tributaries of Hood Canal, with the nearest stock to Hood Canal occurring in Lake Washington (WDFW 2002). Other nearby populations of these fish include the Baker Lake and Lake Washington sockeye populations. Although a lone 12-inch sockeye was captured along the Bangor waterfront in March of 2006 (SAIC 2006), this fish was likely a stray individual sockeye stock from either Lake Washington, Fraser River, or British Columbia (Ruggerone 2006, personal communication). No other sockeye salmon have been captured conducted in the 1970s or 2000s along the Bangor shoreline (Schreiner et al. 1977; Bax et al. 1978, 1980; Salo et al. 1980; SAIC 2006, Bhuthimethee et al. 2009). Due to the primary absence of this species from the region of the projects, sockeye salmon are not discussed further in this document.

1.4. Forage Fish

Nearshore habitat requirements for forage fish are similar to those described in Section 2, below, for salmonids with respect to water and sediment quality, physical and biological habitat use, and underwater noise. One notable difference is that forage fish species use some areas of Puget Sound shorelines for spawning habitat, whereas salmonids use freshwater systems for spawning. Suitable spawning habitat for forage fish is species specific, and is discussed below for each species.

1.4.1. Pacific Herring

1.4.1.1. LIFE HISTORY

Pacific herring (*Clupea pallasii*) are relatively small (9-inch [22.9 centimeter]) schooling fish distributed along the Pacific coast from Baja California, Mexico, to the Bering Sea and northeast to the Beaufort Sea, Alaska. Adult herring feed primarily on planktonic crustaceans, and juveniles prefer a diet of crab and shrimp larvae. Herring are an important food resource for other species in Puget Sound waters. Puget Sound stocks of young herring spend at least their first year in Puget Sound, with some stocks displaying resident behavior, and others migrating in summer months to coastal areas of Washington and southern British Columbia (Bargmann 1998). The majority of herring spawning in Washington State waters occurs annually from late January through early April (Bargmann 1998). Herring deposit their eggs on intertidal and shallow subtidal eelgrass and marine algae. Large spawning areas are found with patchy distribution in northern Hood Canal (Stick and Lindquist 2009). However, the only documented herring spawning grounds potentially affected by the projects occur near Squamish Harbor (Figure 3.3–4).

1.4.1.2. OCCURRENCE

Pacific herring have been detected in small numbers during late winter months and large numbers in early summer months during recent surveys along the Bangor waterfront (SAIC 2006; Bhuthimethee et al. 2009). These very large (occasionally numbering in the thousands), but infrequent summer schools of herring can comprise the majority of all forage fish occurring along the Bangor shoreline, when these larger schools are present. As indication of school variability, in 2005 and 2008 Pacific herring represented less than 1 percent of the beach-seine captured forage fish at NAVBASE Kitsap Bangor, while in 2006 and 2007 they represented

73 percent and 84 percent, respectively, of all forage fish captured (SAIC 2006; Bhuthimethee et al. 2009), though these schools were captured in just a few sampling events.

OCCURRENCE AT LWI PROJECT SITES

In the 2005 to 2008 nearshore fish surveys, Pacific herring were captured at both LWI project sites (SAIC 2006; Bhuthimethee et al. 2009). The sampling effort was most comparable in effort and location in 2006, 2007, and 2008, due to a much lower 2005 sampling effort. Therefore, only the three comparable years are discussed below. A single sample location occurred in the immediate vicinity of the proposed north LWI project site. At the north LWI project site, less than one percent of all Pacific herring captured in 2008 occurred at the nearby sampling location (SAIC 2006; Bhuthimethee et al. 2009). In 2007, only 5 percent of all herring captured along the 15 waterfront sampling sites occurred at this location. However, in 2006, 49 percent of the Pacific herring catch occurred at this location. At the south LWI project site, two sampling locations occurred, immediately north and south of the proposed south LWI project site. At these sampling sites, only one Pacific herring was captured in 2006 and 2008 (SAIC 2006; Bhuthimethee et al. 2009). In 2007, however, of the 15 stations sampled along the waterfront, 10 percent of all herring captured occurred at these two stations (Bhuthimethee et al. 2009). In general, many more Pacific herring were captured at the one sampling location near the north LWI project site than the two sampling stations near the south LWI project site. However, these numbers largely reflect the capture of large schools of fish, and they likely do not indicate a difference in habitat quality or preference between the two locations. The study results indicate that Pacific herring collected along the NAVBASE Kitsap Bangor shoreline in late spring and summer can occur in distinct schools that are not large enough to extend across multiple sampling sites and they do not appear to be attracted to, reside for an extended period at, or show preference for a specific location.

OCCURRENCE AT THE SPE PROJECT SITE

The two fish survey sampling locations that occurred nearest to the SPE project site during the 2006, 2007, and 2008 sampling efforts occurred on either side of Carlson Spit, immediately south of the existing Service Pier structure (SAIC 2006; Bhuthimethee et al. 2009). The inconsistent capture of Pacific herring at this location was similar to that described for the two LWI project sites. Of the 12 stations sampled in 2006, the 2 located at Carlson Spit accounted for 24 percent of the Pacific herring captured. However, of the 15 stations sampled in 2007 and 2008, less than 1 percent of all Pacific herring captured occurred at these two sites. As discussed above, these numbers largely reflect the capture of large schools of fish on a few occasions, and likely do not indicate any preference of this location by Pacific herring.

1.4.2. Surf Smelt

1.4.2.1. LIFE HISTORY

Surf smelt (*Hypomesus pretiosus*) is a common and widespread nearshore forage fish throughout Washington marine waters (Penttila 2007). There is no evidence of widespread migrations to and from Puget Sound to the outer coast. Surf smelt in Puget Sound do not appear to form large schools in open water, instead occurring more exclusively in nearshore waters. This is supported by mid-water research trawl surveys with catches suggesting a distinct preference for more shallow, nearshore habitats and a tendency to remain close to the bottom at all times. In fact, as indicated by Penttila (2007), young-of-the-year surf smelt are virtually ubiquitous along Puget Sound shorelines. Surf smelt are schooling plankton feeders, with an apparent preference for calanoid copepods, along with other small, epibenthic crustaceans and tunicates (Simenstad et al. 1988; Penttila 2007).

These small (9-inch [22.9 centimeters]) schooling fish are distributed along the Pacific coast from Long Beach, California, to Chignik Lagoon, Alaska. During 2005–2006 beach seine surveys, surf smelt were the second most abundant forage fish captured, representing 20 percent of the total forage fish catch (SAIC 2006). As with other forage fish species, surf smelt are an important component in Puget Sound, both as a food resource in the marine food web and as part of the commercial fishing industry.

In southern Hood Canal surf smelt spawn most frequently in the fall and winter. However, in many other regions of Puget Sound, including northern Hood Canal, spawning can occur year round. Potential surf smelt spawning habitat includes beaches composed of mixed sand and gravel in the uppermost one-third of the tidal range, from approximately +7 feet up to extreme high water (Penttila 2007). Although Penttila (1997) found no surf smelt spawning grounds along the Bangor waterfront during surveys conducted from May 1996 through June 1997, they may utilize the northern portion of Squamish Harbor (at the northern boundary of the area affected by the projects) for spawning.

1.4.2.2. OCCURRENCE

In nearshore beach seine surveys conducted from 2005 to 2008, surf smelt were most abundant along the Bangor waterfront in late spring through summer (SAIC 2006; Bhuthimethee et al. 2009).

OCCURRENCE AT LWI PROJECT SITES

Juvenile surf smelt have been found to rear in nearshore waters (Bargmann 1998) and were captured along the shoreline near both LWI project sites from January through the mid-summer months (SAIC 2006; Bhuthimethee et al. 2009). In 2006, of the 12 locations sampled, less than 1 percent of all surf smelt were captured at the one sampling location in the vicinity of the north LWI project site. However, in 2007 and 2008 when 15 locations were sampled, 5 percent and 34 percent, respectively, of the surf smelt captured occurred at the north LWI project site. The survey findings were similar for the south LWI project site. At this site, two sampling locations occurred, immediately north and south of the proposed site. In 2006, of the 12 locations sampled, less than 2 percent of all surf smelt were captured at the two sampling locations in the vicinity of the south LWI project site. However, in 2007 and 2008, when 15 locations were sampled, 10 percent and 34 percent, respectively, of the surf smelt captured occurred at the two sampling locations that occur in the vicinity of the site. Although occurring somewhat more broadly among sampling locations than herring, surf smelt also occur in distinct schools, and do not appear to be attracted to, reside for any extended period at, or show preference toward any specific location along the waterfront. Instead, when these schools occur they appear to be using the nearshore environment as a migratory pathway, similar to salmonids.

OCCURRENCE AT SPE PROJECT SITES

The two fish survey sampling locations that occurred nearest to the SPE project site during the 2006, 2007, and 2008 sampling efforts occurred on either side of Carlson Spit, immediately south of the existing Service Pier structure (SAIC 2006; Bhuthimethee et al. 2009). Juvenile and adult surf smelt were captured in very low abundances along the shoreline near the SPE project site (SAIC 2006; Bhuthimethee et al. 2009). In 2006, of the 12 stations sampled, less than 1 percent of all surf smelt captured occurred at the 2 sampling locations. In 2007 and 2008, 15 stations were sampled, with less than 1 percent and less than 5 percent, respectively, of all surf smelt occurring at these 2 sampling locations.

1.4.3. Pacific Sand Lance

1.4.3.1. LIFE HISTORY

The Pacific sand lance (*Ammodytes hexapterus*), another relatively small (8-inch) schooling fish, occurs throughout the coastal northern Pacific Ocean between the Sea of Japan and southern California, across Arctic Canada, and throughout the Puget Sound region. All life stages of sand lance feed on planktonic organisms, primarily crustaceans, with juveniles showing a preference for calanoid copepods (Penttila 2007). As with other forage fish, the Pacific sand lance is an important part of the trophic link between zooplankton and larger predators in local marine food webs. Bargmann (1998) indicated that 35 percent of all juvenile salmon diets and 60 percent of the juvenile Chinook diet comprised sand lance. Other regionally important species (such as Pacific cod, Pacific hake, and dogfish) feed heavily on juvenile and adult sand lance.

Pacific sand lance are the only forage fish species with spawning habitat documented along the Bangor shoreline. Sand lance deposit eggs on a range of nearshore substrates, from soft, pure, fine sand beaches to beaches armored with gravel up to 1.2 inches (3 centimeters) in diameter; however, most spawning appears to occur on the fine-grained substrates (Bargmann 1998). Spawning occurs at tidal elevations ranging from 5 feet (1.5 meters) above to about the mean higher high water (MHHW) line. Sand lance spawning activity occurs annually from early November through mid-February. Because the sand lance spawns on sand gravel beaches in the upper intertidal zone throughout the increasingly populated Puget Sound basin, it is particularly vulnerable to the cumulative impacts from various types of shoreline development.

Although this species is common and widespread in Puget Sound, very little is known about the life history or biology of sand lance populations in Washington State. Pacific sand lance are highly unusual among local forage fish species in their habit of actively burrowing into nearshore sand-gravel bottom sediments during parts of their diurnal and seasonal cycles of activity (Quinn 1999). Pacific sand lance are known to burrow in soft sediments in intertidal and subtidal areas to escape predation and conserve energy, because they lack a swim bladder to aid in swimming. While slightly older Pacific sand lance have been shown to occupy or be associated with intertidal eelgrass habitats, young-of-the-year sand lance are negatively correlated with these same habitats (Haynes et al. 2008). In addition to age-related habitat preferences, Haynes et al. (2008) postulated that there may be different sediment preferences of sand lance depending on whether the habitat occurs in intertidal or subtidal regions. Although Pacific sand lance are largely associated with these nearshore spawning habitats, an investigation of deeper water sand waves and benthic sediments within the San Juan Islands detected habitat use and occurrence of eggs and non-larval ages of sand lance (Greene et al. 2011).

1.4.3.2. OCCURRENCE

OCCURRENCE AT LWI PROJECT SITES

Pacific sand lance were the third most abundant forage fish collected along the Bangor waterfront during recent surveys and comprised 7 percent of the total forage fish catch (SAIC 2006). At the north LWI project site, Pacific sand lance spawning habitat has been documented along an estimated 1,000-foot (305-meter) length of the shoreline extending from the proposed abutment location southward (Figure 3.3–4) (WDFW 2013). At this location, in 2006 and 2007 less than 1 percent of all sand lance captured along the waterfront occurred in the vicinity of the north LWI project site (SAIC 2006; Bhuthimethee et al. 2009). However, in 2008, 57 percent of all sand lance captured along the NAVBASE Kitsap Bangor shoreline, occurred at this location. At the south LWI project site, spawning habitat has been documented along the shoreline approximately 500 feet (150 meters) north of the proposed abutment location, extending approximately 1,600 feet (488-meters) north (Figure 3.3–4) (WDFW 2013). In 2006 and 2007 at the two sampling locations in the vicinity of the south LWI project site, less than 1 percent of all sand lance captured along the waterfront occurred in this area. However, in 2008, 16 percent of all sand lance captured along the NAVBASE Kitsap Bangor shoreline occurred at the two sampling locations in the vicinity of the south LWI project site.

OCCURRENCE AT SPE PROJECT SITES

The Pacific sand lance spawning habitat that occurs on both sides of Carlson Spit extends northward to include intertidal habitats under the Service Pier causeway (Figure 3.3–4) (WDFW 2013). The two nearest fish survey locations occurred on either side of Carlson Spit (SAIC 2006; Bhuthimethee et al. 2009). In 2006 Pacific sand lance captured at these 2 locations accounted for 22 percent of all Pacific sand lance captured from the 12 NAVBASE Kitsap Bangor shoreline locations sampled that year. In 2007 and 2008, when 15 locations were sampled, the Pacific sand lance captured in the vicinity of the SPE site represented 7 percent and 6 percent, respectively, of all Pacific sand lance captured along the NAVBASE Kitsap Bangor shoreline.

2.0 HABITAT CONDITIONS

Salmonids are most abundant in Hood Canal during the spring juvenile salmonid out-migration (Schreiner et al. 1977; Prinslow et al. 1980; Bax 1983; Salo 1991; SAIC 2006; Bhuthimethee et al. 2009), when these fish are dependent on nearshore habitats for foraging and refuge. NMFS, USFWS, and the Pacific Fisheries Management Council (PFMC) have prepared guidance on the evaluation of properly functioning conditions (PFCs) for salmonids in freshwater systems. Although this Matrix of Pathways Indicators has only been constructed for freshwater and not for marine systems, marine and estuarine habitat requirements for juvenile and adult salmonids have been described by many authors (Fresh et al. 1981; Shepard 1981; Healey 1982; Levy and Northcote 1982; Weitkamp et al. 2000).

Ideally, reliable stock-specific habitat requirements would exist for all populations of listed species that would allow the impacts of an action to be quantified in terms of population impacts (NMFS 1999). However, as stated in the Habitat Approach, an August 1999 supplement to the National Oceanic and Atmospheric Administration (NOAA) Fisheries guidance document *Making Endangered Species Act Determinations of Effects for Individual or Grouped Action at* *the Watershed Scale* (NMFS 1996), in the absence of population-specific information, an assessment must define the biological requirements of a listed fish species. These requirements are defined in terms of PFCs, which are described as the sustained presence of natural habitat-forming processes necessary for the long-term survival of the species through the full range of environmental variation (NMFS 1999). Indicators of PFCs vary in different landscapes based on unique physiological and geologic features (NMFS 1999). Since aquatic habitats are inherently dynamic, PFCs are defined by the persistence of natural processes that maintain habitat productivity at a level sufficient to ensure long-term survival, and are not necessarily defined by absolute thresholds and parameters (NMFS 1999). A more detailed description of the potential impacts of the proposed projects on ESA-listed marine fish using the PFC analysis approach is provided in the Biological Assessment.

2.1. WATER AND SEDIMENT QUALITY

As described in greater detail in Section 3.1.1.1.1, turbidity along the Bangor waterfront meets water quality standards and is considered properly functioning. DO levels meet the extraordinary standard for surface waters (3 to 20 feet [1 to 6 meters] in depth) year round and for deep water (66 to 197 feet [20 to 60 meters] in depth) most of the year, although deeper waters can drop to a fair standard in late summer (Hafner and Dolan 2009; Phillips et al. 2009; Hood Canal Dissolved Oxygen Program 2009).

2.1.1. Water and Sediment Quality at the LWI Project Sites

Existing nearshore current patterns along the shoreline at both LWI project sites, primarily driven by tidal exchange, are described in greater detail in Section 3.1.1.1.1. The nearest freshwater source to the north LWI project site is the Hunter's Marsh system, located immediately behind the Explosives Handling Wharf (EHW)-1 structure, south of the north LWI project site. The strong tides and currents, combined with a small outflow from the marsh, result in well-mixed waters at the north LWI project site with no habitat that acts as an estuary. The south LWI project site occurs near the Devil's Hole outlet. The freshwater exiting the lake has contributed to higher temperatures and lower salinities in the nearshore waters at this location (Phillips et al. 2009). Temperature, pH, and other water quality parameters meet water quality standards, and there is no known water contamination within the general LWI project areas (Section 3.1.1.1.2).

Sediment investigation studies have shown that marine sediments in the vicinity of the LWI project sites are composed of gravelly sands with some cobbles in the intertidal zone, transitioning to silty sands in the subtidal zone (Hammermeister and Hafner 2009). In general, sediment characterization studies along the waterfront demonstrated that organic contaminants, metals, polycyclic aromatic hydrocarbons (PAHs), phthalates, phenols, and some chlorinated pesticides occur at concentrations below the sediment quality standards (SQS) (Section 3.1.1.1.3).

2.1.2. Water and Sediment Quality at the SPE Project Site

Temperature, pH, and other water quality parameters near the SPE project site meet water quality standards, and there is no known water contamination within the general SPE project area (Section 3.1.1.1.2).

As discussed above for the LWI project sites, sediment characterization studies along the waterfront, including the SPE project site, demonstrated that organic contaminants, metals, PAHs, phthalates, phenols, and some chlorinated pesticides occur at concentrations below the cleanup thresholds (see Section 3.1.1.1.3). Additionally, results from the SAIC 2007 sediment survey at Bangor (Hammermeister and Hafner 2008) indicate that surficial sediments near Service Pier consist of 73 to 93 percent sand and gravel, with total organic carbon levels ranging from 0.4 to 2 percent (Section 3.1.1.1.3). There was no evidence of elevated metals, PAHs, pesticides, polychlorinated biphenyls, and all sediment contaminant concentrations were below the corresponding SQS guidelines.

2.2. Physical Habitat and Barriers

The eight in-water structures along the waterfront (Carderock Pier, Service Pier, Keyport/Bangor Dock (KB Dock), Delta Pier, Marginal Wharf, EHW-1, EHW-2 [under construction] and the Magnetic Silencing Facility [MSF]) likely act as migrational barriers to shoreline migrating juvenile salmon. Although there are many nearshore structures in the southern portion of Hood Canal, primarily smaller docks, NAVBASE Kitsap Bangor represents the only industrial waterfront within the Hood Canal area of Puget Sound. Within northern Hood Canal, nearshore development is limited. A few docks and a small pier occur at Seabeck, more than 8 miles (13 kilometers) to the south, and the Hood Canal Bridge, approximately 7 miles (11 kilometers) north of the MSF. The remainder of the northern Hood Canal shoreline is generally undeveloped. For the Marginal Wharf, the large number of piles, their close spacing, the low height-over-water design, and the nearshore location of the wharf likely make this the greatest barrier to migrating juvenile salmon. Most of the other structures have been designed to have the majority of their overwater structures farther offshore, have a greater height-over-water, and an increased separation between piles. Recent fish surveys have captured large numbers of salmonids behind and along the shoreline immediate to the north of each structure, including Marginal Wharf (SAIC 2006; Bhuthimethee et al. 2009), suggesting juvenile salmonids are able to migrate around, or through, these structures. Although statistical analyses of those surveys did not indicate a significant barrier effect of these nearshore structures (Bhuthimethee et al. 2009), they were designed to detect the occurrence, distribution, and habitat use of nearshore fish species, and did not include a study design specific for detecting the potential barrier effects of nearshore NAVBASE Kitsap Bangor structures.

2.2.1. Physical Habitat and Barriers at the LWI Project Sites

Structures along the entire waterfront and in the immediate vicinity of the north and south LWI project sites include in-water physical structures, overwater shading and overwater lighting, considered as potential barriers to juvenile salmonid migration in Puget Sound (Simenstad et al. 1999; Nightingale and Simenstad 2001a).

Existing physical barriers at the north LWI project site includes the piles supporting the EHW-1 causeways, less than 1,000 feet (305 meters) south of the north LWI footprint. Although some delay or slight alteration in migratory behavior of nearshore migrating fish may occur due to the presence of the causeways, the large height over water reduces the potential shading effect, and the larger separation between piles, relative to Marginal Wharf, reduces this effect.

Existing physical barriers at the south LWI project site includes the piles supporting Delta Pier, less than 1,000 feet (305 meters) north of the south LWI footprint. As with the north LWI project site, structural designs of these causeways reduce the potential shading effect and minimize the barrier effect of in-water piles; however, some delay or slight alteration in migratory behavior of nearshore migrating fish may occur due to the presence of in-water structures supporting Delta Pier.

2.2.2. Physical Habitat and Barriers at the SPE Project Site

In addition to the Service Pier itself, in-water structures in the vicinity of the SPE project site include KB Dock, approximately 500 feet (152 meters) to the north, and Carderock Pier approximately 500 feet to the south. The existing structures along the entire waterfront, and in the immediate vicinity of the SPE project site, may delay or slightly alter the existing migratory behavior of nearshore migrating fish due to factors such as in-water physical structures, overwater shading, and overwater lighting.

2.3. BIOLOGICAL HABITAT

2.3.1. Prey Availability

The large majority of salmonids that occur along the Bangor waterfront are juveniles, recently emerged from their natal streams, migrating toward the Pacific Ocean (Schreiner et al. 1977; Salo et al. 1980; Bax 1983; SAIC 2006; Bhuthimethee et al. 2009). At these smaller sizes, juvenile salmonids prefer small benthic invertebrate prey, although larger age-0 fish will prey on smaller fish. Other species, notably coho salmon, can occur as larger age-1 fish during their out-migration, and use larval and juvenile forage fish as a food resource during their migration. Subadult and adult salmonids use juvenile and adult forage fish, among other species, as a food resource (Healey 1991; Salo 1991; Sandercock 1991). A detailed description of forage fish life history and occurrence, including prey resources such as benthic invertebrates used extensively by the younger, more abundant, juvenile salmonids, is provided in Section 1.4 in this appendix.

The presence of small invertebrate prey resources such as harpacticoid copepods, gammarid and corophoid amphipods, which are preferred juvenile salmon prey sources (Healey 1991; Salo 1991; Webb 1991a,b; Fujiwara and Highsmith 1997; HCCC 2005), indicate an epibenthic community capable of providing suitable food resources during the juvenile salmon out-migration along the Bangor shoreline.

2.3.1.1. PREY AVAILABILITY AT THE LWI PROJECT SITES

As described in Section 3.2.1.1.3, benthic organisms, including a number of preferred amphipod species, are abundant and diverse at both LWI project sites. Larger eelgrass beds along the Bangor shoreline, such as the one at the south LWI project site (SAIC 2009), were identified by Salo et al. (1980) as superior foraging habitats for juvenile salmonids due to high standing stocks of their preferred prey. However, the eight nearshore docks, piers, or wharves that occur along the Bangor waterfront include piles and overhead shading of benthic habitat reduce productivity of benthic habitat in the immediate vicinity of these structures.

2.3.1.2. PREY AVAILABILITY AT THE SPE PROJECT SITE

As described in Section 3.2.1.1.3, benthic organisms that occur at the SPE project site are expected to be less abundant than occur in dense eelgrass beds, elsewhere along the shoreline. The SPE project site is located in waters deeper than 30 feet (9 meters) below mean lower low water (MLLW), generally the depth at which eelgrass becomes light limited. An adjacent eelgrass bed likely supports an invertebrate community providing foraging opportunities for juvenile salmonids. However, the existing overwater trestles and decking result in direct shading and reduced productivity of benthic habitat in the immediate vicinity of these structures.

2.3.2. Aquatic Vegetation

Juvenile salmonids use nearshore marine aquatic vegetation, notably eelgrass, as forage and refuge habitat during their migration from natal streams (Simenstad and Cordell 2000; Nightingale and Simenstad 2001a,b; Shafer 2002). Marine vegetation communities, including eelgrass beds, in Puget Sound provide a unique habitat, supporting a variety of invertebrates, such as copepods, amphipods, and snails, which might otherwise not be found on soft sediments (Mumford 2007). As indicated by Salo et al. (1980), the copepods and other zooplankton found in these habitats represent the major food base for the food chain in Puget Sound, specifically for small and juvenile fish including forage fish and salmonids.

2.3.2.1. AQUATIC VEGETATION AT THE LWI PROJECT SITES

The existing marine vegetation community is considered to be healthy and diverse at both LWI project sites, as described in Section 3.2.1.1.2. However, the EHW-1 structure occurs immediately to the south of the north LWI project site, shading the marine vegetation community in its footprint. The presence of this structure likely limits the southern extent of the eelgrass bed at the north LWI project site. The south LWI project site, includes an extensive eelgrass bed fed by the freshwater outflow of Devil's Hole on a small intertidal delta. The combination of shallow waters with plentiful nutrients and no shade likely contributes to the health of the marine vegetation community at this site. Similar to benthic and forage fish spawning habitat, more aquatic vegetation habitat likely would have been present prior to the nearshore construction of the existing piers or wharves. Therefore, it can be assumed that, at a minimum, the reduction in light attenuation due to the presence of these overwater structures limits the suitability of benthic habitats in their immediate vicinity to support healthy aquatic vegetation.

2.3.2.2. AQUATIC VEGETATION AT THE SPE PROJECT SITE

Although the SPE project site occurs in deeper waters, where marine vegetated communities become light limited (generally at depths greater than 30 feet [9 meters] MLLW), a narrow band of eelgrass occurs in the intertidal habitat long the shoreline (Section 3.2.1.1.2). In addition to the light limitation of deeper water, as with other habitats located near overwater structures, at a minimum, the reduction in light attenuation due to the presence of the existing Service Pier, and its causeway, likely contributes to reduced benthic habitat productivity, including healthy aquatic vegetation, in the immediate project vicinity.

2.4. UNDERWATER NOISE

Elevated underwater noise from anthropogenic sources has been found to alter the distribution, behavior, and health of fish that are present during these conditions (Hastings 2002; Hastings and Popper 2005; Popper et al. 2006). The existing underwater noise along the Bangor waterfront is attributed to a variety of both natural and human-related sources. Average underwater noise levels measured along the Bangor waterfront are elevated over ambient conditions due to waterfront operations, but are within the minimum and maximum range of measurements taken at similar environments within Puget Sound.

With respect to underwater noise impacts on fish, the presence of an internal air (swim) bladder to maintain buoyancy likely makes these species more susceptible to injury from underwater noise. This bladder is susceptible to expansion/decompression when a pressure wave from underwater noise is encountered. When the pressure is applied rapidly and at a sufficient level, rapid expansion/decompression is fatal for fish. However, underwater noise threshold criteria, established by a multi-agency working group, currently do not differentiate between species with air bladders and those without them (Fisheries Hydroacoustic Working Group 2008). Additional details regarding fish hearing capabilities is provided in Section 3.0, below.

3.0 FISH HEARING AND RESPONSE TO UNDERWATER SOUND

The degree to which an individual fish would be affected by underwater sound depends on a number of variables, including (1) species of fish, (2) fish size, (3) presence of a swim bladder, (4) physical condition of the fish, (5) maximum sustained sound pressure and frequency, (6) shape of the sound wave (rise time), (7) depth of the water, (8) depth of the fish in the water column, (9) amount of air in the water, (10) size and number of waves on the water surface, (11) bottom substrate composition and texture, (12) effectiveness of bubble curtain sound/pressure attenuation technology (if used for mitigation), (13) tidal currents, and (14) presence of predators (NMFS 2005b). Depending on these factors, effects on fish from underwater sound can range from changes in behavior to immediate mortality. There has been no documented injury or mortality resulting from the use of vibratory hammers; however, fish injury has been documented during installation of steel piles.

3.1. PHYSIOLOGICAL RESPONSES

As with underwater noise impacts on behavior, injury threshold levels and corresponding effects on fish at different intensities of underwater sound are unclear (Hastings and Popper 2005). Many of the previous studies cited for the physical effects, including injury and mortality, of underwater sound on fish were based on seismic air gun and underwater explosives studies (Hastings and Popper 2005). Physical effects from these types of impulsive sounds can include swim bladder, otolith, and other organ damage; hearing loss; and mortality (Hastings and Popper 2005).

Fish with swim bladders, including salmonids and larval rockfish, are more susceptible to barotrauma from impulsive sounds (sounds of very short duration with a rapid rise in pressure) because of swim bladder resonance (vibration at a frequency determined by the physical parameters of the vibrating object). A sound pressure wave can be generated from an impulsive sound source, such as an impact hammer striking a steel pile. When this wave strikes a gas-filled space, such as a swim bladder, it causes that space to vibrate (expand and contract) at its resonant frequency. When the amplitude of this vibration is sufficiently high, the pulsing swim bladder can press against and strain adjacent organs, such as the liver and kidney. This pneumatic compression can cause injury in the form of ruptured capillaries, internal bleeding, and maceration of highly vascular organs (CALTRANS 2002). Larval rockfish generally develop a swim bladder from two to three weeks after their birth (Tagal et al. 2002), but may be vulnerable to harm from noise before the bladder develops. However, not all pile driving is the same with respect to generating a sound pressure wave. In general, larger steel piles being driven by an impact hammer generate more biologically harmful pressure waves than smaller steel piles, similar-sized steel piles generate more harmful pressure waves than concrete piles when being driven by an impact hammer, and piles driven using a vibratory hammer generally do not produce a pressure wave sufficient to cause barotrauma effects on fish that can result from impact hammers. More detailed information on underwater sound produced from pile driving is provided in Appendix D.

Hastings and Popper (2005) also noted that sound waves can cause different types of tissue to vibrate at different frequencies, and that this differential vibration can cause tearing of mesenteries and other sensitive connective tissues. Exposure to high noise levels can also lead to injury through "rectified diffusion," the formation and growth of bubbles in tissues. These bubbles can cause inflammation; cellular damage; and blockage or rupture of capillaries, arteries, and veins (Crum and Mao 1996; Vlahakis and Hubmayr 2000; Stroetz et al. 2001). These effects can lead to overt injury or mortality. Death from barotrauma and rectified diffusion injuries can be instantaneous or delayed for minutes, hours, or even days after exposure.

Even in the absence of mortality, elevated noise levels can cause sublethal injuries affecting survival and fitness. Similarly, if injury does not occur, noise may modify fish behavior that may make them more susceptible to predation. Fish suffering damage to hearing organs may suffer equilibrium problems and have a reduced ability to detect predators and prey (Turnpenny et al. 1994; Hastings et al. 1996). Other types of sublethal injuries can place the fish at increased risk of predation and disease. Adverse effects on survival and fitness can occur even in the absence of overt injury. Exposure to elevated noise levels can cause a temporary shift in hearing sensitivity (referred to as a temporary threshold shift, or TTS), decreasing sensory capability for periods lasting from hours to days (Turnpenny et al. 1994; Hastings et al. 1996).

The severity of effects from high noise levels produced by impact-driving of steel piles depends on several factors, including the size and species of fish exposed. Regardless of species, smaller fish appear to be far more sensitive to injury of non-auditory tissues (Yelverton et al. 1975). For example, NMFS biologists observed that approximately 100 surf perch from three different species (*Cymatogaster aggregata*, *Brachyistius frenatus*, and *Embiotoca lateralis*) were killed during impact pile driving of 36-inch (91-centimeter) diameter steel pilings at Bremerton, Washington (Stadler, NMFS, 2002, personal observation). Dissections revealed complete swim bladder destruction across all species in the smallest fish (7.6 centimeters fork length), while swim bladders in the largest fish (16.51 centimeters fork length) were nearly intact. However, swim bladder damage was typically more extensive in *C. aggregata* compared *to B. frenatus* of similar size. Because of their large size, adult salmon can tolerate higher noise levels and are generally less sensitive to injury of non-auditory tissues than juveniles (Hubbs and Rechnitzer 1952). However, no information is available to determine whether or not the risk of auditory tissue damage decreases with increasing size of the fish.

3.2. BEHAVIORAL RESPONSES

Data are limited for assessing the effects of anthropogenic-produced underwater sound on fish behavior (Hastings and Popper 2005; Popper and Hastings 2009). Of those studies investigating behavioral responses to underwater sound, not all collected the underwater sound data using a similar method, making comparisons between studies difficult (Hastings and Popper 2005). Part of the difficulty is that there are many different anthropogenic noise sources, with each source producing different types of underwater sound (e.g., impulsive vs. non-impulsive sound). Existing studies of fish behavioral response to underwater noise have investigated a variety of noise sources, including pile driving, seismic air gun, sonar, and vessel noise. Depending on the noise source, the physical environment, and the fish species, behavioral responses can vary. A summary of studies that include an investigation of fish behavior reviewed for this EIS is provided below.

A number of studies have been conducted that indicate fish under natural settings display a behavioral or startle response to anthropogenic-produced underwater noise. Wardle et al. (2001) examined the behaviors of various fish species (e.g., gadoids, saithe, whiting, and small cod) on a reef in response to seismic air guns that were calibrated to have a peak level of 210 dB re 1 μPa at 16 meters from the source and 195 dB re 1 μPa at 109 meters from the source. Although they found that fish displayed a startle response, the noise did not chase the fish away and resulted in no permanent changes in the behavior of fish on the reef over the course of the study.

Slotte et al. (2004) utilized a vessel with two seismic sources, each of 20 air guns and 10 hydrophone streamers, and investigated the change in abundance of pelagic fish (including blue whiting and herring) relative to the seismic noise source. Regardless of species, Slotte et al. (2004) found that fish in the area of the air guns appeared to move to greater depths after ensonification compared to their vertical position prior to air gun usage. However, because the acoustic mapping prior to the shooting along some of the seismic transects gave no indications of short-term reactions, it was not evident whether a startle response occurred and the findings were inconclusive.

In a caged fish study, investigating the effects of a seismic air gun on five species of rockfish (*Sebastes* spp.), Pearson et al. (1992) found that the general threshold for startle response occurred at 180 dB re 1 μPa. Behaviors varied between species, although fish generally formed tighter schools and remained somewhat motionless (Pearson et al. 1992). Skalski et al. (1992) found that, following the noise produced from a seismic air gun at the base of rockfish aggregations (186 dB peak re 1 μ Pa), the average rockfish catch for hook and line surveys decreased by 52 percent. Fathometer observations showed that the rockfish schools did not disperse but remained aggregated in schooling patterns similar to those prior to exposure to this noise. However, these aggregations elevated themselves in the water column, away from the underwater noise source.

Other studies have shown that some fish species may habituate to underwater noise (Feist 1991; Feist et al. 1992; Nedwell et al. 2006; Ruggerone et al. 2008) and would continue to occur within an area where underwater noise was well above background levels. Feist (1991) and Feist et al. (1992) investigated the effects of impact pile driving on the behavior of juvenile pink and chum salmon. Observers were placed at various locations and distances from the noise source. A hydrophone was placed at a specific distance from the noise source in an attempt to correlate fish behavior with levels of underwater sound. Feist et al. (1992) concluded that pile driving has an impact on the distributions and behavior of juvenile chum and pink salmon, although the findings suggest no change in overall fish abundance due to elevated underwater sound. Observations included startle responses and changes in general behavior and school size. However, pile driving did not appear to affect foraging of either species. Unfortunately, correlating behavioral effects of these salmonids relative to a specific underwater sound was not possible due in part to the study design where observers could not see fish in deeper environments, and due to methodological and logistics problems.

Ruggerone et al. (2008) investigated the behavioral response of juvenile coho salmon placed in cages at various distances from piles being driven with an impact hammer. Results indicated that coho salmon did not consistently exhibit a startle response during the first or subsequent hammer strikes of each pile. A brief startle response was observed during 4 of 14 first-strikes (29 percent of piles), and during 1 of 14 second-strikes (7 percent). Gut content analysis indicated that both test and control fish readily consumed food. Similarly, based on an investigation of behavioral responses of brown trout (a surrogate for other salmonids), Nedwell et al. (2006) found that fish placed in cages at distances as close as 98 and 177 feet (30 and 54 meters) from a vibratory pile driver driving 36-inch and 20-inch (0.9-meter and 0.5-meter) piles showed very little to no behavioral response, including a startle response, to the underwater sound generated from the activity. However, the study acknowledged that brown trout lack the hearing sensitivity of other salmonids. Further, some acoustic experts have shown hesitancy to include fish behavioral findings from caged fish studies into the development of criteria.

In a critical review of studies investigating the effects of underwater sound on fish, Popper and Hastings (2009) concluded that "very little is known about effects of pile driving and other anthropogenic sounds on fishes, and that it is not yet possible to extrapolate from one experiment to other signal parameters of the same sound, to other types of sounds, to other effects, or to other species." Since sufficient investigations with similar methodologies regarding the behavioral response of fish to anthropogenic noise sources are limited, threshold criteria for this effect have not been developed. As a result, the current approach for estimating the distances from an underwater noise source at which a fish will display a behavioral response are the guideline criteria of 150 dB RMS described by Hastings (2002).

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APPENDIX C

MITIGATION ACTION PLAN

MITIGATION ACTION PLAN

LAND-WATER INTERFACE
AND
SERVICE PIER EXTENSION
AT NAVAL BASE KITSAP BANGOR

NAVAL BASE KITSAP BANGOR
SILVERDALE, WA

July 2016

DEPARTMENT OF THE NAVY

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EXECUTIVE SUMMARY

This document presents a Mitigation Action Plan for the proposed construction and operation of two Proposed Actions on Naval Base Kitsap Bangor (NAVBASE Kitsap Bangor), Washington: the Land-Water Interface (LWI) and the Service Pier Extension (SPE).

Aspects of these two Proposed Actions have the potential to cause environmental impacts. Several measures, including current practices (CPs), best management practices (BMPs), and mitigation measures (MMs), will be applied to the project to avoid, reduce, and mitigate the effects from this action.

Project measures include the following:

- BMPs to ensure compliance with the United States Environmental Protection Agency's (USEPA) general permit for stormwater discharges from construction sites (operational stormwater management is considered part of project design);
- CPs to minimize the potential for impacts during construction and operational phases of the project;
- Noise attenuation measures during construction, including bubble curtains and soft start for impact pile drivers;
- Monitoring to minimize noise impacts;
- Mitigation measures for biological and other resources;
- Compensatory mitigation for impacts to aquatic resources; and
- Treaty mitigation.

These measures are in addition to project compliance with all applicable regulations or permit conditions. The Department of the Navy (Navy) ultimately will be responsible for ensuring agreed-upon measures are implemented.

Measures are described in Sections 2 through 5 of this Mitigation Action Plan. For each category of CPs, BMPs, and MMs, the Mitigation Action Plan provides (1) description of the measure; (2) parties responsible for implementation; (3) planned implementation schedule; (4) planned funding; (5) mitigation-specific performance criteria; (6) monitoring and tracking mechanisms; and (7) enforcement measures. Section 6 of this Mitigation Action Plan describes the Navy's proposed Compensatory Mitigation action, which would offset unavoidable adverse impacts on aquatic resources under the provisions of the Clean Water Act (CWA) Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (U.S. Army Corps of Engineers [USACE] and U.S. Environmental Protection Agency [USEPA] 2008). Section 9 of the Mitigation Action Plan describes mitigation projects proposed to address potential effects of the LWI and SPE Proposed Actions on reserved treaty rights and resources of federally recognized American Indian Tribes. Mitigation measures will be documented in the Records of Decision (ROD) for the two Proposed Actions.

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LIST OF ACRONYMS AND ABBREVIATIONS

BMP	best management practice
BSS	Beaufort Sea State
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COMNAVREGNWINST	Commander Navy Region Northwest Instruction
CP	current practice
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DoD	Department of Defense
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
ESA	Endangered Species Act
FLUPSY	Floating Upwelling System
GPS	Global Positioning System
HCCC	Hood Canal Coordinating Council
Hz	hertz
ILF	In-lieu fee
IMP	integrated management practices
kHz	kilohertz
LID	low impact development
LWI	Land-Water Interface
MBTA	Migratory Bird Treaty Act
MHHW	mean higher high water
MLLW	mean lower low water
MM	mitigation measure
MMO	marine mammal observer
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MSGP	Multi-Sector General Permit
NAVBASE	Naval Base
NAVFAC NW	Naval Facilities Engineering Command Northwest
Navy	Department of the Navy
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OPNAVINST	Chief of Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
PSB	Port Security Barrier
PSNERP	Puget Sound Nearshore Ecosystem Restoration Project
RMS	root mean square
ROD	Record of Decision
SEL	sound exposure level
SHPO	State Historic Preservation Officer
SPE	Service Pier Extension
SPL	sound pressure level
SSBN	OHIO Class Ballistic Missile submarine
SSN	SEAWOLF, LOS ANGELES, or VIRGINIA Class attack submarine
SR	State Route

LIST OF ACRONYMS AND ABBREVIATIONS

SWPPP	storm water pollution prevention plan
TRIDENT	TRIDENT Fleet Ballistic Missile
TTS	temporary threshold shift
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WDOE	Washington Department of Ecology
WRA	Waterfront Restricted Area

1.0 INTRODUCTION

This document presents the Department of the Navy's (Navy's) Mitigation Action Plan for two Proposed Actions on Naval Base (NAVBASE) Kitsap Bangor, Washington: the Land-Water Interface (LWI) and the Service Pier Extension (SPE). NAVBASE Kitsap Bangor, Washington, is located on Hood Canal approximately 20 miles due west of Seattle, Washington (Figure 1). The project sites for the LWI are located on the perimeter of the Waterfront Restricted Area (WRA) at the Bangor waterfront. Access to this portion of the Bangor waterfront is restricted by a fencing system on the land and a floating barrier system on the water. The Service Pier is not located within the WRA but is within the floating barrier system, which extends beyond the WRA (Figure 2). Both project sites are within the Hood Canal hydrologic unit code 17110018 and the Water Resource Inventory Area 15 (Kitsap County).

As recognized by the Council on Environmental Quality (CEQ) in their Memorandum about the appropriate use of mitigation and monitoring (CEQ 2011), mitigation is an important mechanism that federal agencies can use to minimize potential adverse environmental impacts associated with their actions. The term mitigation includes avoiding, minimizing, rectifying and reducing impacts, as well as compensating for impacts. Federal agencies rely upon the expertise of professional staff to assess mitigation needs, develop mitigation plans, and oversee mitigation implementation. Agencies may also rely on outside resources and experts to develop appropriate monitoring strategies and to ensure mitigation has the desired effects.

The mitigation measures detailed in this Mitigation Action Plan were developed through a multi-disciplinary approach. Input from environmental professionals from the Navy, agencies, tribes, and private industry influenced the project design; this will result in an action that would avoid and minimize environmental impacts to the maximum extent possible, while still meeting the Navy's mission requirements. Measures to minimize species impacts were developed through consultation with federal resource agency experts. The Navy's proposed compensatory mitigation is to use the Hood Canal Coordinating Council's In Lieu Fee program, which was developed through extensive discussion with federal agencies, tribes, state agencies, local governments, and non-governmental organizations; this is discussed in further detail in Section 6.0 of this Mitigation Action Plan.

CEQ guidance recommends that agencies not commit to mitigation unless they have sufficient legal authorities and expect there will be resources available to implement the mitigation. The Navy has determined that the mitigation measures within this Mitigation Action Plan are within the Navy's legal authority to implement, and anticipates that resources will be available to ensure mitigation performance. The CEQ also recommends that agencies take steps to ensure that mitigation commitments are actually implemented. The Navy's Environmental Readiness Program Manual (OPNAVINST 5090.1D CH-1) directs action proponents to identify and track mitigation and monitoring requirements committed to in environmental planning decision documents. This Mitigation Action Plan details specific mitigation measures, parties responsible for implementing each measure, schedule for implementation, funding, performance criteria, monitoring and tracking mechanisms, and enforcement measures.

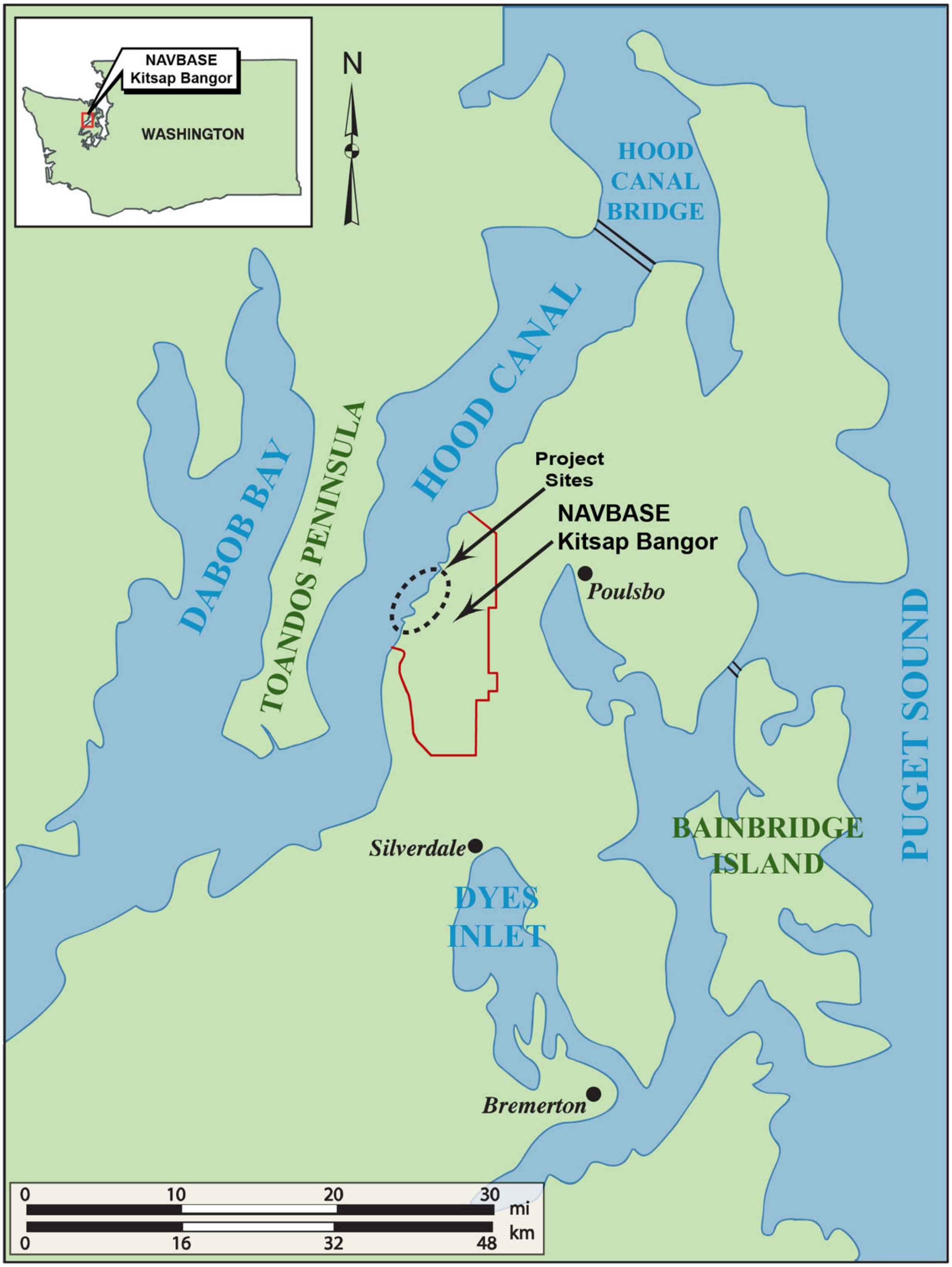

Figure 1. Vicinity Map

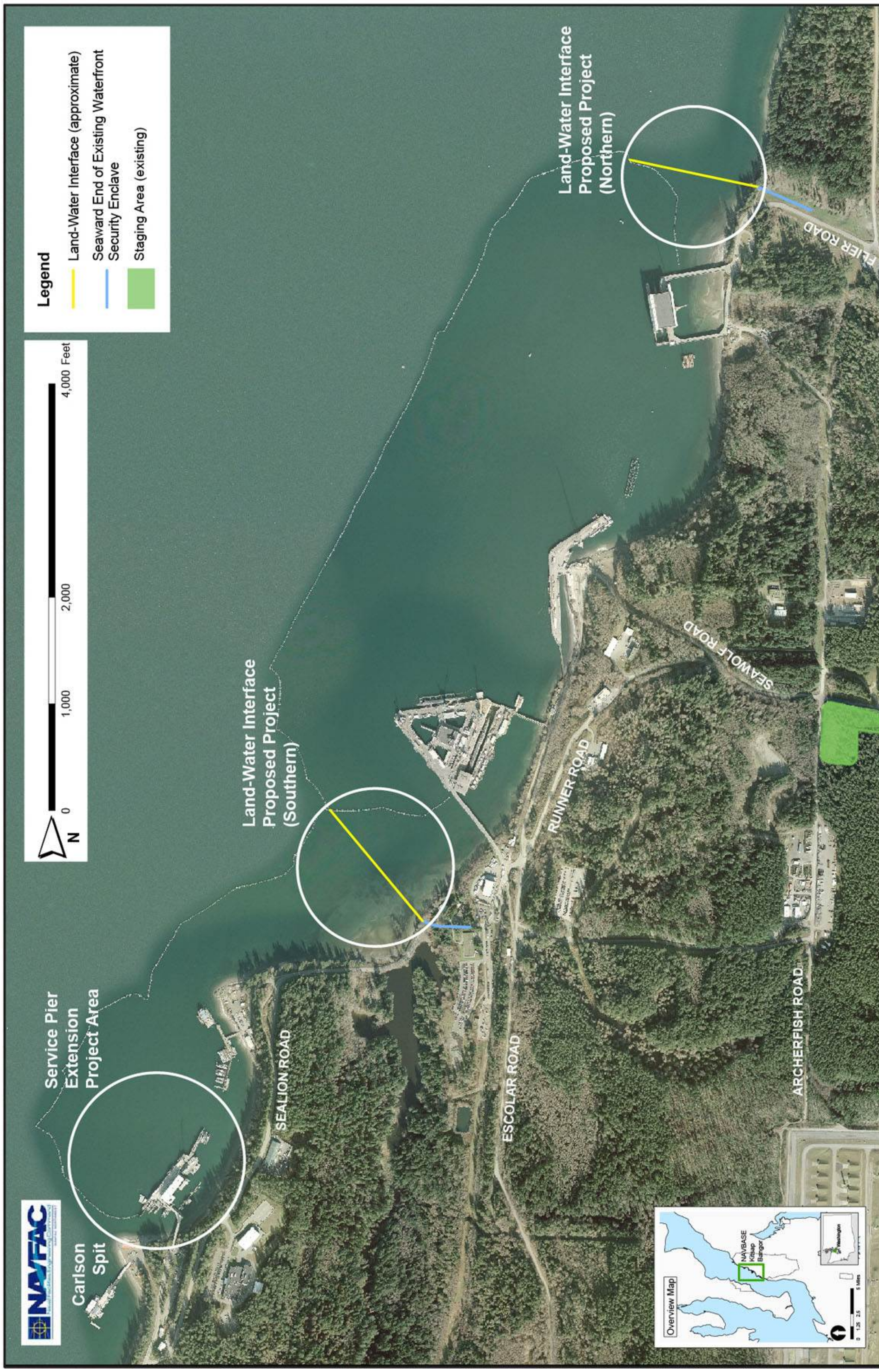

Figure 2. Location of the LWI and SPE Projects

The CEQ encourages agencies to include public involvement components in their mitigation monitoring programs and provide public access to mitigation monitoring information. This Mitigation Action Plan requires the Navy to submit monitoring reports to federal resource agencies at the conclusion of each year of in-water construction. The Navy will make these reports available to the public on a Navy website.

Aspects of the LWI and SPE projects have the potential to cause environmental impacts. Several measures, including current practices (CPs), best management practices (BMPs), and mitigation measures (MMs), will be applied to the project to avoid, reduce, and mitigate the effects from this action. These measures are in conjunction with project compliance to all applicable regulations or permit conditions. CPs are physical, structural, or managerial practices that decrease the potential for impacts, particularly related to water quality. BMPs are required to ensure compliance with the U.S. Environmental Protection Agency (USEPA) general permit for stormwater discharges from construction sites (operational stormwater management is considered part of project design; see Section 2.4.1). They can be used singly or in combination as appropriate in a particular situation. Mitigation measures are used most frequently to reduce or minimize impacts that are unavoidable. These measures are described in Sections 2 through 5 of this Mitigation Action Plan and summarized in Table 1. Section 6 of this Mitigation Action Plan describes the Navy's proposed Compensatory Mitigation action, which would offset unavoidable adverse impacts on aquatic resources under the provisions of the Clean Water Act (CWA) Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (U.S. Army Corps of Engineers [USACE] and USEPA 2008). Section 9 of the Mitigation Action Plan describes mitigation projects proposed to address potential effects of the LWI and SPE Proposed Actions on reserved treaty rights and resources of federally recognized American Indian Tribes. Mitigation measures will be documented in the Records of Decision (ROD) for the two Proposed Actions.

1.1. PROPOSED ACTION

The Navy proposes two projects, the LWI and SPE, on the Bangor waterfront. Under the LWI project, the Navy proposes to enhance security at the perimeter of the Waterfront Restricted Area (WRA) on NAVBASE Kitsap Bangor by constructing physical barriers through shallow waters and onto the immediate upland areas at the northern and southern extent of the WRA. These structures would tie into the existing Port Security Barrier (PSB) system and the on-land Waterfront Security Enclave (WSE) system. Under the SPE project, the Navy proposes to extend the existing Service Pier and construct associated support facilities. The SPE would provide additional berthing for maintenance of existing homeported and visiting submarines. The associated support facilities would provide logistical support for submarines at the Navy's SSN research, development, test, and evaluation hub, which is currently located on NAVBASE Kitsap Bangor. Detailed descriptions of the marine and land components of the two Proposed Actions, including the purpose and need, are provided in Chapters 1 and 2 of the Environmental Impact Statement (EIS).

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for the LWI and SPE Projects

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
1. Protection of Marine Water Quality and Seafloor During Construction			
Impact: Contaminant loading via stormwater runoff from construction sites. **BMP 1:** Implement stormwater pollution prevention plan (SWPPP).	Implement SWPPP prior to the start of construction phase. Install and maintain all structural BMPs throughout construction phase in accordance with SWPPP and permit.	The Navy will be responsible for obtaining USEPA Construction General Permit and complying with permit conditions. The contractor will be responsible for implementing and maintaining BMPs specified in the SWPPP.	Conduct monitoring and inspections as required by SWPPP to document compliance with permit conditions.
Impact: Accidental spill of oil, fuels, or other related materials. **CP 1a:** Implement oil and hazardous spill contingency plan, and deploy containment boom during in-water construction as required.	Use existing NAVBASE Kitsap Bangor fuel spill prevention and response plans (the *Commander Navy Region Northwest Oil and Hazardous Substance Integrated Contingency Plan* and the *NAVBASE Kitsap Bangor Spill Prevention, Control, and Countermeasure Plan* [COMNAVREGNWINST 5090.1, Integrated Contingency Plan, Annex G]); Navy is responsible for providing plans, training, and spill response materials.	The contractor will be responsible for notifying the Navy of any fuel spills. The Navy will be responsible for implementing the plan, notifying appropriate agencies, and providing oversight for incident response.	Containment and cleanup of spilled materials as soon as possible; investigate cause of spill; identify and implement appropriate corrective actions to prevent recurrence.
Impact: Incidental release of construction debris and related contaminants. **CP 1b:** Develop and implement debris management procedures, deploy containment boom during in-water construction, and handle removed treated piles as required.	Develop and implement procedures prior to start of in-water construction activities.	The contractor will be responsible for developing and implementing the procedures. The Navy will be responsible for reviewing and approving the procedures and for monitoring implementation.	The contractor will be responsible for deploying and maintaining booms, as required, throughout construction period and ensuring that all debris and other materials are collected and properly disposed of. Following completion of in-water construction activities, the contractor will conduct an underwater survey to collect and remove any remaining construction materials.

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for LWI and SPE Projects (continued)

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
Impact: Prop wash from work vessels could resuspend bottom sediments. **CP 1c:** Instruct vessel operators to avoid excess engine thrust in water depths shallower than 30 feet (9 meters) to the extent possible.	Conduct briefings with vessel operators prior to start of in-water construction activities.	The contractor will be responsible for briefing vessel operators. The Navy will be responsible for monitoring in-water activities and developing and implementing corrective actions as needed.	Visual inspection to ensure prop wash from vessel operations is not causing sediment resuspension and surface turbidity plumes.
Impact: Grounding of work vessels could disturb bottom sediments. **CP 1d:** Instruct vessel operators to avoid bottoming out (running aground).	Conduct briefings with vessel operators prior to start of in-water construction activities.	The contractor will be responsible for briefing vessel operators. The Navy will be responsible for monitoring in-water activities and developing and implementing corrective actions as needed.	Visual inspection to ensure work vessels are not grounding during low tides.
Impact: Anchoring work vessels could disturb bottom sediments. **CP 1e:** Develop a mooring and anchoring plan and implement measures to avoid dragging anchors and lines in special status areas.	Develop plan and obtain plan approval prior to start of in-water construction activities. Conduct briefings with vessel operators prior to start of in-water construction activities.	The contractor will be responsible for developing the plan and briefing vessel operators. The Navy will be responsible for reviewing and approving the plan, monitoring in-water activities, and developing and implementing corrective actions as needed.	Visual inspection to ensure anchor and line recovery operations are causing minimal sediment disturbance.
2. In-Water Work Windows			
Impact: In-water construction activities could interfere with seasonal migrations or life stages of sensitive marine species. **MM 2:** In-water construction would observe an in-water juvenile salmonid work window.	In-water work would be restricted to periods coinciding with the specified work window (July 15 through January 15). An exception is that, for the LWI project, in-water work other than pile driving and abutment work below MHHW could occur outside the in-water work window.	The construction contractor would be responsible for ensuring that in-water work does not occur outside of the work window except as noted. The Navy would be responsible for monitoring in-water work activities.	The Navy would take necessary corrective actions if the construction contractor does not comply with work window restrictions.

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for LWI and SPE Projects (continued)

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
3. Protection of Upland Water Quality During Construction			
Impact: Increased potential for erosion and sedimentation from stormwater runoff. **BMP 3:** Implement SWPPP.	Implement SWPPP prior to the start of construction phase. Install and maintain all structural BMPs throughout construction phase in accordance with SWPPP and permit.	The Navy will be responsible for obtaining permit and complying with permit conditions. The contractor will be responsible for implementing and maintaining BMPs specified in the SWPPP.	Conduct monitoring and inspections as required by SWPPP to document compliance with permit conditions.
4. Protection of Water Quality During Operations			
Impact: Contaminant loadings from stormwater runoff discharges from the project sites. **BMP 4:** Implement SWPPP.	Implement SWPPP prior to the start of operation phase. Install and maintain all structural BMPs throughout operation phase in accordance with SWPPP, Erosion and Sedimentation Control Plan, and permit.	The Navy will be responsible for obtaining National Pollutant Discharge Elimination System (NPDES) permit and implementing and maintaining BMPs specified in the SWPPP and Erosion and Sedimentation Control Plan.	Conduct monitoring and inspections as required by SWPPP to document compliance with permit conditions.
Impact: Contaminant loadings from stormwater runoff discharges from the project sites. **CP 4a:** Implement low impact development (LID) integrated management practices (IMP).	Implement practices prior to the start of operation phase. Install and maintain all structural IMPs throughout operation phase.	The Navy will be responsible for implementing and maintaining IMPs.	Conduct monitoring and inspections to document effectiveness of practices and compliance with permit conditions.
Impact: Accidental spills from vessels or wharf operations. **CP 4b:** Implement oil and hazardous spill contingency plan.	Use existing NAVBASE Kitsap Bangor fuel spill prevention and response plans (the *Commander Navy Region Northwest Oil and Hazardous Substance Integrated Contingency Plan* and the *NAVBASE Kitsap Bangor Spill Prevention, Control, and Countermeasure Plan* [COMNAVREGNWINST 5090.1, Integrated Contingency Plan, Annex G]); Navy will be responsible for providing plans, training, and spill response materials.	Navy will be responsible for implementing the plan, notifying appropriate agencies, and providing oversight for incident response.	Containment and cleanup of spilled materials as soon as possible; investigate cause of spill; identify and implement appropriate corrective actions to prevent recurrence.

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for LWI and SPE Projects (continued)

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
5. Noise Attenuation During Construction			
Impact: Noise from in-water construction activities could impact marine species. **MM 5a:** Use vibratory driver for pile driving, with the exception of use of impact hammer to drive concrete piles, to proof piles and in cases where vibratory methods are not able to drive the pile to tip elevation. **MM 5b:** Deploy air bubble curtain or other noise attenuating device during impact hammer operations for steel piles. **MM 5c:** Use soft start for impact pile driving operations. **MM 5d:** Observe timing restrictions on pile driving.	These measures would apply to all in-water pile driving operations throughout the construction phase for both projects.	The contractor would be responsible for implementing these measures. The Navy would be responsible for monitoring construction activities.	Performance objective is minimizing potential for noise-related impacts on sensitive species. The Navy would be responsible for monitoring and enforcing these measures (see #6). Documentation would be submitted by the Navy to National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS).
6. Monitoring to Minimize Noise Impacts			
Impact: Noise from construction activities could impact sensitive species. **MM 6:** Conduct marine mammal and marbled murrelet monitoring during pile driving operations. Suspend pile driving operations when sensitive species are present in shutdown zone.	Marine mammal and marbled murrelet monitoring would be conducted daily prior to and during pile driving operations to determine whether individuals of these species are present in the shutdown and behavioral disturbance zones and to ensure that pile driving is suspended as needed.	The Navy would be responsible for ensuring trained monitors conduct real-time monitoring for sensitive species. The Navy would be responsible for notifying the contractor when sensitive species are present in the shutdown and behavioral disturbance zones. The contractor would be responsible for suspending pile driving operations until notified by the trained monitors that the zones are clear of sensitive species.	The Navy would be responsible for monitoring and enforcing this measure. Documentation would be submitted by the Navy to NMFS and USFWS.

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for LWI and SPE Projects (continued)

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
7–13. Mitigation Measures for Biological, Cultural, and Other Resources			
Impact: Shading effects and/or physical disturbance of eelgrass. **CP 7:** Avoid spudding/anchoring in existing eelgrass habitat whenever possible. Vessel operators will be provided with maps of the construction area with eelgrass beds clearly marked.	This measure will be implemented for the duration of in-water construction work.	The construction contractor will be responsible for ensuring that all vessel operators observe this measure. The Navy will also be responsible for monitoring in-water construction activities.	The performance criterion for these requirements is minimizing project-related impacts on eelgrass beds. The Navy will be responsible for monitoring and enforcing these measures.
Impact: Physical disturbance of upland habitat. **MM 8a:** A revegetation plan would be developed with the objective of restoring native vegetation to the areas temporarily cleared for the construction laydown area and construction of new roads. **MM 8b:** Any seed mixtures used in the site would include native grass and herbaceous species, which would provide foraging habitat for wildlife.	These measures would be implemented at the completion of the construction phase in the areas temporarily cleared for the construction laydown area and for construction of new roads. Monitoring would continue for 3 years. Depending on the program developed, the mitigation measure(s) may be completed after construction begins.	The Navy would be responsible for developing and implementing the revegetation plan.	The performance criterion is recovery of the native plant and wildlife communities within areas disturbed by construction operations. Recovery would be monitored and enforced by the Navy.
MM 8c: Periodic monitoring for and removal of noxious weeds from all upland areas cleared for project operations or facilities, and immediately adjacent to the cleared area. Particular attention would be paid to the interface between disturbed and existing adjacent second-growth forest stand. Noxious weeds would be removed by hand, mechanical means, or herbicides as appropriate.			

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for LWI and SPE Projects (continued)

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
MM 8d: Dense weed infestations that require more intensive treatments that result in ground disturbance would be reseeded or planted with native species. A more intensive monitoring and maintenance program (such as once a month) would be implemented until the native plants are sufficiently established to minimize invasion by noxious weeds.			
Impact: Tree removal has the potential to impact migratory birds and potential breeding marbled murrelets. **MM9a:** Tree removal would not occur during the marbled murrelet breeding season of April 1 through September 23. **MM 9b:** Tree removal would be conducted in a manner protective of all migratory birds.	This measure would be implemented throughout tree removal for the SPE project.	The construction contractor would be responsible for ensuring that these measures are implemented. The Navy would be responsible for implementing this measure.	The Navy would be responsible for enforcing these measures.
Impact: Inadvertent discovery of unknown archaeological resources **MM 10:** In compliance with Section 106 of NHPA, inadvertent discovery of unknown archaeological resources would require work stoppage and consultation with the SHPO and affected tribes.	This measure would be implemented throughout the duration of construction.	The Navy would be responsible for consulting with the SHPO and affected tribes.	The performance criterion for this measure is shut-down of the appropriate construction area if unknown archaeological resources are uncovered. The SHPO would be responsible for enforcing this measure.

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for LWI and SPE Projects (continued)

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
Impact: Airborne noise levels from pile driving and other construction activities would exceed allowable noise limits for the Occupational Safety and Health Administration (OSHA). Airborne noise would exceed nighttime maximum residential levels imposed by WAC (50 A-weighted decibel [dBA]) at Thorndyke Bay. Underwater noise from pile driving could affect divers. **MM 11a:** Construction activities would not be conducted during the hours of 10:00 p.m. to 7:00 a.m. Between July 15 and September 23, impact pile driving would occur between 2 hours after sunrise and 2 hours before sunset to protect foraging marbled murrelets during the breeding season. Between September 24 and January 15, in-water construction activities would occur during daylight hours (sunrise to sunset). **MM 11b:** The Navy would notify the public about upcoming construction activities and noise at the beginning of each construction season. The Notice to Mariners (MM 11a) would also serve to notify divers, including tribal divers, of potential underwater noise impacts.	These measures would be implemented throughout the duration of construction. The Navy would notify the public about upcoming construction activities and noise at the beginning of each construction season.	The construction contractor would be responsible for ensuring that all vessel operators observe this measure. The Navy would also be responsible for monitoring in-water construction activities. The Navy would be responsible for implementing this measure.	The Navy would be responsible for enforcing these measures.

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for LWI and SPE Projects (continued)

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
Impact: Temporary adverse noise impact to recreational areas. **MM 11b** (described above)	These measures would be implemented throughout the duration of construction.	The Navy would be responsible for implementing these measures.	The Navy would be responsible for enforcing these measures.
Impact: Increased marine vessel traffic. **MM 12a:** The Navy would develop a local Notice to Mariners to establish uniform procedures to facilitate the safe transit of vessels operating in the project vicinity. **MM 12b:** Barge trips and associated bridge openings would be scheduled to avoid peak commuting hours.	These measures would be implemented throughout the duration of construction.	The Navy would be responsible for implementing these measures.	The Navy would be responsible for enforcing these measures.
Impact: Disturbance and loss of marine/aquatic habitat, including eelgrass **MM 13:** Compensatory mitigation would be implemented to fully mitigate all impacts on waters of the U.S. The Navy would partner with the Hood Canal Coordinating Council (HCCC), an in-lieu-fee (ILF) sponsor, to implement the mitigation action in the Kitsap County/Hood Canal region.	This measure would be implemented as soon as feasible, would take several years to implement, and would require a minimum of 5 years of monitoring. Methods are described in Section 6.0.	Under the ILF program, the Navy would provide the funding while the ILF sponsor would be responsible for planning, implementing and managing the mitigation action.	Compensatory mitigation must comply with the Compensatory Mitigation for Losses of Aquatic resources, Final Rule (USACE and USEPA 2008).

Table 1. Summary of Mitigation Measures, Current Practices, and Best Management Practices for LWI and SPE Projects (continued)

Mitigation Measures	Timing and Methods	Responsible Party(ies)	Performance and Enforcement
Impact: Effects on access to and use of Treaty protected resources **MM 14:** For LWI: a. Shellfish seeding and beach enhancement at locations off Navy property b. Development and implementation of a floating upweller system (FLUPSY) management plan c. Kilisut Harbor Restoration Project For SPE: d. Shellfish seeding and beach enhancement at locations off Navy property e. Culvert replacement at Little Boston Road over Shipbuilders Creek	These measures would be implemented as soon as feasible and would take a varying number of years to implement. Methods are described in Section 9.0.	For items a, b, d, and e the Navy would provide funding through a Cooperative Agreement and the tribal sponsors would be responsible for planning, implementing and managing the mitigation actions. For item c, the Navy would provide funding and the tribal sponsor would be responsible for planning, implementing and managing the mitigation actions.	For items a, b, d, and e the tribal sponsors would be responsible for enforcing these measures. For item c, the project sponsor would be responsible for enforcing these measures.

1.2. SCHEDULE

Construction of the LWI would occur from August 2016 to August 2018. Construction activities planned for August 2016 through January 2017 may involve pile driving. In-water construction, including pile driving and abutment work below mean higher high water (MHHW), for the proposed projects would occur during an in-water work window of July 15 to January 15 (described under Section 2.2). One exception is that, for the LWI project, in-water work other than pile driving and abutment work below MHHW, such as anchor installation, could occur outside the in-water work window. Pile driving and abutment work below MHHW would be accomplished in the dry, that is, when the tide is out. Once the pile driving and abutment work below MHHW is complete, other in-water construction activities may occur in the water up until January 2018. The design life of the LWI Proposed Action is 50 years.

The SPE project is currently unprogrammed, and the construction schedule has not been determined. Upland construction would take approximately 400 days. Construction of all proposed facilities is anticipated to take approximately 24 months. Pile driving would occur within the in-water work windows (July 15 to January 15). It is not expected that completion of pile driving would require two full 6 month in-water work seasons. Relocation of existing PSB units and anchors could occur outside the in-water work window. The design life of the SPE Proposed Action is 50 years.

Construction would typically occur 6 days per week. Upland construction would occur between 7:00 a.m. and 10:00 p.m. in accordance with the Washington Administrative Code (WAC) noise guidelines.

Timing restrictions on pile driving, to protect Endangered Species Act (ESA)-listed marbled murrelet during the breeding season, are described in Section 3.2.4.

1.3. COMPENSATORY MITIGATION

Section 6 of this Mitigation Action Plan describes the Navy's proposed Compensatory Mitigation action, which would offset unavoidable adverse impacts on aquatic resources. Compensatory mitigation is required by CWA Section 404 and Sections 9 and 10 of the Rivers and Harbors Act of 1899. Compensatory Mitigation must comply with the USACE and USEPA Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (USACE and USEPA 2008).

1.4. TREATY MITIGATION

Section 9 of this Mitigation Action Plan describes the Navy's proposed treaty mitigation actions for impacts from the Navy projects on Treaty protected resources. These mitigation actions are being developed in consultation with the affected Native American Tribes. Agreement on the treaty mitigation actions was reached with the Skokomish Indian Tribe. Agreement on the mitigation was not reached with the Port Gamble S'Klallam Tribe, Jamestown S'Klallam Tribe, and Lower Elwha Klallam Tribe. Per Department of Defense (DOD) Instruction 4710.02, Secretary of the Navy Instruction 11010-14A, and Commander Navy Region Northwest Instruction (COMNAVREGNWINST) 11010.14, agreement with Tribes on the mitigation is not required to proceed with the proposed Navy actions.

1.5. MONITORING AND REPORTING PROCEDURES

Mitigation measures would be implemented in accordance with this Mitigation Action Plan. Prior to release of bid specifications, construction plans would be provided to the Navy for review and approval. Operational mitigation measures would be monitored by the Navy and any specified responsible parties designated by the Navy.

This Mitigation Action Plan would be in place through all phases of the project, including design, construction, and operation, and would help ensure that project objectives are achieved. The Navy would be responsible for administering the plan and ensuring that all parties comply with its provisions. The Navy may delegate monitoring activities to staff, consultants, or contractors. All construction contractors would submit an Environmental Protection Plan for Construction Management and approval prior to beginning construction activities. This plan would document how the contractor intends to comply with all measures applicable to the contract including application of BMPs. The Navy also would ensure that monitoring is documented through periodic reports and that deficiencies are promptly corrected. The designated environmental monitor would track and document compliance with mitigation measures, note any problems that may result, and take appropriate action to rectify problems.

1.6. MITIGATION MONITORING AND REPORTING PROGRAM IMPLEMENTATION

This Mitigation Action Plan was prepared to verify compliance with individual mitigation measures. This plan identifies each mitigation measure by discipline, the entity (organization) responsible for its implementation, the report/permit/certification required for each measure, and an accompanying form used to certify completion. Certain inspections and reports must be prepared by qualified individuals, and these are specified as needed. The timing and method of verification for each measure is also specified.

1.7. ADAPTIVE MANAGEMENT

The Proposed Actions include adaptive management to minimize environmental impacts. The Navy would evaluate results from other pile-driving operations and research to ensure the most appropriate noise attenuation measures and procedures are applied during project construction, as discussed in Sections 3.2.1, 3.2.2, and 3.2.3 of this Mitigation Action Plan. Mitigation measures would include visual monitoring of marine mammals and marbled murrelets, and shut down of pile driving when these species approach or enter areas where injury may occur.

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2.0 CURRENT AND BEST MANAGEMENT PRACTICES

2.1. PROTECTION OF MARINE WATER QUALITY AND SEAFLOOR DURING CONSTRUCTION

2.1.1. Potential Impacts

Construction-related impacts on water quality would be limited to temporary (minutes to hours) and localized changes associated with resuspension of bottom sediments from pile installation and barge and tug operations, such as anchoring and propeller wash, as well as accidental losses or spills of construction debris into Hood Canal. These changes would be spatially limited to the construction corridor, including areas potentially impacted by anchor drag and areas immediately adjacent to the corridor (i.e., up to approximately 100 feet [30 meters] from the offshore edge of the construction corridor) that could be impacted by plumes of resuspended bottom sediments, and would not violate applicable state or federal water quality standards. Nevertheless, several CPs and BMPs will be implemented to protect marine water quality and the seafloor during construction of both projects. These measures are intended to prevent or minimize potential impacts associated with the following:

- Contaminant loadings from stormwater discharges containing runoff from the construction site;
- Accidental spills or releases of contaminants from work vessels;
- Accidental or incidental release of construction debris and related contaminants;
- Excessive sediment resuspension from prop wash;
- Seafloor disturbances from grounding of work vessels; and
- Seafloor disturbances from anchor dragging.

2.1.2. Environmental Protection Measures

The following measures will be implemented to address each of the above potential impacts.

2.1.2.1. STORMWATER POLLUTION PREVENTION PLAN (BMP 1)

2.1.2.1.1. DESCRIPTION

During project construction, stormwater discharges will be in accordance with a USEPA Construction General Permit. The Navy will also seek a Water Quality Certification from the Washington Department of Ecology (WDOE), under Section 401 of the CWA, certifying that the Proposed Actions will not violate state water quality standards. The contractor will submit a Storm Water Notice of Intent (NOI) (for coverage under the general permit for construction activities) and a SWPPP for the project to the Contracting Officer and obtain approval prior to the commencement of work. The SWPPP will be filed, through the Contracting Officer, to the appropriate federal or state agency for approval, a minimum of 14 calendar days prior to the start of construction. The contractor and the Navy will file Notices of Intent for permit coverage and Notices of Termination once construction is complete.

The SWPPP will meet the requirements of the USEPA general permit for stormwater discharges from construction sites, following guidance in WDOE's *Stormwater Management Manual for Western Washington* (WDOE 2014). The SWPPP will specify the BMPs that will be implemented during all phases of construction to limit contaminant discharges to Hood Canal and monitoring requirements to document compliance with permit conditions. In addition, the SWPPP will:

- Identify potential sources of pollution that may be reasonably expected to affect the quality of stormwater discharge from the sites;
- Describe and ensure implementation of practices that will be used to reduce the pollutants in stormwater discharge from the sites;
- Ensure compliance with terms of the USEPA Construction General Permit for stormwater discharge;
- Select applicable BMPs from the USEPA guide to developing SWPPPs for construction sites (USEPA 2007, EPA 833-R-060-04); and
- Select applicable BMPs from the WDOE *Stormwater Management Manual for Western Washington* (WDOE 2014).

The contractor will be required to install, inspect, and maintain BMPs, and to conduct and document SWPPP site inspections. The contractor will ensure construction operations and management are in compliance with the terms and conditions of the general permit for stormwater discharges from construction activities.

The contractor will create and maintain a three-ring binder of documents at the construction onsite office that demonstrates compliance with the Stormwater Construction Activity permit. The binder will include a copy of the permit Registration Statement, SWPPP and SWPPP update amendments, inspection reports, copies of correspondence with the agency that issued the permit, and a copy of the permit Notice of Termination. At the completion of the project, the folder will be provided to the Contracting Officer and will become the property of the Navy. An advance copy of the Registration Statement will be provided to the Contracting Officer immediately after the form is presented to the permitting agency.

2.1.2.1.2. Party(ies) Responsible for Implementation

The contractor will be responsible for preparing and submitting an application for the Construction General Permit. The USEPA will review the application and issue the permit. The contractor will be responsible for implementing all required BMPs, including maintenance of structural BMPs, and performing all monitoring and reporting as required by the permit.

2.1.2.1.3. Planned Implementation Schedule

Construction General Permit coverage will be obtained prior to the start of all construction work and maintained for the duration of the construction phase. The SWPPP will be implemented prior to the start of construction. Once construction is complete, the Navy will be responsible for updating the existing industrial SWPPP to reflect changes in the facility and operations associated with the LWI and SPE.

2.1.2.1.4. Planned Funding

Implementation of the Construction General Permit and SWPPP, including installation and maintenance of BMPs, will be part of the contractor's scope of work, and will be funded under the Navy's construction contract.

2.1.2.1.5. Mitigation-Specific Performance Criteria

The performance criteria will be as specified in the Construction General Permit.

2.1.2.1.6. Monitoring and Tracking Mechanisms

As the co-permittee, the contractor will be responsible for monitoring and reporting per the specifications in the permit.

2.1.2.1.7. Enforcement Measures

The Construction General Permit will be enforced by the USEPA. Non-compliance with the permit could be used as a basis for corrective actions and/or fines.

2.1.2.2. SPILL PREVENTION CONTROL MEASURE (CP 1A)

2.1.2.2.1. Description

The existing facility response plans for the Bangor waterfront provide guidance that will be used in a spill response, such as a response procedures, notification, and communication plan; roles and responsibilities; and response equipment inventories (COMNAVREGNWINST 5090.1, Integrated Contingency Plan, Annex G). In the event of an accidental spill, response measures will be implemented immediately to reduce potential impacts on the surrounding environment.

This measure will consist of the following elements:

- Spill kits will be maintained on site and readily available,
- The contractor and crew will be trained in spill prevention and containment techniques,
- Spill prevention will be implemented daily by maintaining awareness in the construction crew and monitoring the activities, and
- Clean and well-maintained equipment and tools will be used.

Additionally, during in-water construction activities, an absorbent oil containment boom will be placed around the construction area, as required by the CWA Section 401 Water Quality Certification for the projects, to contain accidental oil or hazardous materials spills and prevent or minimize impacts on marine mammals or other fish and wildlife species.

2.1.2.2.2. Party(ies) Responsible for Implementation

The Navy will be responsible for providing copies of the spill response plans to the contractors and training the contractor and crew in spill prevention and containment techniques. The Navy also will be responsible for maintaining all equipment and supplies required for a spill response.

The contractor will be responsible for exercising due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. In the event of a spill, the contractor will take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; the contractor will immediately (within 15 minutes) notify the Base or Activity Fire Department, the activity's Command Duty Officer, and the Contracting Officer. The Navy is responsible for verbal and written notifications as required by the federal 40 Code of Federal Regulations (CFR) 355, state, local regulations, and Navy Instructions. Spill response will be in accordance with 40 CFR 300 and applicable state and local regulations.

2.1.2.2.3. Planned Implementation Schedule

The existing spill response plans will be implemented for the duration of the construction phase. An oil containment boom will be in place as required by the CWA Section 401 Water Quality Certification for the projects.

2.1.2.2.4. Planned Funding

If Government assistance is requested or required, the contractor will reimburse the Navy for such assistance. Funding for maintaining spill response activities will be part of the Navy's existing Operations and Maintenance budget.

2.1.2.2.5. Mitigation-Specific Performance Criteria

Performance criteria will be in accordance with the existing plans.

2.1.2.2.6. Monitoring and Tracking Mechanisms

Monitoring and tracking will be in accordance with the existing plans.

2.1.2.2.7. Enforcement Measures

Deficiencies in the spill response, notification, or cleanup will be cause for corrective actions. The contractor will reimburse the government for all costs incurred including sample analysis materials, equipment, and labor if the government must initiate its own spill cleanup procedures, for contractor responsible spills, when (a) the contractor has not begun spill cleanup procedure within one hour of spill discovery/occurrence or (b) if, in the Navy's judgment, the contractor's spill cleanup is not adequately abating a life threatening situation and/or is a threat to any body of water or environmentally sensitive areas.

2.1.2.3. CONSTRUCTION DEBRIS AND PILE REMOVAL CONTROL MEASURES (CP 1B)

2.1.2.3.1. Description

This measure will consist of the following elements:

The contractor will prepare and implement construction debris management procedures as required by the Clean Water Act Section 401 Water Quality Certification for the project. Debris will be prevented from entering the water during all demolition or new construction work. During in-water construction activities, the contractor will deploy and maintain floating booms no further seaward than the 100-foot (30-meter) designated construction corridor to collect and contain floatable materials. Any accidental release of equipment or materials will be immediately retrieved and removed from the water. Uncured concrete or slurries will not be discharged. The contractor will provide a temporary platform or other suitable means of capturing debris from all demolition operations. Debris which could pollute storm water will be stored, covered and frequently removed from the site. Following completion of in-water construction activities, an underwater survey will be conducted to remove any remaining construction materials that may have been missed previously. Removed debris will be disposed of at an approved upland disposal site.

Old piles will be removed using a crane with a clamshell bucket or similar methods and will be cut at the mudline if splitting or breakage occurs. During removal of old piles, removed creosote-treated wood piles and associated sediments (if any) will be contained on a barge or, if a barge is not utilized, stored in a containment area near the construction site. All creosote-treated material and associated sediments will be disposed of in a landfill that meets the liner and leachate standards of the WAC.

2.1.2.3.2. Party(ies) Responsible for Implementation

The Navy will require the construction contractor to retrieve and clean up any debris spilled into Hood Canal. The contractor will be responsible for preparing and implementing the procedures. The Navy will be responsible for reviewing and approving the procedures and for monitoring their implementation.

2.1.2.3.3. Planned Implementation Schedule

The construction debris management procedures and controls will be in place and approved by the Navy Contracting Officer prior to the start of any in-water construction work. These procedures will be implemented throughout the in-water construction period including post-construction removal of any remaining debris.

2.1.2.3.4. Planned Funding

The construction debris management procedures will be part of the contractor’s scope of work, and will be funded under the Navy’s construction contract.

2.1.2.3.5. Mitigation-Specific Performance Criteria

The performance criteria will be no loss of floatable debris outside of the flotation booms and no debris will be left on the seafloor during and after construction is complete. Following completion of in-water construction activities, an underwater survey will be conducted to remove any remaining construction materials that may have been missed during previous cleanups.

2.1.2.3.6. Monitoring and Tracking Mechanisms

The Navy will be responsible for monitoring compliance with the construction debris management procedures. The Navy will monitor for compliance using a combination of visual inspections and written correspondence/documentation from the contractor.

2.1.2.3.7. ENFORCEMENT MEASURES

Non-compliance with the procedures could be used as a basis for corrective actions or non-payment of contractor invoices.

2.1.2.4. PROP WASH CONTROL MEASURE (CP 1C)

2.1.2.4.1. DESCRIPTION

To minimize disturbances of the seafloor from prop wash, vessel traffic will be excluded from shallow areas outside of the 100-foot (30-meter) construction zone, which will be marked using temporary buoys or other visual guides. Additionally, shallow draft, low horsepower tugboats will be used in the nearshore area and for extended operations in areas shallower than about 40 feet (12 meters) below mean lower low water (MLLW).

2.1.2.4.2. PARTY(IES) RESPONSIBLE FOR IMPLEMENTATION

The contractor will be responsible for implementing this measure.

2.1.2.4.3. PLANNED IMPLEMENTATION SCHEDULE

This measure will be implemented throughout the construction phase.

2.1.2.4.4. PLANNED FUNDING

No additional funding will be required for this measure.

2.1.2.4.5. MITIGATION-SPECIFIC PERFORMANCE CRITERIA

The performance criterion for this measure is complete avoidance of excessive prop wash, causing unnecessary resuspension of bottom sediments as manifested by the presence of surface turbidity plumes within the project sites.

2.1.2.4.6. MONITORING AND TRACKING MECHANISMS

The Navy will have overall responsibility for monitoring in-water construction activities. The construction contractor will be directly responsible for monitoring and for tracking compliance with this measure.

2.1.2.4.7. ENFORCEMENT MEASURES

Non-compliance with this measure could be used as a basis for corrective actions or non-payment of contractor invoices.

2.1.2.5. WORK VESSEL GROUNDING CONTROL MEASURE (CP 1D)

2.1.2.5.1. DESCRIPTION

To minimize seafloor disturbances, construction of the LWI and SPE will be conducted from barges in deep-water areas and/or from land to the extent possible. Construction barges will avoid grounding in eelgrass beds during low tides. Spudding/anchoring in existing eelgrass habitat will be avoided wherever possible. Vessel operators will be provided with maps of the project site with eelgrass beds clearly marked. The abutments and observation posts will be built from land.

2.1.2.5.2. Party(ies) Responsible for Implementation

The construction contractor will be responsible for ensuring that all work vessel operations comply with this measure.

2.1.2.5.3. Planned Implementation Schedule

This measure will be implemented throughout the construction phase.

2.1.2.5.4. Planned Funding

No additional funding will be required for this measure.

2.1.2.5.5. Mitigation-Specific Performance Criteria

The performance criterion for this measure is complete avoidance of vessel grounding at the project site.

2.1.2.5.6. Monitoring and Tracking Mechanisms

The Navy will be responsible for monitoring in-water construction activities. The construction contractor will be responsible for monitoring and tracking compliance with this measure.

2.1.2.5.7. Enforcement Measures

Non-compliance with this measure could be used as a basis for corrective actions or non-payment of contractor invoices.

2.1.2.6. MOORING AND ANCHORING PLAN (CP 1E)

2.1.2.6.1. Description

To minimize the potential for seafloor disturbances, the contractor will submit a mooring and anchoring plan for approval by the Contracting Officer. The plan will identify measures to be taken to avoid or minimize significant impacts on bottom habitats in areas identified on the construction drawings from line or anchor drag. Measures will include:

1. Placement of anchors outside of special status areas, to the extent feasible;
2. Placement and retrieval of any anchors required within special status areas using a secondary work boat and/or vertical lift system to avoid/minimize dragging; and
3. Use of a buoy(s) (surface or subsurface) along the lower portion of mooring lines required within special status areas to avoid/minimize dragging.

2.1.2.6.2. Party(ies) Responsible for Implementation

The construction contractor will be responsible for preparing the plan and ensuring that all work vessel operations comply with the approved plan.

2.1.2.6.3. PLANNED IMPLEMENTATION SCHEDULE

This measure will be implemented throughout the construction phases of both projects.

2.1.2.6.4. PLANNED FUNDING

No additional funding will be required for this measure.

2.1.2.6.5. MITIGATION-SPECIFIC PERFORMANCE CRITERIA

The performance criterion for this measure is complete avoidance of dragging anchors or lines through sensitive bottom habitat at the project sites.

2.1.2.6.6. MONITORING AND TRACKING MECHANISMS

The Navy will be responsible for monitoring in-water construction activities. The construction contractor will be responsible for monitoring and tracking compliance with this measure.

2.1.2.6.7. ENFORCEMENT MEASURES

Non-compliance with this measure could be used as a basis for corrective actions or non-payment of contractor invoices.

2.2. IN-WATER WORK WINDOW (MM 2)

2.2.1. Potential Impacts

In-water construction work could interfere with migrating salmonids and/or sensitive life stages of protected species during certain portions of the year.

2.2.2. Mitigation Measures (MM 2)

Construction activities with the greatest potential to harm fish, notably pile driving, would observe an in-water work window when ESA-listed salmonids are least likely to be present. The Tidal Reference Area 13 (northern Hood Canal) in-water juvenile salmonid work window is currently July 15 to January 15, as outlined in WAC-220-660-330. The work window reflects best available science considerations for minimizing in-water project impacts on migrating juvenile salmonids, primarily Hood Canal summer-run chum. All in-water work would occur only during the work window to minimize the number of ESA-listed salmonids exposed to underwater noise and other disturbance. The exception is that, for the LWI project, in-water work other than pile driving and abutment work below MHHW could occur outside the in-water work window.

2.2.3. Party(ies) Responsible for Implementation

The construction contractor would be responsible for ensuring that no in-water construction work occurs outside of the work window, except non-pile driving in-water work for the LWI project and that operations comply with this measure.

2.2.4. Planned Implementation Schedule

This measure would be implemented throughout the construction phase.

2.2.5. Planned Funding

No additional funding would be required for this measure.

2.2.6. Mitigation-Specific Performance Criteria

The performance criterion for this measure is complete avoidance of in-water construction work during non-work windows, as modified.

2.2.7. Monitoring and Tracking Mechanisms

The Navy would be responsible for monitoring in-water construction activities. The construction contractor would be responsible for monitoring and tracking compliance with this measure.

2.2.8. Enforcement Measures

Non-compliance with this measure could be used as a basis for corrective actions or non-payment of contractor invoices. ESA requirements would be enforced by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). Section 10 and 404 permit conditions would be enforced by USACE.

2.3. PROTECTION OF UPLAND WATER QUALITY DURING CONSTRUCTION (BMP 3)

2.3.1. Potential Impacts

During construction, there would be increased potential for erosion and sedimentation from stormwater runoff, which could entrain sediment that would cause temporary localized degradation of some water quality parameters.

2.3.2. Mitigation Measures

2.3.2.1. IMPLEMENT SWPPP (BMP 3)

Construction activities will be in accordance with the USEPA Construction General Permit. For compliance with the Energy Independence and Security Act of 2007, the Navy will maintain site hydrology to the maximum extent feasible. Design of upland features (e.g., laydown area) will consider the USEPA guidance for compliance with the Energy Independence and Security Act (EISA) (USEPA 2009) as well as other relevant technical information regarding methods to improve stormwater retention and quality.

A number of measures will be implemented to protect water quality, including installation of a temporary runoff capture and discharge system, and installation of temporary siltation barriers below the excavation/construction zone, to control stormwater runoff into Hood Canal. Proper installation, routine maintenance, and periodic monitoring of BMPs, in accordance with the SWPPP, will ensure that the measures are effective and minimize the potential for impacts on marine water quality.

During shoreside mobilization of equipment, existing native vegetation will not be disturbed outside of the work area. BMPs for clearing, grading, and maintenance will be employed as needed to control erosion and sedimentation, including the possible use of benched surfaces, downdrain channels, diversion berms and ditches, erosion control blankets or turf reinforcement mats, plastic coverings, silt fences and check dams, and straw bales. Gravel pads will be installed at construction area access points to prevent tracking of soil onto paved roads. Water-spraying on soil will be used to control dust generation during earthmoving and hauling.

2.3.3. Party(ies) Responsible for Implementation

The contractor will be responsible for installing, maintaining, and monitoring BMPs, as specified in the SWPPP, and for ensuring compliance with the conditions of the Construction General Permit.

2.3.4. Planned Implementation Schedule

These measures will be completed prior to the start of construction and maintained for the duration of the construction phases of both projects.

2.3.5. Planned Funding

Implementation of the Construction General Permit and SWPPP, including installation and maintenance of BMPs, will be part of the contractor's scope of work, and would be funded under the Navy's construction contract.

2.3.6. Mitigation-Specific Performance Criteria

The performance criteria will be as specified in the Construction General Permit.

2.3.7. Monitoring and Tracking Mechanisms

As the co-permittee, the contractor will be responsible for monitoring and reporting per the specifications in the permit.

2.3.8. Enforcement Measures

The Construction General Permit will be enforced by USEPA. Non-compliance with the permit could be used as a basis for corrective actions and/or fines.

2.4. PROTECTION OF WATER QUALITY DURING OPERATIONS

2.4.1. Potential Impacts

Operation of the LWI and SPE would not require dredging or placement of fill or direct discharges of waste to the marine environment, other than stormwater discharges. Potential operational impacts on water quality would be limited to the following:

- Contaminant loadings from stormwater runoff discharges from the project sites, and
- Accidental spills or releases of contaminants from work vessels.

Stormwater discharges during operations will be in accordance with the Navy's Multi-Sector General Permit (MSGP) for Stormwater Discharges associated with Industrial Activity and the NAVBASE Kitsap Bangor SWPPP. Stormwater management is considered part of project design. Stormwater runoff from the LWI structures would not require treatment and could discharge directly into Hood Canal because the structure surfaces are expected to consist largely of inert materials and would not represent a source of substantial pollutant loadings to Hood Canal. Drainage water from the SPE project site would be collected in a trench drain on the pier, treated using an in-line canister system designed to meet the basic treatment requirements of the WDOE *Stormwater Management Manual for Western Washington*, and then discharged to Hood Canal in accordance with an NPDES permit. Thus, operations would not intentionally release materials that would have a potential to impact marine water quality, and WDOE stormwater standards would be maintained.

Operation of the LWI would not increase the risk of accidental spills because, other than minor, small boat operations, project operations would not require use of explosives, solvents, or other contaminants. The existing NAVBASE Kitsap Bangor fuel spill prevention and response plans (the *Commander Navy Region Northwest Oil and Hazardous Substance Integrated Contingency Plan* and the *NAVBASE Kitsap Bangor Spill Prevention, Control, and Countermeasure Plan* [COMNAVREGNWINST 5090.1, Integrated Contingency Plan, Annex G]) would minimize the risk of fuel spills from small boat operations. In the event of an accidental spill, emergency cleanup measures would be implemented immediately in accordance with state and federal regulations. Operation of the SPE would not increase the risk of accidental spills of fuel, explosives, cleaning solvents, and other contaminants that, if spilled, would impact water quality in Hood Canal. This is because BMPs and CPs (including the existing NAVBASE Kitsap Bangor spill prevention and response plans), would minimize the risk from fuel spills. In the event of an accidental spill, emergency cleanup measures would be implemented immediately in accordance with state and federal regulations. The cleanup would minimize impacts on the surrounding environment. Thus, the potential for impacts on water quality from LWI and SPE operations is expected to be minimal.

2.4.2. Mitigation Measures

2.4.2.1. INTEGRATED SWPPP (BMP 4)

Stormwater runoff discharges during operations will be regulated by the MSGP and the NAVBASE Kitsap Bangor industrial activity SWPPP. Drainage water from the SPE project site will be collected in a trench drain on the pier, treated using an in-line canister system designed to meet the basic treatment requirements of the WDOE *Stormwater Management Manual for Western Washington*, and then discharged to Hood Canal in accordance with the MSGP permit. Thus, operations will not intentionally release materials that would have a potential to impact marine water quality and WDOE water quality standards would be maintained.

2.4.2.2. LOW IMPACT DEVELOPMENT (CP 4A)

To comply with Section 438 of the EISA, the Navy will implement LID strategies in accordance with UFC 3-210-10N (*Low Impact Development*; Department of Defense [DoD] November 2010). LID is a stormwater management strategy designed to maintain site hydrology and mitigate the adverse impacts of stormwater runoff and non-point source pollution. LID provides decentralized hydrologic source control for stormwater using IMPs, which are distributed small-scale controls that closely maintain or replicate hydrological behavior of the natural system for a defined design storm event. These strategies are intended to complement the federal, state, and local regulations pertaining to stormwater management. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product. Many practices have been used to adhere to these principles such as bio-retention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed.

2.4.2.3. OIL AND HAZARDOUS SPILL CONTINGENCY (CP 4B)

Prevention, containment, and cleanup of spills associated with project operations are addressed by the existing facility response plans for the Bangor waterfront (COMNAVREGNWINST 5090.1, Integrated Contingency Plan, Annex G). The plan provides guidance that will be used in a spill response, such as a response procedures, notification, and communication plan; roles and responsibilities; and response equipment inventories. In the event of an accidental spill, response measures will be implemented immediately to reduce potential impacts on the surrounding environment. Containment practices will be consistent with the existing NAVBASE Kitsap Bangor waterfront structures, including the use of in-water containment booms and facility response plans, and will minimize the risk of spills during operations.

2.4.3. Party(ies) Responsible for Implementation

The Navy will be responsible for implementing the SWPPP and complying with the permit conditions. The Navy in conjunction with the project designer will be responsible for ensuring that the projects are designed with features needed to meet the EISA requirements.

2.4.4. Planned Implementation Schedule

The industrial discharge permit and spill response plan are already in place. The SWPPP will be modified to reflect the new waterfront facilities and any related changes in collection, treatment, and discharge of stormwater.

2.4.5. Planned Funding

No additional funding will be required.

2.4.6. Mitigation-Specific Performance Criteria

The performance criterion for stormwater discharges is compliance with the industrial discharge permit conditions. The performance criteria for spill response are included in the plan, and these include training, maintaining equipment and supplies of spill cleanup materials, and effectiveness as determined by regular spill response exercises.

2.4.7. Monitoring and Tracking Mechanisms

Monitoring and reporting requirements for the stormwater discharges are specified in the industrial discharge permit.

2.4.8. Enforcement Measures

The terms and conditions of the industrial discharge permit are enforced by USEPA, and non-compliance with the permit could result in regulatory actions.

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3.0 NOISE ATTENUATION DURING CONSTRUCTION

3.1. POTENTIAL IMPACTS

Pile driving noise would likely result in behavioral disturbance of ESA-listed fish (salmonids and rockfish), ESA-listed marbled murrelet, birds protected under the Migratory Bird Treaty Act (MBTA), and marine mammals protected under the MMPA. There is also a potential for noise-related injury to these species. This section addresses noise attenuation measures to minimize the potential for noise-related impacts on marine species during construction.

Marine mammal and marbled murrelet monitoring, which would be conducted during pile driving, is discussed in Section 4. The in-water work window restrictions, described in Section 2.2, would also reduce the potential for pile driving noise-related impacts on migrating salmonids.

3.2. MITIGATION MEASURES

The following noise attenuation measures will be implemented to minimize noise levels due to pile driving and other construction operations.

3.2.1. Use of Vibratory Driver in Lieu of Impact Hammer (MM 5a)

3.2.1.1. DESCRIPTION

The vibratory pile driver would be the primary method for driving steel piles; an impact hammer would be used primarily to drive concrete piles and to proof vibratory driven piles, but also to drive steel piles which cannot be driven to the required depth using a vibratory pile driver because of geotechnical conditions. Under the preferred Alternatives, the number of impact hammer strikes would not exceed 2,000 per day. No more than one impact hammer would be used concurrently for each project (LWI and SPE). Construction of the two projects would not overlap in time; therefore pile driving for the two projects would not occur at the same time.

3.2.1.2. PARTY(IES) RESPONSIBLE FOR IMPLEMENTATION

The construction contractor would be responsible for ensuring that use of impact hammers does not exceed the parameters described above.

3.2.1.3. PLANNED IMPLEMENTATION SCHEDULE

This measure would be implemented throughout the construction phases of both projects.

3.2.1.4. PLANNED FUNDING

No additional funding would be required for this measure.

3.2.1.5. MITIGATION-SPECIFIC PERFORMANCE CRITERIA

The performance criterion for this measure is to reduce the use of impact hammers to the extent possible and, at a minimum, comply with the use restrictions described above.

3.2.1.6. MONITORING AND TRACKING MECHANISMS

The Navy would be responsible for monitoring in-water construction activities. The construction contractor would be responsible for monitoring and tracking compliance with this measure.

3.2.1.7. ENFORCEMENT MEASURES

Non-compliance with this measure could be used as a basis for corrective actions or non-payment of contractor invoices.

3.2.2. Deploy Air Bubble Curtains or Other Noise Attenuating Device(s) for Impact Hammer Operations (MM 5b)

3.2.2.1. DESCRIPTION

The contractor would deploy an air bubble curtain, or other noise attenuating device, around impact hammer operations for steel piles during in-water construction. The purpose of the bubble curtain noise attenuator is to reduce underwater pile driving noise levels. The bubble curtain would also reduce the radius of the area in which injurious or disturbing noise levels could occur, thus reducing the area in which fish, marine mammals, and birds would potentially be exposed to injury or disturbance.

3.2.2.2. PARTY(IES) RESPONSIBLE FOR IMPLEMENTATION

The construction contractor would be responsible for ensuring that bubble curtains are deployed and operational around all impact hammer operations.

3.2.2.3. PLANNED IMPLEMENTATION SCHEDULE

This measure would be implemented during all impact hammer operations for steel piles for both projects.

3.2.2.4. PLANNED FUNDING

Funding for this measure would be included in the construction contract.

3.2.2.5. MITIGATION-SPECIFIC PERFORMANCE CRITERIA

The performance criterion for this measure is testing of proper bubble curtain deployment. Pile driving would not be allowed to start until a bubble curtain is shown to be deployed properly. Construction contractor would be responsible for not exceeding performance measures.

3.2.2.6. MONITORING AND TRACKING MECHANISMS

Monitoring in-water noise levels is discussed in Section 4 of this Mitigation Action Plan.

3.2.2.7. ENFORCEMENT MEASURES

ESA and MMPA requirements would be enforced by the Navy. Navy staff would ensure that the bubble curtain has been deployed properly. Assessments would be done by a monitoring contractor. Non-compliance with this measure could be used as a basis for corrective actions or non-payment of contractor invoices.

3.2.3. Soft Start for Pile Driver Operations (MM 5c)

3.2.3.1. DESCRIPTION

The objective of a soft start is to provide a warning and/or give animals in close proximity to pile driving a chance to leave the area prior to an impact driver operating at full capacity, thereby exposing fewer animals to loud underwater and airborne sounds.

- A soft-start procedure would be used at the beginning of each day's in-water pile driving or any time pile driving has ceased for more than 30 minutes.
- For impact pile driving, the following soft-start procedures would be conducted as follows:
  - If a bubble curtain is used for steel impact pile driving, the contractor would start the bubble curtain prior to the initiation of impact pile driving in order to flush fish from the injury zone near the pile.
  - The contractor would provide an initial set of strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then two subsequent sets. (The reduced energy of an individual hammer strike cannot be quantified because strikes vary by individual drivers. Also, the number of strikes would 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.")

For vibratory pile driving, the contractor would initiate noise from vibratory hammers for 15 seconds at reduced energy followed by a 30-second waiting period. The procedure would be repeated two additional times. If marine mammal monitoring data indicate that there is no change in behavior of pinnipeds during vibratory pile driving or soft-start procedures and the NMFS concurs, then the soft-start procedure would no longer be required. Due to mechanical limitations, soft starts for vibratory driving would be conducted only with drivers equipped with variable moment features. Typically, this feature is not available on larger, high-power drivers. The Navy would use the driver model most appropriate for the geologic conditions at the project location, and would perform soft starts if the hammer is equipped to conduct them safely.

3.2.3.2. PARTY(IES) RESPONSIBLE FOR IMPLEMENTATION

The construction contractor would be responsible for ensuring that soft-start procedures are employed for all pile driver operations.

3.2.3.3. PLANNED IMPLEMENTATION SCHEDULE

This measure would be implemented throughout the construction phases of both projects.

3.2.3.4. PLANNED FUNDING

No additional funding would be required for this measure.

3.2.3.5. MITIGATION-SPECIFIC PERFORMANCE CRITERIA

The performance criterion for this measure is consistent use of this method for pile driver operations.

3.2.3.6. MONITORING AND TRACKING MECHANISMS

The Navy would be responsible for monitoring in-water construction activities. The construction contractor would be responsible for monitoring and tracking compliance with this measure.

3.2.3.7. ENFORCEMENT MEASURES

ESA and MMPA requirements would be enforced by USFWS and NMFS. Navy staff would ensure that marine mammal and marbled murrelet monitoring is conducted in accordance with agency-approved monitoring plans. Assessments would be done by monitoring Navy reports/records. Non-compliance with this measure could be used as a basis for corrective actions or non-payment of contractor invoices.

3.2.4. Timing Restrictions (MM 5d)

3.2.4.1. DESCRIPTION

Construction activities would not be conducted between the hours of 10:00 p.m. and 7:00 a.m. Pile driving would be limited to daylight hours due to the requirement for visual monitoring of ESA-listed marbled murrelet presence in the construction area (described in Section 4.2.1). Impact pile driving during the first part of the in-water work window (July 15 to September 23) would only occur between 2 hours after sunrise and 2 hours before sunset to protect foraging marbled murrelets during the breeding season. Vibratory pile driving and other construction activities occurring in the water between July 15 and September 23 would occur during daylight hours (sunrise to sunset). Between September 24 and January 15, in-water construction activities would occur during daylight hours (sunrise to sunset).

3.2.4.2. PARTY(IES) RESPONSIBLE FOR IMPLEMENTATION

The construction contractor would be responsible for ensuring that pile driving work occurs during daylight hours only.

3.2.4.3. PLANNED IMPLEMENTATION SCHEDULE

This measure would be implemented throughout the construction phases of both projects.

3.2.4.4. PLANNED FUNDING

No additional funding would be required for this measure.

3.2.4.5. MITIGATION-SPECIFIC PERFORMANCE CRITERIA

The performance criterion for this measure is minimizing all construction-related noises during the night.

3.2.4.6. MONITORING AND TRACKING MECHANISMS

The Navy would be responsible for monitoring in-water construction activities. The construction contractor would be responsible for monitoring and tracking compliance with this measure.

3.2.4.7. ENFORCEMENT MEASURES

ESA and MMPA requirements would be enforced by USFWS and NMFS. Navy staff would ensure that marine mammal and marbled murrelet monitoring is conducted in accordance with agency-approved monitoring plans. Assessments would be done by monitoring Navy reports/records. Non-compliance with this measure could be used as a basis for corrective actions or non-payment of contractor invoices.

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4.0 MONITORING TO MINIMIZE NOISE IMPACTS

4.1. Potential Impacts

Pile driving noise could disturb ESA-listed fish (salmonids and rockfish), ESA-listed marbled murrelet, MBTA-protected birds, and MMPA-protected marine mammals. There would also be a potential for noise-related injury to these sensitive species. Marine mammal and marbled murrelet monitoring would be conducted during pile driving operations to reduce the potential for injury to ESA and non-ESA listed species. The movements of survey boats engaged in marbled murrelet monitoring during pile driving operations would tend to discourage seabirds from foraging or resting inside the injury zones while noise levels are elevated, as seabirds generally withdraw from moving boats. Thus, the marbled murrelet monitoring protocol would also protect MBTA-protected seabird species as well as the marbled murrelet from exposure to construction noise.

4.2. Mitigation Measures

The monitoring program described below would be implemented during the construction phases of the LWI and SPE projects to reduce impacts on protected species. The monitoring program would include visual monitoring of marine mammals, visual monitoring of marbled murrelets, data collection, and reporting. The monitoring results would be used to assess the need to suspend pile driving operations when sensitive species are present in the work areas. These components are described below. The Navy is in consultation with the regulatory agencies about specific monitoring plans for regulated species. The monitoring plans discussed in this section may be modified as a result of these ongoing consultations.

4.2.1. Monitoring Plans

The Navy would develop protocol monitoring plans for marine mammal occurrence and marbled murrelet occurrence in coordination with NMFS and the USFWS. A draft marine mammal monitoring plan would be developed and submitted to the NMFS and would be approved prior to the start of construction. Similarly, a marbled murrelet monitoring plan consistent with the USFWS Marbled Murrelet Monitoring Protocol (USFWS 2012) would be developed and submitted to USFWS and would be finalized prior to construction. The basic element of the marine mammal monitoring plan is to designate a shutdown zone for pile driving that would be defined in consultation with NMFS to include all areas where underwater sound pressure levels (SPLs) have the potential to exceed physiological injury-related noise levels for marine mammals (Level A take as defined by the MMPA), based on sound attenuation modeling. The injury zones for marine mammals were determined by sound attenuation modeling based on in situ acoustic monitoring results from other pile driving projects (EHW-2 and Test Pile Project) at NAVBASE Kitsap Bangor, and results for similar pile sizes that were reported in the literature (Appendix H of the EIS). Modeled or calculated injury zones may be different from the shutdown zones.

The marbled murrelet monitoring plan would use a shutdown zone for impact pile driving defined as all areas where underwater SPLs have the potential to exceed auditory injury-related noise levels for marbled murrelets, based on sound attenuation modeling. There would be a shutdown zone including areas where airborne SPLs resulting from impact pile driving are anticipated to equal or exceed the auditory masking zone. Conditions governing project shutdown for marbled murrelets could be modified subject to an adaptive management strategy. SPL criteria for various species groups are described in Section 4.2.1.2.

The individuals that implement the monitoring protocols would assess their effectiveness using an adaptive management approach. Monitoring biologists would use their best professional judgment throughout implementation and would seek improvements to these methods when deemed appropriate. Any modifications to the protocols would be coordinated between the Navy, USFWS, and NMFS. There would be multiple dedicated observers for the marine mammal and marbled murrelet survey efforts. Marbled murrelet observers would be certified by USFWS to perform the Marbled Murrelet Monitoring Protocol (USFWS 2012).

4.2.1.1. MARINE MAMMAL AND MARBLED MURRELET VISUAL MONITORING (MM 6)

4.2.1.1.1. SHUTDOWN AND BEHAVIORAL DISTURBANCE ZONES (IMPACT AND VIBRATORY PILE DRIVING/REMOVAL) FOR MARINE MAMMALS

- During impact and vibratory pile driving/removal, the shutdown zone would include all areas where the underwater SPLs are anticipated to equal the Level A (injury) harassment criteria for marine mammals (180 dB isopleths for cetaceans; 190 dB isopleths for pinnipeds). The shutdown zone distances would be specified in consultation with NMFS.
- All shutdown zones would initially be based on the distances from the source that were predicted for each threshold level.
- During impact pile driving, the behavioral disturbance zone would include all areas within the PSB where the underwater or airborne SPLs are anticipated to equal or exceed the Level B (disturbance) harassment criteria for marine mammals during impact pile driving (160 dB isopleth). The modeled distance to the 160 dB isopleth for impulsive sound caused by driving 36-inch steel pile is 1,775 feet (541 meters). Marine mammal observers cannot easily see animals on the other side of the PSB and it is not feasible for boats to move through the PSB structures during monitoring due to the intensive security checks required to enter the WRA. Therefore, visual monitoring to the furthest extent of the calculated disturbance zone may be largely obstructed by the PSB. Marine mammal monitors would monitor the area from the driven pile to the PSB at a minimum and would also attempt to record any additional observations of marine mammals beyond the fence.
- During vibratory pile driving, the Level B (disturbance) harassment criterion (120 dB isopleth) predicts an affected area up to 19.3 square miles (50.1 square kilometers) for 36-inch steel piles. The size of this area would make effective monitoring impractical. As a result, a behavioral disturbance zone equivalent to the size of the predicted 160 dB isopleth for impact pile driving, as described above, would be monitored for pinnipeds and cetaceans during all vibratory pile driving/removal activities. Marine mammal observers cannot easily see animals on the other side of the PSB and it is not feasible for boats to move through the PSB structures during monitoring due to the intensive security checks required to enter the WRA. Therefore, visual monitoring to the furthest extent of the calculated disturbance zone may be largely obstructed by the PSB. Marine mammal monitors would monitor the area from the driven pile to the PSB at a minimum and would also attempt to record any additional observations of marine mammals beyond the PSB fence.

- The shutdown and behavioral disturbance zones would be monitored throughout the time required to drive a pile. If a marine mammal enters the behavioral disturbance zone, an exposure would be recorded and behaviors documented. However, the pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point all pile driving activities would immediately be halted.
- Under certain construction circumstances, where initiating the shutdown and clearance procedures (which could include a delay of 15 minutes or more) would result in an imminent concern for human safety, the shutdown provision may be waived at the discretion of the construction foreman. The marine mammal monitoring plan would define the situations or criteria in which such a scenario may occur.

4.2.1.1.2. SHUTDOWN ZONE (IN-WATER CONSTRUCTION ACTIVITIES NOT INVOLVING A PILE DRIVING HAMMER) FOR MARINE MAMMALS

- During in-water construction activities not involving a pile driver, but having the potential to affect marine mammals, in order to prevent injury to these species from their physical interaction with construction equipment, a shutdown zone of 33 feet (10 meters) would be monitored to ensure that marine mammals are not present in this zone.
- These activities could include, but are not limited to: (1) movement of the barge to the pile location, (2) positioning of the pile on the substrate via a crane (i.e., “stabbing” the pile), (3) removal of the pile from the water column/substrate via a crane (i.e., “deadpull”), or (4) placement of sound attenuation devices around the piles.

4.2.1.1.3. SHUTDOWN ZONE (IMPACT PILE DRIVING) FOR MARBLED MURRELETS

- Shutdown zones for marbled murrelets include areas where underwater SPLs resulting from impact pile driving are anticipated to equal or exceed auditory injury. There would be a shutdown zone including areas where airborne SPLs resulting from impact pile driving are anticipated to equal or exceed the auditory masking zone. The auditory injury criterion is the 202 dB cumulative sound exposure level (SEL) isopleth for impact pile driving, depending on the number of pile strikes, as determined by sound attenuation modeling. The distance may be adjusted based on the number of pile strikes. The shutdown distances would be specified in consultation with the U.S. Fish and Wildlife Service (USFWS).
- The shutdown zones would be monitored throughout the time required to drive a pile with an impact hammer. If a marbled murrelet is observed in the monitored area, impact pile driving would be stopped until the marbled murrelet leaves the area under its own volition, but pile driving does not need to be stopped for longer than 1 hour per marbled murrelet encounter. Impact pile driving does not need to be curtailed for more than 2 hours total time per day, regardless of the number of marbled murrelets encountered.
- The Navy would document the duration and frequency of shutdowns of impact pile driving due to the presence of marbled murrelets. Should shutdowns occur at a frequency that is significantly affecting the project’s schedule for completion, the Navy may convene an adaptive management group consisting of representatives of the Navy and USFWS to address the issue. The adaptive management group would identify and agree to criteria and timelines for implementation of an adaptive strategy. Any changes or refinements of shutdown zones that are approved by USFWS would be incorporated into the marbled murrelet monitoring plan.

4.2.1.1.4. Visual Marine Mammal Monitoring (MM 6)

A Marine Mammal Monitoring Plan would be finalized prior to commencement of pile driving activities. Based on NMFS requirements, the plan would include, at a minimum, the following procedures for impact pile driving.

Qualifications

Monitoring would be conducted by qualified, trained marine mammal observers (MMOs). An observer is a biologist with prior training and experience in conducting at-sea marine mammal monitoring or surveys, and who has the ability to identify marine mammal species and describe relevant behaviors that may occur in proximity to in-water construction activities. NMFS requires that the observers have no other construction-related tasks while conducting monitoring. A trained observer would be placed at the best vantage point(s) practicable (e.g., from a small boat, the pile driving barge, on shore, or any other suitable location) to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator.

Methods of Monitoring

The Navy would monitor the vibratory and impact driver shutdown and behavioral disturbance zones before, during, and after pile driving.

a. MMOs would be located at the best vantage point(s) in order to properly see the entire shutdown zone. This may require the use of a small boat to monitor certain areas while also monitoring from one or more land-based vantage points.
b. During all observation periods, observers would use binoculars and the naked eye to search continuously for marine mammals.
c. If the shutdown zones are obscured by fog, sea state, or poor lighting conditions, pile driving would not be initiated until all zones are visible.
d. The shutdown and behavioral disturbance zones around the pile would be monitored for the presence of marine mammals before, during, and after any pile driving activity.
e. Marine Mammal Observation Record forms (Attachment A-1) would be used to document observations.

Pre-Activity Monitoring:

The shutdown zones would be monitored for 15 minutes prior to initiating the soft start for impact pile driving. Soft start would be implemented at the beginning of each pile driving day and after breaks of more than 30 minutes (for impact pile driving only). If marine mammals are present within the shutdown zone prior to pile driving or during the soft start for impact pile driving, the start of pile driving would be delayed until the animals leave the shutdown zone. Pile driving would be initiated only after the MMO has determined, through sighting or by waiting approximately 15 minutes, that the animal(s) has moved outside the shutdown zone.

DURING ACTIVITY MONITORING:

The shutdown zones would be monitored throughout the time required to drive/remove a pile or complete other in-water construction activities. If a marine mammal is observed outside of this zone, an exposure would be recorded and behaviors documented, to the extent practicable. However, that pile segment or other in-water construction activity would be completed without cessation, unless the animal approaches/enters the shutdown zone, at which point all pile driving or other in-water construction activities would 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. Pile driving can only resume once the animal has left the shutdown zone of its own volition or has not been re-sighted for a period of 15 minutes. However, the shutdown provision may be waived in situations where shutdown would create an imminent concern for human safety.

POST-ACTIVITY MONITORING:

Monitoring of the shutdown and behavioral disturbance zones would continue for 30 minutes following the completion of pile driving. A post-monitoring period is not required for other in-water construction.

4.2.1.1.5. VISUAL MARBLED MURRELET MONITORING (MM 6)

The Navy would conduct marbled murrelet monitoring in compliance with USFWS Protocol for Marbled Murrelet Monitoring during Impact Pile Driving (USFWS 2012). This protocol applies only to impact pile driving. Monitoring would be conducted for marbled murrelets swimming in the water within the underwater auditory injury zone before, during, and after impact pile driving activities. Monitoring of the masking zone would occur before and during impact pile driving. The monitoring distances would be specified in consultation with USFWS. Monitoring would take place from 30 minutes prior to initiation through completion of impact pile driving activities.

QUALIFICATIONS

All observers would be experienced biologists certified through USFWS training to perform the Marbled Murrelet Monitoring Protocol (USFWS 2012).

METHODS OF MONITORING

The Navy would monitor the impact pile driving auditory injury zone before, during, and after pile driving. Based on USFWS protocols, the visual marbled murrelet monitoring would include the following procedures for impact hammer pile driving:

PRE-ACTIVITY MONITORING

The following survey methodology would be implemented prior to commencing impact pile driving activity:

- Transect lines would be established using Global Positioning System (GPS).

- Transect lines would be no more than 164 feet (50 meters) apart. The Navy is working with USFWS and NMFS to define sea states that would preclude the ability to monitor for marine mammals and marbled murrelets effectively and result in pile driving shutdown. As defined by the Beaufort Sea State (BSS) (Attachment B), if the sea state is greater than BSS 2, monitoring cannot be conducted effectively and pile driving activities would cease at BSS 3 or greater. The sea state conditions that would result in stopping pile driving activities may be further defined by wave height or wind conditions, depending on the outcome of ongoing discussions.
- A survey boat would monitor all marbled murrelets within the underwater injury zone radius from pile driving operations. These areas to be monitored would be specified in consultation with USFWS.
- Monitoring would commence at least 30 minutes before the initiation of impact pile driving (but not before daylight) and would continue until pile driving is completed each day (but not after nightfall). Monitoring would not start until 2 hours after sunrise and would cease 2 hours before sunset during the period from July 15 to September 23. Between September 24 and January 15, impact pile driving can occur during daylight hours.
- Impact pile driving would not commence until observers complete two full sweeps of the entire survey area and have determined that no marbled murrelets are within the underwater injury and non-injurious temporary threshold shift (TTS) zones.
- If marbled murrelets are not present within these monitored zones, the observers would communicate with the Lead Biologist, who would radio the Pile Driving Engineer Lead that impact pile driving can commence.
- If marbled murrelets are within these monitored zones, the survey would continue and pile driving would not commence until the murrelets have left the monitored zones. When a murrelet is detected within the monitored zones, it would be continuously observed until it leaves the monitored zones. If observers lose sight of the murrelet, searches for the murrelet would continue for at least 5 minutes. If the murrelet is still not found, then at least two full sweeps of the monitored zones would be conducted prior to resumption of impact pile driving.
- Boat speed would be from 5 to 10 knots per hour.
- Each boat would have a minimum of two observers using binoculars (not including the boat operator).
- In case of fog or reduced visibility, the observers must be able to see a minimum of 164 feet (50 meters) or pile driving would not commence.
- All bird observations would be recorded on the Seabird Monitoring Data Collection Form (Attachment A-2).

DURING-ACTIVITY MONITORING

The underwater auditory injury zones would be monitored throughout impact pile driving. The following monitoring protocol would be implemented:

- The survey protocol identified above would continue and be repeated during pile driving with the following additional conditions.

- If marbled murrelets are seen within the monitored zones during impact pile driving, the observers would communicate with the Lead Biologist, who would communicate to the Pile Driving Engineer Lead. This action would require an immediate shutdown of pile driving. The survey would continue and pile driving would not resume until the murrelets have left the monitored zones. If observers lose sight of the murrelet, searches for the murrelet would continue for at least 5 minutes. If the murrelet still is not found, then at least two full sweeps of the monitored zones would be conducted prior to resumption of impact pile driving.

VISUAL POST-PILE DRIVING OBSERVATIONAL SURVEY

These surveys would observe and record unusual or abnormal behavior of marbled murrelets. During these surveys, dead, injured, or sick seabirds may be discovered. In addition to surveys before and during pile driving, searches for seabird carcasses would be conducted following pile driving activities. Survey results would be noted in the Seabird Monitoring Data Collection Form (Attachment A-2).

Any dead diving seabird found within the survey area would be collected, placed in plastic bags, and kept cool (but not frozen). Carcasses would be submitted to USFWS (Washington Fish and Wildlife Office in Lacey) for necropsy using the Chain of Custody Record Form in Attachment C.

4.2.1.1.6. DATA COLLECTION FOR MARBLED MURRELETS AND MARINE MAMMALS

Each marbled murrelet observer would record information on each survey day using the USFWS-approved Seabird Monitoring Data Collection Form (Attachment A-2) and reference the completed Seabird Monitoring Site/Transects Identification Form (Attachment A-3) (USFWS 2012). The following information would be collected on the data collection form.

a. Date and time that pile driving begins or ends;
b. Construction activities occurring during each observation period;
c. Weather parameters (e.g. wind, humidity, temperature);
d. Tide state and water currents: the Beaufort Wind Scale (Attachment B) would be used to determine sea state;
e. Visibility;
f. Species, numbers, and if possible, sex and age class of marbled murrelets;
g. Marbled murrelet behavior patterns observed, including bearing and direction of travel, and if possible, the correlation to SPLs;
h. Distance from pile driving activities to marbled murrelets and distance from the marbled murrelet to the observation point;
i. Locations of all marbled murrelet observations; and
j. Other human activity in the area.

MMOs would use NMFS-approved sighting forms. At a minimum, the following information would be collected on the sighting forms:

a. Date and time that pile driving begins or ends;

b. Construction activities occurring during each observation period;

c. Weather conditions (e.g., percent cover, visibility);

d. Water conditions (e.g., sea state, tidal state [incoming, outgoing, slack, low, and high]);

e. Species, numbers, and if possible sex and age class of observed marine mammals;

f. Marine mammal behavior patterns observed, including bearing and direction of travel, and if possible, the correlation to SPLs;

g. Distance from pile driving activities to marine mammals and distance from the observed species to the observation point;

h. Locations of all marine mammal observations; and

i. Other human activity in the area.

4.2.1.1.7. EQUIPMENT

The following equipment would be required to conduct marbled murrelet and marine mammal monitoring:

a. Portable radio(s) to communicate with the Pile Driving Engineer Lead and with Port Ops and Security;

b. Hearing protection for biologists;

c. Cellular phones (one per boat) with contact information (other survey boats, Pile Driving Engineer Lead, USFWS point of contact);

d. Three green flags (for boat, barges, or land-based observers) as back-up for radio communication;

e. Three red flags (for boat, barges, or land-based observers) as back-up for radio communication;

f. Nautical charts;

g. Tide and current tables for Hood Canal;

h. Steel-cased thermometer or an equivalent electronic instrument with underwater temperature probe;

i. Chronometers;

j. Binoculars with built-in rangefinder – quality 8 or 10 power (6);

k. Monitoring protocols and equipment list in sealed clear plastic cover;

l. Notebook with pre-standardized monitoring Seabird Monitoring Data Collection Form on non-bleeding paper;

m. Seabird identification guides;

n. Large zip-lock bags for samples;
o. Clipboard; and
p. Pen / Pencil.

The detailed marine mammal and marbled murrelet monitoring plans are in development. Most of the identified equipment cited in this section would also apply to both monitoring efforts; other equipment would be added based on agency discussions.

4.2.1.2. REPORTING

Draft annual reports on marine mammal and marbled murrelet monitoring would be submitted to NMFS and USFWS, respectively, within 60 days of the end of each in-water work period. Content and data requirements for the reports would be developed in consultation with NMFS and USFWS. The reports would include marine mammal and marbled murrelet observations prior to activity, during-activity, and post-activity during pile driving days. Final annual reports would be submitted to NMFS and USFWS within 30 days following receipt of comments on the draft reports from NMFS and USFWS. The Navy would make final reports available to the public by posting final reports on a Navy website. At a minimum, the reports would include:

- General data (all reports):
  - Date and time of activity;
  - Water conditions (e.g., sea state, tidal state); and
  - Weather conditions (e.g., percent cover, visibility).
- Description of the pile driving activity being conducted (size and type);
- Pre-, during-, and post-activity observational survey-specific data (Marine Mammal and Marbled Murrelet reports):
  - Dates and time survey is initiated and terminated;
  - Description of any observable marine birds, marine mammals, or fish behavior in the immediate area during monitoring;
  - Actions performed to minimize impacts on marine mammals and marbled murrelets;
  - Description of any “take” (as described in NMFS or USFWS Biological Opinions);
  - Copies of field data sheets or logs;
  - Birds salvaged for necropsy (if applicable);
  - Use Chain of Custody Record Form (Attachment C) for dead birds/threatened and endangered species (as required); and
  - Necropsy results, based on information provided by the Agencies (as required).

4.2.1.3. INTERAGENCY NOTIFICATION

Observers would immediately notify USFWS upon locating a dead, injured or sick marbled murrelet specimen. Notification must be made to the USFWS Law Enforcement Office at (425)

883-8122 or the Services' Western Washington Fish and Wildlife Office at (360) 753-9440, and include the date, time, precise location of the injured bird or carcass, and any other pertinent information. In addition, one of the following Washington Fish and Wildlife Office staff would be notified:

Nancy Brennan-Dubbs – phone: (360) 753-5835

Emily Teachout – phone: (360) 753-9583

Deanna Lynch – phone: (360) 753-9545

Care should be taken in handling sick or injured birds in order to preserve biological specimens in the best possible state for later analysis of cause of death, if that occurs. In conjunction with the care of the sick or injured specimens or preservation of biological materials from a dead animal, the finder has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

4.3. PARTY(IES) RESPONSIBLE FOR IMPLEMENTATION

The Navy would be responsible for conducting marine mammal and marbled murrelet monitoring during pile driving operations. The observers would be responsible for communicating with the construction contractor and providing information on when impact hammer operations can be initiated without disturbing sensitive species. The construction contractor would be responsible for ensuring that impact hammer operations comply with this measure.

4.4. PLANNED IMPLEMENTATION SCHEDULE

The monitoring plans would be approved by NMFS and USFWS prior to the start of in-water construction activities. Monitoring activities would be performed in accordance with the approved plan throughout the construction phase.

4.5. PLANNED FUNDING

Monitoring activities would be funded by the Navy.

4.6. MITIGATION-SPECIFIC PERFORMANCE CRITERIA

The performance objective would be to minimize the take of sensitive marine species, and this objective would be achieved by implementing the approved monitoring plan and limiting pile driving operations to periods when sensitive species are not present in the shutdown and behavioral disturbance zones.

4.7. MONITORING AND TRACKING MECHANISMS

Monitoring and reporting would be in accordance with the approved monitoring plan.

4.8. ENFORCEMENT MEASURES

Compliance with this measure would be enforced by NMFS and USFWS.

5.0 MITIGATION MEASURES FOR BIOLOGICAL, CULTURAL, AND OTHER RESOURCES

The LWI and SPE projects are expected to affect portions of the nearshore benthic and littoral habitats on NAVBASE Kitsap Bangor, particularly as related to potential effects on submerged macroalgae (eelgrass) beds, habitat and migration pathways for salmonids, and forage fish spawning habitat. Short-term and long-term impacts on eelgrass and eelgrass beds, and to the benthic community, could affect ESA-listed fish species directly, and all species indirectly through effects on prey resources such as forage fish. Both projects could affect migration of juvenile salmonids along the NAVBASE Kitsap Bangor shoreline. Otherwise, operation of the LWI and SPE are not expected to adversely affect ESA-listed species. Compensatory mitigation projects for impacts on marine habitats and prey populations would be undertaken on the shoreline that would restore some of the habitat and prey base functions of the project area (Section 6).

5.1. MITIGATION MEASURES FOR OTHER BIOLOGICAL IMPACTS

This section addresses mitigation measures for biological impacts other than underwater noise impacts (Sections 3.0 and 4.0), and impacts requiring compensatory mitigation (Section 6.0).

5.1.1. Potential Impacts

The LWI and SPE projects are expected to cause unavoidable impacts on marine resources, as well as impacts on terrestrial vegetation and wildlife communities. BMPs and mitigation measures to reduce these impacts are discussed below. The Navy's proposed mitigation plan to compensate for the unavoidable impacts of the Proposed Actions on aquatic habitats and species is described in Section 6.0.

In-water construction would result in water quality impacts and disruption of the seafloor that would affect marine organisms. Installation of piles and anchors would displace marine habitat, while installation of marine structures (piers) would result in shading of marine habitat. Construction of on-land facilities would result in clearing of vegetation, with potential impacts to wildlife species.

5.1.2. Mitigation Measures

Potential impacts on fish and benthic communities will be minimized by several of the environmental protection measures described previously for protecting water quality and the seafloor. These include:

- Deployment of oil containment booms during in-water construction to minimize potential impacts from an accidental oil spill, as required by the CWA Section 401 Water Quality Certifications for the projects **(CP 1a)**;
- Retrieval of lost debris from the seafloor during and following in-water construction to prevent disturbance of benthic habitat **(CP 1b)**;
- Prohibiting work vessels to ground in shallow waters, and excluding construction equipment and activities outside of the 100-foot (30-meter) construction corridor **(CP 1d)**; and

- Restricting in-water work to specified work windows to minimize in-water project impacts on potentially occurring ESA-listed fish species that would otherwise be exposed to construction activities, including underwater noise produced during pile driving **(MM 2)**. The exception is that in-water work other than pile driving and LWI abutment construction below MHHW could occur outside the in-water work window.

An additional measure to prevent or minimize impacts on eelgrass beds is:

- Spudding/anchoring in existing eelgrass habitat will be avoided during in-water construction **(CP 7)**.

Efforts to restore the temporarily cleared upland areas to a natural vegetation community and comply with EO 13112 would include the following mitigation measures:

- A revegetation plan would be developed to establish a coniferous forest overstory and native shrub understory on the site, with the objective of restoring wildlife benefits to the site **(MM 8a)**.
- Any seed mixtures used in the site would include native grass and herbaceous species, which would provide foraging habitat for wildlife **(MM 8b)**.
- The Navy would conduct periodic monitoring for and removal of noxious weeds from within and immediately adjacent to the cleared area. Particular attention would be paid to the interface between disturbed and existing adjacent second-growth forest stand. Noxious weeds, such as Scotch broom and Himalayan blackberry, would be removed by hand, mechanical means, or herbicides per the NAVBASE Kitsap Bangor Pest Management Plan (Navy 2004) **(MM 8c)**.
- Dense weed infestations that require more intensive treatments that result in ground disturbance would be reseeded or planted with native species. A more intensive monitoring and maintenance program (such as once a month) would be implemented until the native plants are sufficiently established to minimize invasion by noxious weeds **(MM 8d)**.

To protect migratory birds and potential breeding marbled murrelets, the following mitigation measures would be implemented during upland construction of the SPE project:

- Tree removal would not be conducted during the marbled murrelet breeding season of April 1 through September 23 (**MM 9a)**.
- Tree removal would be conducted in a manner that is protective of all migratory birds **(MM 9b).**

5.1.3. Party(ies) Responsible for Implementation

The Navy would be responsible for restoring and monitoring the terrestrial vegetation in areas affected by construction activities. The construction contractor would be responsible for conducting tree removal in accordance with mitigation measures **MM 9a** and **MM 9b**.

5.1.4. Planned Implementation Schedule

The revegetation plan would be prepared and approved prior to the completion of the project's construction phase. Once construction activities have stopped, the plan would be implemented. Monitoring would occur for 3 years following revegetation activities. Mitigation measures **MM 9a** and **MM 9b** would be implemented throughout tree removal activities.

5.1.5. Planned Funding

These revegetation activities would be funded by the Navy as part of the overall project. Any costs associated with mitigation measures **MM 9a** and **MM 9b** would be included in funding for the construction contract.

5.1.6. Mitigation-Specific Performance Criteria

The performance criterion for the revegetation measure is development of native plant and wildlife communities in upland areas affected by the project construction activities. An adaptive management plan would be included.

5.1.7. Monitoring and Tracking Mechanisms

The condition of the revegetated areas would be monitored by the Navy for 3 years following revegetation activities. The Navy would monitor tree removal to ensure that mitigation measures **MM 9a** and **MM 9b** are implemented.

5.1.8. Enforcement Measures

These measures would be enforced by the Navy.

5.2. MITIGATION MEASURES FOR CULTURAL RESOURCES IMPACTS

5.2.1. Potential Impacts

The Navy would comply with Section 106 of the National Historic Preservation Act (NHPA)[1]. For both the LWI and SPE projects, the Navy concluded Section 106 consultations with the Washington State Historic Preservation Officer (SHPO), concurring with the Navy's findings of no adverse effects on historic properties. If, in the course of the construction, operation or maintenance of any component of the LWI or SPE, there is an unanticipated discovery of cultural resources, work would be stopped and the Navy cultural resources manager would be contacted to determine subsequent steps in compliance with Section 106 of NHPA and other relevant cultural resources legislation. The Navy would continue to comply with DoD policy and other laws and regulations, including the American Indian Religious Freedom Act of 1978 and Native American Graves Protection and Repatriation Act of 1990, if the need arises.

[1] The NHPA was recodified in December 2014 as part of a larger effort to better organize statutes related to the National Park Service. The code covering NHPA Section 106 is now located in Section 306108 of Title 54 USC.

5.2.2. Mitigation Measures (MM 10)

In compliance with Section 106 of NHPA, inadvertent discovery of unknown archaeological resources would require consultation with the SHPO and affected tribes.

5.2.3. Party(ies) Responsible for Implementation

The Navy would be responsible for completing this mitigation measure.

5.2.4. Planned Implementation Schedule

In the event of inadvertent discovery of unknown archaeological resources during construction, operation or maintenance, work would be stopped and the Navy would consult with the SHPO and affected tribes.

5.2.5. Planned Funding

This mitigation would be funded by the Navy.

5.2.6. Mitigation-Specific Performance Criteria

The specific performance criteria for this measure would be established as part of the agreement implementing the mitigation measures, as developed by the Navy in consultation with the SHPO.

5.2.7. Monitoring and Tracking Mechanisms

Reporting requirements would be specified in the agreement between the Navy and SHPO.

5.2.8. Enforcement Measures

The SHPO would enforce this mitigation measure.

5.3. OTHER RESOURCES

No mitigation measures are proposed for reducing impacts on air quality, aesthetics, socioeconomics, and public health and safety because any impacts on these resources from the LWI and SPE projects are expected to be minimal for reasons discussed below. Mitigation and environmental protection measures for geology and soils, noise, land use and recreation, and transportation are described below.

5.3.1. Geology and Soils

Mitigation measures are not necessary for geological resources because the projects would have only minor direct impacts on geologically hazardous areas and would not involve contaminated soils. However, the projects will include environmental protection measures such as design of the construction roadway and laydown area to minimize impacts by locating these features in areas away from steep slopes and streams, to the extent practicable. A geotechnical design evaluation will be performed to avoid steeper slopes and properly grade the soil, especially in areas where seepage has been observed. Measures to minimize soil erosion are described in Section 2.3.

5.3.2. Noise

Maximum noise levels for the LWI and SPE projects would occur during use of an impact pile driver, and the noise levels would exceed allowable noise limits for the OSHA (90 dBA) and Navy Occupational Safety and Health (84 dBA) for an 8-hour period. This could potentially cause injury to construction personnel working at the sites. In such conditions, personal protective equipment would be required for personnel working in these areas.

Pile driving for SPE would result in noise levels in the community of Olympic View approximately equal to the WAC daytime (7:00 a.m. to 10:00 p.m.) limit of 60 dBA. Temporary construction noise during the hours of 7:00 a.m. to 10:00 p.m. is exempt from WAC noise requirements. The WAC residential limit for nighttime (50 dBA) would not be exceeded because pile driving would occur only during daylight hours (**MM11a**).

For both LWI and SPE, due to intervening terrain and vegetation, residential areas on NAVBASE Kitsap Bangor and in the community of Vinland would not experience adverse noise impacts; noise levels would not exceed the WAC limits. Residential properties on the western shore of Hood Canal and in the community of Olympic View directly south of the base would be able to hear pile driving noise but levels would not experience noise levels above the WAC daytime or nighttime limits, in part because pile driving would not occur at night. The Navy would notify the public about upcoming construction activities and noise at the beginning of each construction season (**MM 11b**).

5.3.3. Air Quality

No mitigation measures are necessary, as the projects would not have an adverse impact on air quality. The project sites are in an attainment area for all six criteria pollutants. These projects would comply with the national and state ambient air quality standards, including being well below annual allowed emissions for criteria pollutants.

5.3.4. Land Use and Recreation

The LWI and SPE projects are consistent with land use plans and policies, and there would only be short-term, adverse noise impacts on land use and recreation on the western shore of Hood Canal during construction. Noise levels on the western shore of Hood Canal and in the community of Olympic View would not exceed environmental noise standards; in addition, the WAC provides an exemption for construction noise originating from temporary construction sites. These projects would be consistent with the NAVBASE Kitsap Bangor Master Plan and Integrated Natural Resources Management Plan. There are no other regulations pertaining to land use or recreation applicable to this alternative. The Navy would implement the following mitigation measures: Construction activities would not be conducted during the hours of 10:00 p.m. to 7:00 a.m.; pile driving would occur only during daylight hours (**MM 11a**); the Navy would notify the public about upcoming construction activities and noise at the beginning of each construction season (**MM 11b**); and the Navy would develop a local Notice to Mariners to establish uniform procedures to facilitate the safe transit of vessels operating in the project vicinity (**MM 12a**).

5.3.5. Aesthetics

While the project would result in changes in the viewshed, these changes would not be out of character with existing conditions. Therefore, no mitigation measures are necessary. There are no regulations pertaining to visual resources or aesthetics.

5.3.6. Socioeconomics

As there would be no adverse environmental impacts on the human population from construction or operation of the LWI or SPE, no mitigation measures are necessary.

Construction may impact adult salmon and steelhead that could be harvested by the tribes because pile driving (hammer and vibratory) would be conducted during adult salmon and steelhead return to Hood Canal, which may cause the salmon and steelhead to move to a different location within Hood Canal. This would not result in a net loss of tribal resources, but could increase the time allocated to observe the tribes' fishing rights. The LWI project would result in an economic loss for tribal shellfish harvest (Section 3.14.12 of the FEIS). This impact would be mitigated as part of the overall tribal mitigation discussed in Section 9.0 of this MAP.

5.3.7. Traffic

5.3.7.1. NOTICE TO MARINERS (MM 12A)

During construction, the projects would result in increased marine vessel traffic. The Navy would develop a local Notice to Mariners to establish uniform procedures to facilitate the safe transit of vessels operating in the project vicinity.

5.3.7.2. BARGE TRAFFIC (MM 12B)

Construction vessel traffic for the LWI and SPE projects would result in an average of 26 additional openings of the Hood Canal Bridge per month, resulting in total traffic delays of 13 hours per month. This would have an adverse impact on travelers crossing the Hood Canal Bridge on State Route (SR)-104. Impacts on motorists would be minimized by scheduling bridge openings during non-peak traffic hours (6:00 to 8:30 a.m. and 3:30 to 6:00 p.m., Monday through Friday) to the extent possible. The increase in weekly barge trips and associated bridge openings would not appreciably increase vessel traffic levels in the project area. This level of vessel traffic is not expected to adversely impact vessel transit routes in Hood Canal or Puget Sound. Potential impacts on vessel traffic would be minimized by the U.S. Coast Guard issuing, at the Navy's request, Notices to Mariners at the beginning of each construction season and for bridge openings. Operation of the LWI project would not result in additional vessel traffic on Hood Canal, so only the operational impacts of the SPE (two openings of the Hood Canal Bridge per month) would occur over the long term.

6.0 COMPENSATORY MITIGATION (MM 13)

6.1. Introduction

The Proposed Actions would result in the loss and shading of eelgrass habitat, impacts on sensitive species, including movement of salmonids, and other long-term impacts on marine habitats and species including forage fish. The Proposed Actions also would require Section 10 permits under the Rivers and Harbors Act (LWI and SPE projects), a 404 permit from USACE (LWI project only), and a CWA Section 401 water quality certification from WDOE (LWI and SPE projects). To receive permits the Proposed Actions must comply with *Compensatory Mitigation for Losses of Aquatic Resources, Final Rule* adopted on April 10, 2008 (USACE and USEPA 2008).

6.2. Regulatory Overview

Compensatory Mitigation is the term given to projects or plans undertaken to offset "unavoidable adverse environmental impacts which remain after all appropriate and practicable avoidance and minimization has been achieved." Compensatory mitigation involves actions taken to offset unavoidable adverse impacts on wetlands, streams, and other aquatic resources. For impacts authorized under a Section 404 permit, compensatory mitigation is not considered until after all appropriate and practicable steps have been taken to first avoid and then minimize adverse impacts on the aquatic ecosystem pursuant to 40 CFR Part 230 (i.e., the CWA Section 404(b)(1) Guidelines). WDOE also considers compensatory mitigation when issuing a CWA Section 401 water quality certification.

Compensatory mitigation is required for permits authorized by the CWA Section 404 and other Department of the Army permits. The 1990 Section 404 Mitigation Memorandum of Agreement (MOA) signed by the USEPA and USACE established procedures for implementing existing Section 404 regulatory requirements. In particular, the MOA set forth the process by which USACE will comply with the Section 404(b)(1) Guidelines when considering impacts and mitigation within the context of Standard Permit (Individual Permit) applications. Only when USACE is satisfied that an applicant has taken all steps to first avoid the impact altogether and second to minimize impacts, will USACE consider mitigation. When determining the level of appropriate mitigation, USACE considers the type of aquatic resource impacted and its functions. Appropriate mitigation generally means in-kind mitigation and the goal is no net loss in aquatic resource functions.

Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (USACE and USEPA 2008) clarifies the use of mitigation banks and ILF programs and identifies the benefits of these mechanisms for providing compensatory mitigation. The rule allows for mitigation banks, approved ILF programs, and permittee responsible mitigation.

Compensatory Mitigation for Losses of Aquatic Resources, Final Rule emphasizes the use of a watershed approach to compensatory mitigation. The watershed approach involves consideration of several factors to assure proper implementation:

- Watershed needs and Compensatory Mitigation projects to address those needs,
- Landscape scale,

- Historic and potential aquatic resource conditions,
- Past and projected aquatic resource impacts, and
- Terrestrial connections between aquatic resources.

The changes to the regulations for compensatory mitigation are intended to increase the Compensatory Mitigation project success rate and improve the health of the aquatic resources in mitigated areas. The Compensatory Mitigation for Losses of Aquatic Resources, Final Rule was developed to provide better aquatic resource mitigation than the traditional focus on onsite/in-kind, which may not always be feasible or appropriate mitigation. Any proposed activity that impacts aquatic resources still needs to be addressed in the following order:

- Avoid. Proposed impacts must be avoided to the maximum extent possible.
- Minimize. Impacts that cannot be avoided should be minimized.
- Compensate for remaining impacts. Impacts that cannot be avoided must be compensated for through compensatory mitigation.

The Compensatory Mitigation for Losses of Aquatic Resources, Final Rule establishes a hierarchy or preference for Compensatory Mitigation:

- Mitigation Banks,
- ILF Programs, and
- Permittee-Responsible Mitigation.

The Navy has authority to participate in ILF programs and Mitigation Banks through the Sikes Act and DoD Natural Resource Policy Guidance.

The HCCC has established an ILF program for Hood Canal (HCCC 2014). Mitigation banks and ILF programs are forms of “third-party” compensation because a third party, such as a bank, or ILF sponsor assumes responsibility for the implementation and success of the compensatory mitigation. The emphasis on this rule is that the compensatory mitigation should be determined based on the specific details of the impacted aquatic resources, the watershed, and viability of various Compensatory Mitigation projects that could mitigate the impacts. The changes implemented by this rule should improve the efficiency, predictability, and success rate of Compensatory Mitigation projects. The rule provides for improved review of mitigation and anticipates enhanced mitigation success based on:

- The use of effective standards based on best available science that should increase the success rate of mitigation projects,
- Increased public participation that should lead to more input and ideas for proposed projects, and
- More uniform standards that should increase the viability of mitigation banks and ILF programs compared to the more traditional permittee-responsible mitigation.

6.3. SUMMARY OF IMPACTS REQUIRING COMPENSATORY MITIGATION

The proposed LWI project would be subject to permits under Section 404 of the CWA because construction of the shoreline abutments would require excavation ("in the dry" at low tide) of sediments below the MHHW water line; the affected area would include 24 square feet (2 square meters) of permanent fill in water of the U.S. represented by the LWI abutment stair landings. However, the Navy's analysis indicates that the bents (rows of pilings) installed for both the LWI and SPE projects would not function as fill as defined by 33 CFR Part 323. Additionally, the proposed project designs include at least 20 feet between bents. As discussed in Section 3.1.2.1.2 of the EIS, the support piles installed for the LWI and SPE would slightly alter current speeds beneath the piers, which would cause minor erosion of fine-grained sediments near some piles impacted by turbulent flows, as well as settling and accumulation of fine-grained sediments at the base of other piles (Chiew and Melville 1987). Over the lifetime of the LWI and SPE, tidal currents would result in a gradual coarsening of surface sediments and thin scouring initially around the perimeter of each pile, and groups of piles (Sumer et al. 2001). However, shells and barnacles that accumulate on the piles would also slough off over time and contribute to the sediment content below the piles. The loss of fine-grained sediment would be offset by the accumulation of shell and barnacle particles. These two processes would result in no net impact on seafloor bathymetry below the piles, although there would be minor, localized coarsening of sediment particle size.

Construction and operation of the LWI and SPE pier structures, and relocation of PSBs and anchors, would not be expected to cause appreciable erosion or deposition of sediments within the project area or interfere with longshore sediment transport and delivery processes (cbec 2013). This conclusion is supported by the Golder Associates (2010) study, which concluded that the presence of other Navy structures along the Bangor shoreline has not caused appreciable changes in the morphology of the shoreline.

The proposed projects would impact aquatic resources, which would be mitigated in accordance with the Compensatory Mitigation for Losses of Aquatic Resources, Final Rule (USACE and USEPA 2008). The impacts and mitigation are summarized in Tables 2 and 3.

Table 2. Compensatory Mitigation for LWI Preferred Alternative Impacts on Aquatic Habitat and Waters of the U.S.

LWI Impact	LWI Alternative 3 Area	LWI Anticipated Mitigation[1]
Habitat displaced by piles and/or anchors in shallow water (< 30 feet [10 meters])	118 square feet (11 square meters)	Mitigation for loss of aquatic resources would be provided by the Navy's participation in the HCCC ILF program for Hood Canal in accordance with the Compensatory Mitigation Rule.
Over-water area (shading) in shallow water[2]	5,070 square feet (471 square meters)	Mitigation for loss of aquatic resources would be provided by the Navy's participation in the HCCC ILF program for Hood Canal in accordance with the Compensatory Mitigation Rule.
Eelgrass covered by buoy mooring anchors or degraded by PSB and buoy grounding	580 square feet (54 square meters)	Mitigation for loss of aquatic resources would be provided by the Navy's participation in the HCCC ILF program for Hood Canal in accordance with the Compensatory Mitigation Rule.
Fill in waters of the U.S. (shoreline abutment stair landings and riprap)	4,124 square feet (383 square meters)	Mitigation for loss of aquatic resources[3] would be provided by the Navy's participation in the HCCC ILF program for Hood Canal in accordance with the Compensatory Mitigation Rule.
Excavation in waters of the U.S. (shoreline abutments)	15,600 square feet (1,449 square meters)	Mitigation for loss of aquatic resources[3] would be provided by the Navy's participation in the HCCC ILF program for Hood Canal in accordance with the Compensatory Mitigation Rule.
Total[4]	20,670 square feet (1,920 square meters)	

N/A = not applicable; USACE = U.S. Army Corps of Engineers

1. Final mitigation requirements for the selected alternative would be determined through the CWA permitting process.
2. No full shading of eelgrass is expected.
3. Impact is from excavation during construction of the abutments and concrete fill from the abutment stair landings.
4. Total is the sum of the overwater area plus the excavation for the abutments; the abutment stair landing fill areas are included in the excavation areas; all other items are included in the overwater shading area.

Table 3. Compensatory Mitigation for SPE Preferred Alternative Impacts on Aquatic Habitat and Waters of the U.S.

SPE Impact	SPE Alternative 2 Area	SPE Anticipated Mitigation[1]
Habitat displaced by piles in deep water (>30 feet [10 meters])	0.045 acre (0.018 hectare)	Mitigation for loss of aquatic resources would be provided by the Navy's participation in the HCCC ILF program for Hood Canal in accordance with the Compensatory Mitigation Rule.
Overwater area (full shading) in deep water (more than 30 feet below MLLW). There would be no shading shallower than 30 feet below MLLW.	1.0 acre (0.41 hectare)	Mitigation for loss of aquatic resources would be provided by the Navy's participation in the HCCC ILF program for Hood Canal in accordance with the Compensatory Mitigation Rule.

1. Final mitigation requirements for the selected alternative would be determined through the CWA permitting process. Habitat displaced by piles is included in the habitat in the overwater area. Project would not shade or displace shallow habitat.

6.4. HOOD CANAL IN-LIEU FEE PROGRAM

The use of an ILF Program remains the preferred compensatory mitigation approach for the unavoidable impacts on aquatic resources from the Proposed Actions.

6.4.1. ILF Program Goal and Objectives

The primary goal of the HCCC ILF Program for Hood Canal is to increase aquatic resource functions in the Hood Canal watershed. This can be accomplished by improving existing mitigation requirements with rigorous site assessment and selection processes that fully support priorities for conserving and restoring Hood Canal. While mitigation seeks to generally offset the impacts of development projects resulting in no net loss, this ILF Program adds value to mitigation processes by implementing projects in a coordinated manner, consistent with existing regulations and legal limitations relating to mitigation. To accomplish this goal, the HCCC incorporated the following objectives into the ILF Program (HCCC 2011):

- Provide a viable option to ensure the availability of high-quality mitigation for unavoidable, site-specific impacts to freshwater wetlands and marine/nearshore aquatic resources in the Hood Canal watershed.
- Promote "net resource gain" (defined as restoration of ecological processes) and improved ecological functions of the Hood Canal watershed.
- Meet the needs and goals of the Hood Canal Integrated Watershed Management Plan approach and the HCCC members.
- Develop, in cooperation with environmental regulatory partners, an ecologically based site selection process to identify the most appropriate mitigation options that result in greater ecological benefit to the Hood Canal watershed than could be achieved through permittee responsible mitigation.
- Combine the mitigation requirements from individual permitted projects within a service area into larger mitigation sites.
- More efficiently and cost-effectively meet federal, state, and local regulatory requirements by creating a mechanism for fulfilling compensatory mitigation requirements.
- Select the best mitigation sites for the watershed through a rigorous analysis by a group of professional resource managers and local experts, drawing from local knowledge and best available science and analyses.
- Develop a self-sustaining ILF Program that identifies, prioritizes, and completes mitigation projects that result in a "net resource gain" on a watershed scale over time.
- Provide an effective and transparent accounting structure for collecting ILFs, disbursing project funds, and conducting compliance reporting, as required under 33 CFR 332.8.
- Work in an efficient and transparent manner with the Interagency Review Team, co-chaired by the USACE and WDOE, to review, analyze, and implement mitigation projects and enact amendments to the ILF Program.

The HCCC has four strategies to accomplish its goal and objectives. These strategies are to: restore aquatic resource functions; enhance existing aquatic resources; establish new functions where they no longer exist; and, under certain circumstances, preserve intact or fully functioning aquatic resource functions. Compensatory mitigation can take one of these four forms, in order of preference:

1. Restoration: returning a damaged aquatic resource to its original condition through restoration of habitat forming processes;
2. Creation: converting an area that has no significant aquatic resources into an aquatic resource area with all of the physical and biological characteristics to replace the area lost or damaged;
3. Enhancement: making changes or improvements to an aquatic resource to replace the functions or values performed by the resources lost or damaged; and
4. Preservation: protecting aquatic resources in an area that is equivalent to the area damaged, and that might otherwise be impacted or lost.

The mitigation strategy selected for each permitted impact would be based on an assessment of type and degree of disturbance at the landscape and/or drift cell scales. Restoration generally would be the first mitigation option considered because the likelihood of success is greater and the impacts on potential ecologically important uplands are reduced compared to enhancement or creation. Restoration also has potential to produce more substantial gains in aquatic resource functions compared to enhancement and preservation.

6.4.2. Hood Canal ILF Service Area

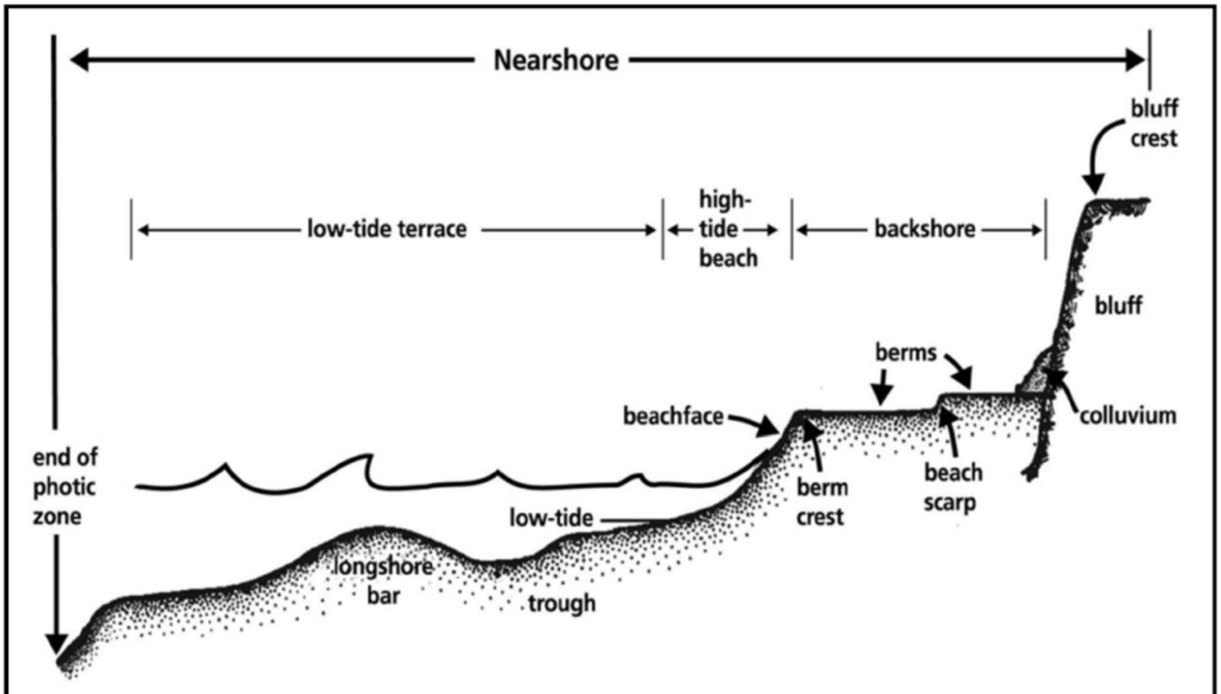
The service area for the Hood Canal ILF Program encompasses those portions of Water Resource Inventory Areas 14, 15, 16, and 17 draining to Hood Canal, defined by a line extending from Foulweather Bluff to Tala Point, south through the Great Bend to its terminus near the town of Belfair, Washington.

The service area is divided into two components for the purposes of this ILF Program:

1. Freshwater Environment, which generally includes areas landward of the marine riparian zone, including freshwater and estuarine wetlands and streams up to and excluding any National Park or National Forest Lands; and
2. Marine / Nearshore Environment, which extends from the marine riparian area at the top of the coastal bluffs to the adjacent aquatic intertidal and subtidal zones (Figure 3).

6.4.3. Navy's Use of the HCCC ILF Program

The Navy's use of the HCCC's ILF program would follow the requirements of the Final Instrument for the HCCC's ILF program, which was developed based on input from the IRT and prescribes the credit/debit methodology, fee calculation structure, and financial assurances for the program (HCCC 2012). Appendix C of the Final Instrument specifies the procedures for approval of an applicant's use of the program, including mitigation sequencing, and how the ILF program would implement the mitigation. In accordance with the Final Instrument and appendices, the Navy, regulatory agencies, and ILF Program will undertake the following actions:



Source: HCCC Draft Hood Canal ILF Program Prospectus

Figure 3. Intertidal and Subtidal

- The Navy will complete data collection and a preliminary site and impacts assessment, and provide this information to the applicable regulatory agencies and permitting entities for review.
- The applicable regulatory agencies and permitting entities will review the proposed development project to ensure impacts are avoided and minimized to the maximum extent practicable and all onsite mitigation options are exhausted.
- The permitting agencies will determine if the HCCC ILF Program provides the best option for compensating for unavoidable impacts; if so then the Navy, in cooperation with the Program Sponsor (the HCCC), will complete the site and impacts assessment to determine the amount of credits needed to offset the impact (or debit). This will constitute the ILF Use Plan. The Program Sponsor will review and confirm the ILF Use Plan, and informally consult with the IRT if appropriate. The ILF Use Plan will then be provided to the applicable regulatory agencies and permitting entities.
- The agencies will approve or deny the permit conditioned on purchasing credits from the HCCC ILF Program for mitigation.
- The Navy will purchase mitigation credits from the HCCC ILF Program to offset the project’s unavoidable impacts.
- The statement of sale will be sent to Corps, Ecology, and any other applicable regulatory or permitting entities which issued the permit conditioned upon purchasing credits from the HCCC ILF Program.

After mitigation sequencing steps have occurred and mitigation has been assigned to the HCCC ILF Program, the following steps (covered in detail in subsequent appendices of the Instrument) describe how mitigation will be implemented:

- The HCCC ILF Program will review impacts and ecological needs at the appropriate, nested scale.
- The HCCC ILF Program will propose mitigation sites and project concepts, along with the draft Spending Agreement, to the Corps and Ecology.
- In consultation with the IRT, the Corps and Ecology will review and approve the sites and conceptual plans, and sign the Spending Agreement. The HCCC ILF Program Credit and Debit calculations include a factor to account for risk and uncertainty associated with temporal loss.
- The HCCC ILF Program will develop draft and final mitigation plan(s) and site protection instrument(s).
- In consultation with the IRT, the Corps and Ecology will review and approve final mitigation plan(s) and final site protection instrument(s).
- The HCCC ILF Program will implement the mitigation project(s).
- All subsequent steps related to credit fulfillment, site maintenance, monitoring/reporting, adaptive management, and site protection are listed and discussed in Appendices K to P of the Final Instrument.
- Once fees are collected from the applicant, the ILF program will have three years to secure a site and begin implementation of the mitigation action.

More information on the HCCC ILF Program can be found on the HCCC website: http://hccc.wa.gov/.

7.0 PERMITTING AND CONSULTATION TERMS AND CONDITIONS

Consultation with NMFS under the ESA and MSA is complete for the LWI project. NMFS did not have conservation recommendations for the LWI project, because they determined that BMPs and other measures included in the BA, and other information provided by the Navy, to avoid, reduce, or mitigate impacts would be sufficient to offset impacts to protected resources. ESA consultation with the USFWS for both the LWI and SPE projects is complete, with the USFWS finding that impacts to bull trout would be insignificant and impacts to the marbled murrelet would be discountable, with no additional conservation recommendations. ESA consultation with NMFS is ongoing for the SPE project, as is CWA permitting by the USACE and WDOE for both projects. Any additional measures to minimize impacts identified during those consultations and permitting processes will be included in this section once those processes are complete.

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8.0 SUMMARY OF PROPOSED MEASURES TO AVOID, MINIMIZE, AND COMPENSATE FOR ENVIRONMENTAL IMPACTS ON AQUATIC RESOURCES

This section summarizes measures that the Navy will implement to avoid, minimize and compensate for impacts on aquatic resources. Integrated into the projects are design features and measures to avoid environmental impacts. Where avoidance is not possible, the designs have been modified to minimize those impacts. Design features include the following:

- For both projects, the number of piles and anchors was minimized while still meeting structural, safety, and security requirements.
- For LWI Alternative 2, the piers were designed to minimize overwater coverage and maximize light transmittance. The pier was limited to pedestrian access, which allows it to be narrower and have a grated deck, as well as fewer, more widely spaced piles.
- For LWI Alternative 2, a mesh anchoring system was developed that did not require dredging.
- For LWI Alternative 2, the mesh size was maximized to facilitate fish passage while still meeting security requirements.
- For LWI Alternative 3, the PSB pontoons would be fitted with "feet" to minimize disturbance of the seafloor when the pontoons bottom out at low tide.
- For both LWI alternatives, the abutments would be built from shore, thereby eliminating the need for in-water pile driving.
- For LWI Alternative 3, the observation posts would be built from shore, thereby eliminating the need for in-water pile driving.
- For both SPE alternatives, the pier extension was placed in deep water to minimize impacts on marine vegetation and habitat, and interference with nearshore fish migration.
- For both SPE alternatives, as many facilities as possible were sited on land versus on the pier to minimize the size of the pier.

Additional measures to avoid, minimize, or compensate for impacts on aquatic resources are described below by resource. Sections of the Mitigation Action Plan providing more detailed descriptions of these measures are cited. Please refer also to Tables 2 and 3 for summaries of aquatic impacts and compensatory mitigation. Residual (i.e., following avoidance and minimization measures) impacts on habitat functions would be compensated for by implementation of the Navy's compensatory habitat mitigation action, which employs a Hood Canal watershed approach, as described in Section 6.0. Residual impacts are described in Sections 3.1 through 3.17 of the EIS.

8.1. HYDROGRAPHY

Impacts on hydrography will be avoided by limiting construction vessels to a construction corridor of 100 feet (30 meters) around the new structure (Section 2.1.2.4) and implementing work vessel grounding control measures (Section 2.1.2.5). Impacts on hydrography would be minimized by:

- Keeping the size of the proposed LWI piers and SPE to the minimum needed to provide the functions required;
- Establishing construction debris and pile removal control measures (Section 2.1.2.3);
- Instituting prop wash control measures (Section 2.1.2.4); and
- Preparing and implementing a mooring and anchoring plan to avoid underwater anchor and line drag (Section 2.1.2.6).

8.2. Marine Water Quality

Impacts on marine water and sediment quality will be avoided by preparing and implementing a SWPPP (Section 2.1.2.1) and limiting construction vessels to a construction corridor of 100 feet around the new structure (Section 2.1.2.4). Impacts on marine water quality would be minimized by:

- Implementing spill response control measures in the event of an accidental spill (Section 2.1.2.2);
- Establishing construction debris and pile removal control measures (Section 2.1.2.3);
- Instituting prop wash control measures (Section 2.1.2.4); and
- Preparing and implementing a mooring and anchoring plan (Section 2.1.2.6).

8.3. Eelgrass

Impacts on eelgrass will be avoided by:

- Keeping the size of the proposed LWIs and SPE to the minimum needed to provide the functions required;
- Limiting construction vessels to a construction corridor of 100 feet (30 meters) around the new structures (Section 2.1.2.4);
- Implementing work vessel grounding control measures (Section 2.1.2.5); and
- Avoiding spudding and anchoring in eelgrass beds (Section 5.1.2).

Impacts on eelgrass will be minimized by:

- Placing the SPE in deep waters;
- Limiting the width of the LWI piers that cross the eelgrass bed to the minimum needed to provide the functions required;
- Aligning the LWI piers perpendicular to the shoreline so that the piers cross the shortest length of eelgrass bed possible;
- Designing the PSB pontoons with feet to reduce the amount of eelgrass disturbed;
- Establishing construction debris and pile removal control measures (Section 2.1.2.3);
- Instituting prop wash control measures (Section 2.1.2.4); and

- Preparing and implementing a mooring and anchoring plan (Section 2.1.2.6).

Residual (i.e., following avoidance and minimization measures) impacts on eelgrass and its environmental functions would be compensated for by implementation of the Navy's compensatory mitigation action as described in Section 6.0.

8.4. BENTHIC COMMUNITY

Impacts on benthic communities will be avoided by:

- Preparing and implementing a SWPPP (Section 2.1.2.1);
- Limiting construction vessels to a construction corridor of 100 feet (30 meters) around the new structure (Section 2.1.2.4); and
- Implementing work vessel grounding control measures (Section 2.1.2.5).

Impacts on benthic communities will be minimized by:

- Placing the SPE in deep waters;
- Limiting the width of the LWI piers that cross nearshore benthic habitats such as oyster beds to the minimum needed to provide the functions required;
- Aligning the LWI piers perpendicular to the shoreline so that the piers cross the shortest length of nearshore benthic habitats possible;
- Designing the PSB pontoons with feet to reduce the amount of benthic habitat disturbed;
- Establishing construction debris and pile removal control measures (Section 2.1.2.3);
- Instituting prop wash control measures (Section 2.1.2.4); and
- Preparing and implementing a mooring and anchoring plan (Section 2.1.2.6).

Avoidance and minimization measures described above that are protective of eelgrass beds would also be protective of those benthic species which use eelgrass for habitat (e.g., Dungeness crabs). Residual (following avoidance and minimization measures) impacts on the benthic community and its environmental functions would be compensated for by implementation of the Navy's compensatory mitigation action as described in Section 6.0.

8.5. MARINE FISH

Impacts on marine fish, including ESA-listed species, will be avoided by adhering to the established work window, except as noted, for this portion of Hood Canal (Section 2.2). Impacts on marine fish would be further minimized by:

- Limiting the width of the LWI piers that cross the migratory path of juvenile salmonids to the minimum needed to provide the functions required; and
- Deploying air bubble curtains or other noise attenuating device(s) during impact hammer operations for steel piles (Section 3.2.2).

Other avoidance and minimization measures described above for hydrography, water quality, and eelgrass would also be protective of marine fish habitats (Section 5.1.2).

8.6. MARINE MAMMALS AND BIRDS

Impacts on ESA-listed marine birds and MMPA-protected marine mammals will be avoided by the use of visual monitoring for marine mammals and marbled murrelets during construction and shut-down of pile driving when these species approach or enter areas where injury could occur (Section 4.0). Impacts on marine mammals and birds will be minimized by deploying air bubble curtains or other noise attenuating device(s) during impact hammer operations (Section 3.2.2) and employing a soft-start approach during pile driving operations (Section 3.2.3). Other avoidance and minimization measures described above for hydrography, water quality, eelgrass, and marine fish would also be protective of marine mammal and bird aquatic habitats and food resources.

9.0 TREATY MITIGATION (MM 14)

As discussed in FEIS Section 3.14, the LWI and SPE Proposed Actions would affect American Indian traditional resources subject to tribal treaty rights. The Navy invited and has engaged in government-to-government consultation with the affected tribes to evaluate potentially significant impacts to Treaty-protected resources, and identify appropriate mitigation for the impacts. The following subsections describe measures the Navy would undertake to mitigate potential adverse impacts of the LWI and SPE Proposed Actions on Treaty protected resources.

9.1. SKOKOMISH INDIAN TRIBE

The Navy and the Skokomish Indian Tribe have conducted government-to-government consultations to discuss the nature, scope, and schedule of the Navy's Proposed Actions. These consultations began in May 2008 for the LWI project and July 2012 for the SPE project, and focused on measures to address the potential effects of the projects on reserved tribal treaty rights and resources. On March 3, 2016 the Navy and the Skokomish Indian Tribe completed a Memorandum of Agreement (MOA) to undertake treaty mitigations for LWI and SPE by contributing funding to support Skokomish River Basin restoration, with the terms and conditions of the MOA to apply only after the Navy begins in-water construction.

9.1.1. Skokomish River Basin Ecosystem Restoration

The Skokomish River Basin, located on the Great Bend of Hood Canal, is the largest source of freshwater to Hood Canal and includes the Skokomish Indian Reservation. The mitigation measures identified in the MOA are part of an ecosystem restoration plan for the Skokomish Basin being undertaken by USACE in partnership with the Skokomish Indian Tribe and Mason County, Washington. The plan is described and its alternatives analyzed in the *Skokomish River Basin Mason County, Washington Ecosystem Restoration Integrated Feasibility Report and Environmental Impact Statement* (Skokomish River Basin EIS; USACE 2015), incorporated here by reference. The preferred alternative (Section 3.11, p. 54-56) consists of the following actions:

- Removal of a levee;
- Placement of large woody debris;
- Reconnection of a side channel; and
- Wetland restoration at two sites.

The Skokomish River Basin EIS (Section 5.9.1, p. 126) summarizes the anticipated unavoidable adverse impacts of the actions itemized above as follows:

- Temporary, minor, and localized degradation of water quality from increases in turbidity during in-water work;
- Temporary, minor disturbance to fish and aquatic insects through increased turbidity and construction activity in the water;
- Temporary clearing of upland and riparian vegetation for access and staging areas;

- Fill of up to 5 acres (2 hectares) of wetland where wetland embankments are constructed, which is offset by a net gain of 51 acres (21 hectares) of wetlands by these increments; plus another 1 acre (0.4 hectare) of disturbance to wetlands for the Side Channel Reconnection inlet; and
- Temporary and localized disruptions to traffic caused by construction vehicle access to worksites.

These impacts would be mitigated as summarized in Section 5.10, p. 127, of the Skokomish River Basin EIS: "Implementation of the recommended plan would involve three ecosystem restoration sites with only minor construction activities in the aquatic environment, primarily for temporary culvert installation for access. Each of the proposed sites would have negligible, short-term construction related effects. All of these minor and temporary effects can be avoided and minimized through construction designs and standard best management practices (BMPs). Specific measurable and enforceable measures would be developed for each site based on the specific effects of the project. The Corps would require construction contractors to adhere to BMPs to protect water quality. Standard construction stormwater BMPs can be incorporated into site designs, operational procedures, and physical measures on site. There are no legal requirements to mitigate for greenhouse gas emissions; however, BMPs are available for fuel and material conservation during construction."

A NEPA Record of Decision is expected to be executed in 2016 for the Ecosystem Restoration Project. The project design and construction would be implemented on a cost sharing basis between the federal government (65 percent) and the Skokomish Indian Tribe and Mason County (35 percent). The Navy would contribute funding toward the Skokomish Indian Tribe's cost share.

9.2. PORT GAMBLE S'KLALLAM TRIBE, JAMESTOWN S'KLALLAM TRIBE, AND LOWER ELWHA KLALLAM TRIBE

The Navy began government-to-government consultation with the Port Gamble S'Klallam Tribe, Jamestown S'Klallam Tribe, and Lower Elwha Klallam Tribe for the LWI project in 2008 and for the SPE project in 2012. Although the Navy and Tribes were not able to reach formal agreement on the treaty mitigation measures at the time of publication of this FEIS, the Navy would fund one or more of the following treaty mitigation projects.

For LWI:

- Shellfish seeding and beach enhancement at locations off Navy property;
- Development and implementation of a floating upweller system (FLUPSY) management plan; and
- Kilisut Harbor Restoration Project.

For SPE:

- Shellfish seeding and beach enhancement at locations off Navy property; and
- Culvert replacement at Little Boston Road over Shipbuilders Creek.

9.2.1. Shellfish Seeding and Beach Enhancement

As mitigation for the LWI and SPE Proposed Actions, the Navy would fund shellfish seeding and beach enhancement at locations off Navy properties. This mitigation measure would be consistent with the goals of the Port Gamble S'Klallam Tribe's Sustainable Shellfish Program to improve the health of the Hood Canal nearshore areas and shellfish populations.

The procedures and expected environmental impacts of shellfish seeding are described in the *TRIDENT Support Facilities Explosives Handling Wharf (EHW-2) Final Environmental Impact Statement* (EHW-2 FEIS) (Navy 2012; Appendix F, Mitigation Action Plan, p. F-166-169), incorporated here by reference. Beach seeding with juvenile clams or oysters is done by hand during a low tide when the intertidal area is exposed as much as possible. The seeding requires an aquaculture permit from USACE. The process does not result in adverse impacts to fish and wildlife or physical features of the environment, and socioeconomic effects are beneficial. Shellfish seeding would not be conducted in locations where eelgrass is present.

The procedures and expected environmental impacts of beach enhancement are described in the EHW-2 FEIS, Appendix F, p. F-157-161, and incorporated here by reference. Beach enhancement involves placing gravel and sand on tidelands (beach nourishment) to enhance shellfish seed habitat. The gravel and sand are placed through the use of barges and dispersal equipment during appropriate tidal windows. The fill placement is regulated by a USACE permit under the authority of CWA Section 404 and also requires a Section 401 Water Quality Certification from WDOE. The work would be conducted during a NMFS-approved in-water work window to minimize potential impacts on ESA-listed fish species and juvenile populations. The impact on ESA-listed species would likely be "may affect, not likely to adversely affect" because adults of these species could be present during the in-water work window. Beach enhancement would not be conducted in locations where eelgrass is present. The fill placement would produce temporary water quality impacts through local turbidity, but no long-term adverse effects on water quality would be expected. Short-term air quality impacts would occur from haul truck and construction equipment exhaust and from brief fugitive dust emissions. Equipment operating during the fill placement would generate noise temporarily, but there would be no sensitive receptors near the proposed mitigation action. Long-term socioeconomic impacts would be beneficial.

9.2.2. Floating Upweller System (FLUPSY) Management Plan

As mitigation for the LWI project, the Navy would fund the development and implementation of a management plan for a shellfish nursery floating upweller system (FLUPSY) to be operated by the Port Gamble S'Klallam Tribe. In coordination with the Jamestown S'Klallam Tribe and Lower Elwha Klallam Tribe, the Port Gamble S'Klallam Tribe would hire a consultant with expertise in shellfish nursery operation to develop a plan that would specify procedures for achieving a self-sustaining FLUPSY operation within 6 years after startup. The management plan would describe the setup, procedures, required equipment, schedules, and other information necessary to operate and maintain the FLUPSY, including a shellfish seeding/capacity plan for the FLUPSY during build-out and implementation. FLUPSY operations in the Pacific Northwest are typically initiated in the spring and run through at least late October on an annual basis. Supervision and oversight by a shellfish nursery consultant would be needed for the first 6 years of operation as oyster seed grow out. The consultant would assist with setting up pumps or paddlewheels, stocking bins with shellfish seed, maintaining seed on a daily and weekly basis, and ensuring that gantry operations are conducted efficiently and safely. Minor equipment and supplies may also be purchased.

The procedures and expected environmental impacts of FLUPSY operations are described in the EHW-2 FEIS, Appendix F, p. F-171-176, and incorporated here by reference. The proposed FLUPSY would be located in the marine environment beyond depths in which eelgrass and other marine vegetation typically grow, and the structure would be sited to avoid impacts from underwater utility cables on nearshore marine vegetation, shoreline riparian vegetation, and fish and wildlife resources and habitats. The FLUPSY would be sited to minimize impacts on ESA-listed fish species and their habitats during operation, and the short-term construction impact on listed species would likely be “may affect, not likely to adversely affect” because adults of these species could be present during the in-water work window. All applicable stormwater control measures would be in effect during construction, and a Spill Prevention, Control and Countermeasure Plan for fuels and lubricants would be maintained and followed during facility operation. With these controls in place, no appreciable adverse effect on water quality would be expected during construction and operation of the FLUPSY. Power tools used to build the facility would be audible nearby during construction; during operation, pumps used to produce upwellings, and occasional boat traffic to and from the facility, would not appreciably raise ambient noise levels above existing conditions. Vehicle and boat engine emissions would occur during construction, but no new stationary emission source would be involved, and no long-term air quality impacts would be anticipated to result from operation of the facility.

9.2.3. Kilisut Harbor Restoration Project

As mitigation for LWI, the Navy would fund a portion of the Kilisut Harbor Restoration Project. Kilisut Harbor is located at the southern tips of Indian and Marrowstone Islands in northern Puget Sound. As described by the project website (North Olympic Salmon Coalition 2016), the harbor was once connected to Oak Bay through two tidal channels. A causeway and two bridges were constructed across the channels and intertidal area in the early 1900s to support Washington State Route 116. Since that time the former tidal channels have become closed by sediment deposition due to reduced tidal exchange, and in recent decades saltwater flow from Oak Bay to the marsh system has been limited to waves overtopping the beach during storm events. In the early 1970s extensive fish kills were reported in Kilisut Harbor due to low dissolved oxygen levels caused by the reduced tidal flushing. The proposed project would partially restore former conditions by reopening the tidal channels and replacing the existing undersized culverts with a bridge spanning the channels.

The Kilisut Harbor Restoration Project, known also as the Kilisut Harbor/Oak Bay Reconnection Project, is one of 36 candidate restoration projects under consideration by the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP), a partnership organization of federal state, local, and tribal governments along with academic institutions, nongovernmental organizations, and private sector representatives led by USACE and the Washington Department of Fish and Wildlife (PSNERP 2012).

The Kilisut Harbor Restoration Project was not among the 11 projects selected for analysis in the *Puget Sound Nearshore Ecosystem Restoration Study Draft Integrated Feasibility Report and Environmental Impact Statement* (Puget Sound Ecosystem Restoration DEIS) (USACE 2014).

However, planning for the project continues under the sponsorship of the North Olympic Salmon Coalition and cooperating organizations within the Regional Fisheries Enhancement Group Program. The project goal is to "Re-create the historic and self-maintaining tidal channel connection between southern Kilisut Harbor and Oak Bay to restore ecosystem processes to a regionally significant water body and shoreline" (North Olympic Salmon Coalition 2016). To accomplish this, the project would replace 450 linear feet of road fill and existing twin 5-foot-diameter culverts on State Route 116 with a bridge spanning excavated tidal channels that would reconnect the salt marsh and southern Kilisut Harbor to Oak Bay, thereby increasing flushing, improving water quality, and restoring connectivity during high tide periods (PSNERP 2012).

Environmental impacts of the Kilisut Harbor Restoration Project would be comparable to most of those described for the restoration projects analyzed in the Puget Sound Ecosystem Restoration DEIS and are incorporated here by reference (USACE 2014, Sections 5.1-5.5, p. 159-204 and summarized in Table 5-10, p. 199-204. The projects evaluated in the Puget Sound Ecosystem Restoration DEIS are approximately similar in scale, scope, and regional setting to the Kilisut Harbor Restoration Project and were analyzed collectively in the DEIS. Adverse effects of the restoration projects were documented to be associated primarily with short-term construction activities, including but not limited to:

- Localized and temporary impacts to nearshore currents due to location of temporary work structures;
- Risk of fuel spill and encountering undocumented sources of contaminants;
- Short-term release of sediment from excavation and blockage removal;
- Greenhouse gas emissions from construction equipment;
- Potential for noise-producing activities that could cause behavior disruption or harm to aquatic species;
- Potential for harm to birds or marine mammals, or loss of a few fish in close proximity to pile driving;
- Temporary turbidity disturbance to vegetation and wetlands;
- Minor loss of freshwater marsh plants from restoring tidal inundation;
- Disturbance to benthic and epibenthic communities from dredging and related temporary increases in turbidity;
- Turbidity from excavation and dredging, and noise and vibration from pile driving, could cause fish and wildlife to flee, delay migration, or cause physical harm;
- Wildlife disturbance from noise from pile driving and operation of heavy equipment;
- Pile driving noise may disturb marine mammals in locating prey, or cause flee response or temporary hearing loss;
- Potential to affect or encounter known or unknown archaeological resources during construction, and long-term risk of damage to or loss of artifacts from erosion or inundation;
- Access and recreational opportunities temporarily limited or closed during construction; and
- Temporary lane closures on State Route 116 during construction.

Mitigation measures for construction of the Kilisut Harbor Restoration Project would be similar to those described in the Puget Sound Ecosystem Restoration DEIS and are incorporated here by reference (USACE 2014, Section 5.7, p. 217-220). In summary, the mitigation measures proposed to alleviate impacts of the ecosystem restoration projects include:

- Standard practices to mitigate negative effects of construction;
- Best management practices to protect water quality;
- Measures to limit greenhouse gas emissions;
- Mitigation measures for underwater noise effects; and
- Best management practices and mitigation measures for cultural resources.

9.2.4. Culvert Replacement at Little Boston Road over Shipbuilders Creek

As mitigation for SPE, the Navy would provide funding to support the replacement of a culvert at Shipbuilders Creek on the Port Gamble S'Klallam Tribe Reservation. The present culvert is undersized, perched, and is a barrier to fish passage. To restore fish migration, the project would install a properly-sized culvert, designed per Washington State Department of Fish and Wildlife stream simulation modeling criteria. The adjacent riparian corridor disturbed by the construction would be restored with native vegetation and appropriate streambed substrate.

The replacement culvert at the Little Boston Road crossing of Shipbuilders Creek would be properly designed, sized, aligned, and sloped for optimal fish passage and appropriate hydraulic parameters in compliance with the Hydraulic Project Approval (Washington Department of Fish and Wildlife 2013; Washington State Department of Transportation 2016). Adverse environmental effects would be confined to the construction and immediate post-construction periods and could include, but would not be limited to, the following types of impacts, which would be mitigated through standard Best Management Practices in compliance with applicable permits and approvals:

- Temporary roadway or lane closures
- Removal of existing paving, exposing soil to runoff;
- Removal of existing vegetation, including bank-stabilizing roots;
- Construction stormwater runoff;
- Bank erosion and downstream sedimentation;
- Siltation-related effects on downstream fish and wildlife;
- Inadvertent exposure of, or damage to, archaeological artifacts;
- Potential contaminant release from accidental spills or leaks;
- Construction noise;
- Greenhouse gas emissions from equipment and vehicle exhaust; and
- Fugitive dust emissions.

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ATTACHMENT A-1

MARINE MAMMAL OBSERVATION RECORD FORM (Sample)

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Project Name: ______________________________ Monitoring Location______________________________ Page ___________ of ____________
(Pier Location, Vessel based, Land Location, other)

Date: ______________________________ Vessel Name: ______________________________ Time Effort Initiated:______________

Time Effort Completed:______________

Sighting Data

Event Code	Sighting Number (1 or 1.1 if resight)	Time/Duration watching sighting (Start/End time if continuous)	WP # (every time a sighting is made)	Observer	Sighting cue	Species	Dist/ Dir to Animal (from Observer)	Dist to Pile (btwn animal & pile)	# of Animals Group Size (min/max/best) # of Calves	Relative Motion/and Behavior Code (see code sheet)	Const Type During Sighting	Miti gation used during sighting?	Miti gation Type?	Visibility	% Glare	Weath Cond	Sea State and Wave Ht	Swell Dir	Behavior Change/ Response to Activity/Comments
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ______	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E			Light Mod Heavy	N or S W or E	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ______	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E			Light Mod Heavy	N or S W or E	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ______	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E			Light Mod Heavy	N or S W or E	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ______	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E			Light Mod Heavy	N or S W or E	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ______	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E			Light Mod Heavy	N or S W or E	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ______	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E			Light Mod Heavy	N or S W or E	
		: : : :					m or km °	m or km	/ / ___ calves	opening closing parallel none Behavior Code: ______	PRE POST SSV SSI V I PC DP ST NONE	Y N	DE SD	B P M G E				N or S W or E	

Sighting #=chronological number of sightings, If resight of same animal, then 1.1, 1.2, etc. WP (Waypoint)=GPS recording of lat/long, time/date stamp. Critical for vessel observers.

Sighting Form last revised October 10, 2012. POC-DoN, NAVFAC NW, Balla-Holden

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
Pinniped only		
EW	Enter Water (from haul out)	Enters water from a haul-out for no obvious reason
FL	Flush (from haul out)	Enters water in response to disturbance
HO	Haul out (from water)	Hauls out on land
RE	Resting	Resting onshore or on surface of water
LO	Look	Is upright in water "looking" in several directions or at a single focus
SI	Sink	Sinks out of sight below surface without obvious effort (usually from an upright position)
VO	Vocalizing	Animal emits barks, squeals, etc.
Cetacean only		
LG	Logging	Resting on surface of water with no obvious signs of movement

Sighting Form last revised October 10, 2012. POC-DoN, NAVFAC NW, Balla-Holden

Marine Mammal Species

Code	Marine Mammal Species
CASL	California Sea Lion
HSEA	Harbor Seal
STSL	Steller Sea Lion
HPOR	Harbor Porpoise
DPOR	Dall's Porpoise
ORCA	Killer Whale
HUMP	Humpback Whale
UNLW	Unknown Large Whale
OTHR	Other
UNKW	Unknown

Construction Type

Code	Activity Type
SSV	Soft Start (Vibratory)
SSI	Soft Start (Impact)
V	Vibratory Pile Driving (installation and extraction)
I	Impact Pile Driving
PC	Pneumatic Chipping
DP	Dead pull
ST	Stabbing
NONE	No Pile Driving
OTH	Other

Event

Code	Activity Type
E ON	Effort On
E OFF	Effort Off
PRE	Pre Watch
POST	Post Watch
SSV	Soft start-vibratory
SSI	Soft start-impact
WC	Weather Condition/Change
S	Sighting
M-DE	Mitigation Delay
M-SD	Mitigation Shutdown

Mitigation Codes

Code	Activity Type
DE	Delay onset of Pile Driving
SD	Shut down Pile Driving

Sighting Form last revised October 10, 2012. POC-DoN, NAVFAC NW, Balla-Holden

Visibility

Code	Distance Visible
B	Bad (<0.5km)
P	Poor (0.5 – 1.5km)
M	Moderate (1.5 – 10km)
G	Good (10 - 15km)
E	Excellent (>15km)

Glare

Percent glare should be the total glare of observers' area of responsibility. Determine if observer coverage is covering 90 degrees or 180 degrees and document daily. Then assess total glare for that area. This will provide needed information on what percentage of the field of view was poor due to glare.

Weather Conditions

Code	Weather Condition
S	Sunny
PC	Partly Cloudy
L	Light Rain
R	Steady Rain
F	Fog
OC	Overcast

Sea State and Wave Height

Use Beaufort Sea State Scale for Sea State Code. This refers to the surface layer and whether it is glassy in appearance or full of white caps. In the open ocean, it also takes into account the wave height or swell, but in inland waters the wave height (swells) may never reach the levels that correspond to the correct surface white cap number. Therefore, include wave height for clarity.

Code	Wave Height
Light	0 – 3 ft
Moderate	4 – 6 ft
Heavy	>6 ft

Swell Direction

Swell direction should be where the swell is coming from (S for coming from the south). If possible, record direction relative to fixed location (pier). Choose this location at beginning of monitoring project.

Sighting Form last revised October 10, 2012. POC-DoN, NAVFAC NW, Balla-Holden

ATTACHMENT A-2

SEABIRD MONITORING DATA COLLECTION FORM (Sample)

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Seabird Monitoring Data Collection Form

Date________________

Project Name ________________________________ Monitoring Site/Transect ID________________________

Observers ____

Activity ________________________________ Time and Duration________________________________

Time	Species	# of birds	Wind speed (Beaufort Marine Scale)	Land Observer	Boat Observer		Observed Behavior*	Comments
				Grid Location	Distance	Land/Sea Ward		

*R=resting, F=feeding/diving, P=preening, Y= flushing, T=transiting, N=nesting, O=other

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ATTACHMENT A-3

SEABIRD MONITORING SITE/TRANSECTS IDENTIFICATION FORM (Sample)

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Seabird Monitoring Site/Transect Identification Form (Sample)

Seabird Monitoring Site/Transect Identification Form

Project Name

Dolphin repair

Monitoring Dates

November 8, 9, 10, 2012

Number of Monitoring Sites/Transects

4

Insert aerial photo of entire monitoring project area. Identify each monitoring site/station reflecting 50 meter zones for each observer. For example, if there are two observers on a boat transect, the box will be 100 meters wide. Some monitoring stations will overlap and should be indicated here.

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ATTACHMENT B

BEAUFORT WIND SCALE

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Table 1 – Beaufort Wind Scale develop in 1805 by Sir Francis Beaufort of England (0 = calm to 12 = hurricane)

Force	Wind (knots)	Classification	Appearance of wind effects on the water	Appearance of wind effects on land	Notes specific to on-water seabird observations
0	<1	Calm	Sea surface smooth and mirror like	Calm, smoke rises vertically	Excellent conditions, no wind, small or very smooth swell. You have the impression you could see anything.
1	1-3	Light air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes	Very good conditions, surface could be glassy (Beaufort 0), but with some lumpy swell or reflection from forests, glare, etc.
2	4-6	Light breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move	Good conditions, no whitecaps, texture/lighting contrast of water make murrelets hard to see. Surface could also be glassy or have small ripples, but with a short, lumpy swell, thick fog, etc.
3	7-10	Gentle breeze	Large wavelets, crests beginning to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended	Surveys cease, scattered whitecaps present, detection of murrelets definitely compromised, a hit-or-miss chance of seeing them owing to water choppiness and high contrast. This could also occur at lesser wind with a very short wavelength, choppy swell.
4	11-16	Moderate breeze	Small waves 0.3 to 1.1m becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move	
5	17-21	Fresh breeze	Moderate waves 1.1 to 2.0 m taking longer form, many whitecaps, some spray	Small trees begin to sway	

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ATTACHMENT C

CHAIN OF CUSTODY RECORD FORM

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<table>
<tr><th colspan="5">Chain of Custody Record</th></tr>
<tr><td>Date and Time of Collection:</td><td>Duty Station:</td><td colspan="3">Collection By:</td></tr>
<tr><td colspan="2">Source of Specimen (Person and/or Location)
Found At:</td><td colspan="3">Project Name:</td></tr>
<tr><td>Item No:</td><td colspan="4">Description of Specimen (include Species and Tag Number):</td></tr>
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FEDEX
U.S. Mail
In Person
Other:</td></tr>
<tr><td>To: (Print Name, Agency)</td><td>Receipt Signature:</td><td>Receipt Date:</td></tr>
<tr><td>To: (Print Name, Agency)</td><td>Receipt Signature:</td><td>Receipt Date:</td></tr>
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FEDEX
U.S. Mail
In Person
Other:</td></tr>
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APPENDIX D

NOISE ANALYSIS

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1.0 INTRODUCTION

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.

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) (Acoustical Society of America 1994). 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 (dB) is used to evaluate these properties; in acoustics, "level" indicates a sound measurement in decibels. The 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. In other words, 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 (SPLs). For measurements of underwater sound, the standard reference pressure is 1 micropascal (μPa, or 10^{-6} pascals), and is expressed as "dB re 1 μPa." 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; National Marine Fisheries Service [NMFS] 2013), 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 D–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 under-pressure observed during each sound event and is presented in dB re 1 μPa peak. The root mean square level is the square root of the energy divided by a defined time period, given as dB re 1 μPa RMS.

Table D–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 1 µPa peak	The maximum absolute value of the instantaneous sound pressure expressed as dB re 1 µPa peak.
Root Mean Square [rms], dB re 1 µPa rms	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 1 µPa.
Sound Exposure Level [SEL], dB re 1 µPa^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.

While the body of knowledge on the impacts of pile driving noise on marine and terrestrial species has expanded significantly in the past few years, monitoring and research are still needed to better gauge both the scope and intensity of these impacts. The Navy has enhanced its approach for the selection of appropriate proxy source levels, acoustic propagation modeling, and understanding the potential behavioral and physiological effects on marine mammals, fish, sea turtles, and birds. This progress is facilitated by dedicated acoustic monitoring during active installation and experience removing a wide variety pile sizes and materials. Further, new peer-reviewed and grey literature from monitoring and studies both in the U.S. and internationally is helping to inform the Navy's analysis of environmental effects during infrastructure upgrades. Scientific research and recent biological opinions from regulatory agencies have suggested that current guidelines and criteria for marine species behavioral and physiological impacts may warrant review and revision.

For the assessment of potential impacts associated with the LWI and SPE projects, the Navy has considered previous analyses for pile driving projects in Puget Sound and Hood Canal, as well as standards for similar projects around the country. These analyses and standards were combined with the best available science and literature, real-world requirements for construction activities, and opinions from regulatory agencies. The assessment and resulting conclusions included in this document reflect these factors.

2.0 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 (Acoustical Society of America 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 likely to be considered undesirable *noise* by marine mammals. Sounds produced by military training and construction activities 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).

3.0 DESCRIPTION OF NOISE SOURCES

3.1. EXISTING NOISE LEVELS

Ambient noise in the vicinity of the Land-Water Interface (LWI) / Service Pier Extension (SPE) project is a composite of sounds from natural sources, and typical recreational and enterprise activities such as boating, commercial and recreational fishing, and military ship traffic. Small powerboats generate peak narrow band SPLs of 150 to 165 dB at 3 feet (0.9 meter) in the 350 to 1,200 Hz region, with mean SPLs of 148 dB at 3 feet (0.9 meter) (Barlett and Wilson 2002).

Fishing vessels can generate peak spectral densities of 140 dB at 3 feet (0.9 meter) in the 250 to 1,000 Hz regime (Hildebrand 2004). Underwater sound from human activities includes ship traffic noise, use of sonar and echo sounders in commercial fishing to locate fish schools, industrial ship noise, and recreational boat use. Ship and small boat noise comes from propellers and other on-board mechanical equipment or fluid systems. Other sources of underwater noise at industrial waterfronts can come from cranes, generators, and electrical distribution facilities, as well as mechanized equipment operating on wharves or the adjacent shoreline.

In a study conducted in Haro Strait, San Juan Islands, data showed that the ambient half-hourly SPL ranged from 95 dB to 130 dB (Veirs and Veirs 2005), demonstrating the range over which localized human-generated noise can vary by specific locations and time periods. Carlson et al. (2005) measured the underwater baseline noise at Hood Canal Bridge and found that broadband (24 kilohertz [kHz] bandwidth) underwater noise levels ranged from 115 to 135 dB re 1 µPa. The Washington State Department of Transportation (WSDOT) summarized underwater broadband (20 Hz to 20 kHz) noise over three consecutive 24-hour periods at ferry terminals in Mukilteo, Port Townsend, Anacortes, Edmonds, and Seattle (Laughlin 2014). Based on WSDOT's recent research, the broadband sound level was 124 dB at Mukilteo, 107 dB at Port Townsend, 133 dB at Anacortes, 123 dB at Edmonds, and 141 dB at Seattle.

3.1.1. LWI Project Sites

Existing noise levels at the LWI project site are expected to be similar to baseline underwater noise levels measured during a 30-day period along the developed portion of the Bangor waterfront (Slater 2009). The average broadband RMS noise level at the LWI project sites is approximately 114 dB re 1 µPa between 100 Hz and 20 kHz; the minimum was 103 dB RMS re 1 µPa and the maximum was 147 dB RMS re 1 µPa (Slater 2009). The primary source of noise was due to industrial activity along the waterfront (e.g., at the Explosives Handling Wharf-1 [EHW-1], Marginal Wharf, and Delta Pier), small boat traffic, and wind-driven wave noise. No substantial precipitation was noted during the study period, although this would undoubtedly contribute to noise during seasonal periods. Peak spectral noise from industrial activity was noted below a frequency of 300 Hz, with maximum levels of 110 dB re 1 µPa noted in the 125 Hz band. In the 300 Hz to 5 kHz range, average levels ranged between 83 and 99 dB re 1 µPa. Wind-driven wave noise dominated the background noise environment at approximately 5 kHz and above, and ambient noise levels flattened above 10 kHz.

Ambient underwater sound in the vicinity of EHW-1, approximately 1,500 feet (450 meters) from the north LWI and 5,900 feet (1,800 meters) from the south LWI, was measured during the Test Pile Program (TPP) in 2011. Average underwater sound levels ranged from 112 dB RMS re 1 µPa at mid-depth between 50 Hz and 20 kHz to 114 dB RMS re 1 µPa at deep depth (Illingworth & Rodkin 2012). For the purposes of noise analyses for the LWI project, the average background underwater noise level at the project area was considered to be 114 dB RMS re 1 µPa between 100 kHz and 20 kHz.

3.1.2. Service Pier Extension Project Site

Some of the baseline underwater noise levels described above for LWI were measured at sample locations in the vicinity of the existing Service Pier (Slater 2009). Therefore, existing underwater noise levels at Service Pier are expected to be similar to those described above for the LWI project sites. For the purposes of noise analyses for the SPE project, the average background underwater noise level at the project area was considered to be 114 dB RMS re 1 μPa between 100 kHz and 20 kHz.

3.2. CONSTRUCTION NOISE SOURCES

In-water construction activities associated with SPE Alternative 2 include impact and vibratory 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 each sound type may cause different types of physical effects to marine species, particularly with regard to hearing (Ward 1997).

Impulsive sounds (e.g., explosions, seismic airgun pulses, and impact pile driving) 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 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).

Table D–2 details representative noise levels of anthropogenic activities to provide context for this analysis.

Table D–2. Representative Underwater Noise Levels of Anthropogenic Sources

Noise Source	Source Level	Frequency Range	Reference
Dredging	161 – 186 dB RMS re: 1 μPa @ 1 meter	1 – 500 Hz	Richardson et al. 1995; DEFRA 2003; Reine et al. 2014
Wind Turbine	100 – 120 dB RMS re: 1 μPa @ 100 meters	30 – 200 Hz	Betke 2006; Nedwell et al. 2007
Small Vessel	141 – 175 dB RMS re: 1 μPa @ 1 meter	860 – 8,000 Hz	Galli et al. 2003; Matzner and Jones 2011; Sebastianutto et al. 2011
Large Ship	176 – 186 dB re: 1 μPa^2sec SEL @ 1 meter	20 – 1,000 Hz	McKenna et al. 2011
Airgun Array	255 – 262 dB peak re: 1 μPa @ 1 meter[1]	10 – 200 Hz	MacGillivray and Chapman 2005; Götz et al. 2009

[1]Measurements = reported in both peak and peak-to-peak units.

4.0 PROXY SOURCE LEVELS

During construction of the LWI and SPE projects, underwater and airborne noise levels in the Action Areas would be elevated due to pile driving, vessel and boat traffic, and operation of heavy construction equipment. The greatest sound levels would be produced by impact driving hollow steel piles (WSDOT 2013). Some noise would be generated with construction support vessels, small boat traffic, and barge-mounted equipment such as cranes and generators, but this noise will typically not exceed existing underwater noise levels resulting from existing routine waterfront operations in the vicinity of the construction sites. Several non-pile driving construction activities would also occur at the project areas. Among them are relocation of mooring anchors; installation of Port Security Barrier [PSB] units, pier decking, and camels; and operation of cranes, power utility booms, and other equipment. While no in situ empirical data exist for these construction activities, they are expected to be significantly lower than those estimated for pile installation using an impact/vibratory pile driver. Although it is possible that sound could be transmitted from these activities along the piles' length and enter the water, underwater acoustic impacts from these construction operations are expected to be minimal.

4.1. Underwater Source Levels

Underwater pile driving source levels were chosen from recommendations developed by the Navy for Navy waterfront projects located in Puget Sound (Navy 2015, FEIS Appendix H: *Proxy Source Sound Levels and Potential Bubble Curtain Attenuation for Acoustic Modeling of Nearshore Marine Pile Driving at Navy Installations in Puget Sound*). Values used in the analysis are shown in Table D–3.

4.2. Airborne Source Levels

Unweighted airborne impact and vibratory pile driving source levels are reviewed in Appendix H. Recommended unweighted airborne source level values are presented in Table D-4.

The most recent A-weighted data from the 2013 Explosives Handling Wharf (EHW-2) acoustic monitoring report (Illingworth & Rodkin 2013) were reviewed in order to determine the proxy levels for modeling of airborne noise for receptors other than pinnipeds. Based on measurements for 24-inch (60-centimeter) piles, a conservative assumed value of 100 dBA was modeled for all pile sizes.

Table D–3. Underwater Pile Driving Source Levels (unattenuated)

Impact Driving			
Pile Size / Type	**dB RMS re: 1 μPa @ 10 m**	**dB peak re: 1 μPa @ 10 m[1]**	**dB SEL re: 1 μPa^2 sec @ 10 m**
36-inch (90-centimeter) steel pipe	194	211	181
24-inch (60-centimeter) steel pipe	193	210	181
18-inch (45-centimeter) square concrete	170	184	159
Vibratory Driving			
Pile Size / Type	**dB RMS re: 1 μPa @ 10 m**	**dB peak re: 1 μPa @ 10 m**	**dB SEL re: 1 μPa^2 sec @ 10 m**
36-inch steel pipe	166	n/a	n/a
24-inch steel pipe	161		

1. Because 36- and 24-inch steel pipe piles may be installed on any active pile driving day during the first in-water work window under SPE Alternative 2, the more conservative (i.e., higher) source level for 36-inch piles was modeled, yielding the largest potential range to effect.

Table D–4. Airborne Pile Driving Source Levels

Impact Driving		
Pile Size / Type	**dB RMS re: 20 μPa @ 15 m**	
	Unweighted	A-weighted
36-inch (90-centimeter) steel pipe	112	100[1]
30-inch (76-centimeter) steel pipe	---[1]	
24-inch (60-centimeter) steel pipe	110[1]	
18-inch (45-centimeter) square concrete	112	
Vibratory Driving		
Pile Size / Type	**dB RMS re: 20 μPa @ 15 m**	
	Unweighted	A-weighted
36-inch steel pipe	95	96
30-inch steel pipe	95	---
24-inch steel pipe	92[1]	89[1]

1. Because steel pipe piles may be installed on any active pile driving day during the first in-water work window under SPE Alternative 2, the more conservative (i.e., higher) source level for 36-inch piles was modeled, yielding the largest potential range to effect.

4.3. Attenuation

A bubble curtain or other noise attenuating device is assumed to be used to minimize noise levels during impact pile driving operations. Bubble curtain attenuators emit a series of bubbles around a pile to introduce a high-impedance boundary through which pile driving noise is attenuated. A review of bubble curtain performance is presented in FEIS Appendix H. The analysis concluded that 8 to 10 dB was an achievable level of attenuation for 36- and 48-inch (90- and 120-centimeter) steel pipe piles.

These analyses support an 8 dB reduction in sound levels for impact proofing of steel piles with bubble curtains during the first in-water work window. TPP data were inadequate to evaluate attenuation values for 24-inch (60-centimeter) piles, and no recommendation was made for this pile size in the literature review. Therefore, it is assumed that attenuation for 24-inch piles would be similar to attenuation for 36- and 48-inch (90- and 120-centimeter) piles. A bubble curtain will not be deployed during impact driving of concrete piles. Therefore, no attenuation value was assumed when calculating the estimated zone of influence for underwater noise from concrete piles.

4.4. Assumptions

Assumptions that were used to complete the noise analysis are as follows:

- Up to 10 piles of any type could be installed during an active pile driving day.
- Vibratory driving would be the primary installation method for 36-, 30-, and 24-inch (90-, 76-, and 60-centimeter) steel piles; 18-inch (45-centimeter) concrete piles would be driven with an impact hammer (incorporating a cushion block).
- Proofing of steel piles, if needed, would require up to 200 strikes per pile; the actual amount of impact driving is expected to be significantly less than this number, yielding a conservative (i.e., larger than anticipated during actual pile installation) effect range for fish and marbled murrelet injury criteria (described in Sections 3.3 and 3.5, respectively).
- Installation of each concrete pile would require up to 300 strikes per pile.
- A bubble curtain will be used to minimize noise levels during impact pile driving of steel piles, with an average reduction of 8 dB from unattenuated pile driving source levels.
- No bubble curtain would be used during impact pile driving of concrete piles, or during vibratory driving of steel piles.

Table D–5 summarizes the number of piles and active driving / proofing days modeled for each alternative.

Table D–5. Summary of Pile Numbers and Active Driving / Proofing Days Modeled

DEIS Alternatives	Size / Type	Number	Number of Days	In-Water Work Window
LWI Alternative 2	24-inch (60-centimeter) steel	54 (north)	80	first
		202 (south)		
	24-inch steel	5 (north) (in the dry)		
		5 (south) (in the dry)		
	36-inch (90-centimeter) steel	15 (north) (in the dry)		
		16 (south) (in the dry)		
LWI Alternative 3	**36-inch steel**	**15 (north) (in the dry)**	**30**	**first**
		16 (south) (in the dry)		
	30-inch (76-centimeter) steel	**Up to 12 (north) (in the dry)**		
		Up to 12 (south)(in the dry)		
	24-inch steel	**15 (north) (in the dry)**		
		15 (south) (in the dry)		
SPE Alternative 2	**36-inch steel**	**230**	**125**	**first**
	24-inch steel	**50**		
	18-inch (45-centimeter) concrete	**105**	**36**	**second**
SPE Alternative 3	24-inch steel	500	155	first
	18-inch concrete	160	50	second

Bolded text denotes preferred Alternatives; "in the dry" refers to piles driven on shore – no underwater noise is associated with these piles.

4.5. METHODOLOGY

4.5.1. Underwater Propagation

Modeling sound propagation is useful in evaluating noise levels to determine distance from the pile driving activity that certain sound levels may travel. 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:

$$TL = B * log_{10}\left(\frac{R_1}{R_2}\right) + C * R_1,$$

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 meters for underwater values, and 15 meters for airborne values).

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 and transmission loss was calculated using only logarithmic spreading. Therefore, using practical spreading (B = 15), the revised formula for transmission loss is $TL = 15 \log_{10} (R_1/10)$.

The practical spreading loss model ($TL = 15 \log_{10} (R_1/10)$) discussed above was used to calculate the underwater propagation of pile driving noise in and around the proposed LWI and SPE project locations.

The estimated effects ranges for fish, marine mammals, and marine birds are detailed in Sections 3.3, 3.4, and 3.5, respectively, of the DEIS. The ensonified areas are assumed to take a circular shape around the notional pile being driven; proximity to land features (e.g., shorelines) may result in some areas being "clipped" as sounds will attenuate as they encounter land or other solid obstacles. As a result, the ranges calculated may not actually be attained.

4.5.2. Airborne Propagation

Spherical spreading predicts that sound produced by a source will propagate through the environment and attenuate at a rate of 6 dB per doubling of distance. The mathematical formula for this model is the same as described above for underwater propagation. For airborne propagation, B (logarithmic loss) = 20 rather than 15 as for practical spreading. Airborne noise is analyzed in Section 3.9 of the DEIS.

4.5.3. Masking Effects

Masking is the increase in the detection threshold of sounds due to the presence of another sound such as the ambient or background sound level or an intermittent source such as pile driving. As determined by the Marbled Murrelet Hydroacoustic Science Panel II (SAIC 2012), masking of marbled murrelet vocalizations due to in-air pile driving noise has the potential to affect foraging behavior and efficiency because murrelets forage in pairs and it is assumed that foraging murrelets must be able to detect their partner's calls within 100 feet (30 meters). The amount of masking of a signal is measured by the critical ratio (i.e., signal-to-noise ratio) in the frequency range of the signal. For both TTS and noise masking of communication signals, the levels of concern are always dependent on existing ambient noise levels. Thus, these levels are site-specific and temporally variable. The USFWS (2013) has provided guidance on evaluating the significance of airborne masking effects for pile driving projects. "Typical" pile driving projects involve:

- Installation of 24-inch or 36-inch (60- or 90-centimeter) steel piles,
- Use of vibratory pile drivers,
- Use of impact pile drivers for proofing only, and
- Adherence to a 2-hour timing restriction (i.e., no pile driving 2 hours after sunrise and 2 hours before sunset during the breeding season).

The distances affected by masking due to pile driving noise were calculated for 36-inch (90-centimeter) steel piles (SAIC 2012) and 24-inch (60-centimeter) steel piles (USFWS 2013), representing the airborne construction source levels measured during the TPP in 2011 (Illingworth & Rodkin 2012). These distances are 138 feet (42 meters) and 550 feet (168 meters), respectively. Results of acoustic monitoring for EHW-2 construction have indicated that average airborne source levels during impact driving of 36-inch (90-centimeter) steel piles are the same as, and in some cases lower than, 24-inch steel piles; and levels for concrete piles are generally lower than for steel piles of comparable size. The effects of masking noise due to pile driving on marbled murrelets are reported in Section 3.5.

4.6. Additive Effects of Concurrent Pile Driving

If impact pile driving for NAVBASE Kitsap Bangor projects occurred at the same time, underwater noise levels could increase by as much as 3 dB at sites roughly equidistant between the multiple pile-driving rigs, for both impact and vibratory driving. Noise from multiple simultaneous sources produces an increase in the overall noise field. A doubling in sound power results in an increase of 3 dB, which is the result of two sources incoherently adding acoustic pressures in the combined noise environment. The resultant sound pressure level (SPL) from n-number of multiple sources is computed with the following relationship, using principles of decibel addition:

$$CombinedSPL = 10 \cdot \log_{10}\left(10^{\frac{SPL1}{10}} + 10^{\frac{SPL2}{10}} + \ldots + 10^{\frac{SPLn}{10}}\right)$$

In areas not roughly equidistant between the two sites, representing the majority of the area affected by noise from one of the pile drivers, noise levels at a given location would be dominated by the closer pile-driving activity, with little to no increase in levels above those from one pile driving operation.

5.0 DEFINITIONS

Ambient sound. Background sound levels on a site; may include project-generated noise.

Broadband. Sound containing frequencies across a wide range, e.g., 20 Hz to 20 kHz.

Critical ratio. The ratio of a signal level to the spectrum level of a non-signal sound. Ambient (background) noise in the frequency range of the signal is most important in masking the signal.

Masking. The increase in the detection threshold of a sound (signal) due to the presence of another sound (non-signal) in the same frequency range.

Source level. Sound energy, in decibels above a reference level, at a specified distance from the source of the sound.

Spectrum level. Sound energy at a particular frequency with 1.0 Hz bandwidth. The frequency of 3,150 Hz is a relevant frequency for birds because it is centered on the zone of maximum hearing sensitivity for many species.

//. Spectrum level notation; e.g., 5 dB//Hz signifies a spectrum sound level of 5 dB at a specified frequency such as 3 kHz.

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APPENDIX E

AIR QUALITY EMISSIONS CALCULATIONS

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Table 1. Emission Source Data for Construction of LWI - Pile-Supported Pier

Construction Activity/Equipment Type	*Max HP Rating*	*Ave. Daily Load Factor*	*Number Active*	*Estimated Avg HP*	*Hours/ Day*	*Daily Hp-Hrs*	*Work Days*	*Total Hp-Hrs*
Construction (1) (10)								
Crane Hoist	564	0.25	1	141	4.0	564	80.0	45,120
Generator - Pile Hammer	190	0.60	1	114	8.0	912	80.0	72,960
Tugboat	1,200	0.25	1	300	1.0	300	50.0	15,000
Barge Equipment	195	0.50	1	98	12.0	1,170	50.0	58,500
Tugboat - Material Deliveries (2) (3)	1,200	0.50	1	600	9.7	5,797	16.0	92,754
Backhoe	160	0.50	1	80	4.0	320	8.0	2,560
Bulldozer - D6	165	0.50	1	83	8.0	660	12.0	7,920
Compactive Roller (4)	165	0.50	1	83	8.0	660	8.0	5,280
Fugitive Dust (5)	NA	NA	1	NA	NA	NA	12.0	6
Grader	180	0.50	1	90	8.0	720	8.0	5,760
Haul Truck - Soil (6) (7)	NA	NA	34	NA	20.0	680	95.0	64,600
Other Construction Truck Traffic (6) (8)	NA	NA	20	NA	8.0	160	540.0	86,400
Other Construction Traffic (6) (8)	NA	NA	20	NA	30.0	600	540.0	324,000
Loader	215	0.50	1	108	8.0	860	8.0	6,880
Paving Machine	200	0.50	1	100	8.0	800	8.0	6,400
Water Truck - 5,000 Gallons	175	0.40	1	70	6.0	420	12.0	5,040
Phase 2 Grate/Mesh Installation (9)								
Tugboat	1,200	0.25	1	300	1	300	260.0	78,000
Barge Equipment	195	0.50	1	98	12	1,170	260.0	304,200
Derrick Barge Crane Hoist	564	0.25	1	141	4	564	260.0	146,640

Notes: (1) Pile driving equipment usage estimates based on 80 days.

(2) Hours per day = Hours per trip, Daily HP Hours = HP hours per trip, and Work Days = # of trips

(3) Assuming that the materials are 50 miles away and the tug travels at a speed of 9 knots

(4) Number Active is acres to be paved.

(5) Number Active = acres disturbed per day, Total Hp-Hrs = total acre-days.

(6) Number Active = miles/roundtrip, Hours/Day = daily truck trips, Daily Hp-Hrs = daily miles, and Total Hp-Hrs = total miles.

(7) Assuming that concrete comes from Bremerton, WA, a round trip distance of 34 miles.

(8) Average round trip for construction related truck or vehicle trip estimated at 20 miles.

(9) Phase 2 will be the remaining days, 260, of the over-water construction period.

(10) Phase 1 construction activity data based on an acreage comparison of POLA Berths 136-147 Container Terminal Project, FEIS/FEIR December 2007 and the SCAQMD construction survey.

Table 2. Emission Source Data for Construction of LWI - PSB Modifications

Construction Activity/Equipment Type	Max HP Rating	Ave. Daily Load Factor	Number Active	Estimated Avg HP	Hours/ Day	Daily Hp-Hrs	Work Days	Total Hp-Hrs
Construction (1) (9)								
Crane Hoist	564	0.25	1	141	4.0	564	30.0	16,920
Generator - Pile Hammer	190	0.60	1	114	8.0	912	30.0	27,360
Tugboat	1,200	0.25	1	300	1.0	300	30.0	9,000
Barge Equipment	195	0.50	1	98	12.0	1,170	30.0	35,100
Tugboat - Material Deliveries (2) (3)	1,200	0.50	1	600	9.7	5,797	3.0	17,391
Backhoe	160	0.50	1	80	4.0	320	8.0	2,560
Bulldozer - D6	165	0.50	1	83	8.0	660	12.0	7,920
Compactive Roller (4)	165	0.50	1	83	8.0	660	8.0	5,280
Fugitive Dust (5)	NA	NA	0.5	NA	NA	NA	12.0	6
Grader	180	0.50	1	90	8.0	720	8.0	5,760
Haul Truck - Soil (6) (7)	NA	NA	34	NA	20.0	680	95.0	64,600
Other Construction Truck Traffic (6) (8)	NA	NA	20	NA	8.0	160	540.0	86,400
Other Construction Traffic (6) (8)	NA	NA	20	NA	30.0	600	540.0	324,000
Loader	215	0.50	1	108	8.0	860	8.0	6,880
Paving Machine	200	0.50	1	100	8.0	800	8.0	6,400
Semi Truck (6) (8)	NA	NA	93	NA	2.0	186	8.0	1,488
Water Truck - 5,000 Gallons	175	0.40	1	70	6.0	420	12.0	5,040

Notes: (1) Pile driving equipment usage estimates based on 30 days.

(2) Hours per day = Hours per trip, Daily HP Hours = HP hours per trip, and Work Days = # of trips

(3) Assuming that the materials are 50 miles away and the tug travels at a speed of 9 knots

(4) Number Active is acres to be paved.

(5) Number Active = acres disturbed per day, Total Hp-Hrs = total acre-days.

(6) Number Active = miles/roundtrip, Hours/Day = daily truck trips, Daily Hp-Hrs = daily miles, and Total Hp-Hrs = total miles.

(7) Assuming that concrete comes from Bremerton, WA, a round trip distance of 34 miles.

(8) Average round trip for construction related truck or vehicle trip estimated at 20 miles.

(9) Data for construction activity taking place on land based on an acreage comparison of POLA Berths 136-147 Container Terminal Project, FEIS/FEIR December 2007 and the SCAQMD construction survey.

Table 3. Emission Source Data for Construction of SPE - Short Pier

Construction Activity/Equipment Type	Max HP Rating	Ave. Daily Load Factor	Number Active	Estimated Avg HP	Hours/ Day	Daily Hp-Hrs	Work Days	Total Hp-Hrs
Over Water Construction (1)								
Crane Hoist	564	0.25	1	141	4.0	564	161.0	90,804
Generator - Pile Hammer	190	0.60	1	114	8.0	912	161.0	146,832
Tugboat	1,200	0.25	1	300	1.0	300	161.0	48,300
Barge Equipment	195	0.50	1	98	12.0	1,170	161.0	188,370
Tugboat - Material Deliveries (2) (3)	1,200	0.50	1	600	9.7	5,797	144.0	834,783
Pier Services and Compressor Bldg (7)								
Air Compressor - 100 CFM	50	0.60	1	30	6.0	180	3.6	648
Concrete/Industrial Saw	84	0.73	1	61	6.0	368	3.6	1,325
Crane	190	0.30	1	57	6.0	342	3.6	1,231
Forklift	94	0.48	1	45	6.0	268	3.6	964
Generator	45	0.60	1	27	8.0	216	3.6	778
Fugitive Dust (6)	NA	NA	0.05	NA	8.0	NA	0.9	1.0
Waterfront Ship Support Building (7)								
Air Compressor - 100 CFM	50	0.60	1	30	6.0	180	90.0	16,200
Concrete/Industrial Saw	84	0.73	1	61	6.0	368	90.0	33,113
Crane	190	0.30	1	57	6.0	342	90.0	30,780
Forklift	94	0.48	1	45	6.0	268	90.0	24,111
Generator	45	0.60	1	27	8.0	216	90.0	19,440
Fugitive Dust (6)	NA	NA	1.1	NA	8.0	NA	21.8	25
Parking Lot (7)								
Paving Machine	200	0.50	1	100	8.0	800	4.0	3,200
Water Truck - 5,000 Gallons	175	0.40	1	70	8.0	560	5.7	3,200
Compactive Roller	165	0.50	2	165	8.0	1,320	2.3	3,093
Scraper	195	0.50	2	195	8.0	1,560	4.0	6,240
Grader	180	0.50	1	90	8.0	720	5.0	3,600
Loader	215	0.50	1	108	8.0	860	5.0	4,300
Backhoe	160	0.50	1	80	8.0	640	4.0	2,560
Bulldozer - D6	165	0.50	1	83	8.0	660	4.0	2,640
Fugitive Dust (6)	NA	NA	3	NA	8.0	NA	5.7	17
Construction Truck and Vehicle Trips								
Construction Truck Traffic (4) (5)	NA	NA	20	NA	18.0	360	400	144,000
Construction Vehicle Traffic (4) (5)	NA	NA	20	NA	70.0	1,400	400	560,000

Notes: (1) Pile driving equipment usage estimates based on 161 days.
(2) Hours per day = Hours per trip, Daily HP Hours = HP hours per trip, and Work Days = # of trips
(3) Assuming that the materials are 50 miles away and the tug travels at a speed of 9 knots
(4) Number Active = miles/roundtrip, Hours/Day = daily truck trips, Daily Hp-Hrs = daily miles, and Total Hp-Hrs = total miles.
(5) Average round trip for construction related truck or vehicle trip estimated at 20 miles.
(6) Number Active = acres disturbed per day, Total Hp-Hrs = total acre-days.
(7) Construction is based on a acreage comparison of POLA Berths 136-147 Container Terminal Project, FEIS/FEIR December 2007, the SCAQMD construction survey and data provided by the US Navy in a 3/20/2013 email.

Table 4. Emission Source Data for Construction of SPE - Long Pier

Construction Activity/Equipment Type	Max HP Rating	Ave. Daily Load Factor	Number Active	Estimated Avg HP	Hours/ Day	Daily Hp-Hrs	Work Days	Total Hp-Hrs
Over Water Construction (1)								
Crane Hoist	564	0.25	1	141	4.0	564	205.0	115,620
Generator - Pile Hammer	190	0.60	1	114	8.0	912	205.0	186,960
Tugboat	1,200	0.25	1	300	1.0	300	205.0	61,500
Barge Equipment	195	0.50	1	98	12.0	1,170	205.0	239,850
Tugboat - Material Deliveries (2) (3)	1,200	0.50	1	600	9.7	5,797	252.0	1,460,870
Pier Services and Compressor Bldg (7)								
Air Compressor - 100 CFM	50	0.60	1	30	6.0	180	3.6	648
Concrete/Industrial Saw	84	0.73	1	61	6.0	368	3.6	1,325
Crane	190	0.30	1	57	6.0	342	3.6	1,231
Forklift	94	0.48	1	45	6.0	268	3.6	964
Generator	45	0.60	1	27	8.0	216	400.0	86,400
Fugitive Dust (6)	NA	NA	0.05	NA	8.0	NA	4.0	0
Waterfront Ship Support Building (7)								
Air Compressor - 100 CFM	50	0.60	1	30	6.0	180	90.0	16,200
Concrete/Industrial Saw	84	0.73	1	61	6.0	368	90.0	33,113
Crane	190	0.30	1	57	6.0	342	90.0	30,780
Forklift	94	0.48	1	45	6.0	268	90.0	24,111
Generator	45	0.60	1	27	8.0	216	90.0	19,440
Fugitive Dust (6)	NA	NA	1	NA	8.0	NA	21.8	25
Parking Lot (7)								
Paving Machine	200	0.50	1	100	8.0	800	4.0	3,200
Water Truck - 5,000 Gallons	175	0.40	1	70	8.0	560	5.7	3,200
Compactive Roller	165	0.50	2	165	8.0	1,320	2.3	3,093
Scraper	195	0.50	2	195	8.0	1,560	4.0	6,240
Grader	180	0.50	1	90	8.0	720	5.0	3,600
Loader	215	0.50	1	108	8.0	860	5.0	4,300
Backhoe	160	0.50	1	80	8.0	640	4.0	2,560
Bulldozer - D6	165	0.50	1	83	8.0	660	4.0	2,640
Fugitive Dust (6)	NA	NA	3	NA	8.0	NA	5.7	17
Construction Truck and Vehicle Trips								
Construction Truck Traffic (4) (5)	NA	NA	20	NA	18.0	360	400.0	144,000
Construction Vehicle Traffic (4) (5)	NA	NA	20	NA	70.0	1,400	400.0	560,000

Notes: (1) Pile driving equipment usage estimates based on 205 days.

(2) Hours per day = Hours per trip, Daily HP Hours = HP hours per trip, and Work Days = # of trips

(3) Assuming that the materials are 50 miles away and the tug travels at a speed of 9 knots

(4) Number Active = miles/roundtrip, Hours/Day = daily truck trips, Daily Hp-Hrs = daily miles, and Total Hp-Hrs = total miles.

(5) Average round trip for construction related truck or vehicle trip estimated at 20 miles.

(6) Number Active = acres disturbed per day, Total Hp-Hrs = total acre-days.

(7) Construction is based on a acreage comparison of POLA Berths 136-147 Container Terminal Project, FEIS/FEIR December 2007, the SCAQMD construction survey and data provided by the US Navy in a 3/20/2013 email.

Table 5. Emission Factors for Construction of LWI

Project Year/Source Type	*Fuel Type*	Emission Factors VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2	Units	*References*
Year 2014												
Off-Road Equipment - 25-39 Hp	D	0.38	1.65	4.20	0.76	0.66	0.64	0.09	0.01	609.7	g/hp-hr	(1), (6)
Off-Road Equipment - 40-49 Hp	D	0.36	1.58	4.14	0.76	0.67	0.65	0.09	0.01	611.0	g/hp-hr	(1), (6)
Off-Road Equipment - 50-74 Hp	D	0.43	2.80	4.07	0.79	0.65	0.63	0.09	0.01	607.5	g/hp-hr	(1), (6)
Off-Road Equipment - 75-99 Hp	D	0.44	3.02	3.47	0.77	0.78	0.75	0.09	0.01	608.1	g/hp-hr	(1), (6)
Off-Road Equipment - 100-174 Hp	D	0.32	1.26	3.00	0.69	0.59	0.57	0.09	0.01	546.5	g/hp-hr	(1), (6)
Off-Road Equipment - 175-299 Hp	D	0.24	0.81	2.56	0.66	0.55	0.53	0.09	0.01	538.7	g/hp-hr	(1), (6)
Off-Road Equipment - 300-599 Hp	D	0.22	1.19	3.13	0.67	0.49	0.47	0.08	0.01	534.6	g/hp-hr	(1), (6)
Off-Road Equipment - 600-749 Hp	D	0.21	1.50	3.12	0.67	0.49	0.48	0.08	0.01	534.3	g/hp-hr	(1), (6)
Off-Road Equipment - 750-999 Hp	D	0.32	1.15	4.48	0.67	0.53	0.51	0.08	0.01	534.0	g/hp-hr	(1), (6)
Off-Road Equipment - 1000-1199 Hp	D	0.32	1.09	4.39	0.67	0.53	0.52	0.08	0.01	534.2	g/hp-hr	(1), (6)
Off-Road Equipment - 1200-1999 Hp	D	0.33	1.24	4.45	0.67	0.54	0.53	0.00	0.01	534.8	g/hp-hr	(1), (6)
On-Road Truck - 10 mph		0.28	0.92	3.87	0.65	0.56	0.54	0.00	0.01	535.7	g/mi	(2)
On-Road Truck - 25 mph		0.47	1.43	4.34	0.01	0.14	0.11	0.00	0.01	19.5	g/mi	(2)
On-Road Truck - 55 mph		0.34	0.94	3.87	0.01	0.14	0.11	0.00	0.01	19.5	g/mi	(2)
On-Road Trucks - Composite		0.36	1.03	3.96	0.05	0.16	0.13	0.00	0.01	45.3	g/mi	(3)
On-Road Vehicles - Composite		1.65	14.06	8.47	0.01	0.44	0.44	0.02	0.07	1,189.22	g/mi	(2)
All Years												
Tugboat	D	0.53	1.10	13.20	0.81	0.72	0.67	0.08	0.06	146.9	g/hp-hr	(4)
Small Harbor Craft	D	0.16	1.27	7.46	0.47	0.30	0.28	0.09	0.01	668.2	g/hp-hr	(1)
Fugitive Dust	---	---	---	---	---	27.50	13.45	---	---	---	lbs/acre-day	(5)

Notes: (1) Composite emission factors in [g/bhp-hr] developed from the USEPA NONROAD emissions model CY2014 assume two years before construction. USEPA. 2009. NONROAD Model Core Model ver. 2008a, posted July 6, 2009. http://www.epa.gov/otaq/nonrdmdl.htm.

(2) CY2014 HHDV On-road emissions factors in [g/mi] developed from the USEPA MOVES emissions model (http://www.epa.gov/otaq/models/moves/moves-docum.htm). [g/hr or g/mi]

(3) Composite factors based on a round trip of 75% at 55 mph, 20% at 25 mph, and 5% at 5 mph. Units in grams/mile.

(4) Entec UK Ltd. 2002. European Commission Quantification of emissions from ships associated with ship movements between ports in the European Community. Final Report. Northwich, Cheshire, UK. July 2002.

(5) Units in lbs/acre-day; USEPA. 1995. Heavy Construction Operations (Section 13.2.3). In Compilation of air pollutant emission factors. Washington, DC: U. S. Environmental Protection Agency. http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s02-3.pdf.

(6) N_2O and CH_4 EFs are from the GHG Emission Factors from The Climate Registry GHG Reporting Protocol (www.theclimateregistry.org).

Table 6. Total Emissions for Construction of LWI - Pile-Supported Pier

Construction Activity/Equipment Type	Tons								
	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2
Construction									
Crane Hoist	0.01	0.06	0.16	0.03	0.02	0.02	0.00	0.00	26.6
Generator - Pile Hammer	0.02	0.07	0.21	0.05	0.04	0.04	0.01	0.00	43.3
Tugboat	0.01	0.02	0.22	0.01	0.01	0.01	0.00	0.00	2.4
Barge Equipment	0.02	0.05	0.16	0.04	0.04	0.03	0.01	0.00	34.7
Tugboat - Pile Deliveries	0.05	0.11	1.35	0.08	0.07	0.07	0.01	0.01	15.0
Backhoe	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0
Bulldozer - D6	0.00	0.01	0.03	0.01	0.01	0.00	0.00	0.00	0.0
Compactive Roller	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.0
Fugitive Dust	-	-	-	-	0.08	0.04	-	-	-
Grader	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	3.4
Haul Truck - Soil	0.03	0.07	0.28	0.00	0.01	0.01	0.00	0.00	3.3
Other Construction Truck Traffic	0.03	0.10	0.38	0.00	0.02	0.01	0.00	0.00	4.5
Other Construction Traffic	0.59	5.02	3.03	0.01	0.16	0.16	0.01	0.03	425.5
Loader	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	4.1
Paving Machine	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	3.8
Water Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	3.0
Subtotal	**0.77**	**5.55**	**5.91**	**0.27**	**0.48**	**0.42**	**0.04**	**0.03**	**447.7**
Phase 2 - Grate Installation									
Tugboat	0.05	0.09	1.13	0.07	0.06	0.06	0.01	0.00	12.63
Barge Equipment	0.08	0.27	0.86	0.22	0.18	0.18	0.03	0.00	180.65
Derrick Barge Crane Hoist	0.03	0.19	0.51	0.11	0.08	0.08	0.01	0.00	86.42
Subtotal	**0.16**	**0.56**	**2.50**	**0.40**	**0.33**	**0.31**	**0.05**	**0.01**	**279.69**

Table 7. Total Emissions for Construction of LWI - PSB Modifications

Construction Activity/Equipment Type	Tons								
	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2
Construction									
Crane Hoist	0.00	0.02	0.06	0.01	0.01	0.01	0.00	0.00	10.0
Generator - Pile Hammer	0.01	0.02	0.08	0.02	0.02	0.02	0.00	0.00	16.2
Tugboat	0.01	0.01	0.13	0.01	0.01	0.01	0.00	0.00	1.5
Barge Equipment	0.01	0.03	0.10	0.03	0.02	0.02	0.00	0.00	20.8
Tugboat - Pile Deliveries	0.01	0.02	0.25	0.02	0.01	0.01	0.00	0.00	2.8
Backhoe	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	1.5
Bulldozer - D6	0.00	0.01	0.03	0.01	0.01	0.00	0.00	0.00	4.8
Compactive Roller	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	3.2
Fugitive Dust	-	-	-	-	0.08	0.04	-	-	-
Grader	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	3.4
Haul Truck - Soil	0.03	0.07	0.28	0.00	0.01	0.01	0.00	0.00	3.3
Other Construction Truck Traffic	0.03	0.10	0.38	0.00	0.02	0.01	0.00	0.00	4.5
Other Construction Traffic	0.59	5.02	3.03	0.01	0.16	0.16	0.01	0.03	425.5
Loader	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	4.1
Paving Machine	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	3.8
Semi Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.1
Water Truck	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	3.0
Subtotal	**0.66**	**5.24**	**3.82**	**0.04**	**0.29**	**0.24**	**0.02**	**0.03**	**457.2**

Table 8. Total Emissions for Construction of SPE - Short Pier

	Tons								
Construction Activity/Equipment Type	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2
Over Water Construction									
Derrick Barge Crane Hoist	0.02	0.12	0.31	0.07	0.05	0.05	0.01	0.00	53.5
Generator - Pile Hammer	0.04	0.13	0.41	0.11	0.09	0.09	0.02	0.00	87.2
Tugboat	0.02	0.07	0.24	0.04	0.03	0.03	0.00	0.00	28.5
Barge Equipment	0.05	0.17	0.53	0.14	0.11	0.11	0.02	0.00	111.9
Tugboat - Pile Deliveries	0.48	1.01	12.15	0.75	0.66	0.62	0.08	0.05	135.1
Subtotal	**0.61**	**1.50**	**13.64**	**1.09**	**0.94**	**0.89**	**0.12**	**0.06**	**416.2**
Pier Services and Compressor Bldg									
Air Compressor - 100 CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4
Concrete/Industrial Saw	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.9
Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.6
Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.5
Fugitive Dust	-	-	-	-	0.00	0.00	-	-	-
Subtotal	**0.00**	**0.01**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.2**
Waterfront Ship Support Building									
Air Compressor - 100 CFM	0.01	0.05	0.07	0.01	0.01	0.01	0.00	0.00	10.8
Concrete/Industrial Saw	0.02	0.11	0.13	0.03	0.03	0.03	0.00	0.00	22.2
Crane	0.01	0.03	0.09	0.02	0.02	0.02	0.00	0.00	18.3
Forklift	0.01	0.08	0.09	0.02	0.02	0.02	0.00	0.00	16.2
Generator	0.01	0.03	0.09	0.02	0.01	0.01	0.00	0.00	13.1
Fugitive Dust	-	-	-	-	0.01	0.00	-	-	-
Subtotal	**0.05**	**0.30**	**0.47**	**0.10**	**0.10**	**0.09**	**0.01**	**0.00**	**80.6**
Parking Lot									
Paving Machine	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.9
Water Truck - 5,000 Gallons	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.9
Compactive Roller	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.9
Scraper	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	3.7
Grader	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	2.1
Loader	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	2.6
Backhoe	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.5
Bulldozer - D6	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.6
Fugitive Dust	-	-	-	-	0.00	0.00	-	-	-
Subtotal	**0.01**	**0.03**	**0.09**	**0.02**	**0.02**	**0.02**	**0.00**	**0.00**	**17.2**
Construction Truck and Vehicle Trips									
Construction Truck Traffic	0.06	0.16	0.63	0.01	0.03	0.02	0.00	0.00	7.54
Construction Vehicle Traffic	1.02	8.68	5.24	0.01	0.27	0.27	0.01	0.04	735.47
Subtotal	**1.08**	**8.84**	**5.87**	**0.02**	**0.30**	**0.29**	**0.01**	**0.04**	**743.02**

Table 9. Total Emissions for Construction of SPE - Long Pier

Construction Activity/Equipment Type	Tons								
	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2
Over Water Construction									
Derrick Barge Crane Hoist	0.03	0.15	0.40	0.09	0.06	0.06	0.01	0.00	68.1
Generator - Pile Hammer	0.05	0.17	0.53	0.14	0.11	0.11	0.02	0.00	111.0
Tugboat	0.02	0.08	0.30	0.05	0.04	0.04	0.00	0.00	36.3
Barge Equipment	0.06	0.22	0.68	0.17	0.15	0.14	0.02	0.00	142.4
Tugboat - Pile Deliveries	0.85	1.77	21.26	1.30	1.16	1.09	0.13	0.09	236.5
Subtotal	**1.01**	**2.39**	**23.16**	**1.74**	**1.52**	**1.43**	**0.19**	**0.10**	**594.3**
Pier Services and Compressor Bldg									
Air Compressor - 100 CFM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.4
Concrete/Industrial Saw	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.9
Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.6
Generator	0.03	0.15	0.39	0.07	0.06	0.06	0.01	0.00	58.2
Fugitive Dust	-	-	-	-	0.00	0.00	-	-	-
Subtotal	**0.04**	**0.16**	**0.41**	**0.08**	**0.07**	**0.07**	**0.01**	**0.00**	**60.9**
Waterfront Ship Support Building									
Air Compressor - 100 CFM	0.01	0.05	0.07	0.01	0.01	0.01	0.00	0.00	10.8
Concrete/Industrial Saw	0.02	0.11	0.13	0.03	0.03	0.03	0.00	0.00	22.2
Crane	0.01	0.03	0.09	0.02	0.02	0.02	0.00	0.00	18.3
Forklift	0.01	0.08	0.09	0.02	0.02	0.02	0.00	0.00	16.2
Generator	0.01	0.03	0.09	0.02	0.01	0.01	0.00	0.00	13.1
Fugitive Dust	-	-	-	-	0.01	0.00	-	-	-
Subtotal	**0.05**	**0.30**	**0.47**	**0.10**	**0.10**	**0.09**	**0.01**	**0.00**	**80.6**
Parking Lot									
Paving Machine	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.9
Water Truck - 5,000 Gallons	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.9
Compactive Roller	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.9
Scraper	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	3.7
Grader	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	2.1
Loader	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	2.6
Backhoe	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.5
Bulldozer - D6	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	1.6
Fugitive Dust	-	-	-	-	0.00	0.00	-	-	-
Subtotal	**0.01**	**0.03**	**0.09**	**0.02**	**0.02**	**0.02**	**0.00**	**0.00**	**17.2**
Construction Truck and Vehicle Trips									
Construction Truck Traffic	0.06	0.16	0.63	0.01	0.03	0.02	0.00	0.00	7.54
Construction Vehicle Traffic	1.02	8.68	5.24	0.01	0.27	0.27	0.01	0.04	735.47
Subtotal	**1.08**	**8.84**	**5.87**	**0.02**	**0.30**	**0.29**	**0.01**	**0.04**	**743.02**

Table 10. Air Emissions for LWI - Pile-Supported Pier

	Tons									
Construction Activity	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2	CO_2e
Construction Activity	0.77	5.55	5.91	0.27	0.48	0.42	0.03	0.03	406.1	417.6
Phase 2 - Grate/Mesh	0.16	0.56	2.50	0.40	0.33	0.31	0.05	0.01	253.7	268.5
Commuters	1.96	16.73	10.08	0.01	0.52	0.01	0.02	0.08	1,284.3	1,291.5
Total	**2.89**	**22.84**	**18.49**	**0.68**	**1.33**	**0.75**	**0.10**	**0.11**	**1,944.2**	**1,977.5**

N_2O, CH_4, CO_2, and CO_2e are in Metric Tons

Table 11. Air Emissions for LWI - PSB Modifications

	Tons									
Construction Activity	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2	CO_2e
Construction Activity	0.66	5.24	3.82	0.04	0.29	0.24	0.02	0.02	414.8	420.7
Commuters	1.96	16.73	10.08	0.01	0.52	0.01	0.02	0.08	1,284.3	1,291.5
Total	**2.63**	**21.97**	**13.90**	**0.06**	**0.81**	**0.26**	**0.04**	**0.10**	**1,699.1**	**1,712.2**

N_2O, CH_4, CO_2, and CO_2e are in Metric Tons

Table 12. Air Emissions for SPE - Short Pier

	Tons									
Construction Activity	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2	CO_2e
Over Water Construction	0.61	1.50	13.64	1.09	0.94	0.89	0.11	0.05	377.5	412.0
Pier Services and Compressor Bldg.	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	2.9	3.1
Waterfront Ship Support Building	0.05	0.30	0.47	0.10	0.10	0.09	0.01	0.00	73.1	76.7
Parking Lot	0.01	0.03	0.09	0.02	0.02	0.02	0.00	0.00	15.6	16.4
Bldg. Operations	0.07	0.37	0.07	-	-	-	-	-	-	-
Construction Truck and Vehicle Trips	1.08	8.84	5.87	0.02	0.30	0.29	0.01	0.04	743.02	747.4
Commuters	1.02	8.68	5.23	0.01	0.27	0.01	0.01	0.04	666.0	669.7
Total (Construction)	**2.77**	**19.36**	**25.31**	**1.24**	**1.63**	**1.31**	**0.14**	**0.14**	**1,878.13**	**1,925.31**
Total	**2.84**	**19.74**	**25.38**	**1.24**	**1.63**	**1.31**	**0.14**	**0.14**	**1,878.13**	**1,925.31**

N_2O, CH_4, CO_2, and CO_2e are in Metric Tons

Table 13. Air Emissions for SPE - Long Pier

	Tons									
Construction Activity	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2	CO_2e
Over Water Construction	1.01	2.39	23.16	1.74	1.52	1.43	0.17	0.09	539.2	593.6
Pier Services and Compressor Bldg.	0.04	0.16	0.41	0.08	0.07	0.07	0.06	0.01	0.0	18.5
Waterfront Ship Support Building	0.05	0.30	0.47	0.10	0.09	0.10	0.08	0.01	0.0	26.5
Parking Lot	0.01	0.03	0.09	0.02	0.02	0.02	0.02	0.00	0.0	5.1
Bldg. Operations	0.07	0.37	0.07	-	-	-	-	-	-	-
Construction Truck and Vehicle Trips	1.08	8.84	5.87	0.02	0.30	0.29	0.01	0.04	743.02	747.4
Commuters	1.02	8.68	5.23	0.01	0.27	0.01	0.01	0.04	666.0	669.7
Total (Construction)	**3.20**	**20.40**	**35.22**	**1.97**	**2.26**	**1.92**	**0.35**	**0.19**	**1,948.14**	**2,060.85**
Total	**3.27**	**20.78**	**35.29**	**1.97**	**2.26**	**1.92**	**0.35**	**0.19**	**1,948.14**	**2,060.85**

N_2O, CH_4, CO_2, and CO_2e are in Metric Tons

Table 14. Construction Worker Activity

LWI - Pile-Supported Pier				
Number of Workers	***Workers***	***Miles/Day***	***# of Days***	***Total Activity***
Upland Construction	100	20	540	1,080,000
LWI - PSB Modifications				
Number of Workers	***Workers***	***Miles/Day***	***# of Days***	***Total Activity***
Upland Construction	100	20	540	1,080,000
Service Pier Extension - Either Alternative				
Number of Workers	***Workers***	***Miles/Day***	***# of Days***	***Total Activity***
Upland Construction	70	20	400	560,000

Table 15. Emission Factors for Construction Commuter Vehicles

	grams/mile									
Project Year/Source Type	**VOC**	**CO**	**NO_X**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**N_2O**	**CH_4**	**CO_2**	***Notes***
Year 2014										
On-Road Vehicles - Composite	1.65	14.06	8.47	0.01	0.44	0.01	0.02	0.07	1189.22	(1)

Note: 1. Emission factors from MOVES - CY2014

Table 16. Air Emissions for Construction Commuter Vehicles

	Tons									
Personnel Activity	**VOC**	**CO**	**NO_X**	**SO_2**	**PM10**	**$PM_{2.5}$**	**N_2O**	**CH_4**	**CO_2**	**CO_2e**
LWI Pile-Supported Pier										
Construction Commuters	1.96	16.73	10.08	0.01	0.52	0.01	0.02	0.08	1415.7	1423.6
Total	***1.96***	***16.73***	***10.08***	***0.01***	***0.52***	***0.01***	***0.02***	***0.08***	***1415.7***	***1423.6***
LWI - PSB Modifications										
Construction Commuters	1.96	16.73	10.08	0.01	0.52	0.01	0.02	0.08	1415.7	1423.6
Total	***1.96***	***16.73***	***10.08***	***0.01***	***0.52***	***0.01***	***0.02***	***0.08***	***1415.7***	***1423.6***
Service Pier Extension - Either Alternative										
Construction Commuters	1.02	8.68	5.23	0.01	0.27	0.01	0.01	0.04	734.1	738.2
Total	***1.02***	***8.68***	***5.23***	***0.01***	***0.27***	***0.01***	***0.01***	***0.04***	***734.1***	***738.2***

Table 17. Operational Emissions for SPE - Support Buildings (tons per year)

	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$
SPE	0.07	0.37	0.07	0.00	0.00	0.00

Notes:

Based on 52,000 square feet of the 2 new facilities using Urbemis 2007

Estimated Natural gas usage of 2.0 feet^3 / sq. ft/month

Emissions Factors from SCAQMD. 1993. CEQA Air Quality Handbook. Diamond Bar, C

Table 18. Comparison of Air Emissions Total Impacts for LWI and SPE Project Alternatives

	Total Tons									
Alternatives	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2	CO_2e
LWI - Pile-Supported Pier	*2.89*	*22.84*	*18.49*	*0.68*	*1.33*	*0.75*	*0.10*	*0.11*	*1944.2*	*1977.5*
LWI - PSB modifications	*2.63*	*21.97*	*13.90*	*0.06*	*0.81*	*0.26*	*0.04*	*0.10*	*1699.1*	*1712.2*
Short Pier	*2.77*	*19.36*	*25.31*	*1.24*	*1.63*	*1.31*	*0.14*	*0.14*	*1878.1*	*1925.3*
Long Pier	3.20	20.40	35.22	1.97	2.26	1.92	0.35	0.19	1948.1	2060.9

N_2O, CH_4, CO_2, and CO_2e are in Metric Tons

Table 19. Comparison of Construction-Related Air Emissions for LWI Project Alternatives

	Tons/Year									
Alternatives	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2	CO_2e
LWI - Pile-Supported Pier	*2.89*	*22.84*	*18.49*	*0.68*	*1.33*	*0.75*	*0.10*	*0.11*	*1944.19*	*1977.54*
LWI - PSB modifications	*2.63*	*21.97*	*13.90*	*0.06*	*0.81*	*0.26*	*0.04*	*0.10*	*1699.14*	*1712.19*

N_2O, CH_4, CO_2, and CO_2e are in Metric Tons

Table 20. Comparison of Construction-Related Air Emissions for SPE Project Alternatives

	Tons/Year									
Alternatives	VOC	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N_2O	CH_4	CO_2	CO_2e
Short Pier	*2.77*	*19.36*	*25.31*	*1.24*	*1.63*	*1.31*	*0.14*	*0.14*	*1878.1*	*1925.3*
Long Pier	*3.20*	*20.40*	*35.22*	*1.97*	*2.26*	*1.92*	*0.35*	*0.19*	*1948.1*	*2060.9*

N_2O, CH_4, CO_2, and CO_2e are in Metric Tons

APPENDIX F

TRAFFIC ANALYSIS

FOR THE CONSTRUCTION OF LAND-WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR

Memo

To: Ted R. Turk, PhD

From: Aruna Mathuranayagam, P.E., P.T.O.E.

CC: Jennifer Wallin

Date: 01/27/2016

Re: Naval Base Kitsap Bangor – Revised Traffic Analysis for Land Water Interface & Service Pier Extension EIS

PROJECT DESCRIPTION

Traffic data review and operational analysis was conducted to study the impacts of the additional trips generated by the construction traffic to the proposed north and south Land Water Interface (LWI) sites and the proposed Service Pier Extension (SPE) site within Naval Base Kitsap (NAVBASE Kitsap) at Bangor. The LWI Proposed Action includes constructing two LWI structures and modifying the existing floating Port Security Barrier (PSB) system. The SPE Proposed Action will require extension of the existing Service Pier and improvements to land-based associated support facilities, including construction of a maintenance support facility, utility upgrades that include an emergency power generator, and a parking lot.

In addition to studying the temporary impacts of the construction traffic along the existing roadway network, traffic operational impacts following the Proposed SPE Action caused by the addition of 322 new employees to the site were also studied.

Proposed construction activity for the LWI project is expected to occur between May 2016 and May 2018 with most of the soil hauling work completed by 2017. The SPE project is currently unprogrammed and a construction scheduled has not been established. For the purposes of traffic impact analysis, a construction period of April 2018 through March 2020 has been assumed as a reasonably representative case. Construction of all proposed facilities is anticipated to take approximately 24 months. The area evaluated includes the primary access roads leading to the Naval Base and the internal roadway network within NAVBASE Kitsap Bangor. The primary entrance routes to the base include Trigger Avenue and Trident Boulevard (NW Luoto Road) as they provide direct access from State Route 3 (SR 3), which is the major controlled access roadway serving the base from Bremerton, Poulsbo, Silverdale, and Hood Canal Bridge.

ROADWAY NETWORK

Staging (i.e., parking lot, material/equipment storage, and soil stockpiling) for both LWI project sites would take place at a single site located near the intersection of Archerfish and Seawolf Roads. This site is approximately 5.4 acres (2.2 hectares) in size and has been used recently for staging for other projects. Flier Road and Sealion Road would be the primary haul routes for construction of the LWI north and south project sites.

Staging (i.e., parking lot, material/equipment storage, and soil stockpiling) for the SPE project site would be located at the SPE construction site. The following roadway sections were identified as the primary access and internal roadways under the area of the influence of the proposed LWI and SPE projects within the study area:

- Trigger Avenue south of Trident Boulevard (LWI / SPE),
- Trident Boulevard east of Trigger Avenue (LWI / SPE),
- Trigger Avenue East of Escolar Road (LWI / SPE),
- Escolar Road North of Trigger Avenue (LWI),
- Escolar Road North of Sturgeon Street (LWI),
- Greenling Road West of Archerfish Road (LWI),
- Archerfish Road North of Seawolf Road (LWI),
- Seawolf Road East of Flier Road (LWI North),
- Flier Road North of Seawolf Road (LWI North),
- Trigger Avenue South of Sturgeon Street/Attu Road (LWI South / SPE),
- Sturgeon Street/Attu Road West of Trigger Avenue (LWI South / SPE), and
- Sealion Road North of Sturgeon Street/Attu Road/ (LWI South / SPE).

Of the above shown roadway sections, Trigger Avenue and Trident Boulevard (NW Luoto Road) are multi-lane divided highways serving as primary entrance routes to the base providing access from SR 3.

Similarly, the following intersections were identified as those under the area of the influence of the proposed changes within the study area:

- Trigger Avenue and Ohio Street (LWI / SPE),
- Trigger Avenue and Trident Boulevard (LWI / SPE),
- Trigger Avenue and Escolar Road (LWI / SPE),
- Escolar Road and Sturgeon Street (LWI),
- Escolar Road and Greenling Road (LWI),
- Archerfish Road and Seawolf Road (LWI),
- Seawolf Road and Flier Road (LWI North), and
- Trigger Avenue and Sturgeon Street (LWI South / SPE).

The existing roadway and intersection geometry and intersection control conditions were used in performing the traffic analyses for the baseline traffic conditions, future traffic demand conditions during construction generated by the construction-related activities, and future traffic demand conditions following construction generated by the proposed action improvements. Roadway sections and intersections operating at unacceptable levels of service (LOS) under the various analysis scenarios were identified.

TRAFFIC DATA

Existing Baseline (2011 and 2012) average daily traffic data, and morning and evening peak period intersection turning movement data, along the study area roadway sections and intersections affected by the LWI and SPE projects were obtained from the Parametrix Report completed in February 2011 and traffic counts conducted by All Traffic Data in November 2012. Review of the data indicated that the morning peak hour occurred between 07:00 and 09:00 a.m. and the evening peak hour occurred between 02:00 and 04:00 p.m. The highest hourly traffic demand observed during the morning and evening peak periods was used in developing future projections and conducting traffic operational analysis to determine the LOS.

Table 1 shows the Baseline 2011 and 2012 average daily traffic (ADT) for the key study area roadway sections affected by the proposed construction traffic. Table 2 shows the Baseline 2011 and 2012 overall intersection entering traffic for the study area intersections affected by the proposed construction traffic.

Table 1: Baseline Average Daily Traffic Volumes — NAVBASE Kitsap at Bangor Roadways

Location	Cars / Bikes / SUVs	Trucks /Buses	Total
All Site Traffic:			
Trigger Avenue north of Thresher Avenue	6,854	266	7,120
Trigger Avenue east of Escolar Road	8,676	702	9,378
Trident Boulevard east of Scorpion Avenue	10,830	751	11,581
LWI Site Traffic:			
Escolar Road south of Goldfinch Lane	4,026	226	4,252
Escolar Road north of Sturgeon	3,446	96	3,542
Greenling Road west of Archerfish Road	829	25	854
Archerfish Road north of Tinian Road	446	2	448
LWI North Site Traffic:			
Seawolf Road east of Flier Road	n/a	n/a	510
Flier Road north of Seawolf Road	n/a	n/a	520
LWI South OR SPE Site Traffic:			
Trigger Avenue south of Sturgeon Street	n/a	n/a	2,710
Sturgeon Street west of Trigger Avenue	n/a	n/a	3,220
Sealion Road north of Sturgeon Street	n/a	n/a	2,100

Source: Parametrix 2011, All Traffic Data Services, Inc. 2012

Table 2: Baseline Overall Intersection Entering Traffic Volumes — NAVBASE Kitsap at Bangor

Location	Overall Intersection Entering Traffic		Overall Intersection Peak Hour Factor [1]		Overall Intersection Heavy Vehicle Factor	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
All Site Traffic:						
Trigger Avenue/Ohio Street	1,267	1,424	0.94	0.90	1.6%	1.2%
Trigger Avenue/Trident Boulevard	1,693	1,512	0.83	0.79	0.1%	0.1%
Escolar Road/Trigger Avenue	1,445	1,480	0.89	0.77	0.7%	0.9%
LWI Site Traffic:						
Escolar Road/Sturgeon Road	625	460	0.81	0.79	2.7%	3.0%
Escolar Road/Greenling Road	398	347	0.77	0.68	2.0%	0.6%
Archerfish Road/Seawolf Road	91	72	0.84	0.78	1.1%	4.2%
LWI North Site Traffic:						
Seawolf/Flier	45	36	0.70	0.69	13.3%	8.3%
LWI South OR SPE Site Traffic:						
Trigger/Sturgeon	313	415	0.84	0.80	3.8%	3.9%

Source: Parametrix 2011, All Traffic Data Services, Inc. 2012

NOTE:

1. Peak hour Factor indicates the hourly volume during the maximum-volume hour of the day divided by the peak 15-min flow rate within the peak hour; a measure of traffic demand fluctuation within the peak hour.

The baseline traffic data were used in developing future projections for the years 2016, 2017, 2018, 2019, and 2020 for the primary entrance routes to the Naval Base and other internal roadways. Project-generated ADT and intersection turning movement projections for the analysis roadways and intersections within the study area were developed for the years 2016, 2017, and 2018 (for the LWI projects), and the years 2018, 2019, and 2020 (for the SPE project), when the generated automobile and truck trips are expected to be at their maximum. The baseline traffic data and intersection turning movement counts were projected using a 1.2% average annual growth factor to determine the future baseline 2016, 2017, 2018, 2019, and 2020 traffic trips.

Construction-related truck traffic would be generated by the need to deliver construction materials and remove construction debris from the construction sites. Construction debris would be hauled off site to an approved disposal location. Over the duration of construction (48 months), construction workers and large truck traffic including construction vehicles and soil hauling trucks will drive to and from the LWI and SPE construction sites.

LWI Sites:

Over the duration of construction (24 months), a maximum of 100 workers are conservatively assumed to drive to and from the LWI construction sites. General large truck traffic is estimated to be five (5) to ten (10) trips per day on average, while other construction traffic such as inspectors, visitors, and miscellaneous smaller vehicles is estimated to be 30 trips per day on average. Soil hauling is expected to require an additional 1,300 truck trips over a period of 6 months (a minimum of 95 work days) during 2016 and 2016, for a daily average of 15–20 truck trips per day during that period. Based on relative cut and fill volumes, 80 percent of these soil hauling trucks are estimated to go to the north site, while 20 percent are estimated to go to the south site. During peak construction activities, there would be a substantial increase in the peak number of daily truck trips.

SPE Site:

Over the duration of construction (24 months), a maximum of 70 workers are conservatively assumed to drive to and from the SPE construction site. General large truck traffic is estimated to be 18 trips per day on average, while other construction traffic such as inspectors, visitors, and miscellaneous smaller vehicles is estimated to be 70 trips per day on average. Materials and equipment for the in-water work would be brought in by barge, while materials and equipment for upland construction would be brought in by truck.

The estimated trips generated from the construction-related activities were combined with the future projected traffic volumes to obtain the analysis volumes for the years 2016, 2017, and 2018 (for the LWI sites), and 2018, 2019, and 2020 (for the SPE site). These were used in performing traffic operational analysis at all the affected roadways and intersections to determine LOS and traffic delays.

The following conditions were used to distribute the generated trips from the construction-related activities along the study area roadways and intersections:

- Automobile traffic will enter from either the gate on Trident Boulevard or Trigger Avenue and head northwesterly towards Escolar Road. A 50/50 percent assumption was used to estimate automobile traffic entering the base via Trident Boulevard and Trigger Avenue.
- Truck traffic will enter the base only at Trident Boulevard. Trucks will then follow the same route as the automobiles.

LWI Sites:

- Traffic accessing the north LWI project site will head north on Escolar Road, traveling east on Greenling Road, and then north on Archerfish Road to reach the construction site via Seawolf and Flier Roads.
- Traffic accessing the south LWI project site will continue along Trigger Avenue west of Escolar Road to access the construction site via Sturgeon and Sealion Roads.

- 90 percent of the soil hauling truck trips will be generated by the LWI north site; these trips will follow the same route as the automobiles: Escolar → Greenling → Archerfish → Seawolf → Flier.
- 10 percent of the soil hauling truck trips will be generated by the south LWI project site; these trips will follow Trigger → Sturgeon → Sealion.
- Construction workers will park at the staging area located near the intersection of Archerfish and Seawolf Roads.

SPE Site:

- Traffic accessing the SPE site will continue along Trigger Avenue west of Escolar Road to access the construction site via Sturgeon → Sealion → Wahoo.
- All traffic will travel to the site and park at the one available parking area.
- Construction workers will also park at the staging/parking area at the site.

The generated trip numbers and traffic distribution patterns were used to determine the future construction trips along all the study area key roadway sections and intersections. The future projected trips along the primary entrance routes of Trigger Avenue and Trident Boulevard are shown in Table 3 and Table 4.

Table 3: Projected Daily Traffic Volumes along Trident Boulevard / NW Luoto Road for the LWI & SPE Projects — NAVBASE Kitsap Bangor

LWI Projects			
Trip Description	**Year 2016**	**Year 2017**	**Year 2018**
Non-Project Traffic	13,526	13,689	13,853
Construction Worker Automobile Trips - LWI	100	100	100
Soil Hauling Truck Trips - LWI	20	20	0
Other Construction Truck Traffic Trips - LWI	8	8	8
Other Construction Traffic - LWI	30	30	30
Total	**13,684**	**13,847**	**13,991**
SPE Project			
Trip Description	**Year 2018**	**Year 2019**	**Year 2020**
Non-Project Traffic	13,853	14,187	14,358
Construction Worker Automobile Trips - SPE [1]	70	70	70
Soil Hauling Truck Trips - SPE [1]	0	0	0
Other Construction Truck Traffic Trips - SPE [1]	18	18	18
Other Construction Traffic - SPE [1]	70	70	70
Total	**14,011**	**14,345**	**14,516**

Source: (1) U.S. Navy, email dated Wednesday - 03/20/2013.

Table 4: Projected Daily Traffic Volumes along Trigger Avenue for the LWI & SPE Projects — NAVBASE Kitsap Bangor Roadways

LWI Projects			
Trip Description	**Year 2016**	**Year 2017**	**Year 2018**
Non-Project Traffic	12,570	12,721	12,873
Construction Worker Automobile Trips - LWI	100	100	100
Soil Hauling Truck Trips - LWI	20	20	0
Other Construction Truck Traffic Trips - LWI	8	8	8
Other Construction Traffic - LWI	30	30	0
Total	**12,728**	**12,879**	**12,981**
SPE Project			
Trip Description	**Year 2018**	**Year 2019**	**Year 2020**
Non-Project Traffic	12,873	13,184	13,342
Construction Worker Automobile Trips - SPE [1]	70	70	70
Soil Hauling Truck Trips - SPE [1]	0	0	0
Other Construction Truck Traffic Trips - SPE [1]	18	18	18
Other Construction Traffic - SPE [1]	70	70	70
Total	**13,031**	**13,342**	**13,500**

Source: (1) U.S. Navy, email dated Wednesday - 03/20/2013.

TRAFFIC OPERATIONAL ANALYSIS & METHODOLOGY

Traffic analysis to study the impacts of additional traffic generated during construction-related activities and following construction, from proposed action improvements, was performed at signalized intersections and roadway sections. The analysis for signalized intersections was conducted using Synchro/SimTraffic. The analysis for the two-lane and four-lane divided/undivided roadway sections was conducted using the Highway Capacity Software (HCS 2010), which is based on the guidelines listed in the Highway Capacity Manual (HCM) 2010 to determine the LOS. LOS is a measure of traffic operations, which uses a qualitative grading scale from A to F. LOS A represents the best traffic operations and LOS F represents the worst traffic operations. The LOS for multi-lane divided/undivided roadways is defined by vehicular density (vehicles per mile per lane). The LOS for two-lane roadways is defined by average travel speed and percent time spent following. The LOS for signalized and unsignalized intersections is defined by control delay (seconds per vehicle). Table 5 shows the measures of effectiveness used in determining the LOS of the various roadway facilities and intersection control types encompassed within the study area.

Analysis Software - Synchro/SimTraffic

Synchro is a macroscopic signal design software application supported by SimTraffic, the microscopic simulation model. This application was used to determine the LOS for optimized signal timing and phasing conditions at all the signalized and unsignalized intersections within the study area. Synchro is based on the HCM-recommended guidelines for signalized and unsignalized intersections. Synchro models traffic arriving or present at the intersection approaches and does not account for traffic flow or spillback conditions at adjacent intersections.

Table 5: Measures of Effectiveness used in Determining Levels of Service

LOS	At-Grade Un-Signalized Intersection Average Control Delay Per Vehicle (s/veh)	At-Grade Signalized Intersection Control Delay Per Vehicle (s/veh)	Percent Time Spent Following for Two-Lane Highways in Class II
A	0 - 10	≤ 10	≤ 40
B	> 10 - 15	> 10 - 20	> 40-55
C	> 15 - 25	> 20 - 35	> 55-70
D	> 25 - 35	> 35 - 55	> 70-85
E	> 35 - 50	> 55 - 80	> 85
F	> 50	> 80	Note 1

NOTE:

1. LOS F applies whenever the flow rate exceeds the segment capacity

Analysis Software - HCS 2010

The Highway Capacity Software is based on concepts and guidelines outlined in the HCM developed by the Transportation Research Board (TRB) to determine the capacity and quality of service of various roadway facilities that carry both vehicular and non-vehicular traffic. The HCM is a result of a multi-agency effort including TRB, American Association of State Highway and Transportation Officials, and Federal Highway Administration and is a widely used reference for traffic and transportation engineering practice.

ANALYSIS OF ALTERNATIVES

The various scenarios analyzed under the baseline and future morning (a.m.) and evening (p.m.) peak hour traffic demand conditions for the key roadway sections and intersections include the following:

- Baseline Condition 2011 or 2012 (a.m. / p.m. Peak Analysis)
- Future 2016 Condition with Construction Traffic for LWI projects only (a.m. / p.m. Peak Analysis)
- Future 2017 Condition with Construction Traffic for LWI projects only (a.m. / p.m. Peak Analysis)
- Future 2018 Condition with Construction Traffic for LWI projects only (a.m. / p.m. Peak Analysis)
- Future 2018 Condition with Construction Traffic for SPE project only (a.m. / p.m. Peak Analysis)
- Future 2019 Condition with Construction Traffic for SPE project only (a.m. / p.m. Peak Analysis)
- Future 2020 Condition with Construction Traffic for SPE project only (a.m. / p.m. Peak Analysis)

Table 6 shows the morning and evening peak hour LOS and measures of effectiveness values for the intersections within the NAVBASE Kitsap Bangor study area. The LOS shown indicates the impact of the added traffic from the LWI project(s) and the SPE project. Results of the intersection operational analysis indicate all of the key intersections operating at acceptable levels of service, LOS A, B, C, or D under the future 2016, 2017, 2018, 2019, and 2020 traffic demand conditions.

Tables 7 and 8 show the morning and evening peak hour LOS and measures of effectiveness values for the roadway sections within the NAVBASE Kitsap Bangor study area. The LOS shown indicates the impact of the added traffic from the LWI project(s) and the SPE project, respectively. Results of the operational analysis indicate all of the multi-lane and two-lane roadway sections operating at acceptable levels of service, LOS A, B, C, or D, under the future 2016, 2017, 2018, 2019, and 2020 traffic demand conditions.

LWI Proposed Action Operations:

The proposed LWI action and future operations will not generate additional traffic. Hence, the impacts of this proposed action on the major access roadways, internal base roadway network, and intersections are negligible.

SPE Proposed Action Operations:

The proposed SPE action will require improvements to land-based associated support facilities, including construction of a maintenance support facility, utility upgrades that include an emergency power generator, and a parking lot. The proposed Maintenance Support Facility would be located on an existing parking lot on the east side of Wahoo Road. With the completion of the proposed action, 322 new employees will be added to support the shore-based maintenance activities. This, in turn, will generate additional trips, with the new employee traffic accessing the proposed parking lot. Access to and from the proposed main parking lot will be via Sturgeon Street (Attu Road) controlled by a stop sign. The proposed parking lot will be 6 acres (2.4 hectares) in size and contain 535 parking spaces. Access to the smaller lot for Government vehicles will be via Sealion Road.

A review of the post-construction traffic impacts to the SPE site under the highest peak hour traffic demand conditions also indicated the following:

- Trigger & Sturgeon (a.m. Peak) - LOS C / 20.5 seconds (decline from a LOS B)
- Trigger & Escolar (p.m. Peak) - LOS D / 51.6 seconds (approaching LOS E)

CONCLUSIONS & RECOMMENDATIONS

The construction activity for the proposed Waterfront Restricted Area LWI and SPE actions will add construction traffic to the existing roadway network within NAVBASE Kitsap Bangor and to the primary roadways providing access to the base. Added construction-related traffic will include both automobile and truck traffic. The impact from this additional traffic is estimated to affect traffic operations at the Escolar/Trigger and Escolar/Sturgeon and Trigger/Sturgeon intersections. Similarly, the additional traffic will also impact the operations of the roadway sections along Escolar Road between Trigger and Greenling, Greenling Road, Archerfish Road and Flier Road; Trigger Avenue between Escolar and Sturgeon, Sturgeon Street and Sealion Road. In spite of the additional construction-related traffic, the existing roads planned for construction traffic could accommodate the additional vehicles and trucks, and would not need to be upgraded to accommodate construction traffic. However, the additional traffic volumes may create longer wait times to enter the base, particularly during the a.m. peak hour, as vehicles queue up to pass through the security checkpoint.

To maintain a LOS D along the roadways providing access to the SPE site post, the proposed action, the following improvements are recommended:

- Trigger & Escolar Intersection - Widen southbound approach to add an additional left turn lane
- Sturgeon Street - Improve existing street at the parking lot access drive

Road improvements to accommodate changes in traffic patterns along Wahoo and Sealion roads as well as repairs to existing roads damaged from construction activity are included as part of the SPE alternative.

REFERENCES

All Traffic Data Services. 2012. Traffic counts at various NAVBASE Kitsap Bangor intersections, November 2012. All Traffic Data Services, Inc., Renton, WA.

Parametrix. 2011. Technical Memorandum: Bangor traffic analysis - construction of EHW-2. Prepared by Cindy Clark, Parametrix, Poulsbo, WA. Prepared for SAIC, Bothell, WA. February 11, 2011.

U.S. Navy. 2013. Curtis Hickle, SPE Project Manager, NAVFAC Northwest, Silverdale, WA. Email, March 20, 2013. Personal communication with Ted Turk, Senior Project Manager, Science Applications International Corporation, Bothell, WA, re: SPE construction and operations information.

Table 6: Peak Hour Intersection Level of Service Analysis for the LWI & SPE Proposed Actions – NAVBASE Kitsap Bangor Roadways

LWI PROPOSED ACTIONS																
Intersection	AM Peak								PM Peak							
	BASELINE		FUTURE WITH CONSTRUCTION TRAFFIC						BASELINE		FUTURE WITH CONSTRUCTION TRAFFIC					
	2011 / 2012		2016		2017		2018		2011 / 2012		2016		2017		2018	
	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)
Trigger & Ohio	B	11.2	B	11.5	B	11.6	B	11.7	B	12.6	B	12.8	B	12.9	B	13.1
Trigger & Trident	B	19.8	C	23.2	C	23.8	C	29.2	B	10.2	B	12.1	B	12.2	B	12.3
Trigger & Escolar	A	5.5	A	7.8	A	7.9	A	8.1	D	37.9	D	42.5	D	43.9	D	45.3
Escolar & Sturgeon	B	14.3	C	16.9	C	17.1	C	17.2	C	22.9	D	26.1	D	26.7	D	28.1
Escolar & Greenling	B	11.5	C	16.2	C	16.6	C	16.8	A	9.9	B	13.7	B	13.9	B	14.1
Archerfish & Seawolf	A	9.4	B	11.4	B	11.4	B	11.6	A	9.3	B	11.2	B	11.2	B	11.4
Seawolf & Flier	A	8.9	A	9.3	A	9.3	A	9.4	A	9.3	A	9.5	A	9.5	A	9.6
Trigger & Sturgeon	B	11.1	B	11.7	B	11.7	B	11.8	B	10.0	B	10.3	B	10.3	B	10.5

SPE PROPOSED ACTION																
Intersection	AM Peak								PM Peak							
	BASELINE		FUTURE WITH CONSTRUCTION TRAFFIC						BASELINE		FUTURE WITH CONSTRUCTION TRAFFIC					
	2011 / 2012		2018		2019		2020		2011 / 2012		2018		2019		2020	
	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)
Trigger & Ohio	B	11.2	B	11.8	B	11.9	B	12.0	B	12.6	B	13.0	B	13.1	B	13.2
Trigger & Trident	B	19.8	C	24.0	C	24.2	C	24.4	B	10.2	B	12.0	B	12.0	B	12.1
Trigger & Escolar	A	5.5	A	7.0	A	7.1	A	7.1	D	37.9	D	44.1	D	43.9	D	45.7
Trigger & Sturgeon	B	11.1	B	14.3	B	14.4	B	14.5	B	10.0	B	11.3	B	11.7	B	12.2

NOTE:

1. Default values used in determining the LOS were obtained from Parametrix 2011 Bangor Traffic Analysis-Construction of EHW Impacts (Technical Memorandum)
2. LOS values shown for the unsignalized intersections are for the stop-controlled movements experiencing the highest delay.
3. LOS values shown indicate the cumulative impacts of the LWI and SPE projects.
4. LOS = Level of Service

Table 7: Peak Hour Roadway Sections Level of Service Analysis for the LWI Proposed Actions – NAVBASE Kitsap Bangor Roadways

LWI PROPOSED ACTIONS																
Multi-Lane Roadway Sections																
Roadway Section	AM Peak								PM Peak							
	BASELINE		FUTURE WITH CONSTRUCTION TRAFFIC						BASELINE		FUTURE WITH CONSTRUCTION TRAFFIC					
	2011/2012		2016		2017		2018		2011/2012		2016		2017		2018	
	LOS	Density (veh/mile/lane)	LOS	Density (veh/mile/lane)	LOS	Density (veh/mile/lane)	LOS	Density (veh/mile/lane)	LOS	Density (veh/mile/lane)	LOS	Density (veh/mile/lane)	LOS	Density (veh/mile/lane)		Density (veh/mile/lane)
Trigger north of Thresher	A	7.8	A	8.9	A	9.1	A	9.2	A	6.7	A	7.7	A	7.9	A	8.1
Trident east of Trigger	A	7.2	A	8.4	A	8.4	A	8.5	A	6.9	A	8.0	A	8.1	A	8.1
Trigger north of Trident	B	14.8	B	17.3	B	17.5	B	17.6	B	13.0	B	15.4	B	15.6	B	15.7
Trigger east of Escolar	B	14.3	C	18.3	C	18.4	C	18.5	B	14.7	B	17.3	B	17.4	B	17.5
Trigger south of Sturgeon	A	2.3	A	2.7	A	2.7	A	2.8	A	3.5	A	3.9	A	3.9	A	4.0
Two-Lane Roadway Sections																
Roadway Section	AM Peak								PM Peak							
	BASELINE		FUTURE WITH CONSTRUCTION TRAFFIC						BASELINE		FUTURE WITH CONSTRUCTION TRAFFIC					
	2011/2012		2016		2017		2018		2011/2012		2016		2017		2018	
	LOS	Percent Time Spent Following (PTSF%)	LOS	Percent Time Spent Following (PTSF%)	LOS	Density (veh/mile/lane)	LOS	Percent Time Spent Following (PTSF%)	LOS	Percent Time Spent Following (PTSF%)	LOS	Percent Time Spent Following (PTSF%)	LOS	Density (veh/mile/lane)	LOS	Percent Time Spent Following (PTSF%)
Escolar north of Trigger	D	79.5%	D	83.2%	D	83.4%	D	83.7%	D	76.7%	D	80.9%	D	81.1%	D	81.2%
Escolar north of Sturgeon	D	72.3%	D	73.7%	D	73.9%	D	74.0%	C	68.8%	D	73.4%	D	73.5%	D	73.5%
Greenling west of Archerfish	C	58.9%	C	66.5%	C	66.8%	C	66.9%	B	51.3%	C	63.7%	C	63.9%	C	64.0%
Seawolf east of Archerfish	B	46.2%	C	60.2%	C	60.4%	C	60.5%	A	31.8%	C	57.6%	C	57.8%	C	58.0%
Flier north of Seawolf	A	37.1%	B	40.7%	B	40.8%	B	40.9%	A	38.7%	B	44.2%	B	44.4%	B	44.5%
Sturgeon west of Trigger	C	67.3%	C	68.5%	C	68.7%	C	68.9%	D	71.9%	D	73.5%	D	73.7%	D	73.8%
Sealion north of Sturgeon	C	62.1%	C	63.2%	C	63.4%	C	63.5%	C	66.1%	C	67.8%	C	68.0%	C	68.2%

1. Default values used in determining the LOS were obtained from Parametrix 2011 Bangor Traffic Analysis-Construction of EHW Impacts (Technical Memorandum)
2. LOS values shown indicate the cumulative impacts of the LWI and SPE projects.
3. LOS = Level of Service

Table 8: Peak Hour Roadway Sections Level of Service Analysis for the SPE Proposed Action – NAVBASE Kitsap Bangor Roadways

SPE PROPOSED ACTION																
Multi-Lane Roadway Sections																
Roadway Section	**AM Peak**								**PM Peak**							
	BASELINE		**FUTURE WITH CONSTRUCTION TRAFFIC**						**BASELINE**		**FUTURE WITH CONSTRUCTION TRAFFIC**					
	2011/2012		**2018**		**2019**		**2020**		**2011/2012**		**2018**		**2019**		**2020**	
	LOS	**Density (veh/mile/lane)**	**LOS**	**Density (veh/mile/lane)**	**LOS**	**Density (veh/mile/lane)**	**LOS**	**Density (veh/mile/lane)**	**LOS**	**Density (veh/mile/lane)**	**LOS**	**Density (veh/mile/lane)**	**LOS**	**Density (veh/mile/lane)**	**LOS**	**Density (veh/mile/lane)**
Trigger north of Thresher	A	7.8	A	9.0	A	9.1	A	9.2	A	6.7	A	7.9	A	7.9	A	8.1
Trident east of Trigger	A	7.2	A	8.5	A	8.6	A	8.7	A	6.9	A	8.1	A	8.2	A	8.3
Trigger north of Trident	B	14.8	B	17.7	B	17.9	C	18.1	B	13.0	B	15.7	B	15.9	B	16.1
Trigger east of Escolar	B	14.3	C	18.7	C	18.9	C	19.1	B	14.7	B	17.7	B	17.9	C	18.1
Trigger south of Sturgeon	A	2.3	A	3.9	A	4.0	A	4.1	A	3.5	A	5.0	A	5.1	A	5.2
Two-Lane Roadway Sections																
Roadway Section	**AM Peak**								**PM Peak**							
	BASELINE		**FUTURE WITH CONSTRUCTION TRAFFIC**						**BASELINE**		**FUTURE WITH CONSTRUCTION TRAFFIC**					
	2011/2012		**2018**		**2019**		**2020**		**2011/2012**		**2018**		**2019**		**2020**	
	LOS	**Percent Time Spent Following (PTSF%)**	**LOS**	**Percent Time Spent Following (PTSF%)**	**LOS**	**Density (veh/mile/lane)**	**LOS**	**Percent Time Spent Following (PTSF%)**	**LOS**	**Percent Time Spent Following (PTSF%)**	**LOS**	**Percent Time Spent Following (PTSF%)**	**LOS**	**Density (veh/mile/lane)**	**LOS**	**Percent Time Spent Following (PTSF%)**
Sturgeon west of Trigger	C	67.3%	D	72.9%	D	73.0%	D	73.1%	D	71.9%	D	74.0%	D	74.1%	D	74.2%
Sealion north of Sturgeon	C	62.1%	D	69.2%	D	69.3%	D	69.4%	C	66.1%	D	72.2%	D	72.3%	D	72.3%

1. Default values used in determining the LOS were obtained from Parametrix 2011 Bangor Traffic Analysis-Construction of EHW Impacts (Technical Memorandum)

2. LOS values shown indicate the cumulative impacts of the LWI and SPE projects.

3. LOS = Level of Service

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APPENDIX G

AGENCY CONSULTATION AND COORDINATION

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APPENDIX G
AGENCY CONSULTATION AND COORDINATION

The Navy has consulted with regulatory agencies during the National Environmental Policy Act process and before implementing the Proposed Actions to ensure that regulatory requirements have been met. The following is a list of regulatory agencies consulted for each applicable law with current status of consultation. Correspondence associated with each consultation is provided in this appendix.

Endangered Species Act

- U.S. Fish and Wildlife Service: Biological Assessment was submitted on March 10, 2015 and revised Biological Assessment was submitted on June 10, 2015; Letter of Concurrence for Land-Water Interface (LWI) and Service Pier Extension (SPE) projects was received March 9, 2016.

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service, West Coast Region: Biological Assessment was submitted on March 10, 2015 and revised Biological Assessment was submitted on June 10, 2015; additional information requests were made on March 19, October 6, and November 9, 2015, and the Navy provided all requested additional information; Letter of Concurrence for LWI project was received November 16, 2015.

Marine Mammal Protection Act

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Headquarters: The draft application for an Incidental Harassment Authorization (IHA) for the SPE project was submitted in June 2015; a revised IHA application would be submitted approximately 9 months before the start of construction, which is currently unscheduled.

Magnuson-Stevens Fishery Conservation and Management Act

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service, West Coast Region: Consultation was initiated March 10, 2015; Letter of Concurrence for LWI project was received November 16, 2015; SPE consultation is on hold pending project implementation.

National Historic Preservation Act

- Washington Department of Archaeology and Historic Preservation, State Historic Preservation Office (SHPO): Consultation for Land-Water Interface and Service Pier Extension projects was initiated in September 2012; SHPO concurrences with the Navy's findings of effect and determinations of eligibility for the LWI and SPE projects were received July 30 and October 7, 2015, respectively. Concurrences with the Navy's findings of effect and determinations of eligibility were received from the Jamestown S'Klallam Tribe on July 30, 2015 and from the Lower Elwha Klallam Tribe on September 15, 2015.

Government-to-Government Consultation

- Skokomish Indian Tribe, Port Gamble S'Klallam Tribe, Jamestown S'Klallam Tribe, Lower Elwha Klallam Tribe, and Suquamish Tribe: Consultations on Tribal Treaty Mitigation for LWI were initiated in 2008; for SPE, consultations were initiated in July 2012; the Navy and Skokomish Indian Tribe completed a Memorandum of Agreement (MOA) on March 3, 2016; consultations with the Port Gamble S'Klallam Tribe, Jamestown S'Klallam Tribe, and Lower Elwha Klallam Tribe are in progress.

Clean Water Act

- U.S. Army Corps of Engineers and Washington Department of Ecology: Joint Aquatic Resources Permit Application submitted on June 13, 2016.

Coastal Zone Management Act

- Washington Department of Ecology: Federal Consistency Determination submitted on May 25, 2016.

Notice of Intent to Prepare EIS and Notice of Availability of DEIS

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9:00 a.m.–9:15 a.m. Public Forum
9:15 a.m.–10:15 a.m. Navy Safe Harbor Response to RWTF FY12 Recommendations
10:15 a.m.–10:30 a.m. Break
10:30 a.m.–12:15 p.m. Navy Harbor Survey Program
12:15 p.m.–1:15 p.m. Break for Lunch
1:15 p.m.–2:15 p.m. Marine Corps Response to RWTF FY12 Recommendations
2:15 p.m.–3:00 p.m. Marine Corps Wounded Warrior Regiment Survey Program
3:00 p.m.–3:15 p.m. Break
3:15 p.m.–4:15 p.m. Marine Corps Wounded Warrior Regiment Survey Program (continued)
4:45 p.m.–5:00 p.m. Wrap Up

Public's Accessibility to the Meeting: Pursuant to 5 U.S.C. 552b and 41 CFR 102–3.140 through 102–3.165, and the availability of space, this meeting is open to the public. Seating is on a first-come basis.

Pursuant to 41 CFR 102–3.105(j) and 102–3.140, and section 10(a)(3) of the Federal Advisory Committee Act of 1972, the public or interested organizations may submit written statements to the Department of Defense Task Force on the Care, Management, and Transition of Recovering Wounded, Ill, and Injured Members of the Armed Forces about its mission and functions. If individuals are interested in making an oral statement during the Public Forum time period, a written statement for a presentation of two minutes must be submitted and must identify it is being submitted for an oral presentation by the person making the submission. Identification information must be provided and at a minimum must include a name and a phone number. Individuals may visit the Task Force Web site at *http://dtf.defense.gov/rwtf/to* view the Charter. Individuals making presentations will be notified by Wednesday, February 20, 2013. Oral presentations will be permitted only on Wednesday, February 27, 2013 from 9:00 a.m. to 9:15 a.m. EDT before the Task Force. The number of oral presentations will not exceed ten, with one minute of questions available to the Task Force members per presenter. Presenters should not exceed their two minutes.

Written statements in which the author does not wish to present orally may be submitted at any time or in response to the stated agenda of a planned meeting of the Department of Defense Task Force on the Care, Management, and Transition of Recovering Wounded, Ill, and Injured Members of the Armed Forces.

All written statements shall be submitted to the Designated Federal Officer for the Task Force through the contact information in **FOR FURTHER INFORMATION CONTACT**, and this individual will ensure that the written statements are provided to the membership for their consideration.

Statements, either oral or written, being submitted in response to the agenda mentioned in this notice must be received by the Designated Federal Officer at the address listed in **FOR FURTHER INFORMATION CONTACT** no later than 5:00 p.m. EDT, Monday, February 18, 2013 which is the subject of this notice. Statements received after this date may not be provided to or considered by the Task Force until its next meeting. Please mark mail correspondence as "Time Sensitive for February Meeting."

The Designated Federal Officer will review all timely submissions with the Task Force Co-Chairs and ensure they are provided to all members of the Task Force before the meeting that is the subject of this notice.

Reasonable accommodations will be made for those individuals with disabilities who request them. Requests for additional services should be directed to Ms. Heather Moore, (703) 325–6640, by 5:00 p.m. EDT, Monday, February 18, 2013.

Dated: January 29, 2013.

Aaron Siegel,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 2013–02172 Filed 1–31–13; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare an Environmental Impact Statement for Land-Water Interface and Service Pier Extension, Naval Base Kitsap Bangor, Silverdale, WA and To Announce Public Scoping Meetings

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to section (102)(2)(c) of the National Environmental Policy Act (NEPA) of 1969 and the regulations implemented by the Council on Environmental Quality (CEQ) (40 CFR parts 1500–1508), the Department of the Navy (DoN) announces its intent to prepare an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts associated with two actions: (1) The proposed construction and operation of Land-Water Interface (LWI) structures and (2) the proposed construction and operation of a Service Pier Extension (SPE) on Naval Base (NAVBASE) Kitsap Bangor.

The DoN proposes two projects on NAVBASE Kitsap Bangor waterfront to: (1) Comply with Department of Defense (DoD) directives to protect Navy OHIO Class ballistic missile submarines (TRIDENT submarines) from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets and (2) eliminate deployment constraints and improve maintenance of SEAWOLF Class submarines.

The first proposed action includes constructing two LWI structures and modifying the existing floating Port Security Barrier (PSB) system for improved protection of TRIDENT submarines. Construction of the LWI structures would enclose the Navy Waterfront Restricted Area (WRA) on NAVBASE Kitsap Bangor by constructing security barriers in the intertidal zone at the Bangor waterfront. Construction is anticipated to take two years. Construction activities occurring in the water during the first year may involve pile driving and would be conducted July 2015 through February 2016. Once the pile driving is complete, activities other than pile driving may occur in the water up until February 2017.

The second proposed action would relocate SEAWOLF Class submarines SSN–21 (SEAWOLF) and SSN–22 (CONNECTICUT) from NAVBASE Kitsap Bremerton to join SSN–23 (JIMMY CARTER) at NAVBASE Kitsap Bangor. The existing Service Pier would be extended and land based associated support facilities would be constructed including a Maintenance Support Facility, and utility upgrades including an emergency power generator, and a parking lot. Shore based facilities constructed on the pier would include a Pier Services and Compressor Building and a pier crane. Construction would occur from April 2015 to March 2017. Construction in the water is planned for July through February of each year, beginning in July 2015 and concluding in February 2017. The relocation would result in the consolidation of berthing and support for the SEAWOLF Class submarines at NAVBASE Kitsap Bangor.

NAVBASE Kitsap is the action proponent. The LWI construction and PSB modifications are for the DoN's Strategic Systems Programs (SSP), which directs research, development, manufacturing, test, evaluation, and operational support of the TRIDENT

program. The SPE and supporting facilities are for Commander, Submarine Development Squadron Five (CSDS–5). CSDS–5 is the Immediate Superior in Command for all three SEAWOLF Class submarines and four DoN research, development, test, and evaluation (RDT&E) detachments based at NAVBASE Kitsap Bangor.

The DoN is the lead federal agency for this action. The DoN is requesting the U.S. Army Corps of Engineers and the National Marine Fisheries Service to be Cooperating Agencies. The DoN will hold public scoping meetings to receive oral and/or written comments on environmental concerns related to the proposed actions, to determine the scope of issues to address in the Draft EIS, and to identify and refine alternatives to the proposed actions. Federal, state, and local agencies, American Indian tribes, and the public are invited to participate in the scoping process.

The public scoping meetings will be conducted in English and will be arranged in an informal, open-house format. Attendees will be provided the opportunity to sign in and then visit various stations hosted by DoN representatives and technical staff assigned to provide information and answer questions. Several large display boards will be located throughout the meeting locations to assist attendees in understanding the proposed actions and the alternatives. Fact sheets about the proposed actions and alternatives will be available to attendees. A comment table with comment sheets will be placed in an easily accessible location.

DATES AND ADDRESSES: The public scoping meetings will be held on the following dates and locations:

1. February 20, 2013 from 5:00 p.m. to 8:00 p.m. at the Chimacum High School Commons, 91 West Valley Road, Chimacum, WA 98325; and

2. February 21, 2013 from 5:00 p.m. to 8:00 p.m. at the North Kitsap High School Commons, 1780 Northeast Hostmark Street, Poulsbo, WA 98370.

FOR FURTHER INFORMATION CONTACT: Naval Facilities Engineering Command Northwest, Attn: Thomas Dildine, LWI/SPE EIS Project Manager, 1101 Tautog Circle, Silverdale, WA 98315–1101. Email: *nwnepa@navy.mil*, Phone: 360–396–6387, or Web site: *https://www.nbkeis.com/lwi/*.

SUPPLEMENTARY INFORMATION: The purpose of the LWI project is to (1) comply with DoD directives to protect TRIDENT submarines from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets. The purpose of the SPE project is to eliminate deployment constraints and improve maintenance of SEAWOLF Class submarines.

The need for the LWI is to:

• Enhance security within the WRA. Protection of strategic military assets is a vital national security concern. Aggressive security improvements within the DoN pre-date the USS Cole incident and the terrorist attacks of September 11, 2001 and continue today.

The need for the SPE is to:

• Remove restrictions on navigating SEAWOLF Class submarines through Rich Passage under certain tidal conditions;

• Improve long-term operational effectiveness for the three SEAWOLF Class submarines at NAVBASE Kitsap Bangor;

• Provide berthing and logistical support at the DoN's submarine RDT&E hub, which is located on NAVBASE Kitsap Bangor; and

• Improve submarine crew training and readiness through co-location of the SEAWOLF Class submarines and crew with command functions at NAVBASE Kitsap Bangor submarine training center.

The LWI and SPE are related actions due to their proximity, anticipated timing of construction, and potential to affect similar resources, but are not connected projects because each proposed action would function independently. While independent in function, the projects may have the potential to affect related resources, so the DoN has chosen to analyze both projects in a single EIS.

The EIS must evaluate reasonable alternatives in accordance with the CEQ regulations (40 Code of Federal Regulations [CFR] § 1502.14) and DoN regulations (32 CFR Part 775) that implement the NEPA. Alternatives for the proposed action were identified based on security and program requirements, avoiding or minimizing environmental impacts, and compatibility with existing facilities, infrastructure, and operational missions.

The DoN is considering the following alternatives to satisfy each purpose and need:

(i) LWI Alternative 1 (No Action)—Under the No Action Alternative, the DoN would not build the LWI and associated PSB modifications. DoD and DoN security requirements for the TRIDENT program would not be met.

(ii) LWI Alternative 2 (Pile-Supported Pier and PSB Modification)—Under this alternative, the LWI structure would include two pile-supported piers built from shoreline abutments to connect with the existing PSB system at the north and south sides of the NAVBASE Kitsap Bangor WRA. Each pier would connect to a solid concrete abutment to be constructed on the shore, and an anchoring structure for the PSBs to be installed at the seaward end of each pier. The LWI pier structure would be 280 feet long at the northern location and 730 feet long at the southern location. The piers would be supported by up to fifty-four 24-inch diameter steel piles at the northern location and up to eighty-two 24-inch diameter steel piles at the southern location. A fence would be installed along the length of the piers, five 30 foot tall towers would be installed on the piers to support lights and cameras, and a mesh/grate with sensors would extend from the bottom of the pier walkway to the seafloor.

(iii) LWI Alternative 3 (Port Security Barrier Modification)—This alternative, the DoN would build the LWI using PSBs instead of a pile supported pier. The LWI structures would consist of modifying and lengthening the existing PSBs at the same north and south locations as the pile supported pier alternative. The PSB sections would be 280 feet long at the northern location and 730 feet long at the southern location. The existing PSB system would be modified and lengthened to extend across the intertidal zone and would attach to shoreline abutments. Two solid concrete abutments would be constructed at the shore end of the north and south location to form a secure barrier from the bluff to the intertidal zone. Three 30 foot tall in-water towers would be installed to support lights and security equipment. The in-water towers would each be supported by a platform resting on four 24 inch piles. Two additional 30 foot tall towers would be installed on land.

(iv) SPE Alternative 1 (No Action)—The DoN would not consolidate SEAWOLF berthing and support services. The SEAWOLF Class submarines would continue to have reduced operational availability (due to tide windows limiting safe navigation through Rich Passage) and the long-term operations and maintenance efficiency and effectiveness resulting from consolidation of SEAWOLF Class submarines in one location would not occur.

(v) SPE Alternative 2 (Short Pier Configuration) The DoN would consolidate SEAWOLF Class submarines on NAVBASE Kitsap Bangor and build and operate the SPE proposed action using a side by side submarine mooring configuration. The proposed new facilities associated with this option include a 600-lineal-foot SPE, a 3,100-square-foot Pier Services and Compressor Building, a pier crane, a

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50,000-square-foot shoreside Maintenance Support Facility, and a shoreside emergency diesel generator facility. The new Maintenance Support Facility would be built within an existing parking lot. To support additional personnel, a 6-acre upland parking lot and lay down area would be constructed near the proposed Maintenance Support Facility. The SPE would be supported by approximately 320 steel piles.

(vi) SPE Alternative 3 (Long Pier Configuration)—The DoN would consolidate SEAWOLF Class submarines on NAVBASE Kitsap Bangor and build and operate the SPE proposed action using an in-line berth submarine mooring configuration. The proposed new facilities associated with this option include a 1,200-lineal-foot SPE, a 3,100-square-foot Pier Services and Compressor Building, a pier crane, a 50,000-square-foot shoreside Maintenance Support Facility, and a shoreside emergency diesel generator facility. The new Maintenance Support Facility would be built within an existing parking lot. To support additional personnel, a 6-acre upland parking lot and lay down area would be constructed near the proposed Maintenance Support Facility. The SPE would be supported by approximately 700 steel piles.

The proposed actions will be designed to minimize environmental impacts to the extent practicable. Project details including construction methods, schedule, operations, and maintenance, will be developed during the design process and analyzed in the Draft EIS.

No decision will be made to implement any alternative until the EIS process is completed and a Record of Decision is signed by the acting Principal Deputy Assistant Secretary of the Navy (Energy, Installations, and Environment).

The impacts to be evaluated include, but will not be limited to, effects on federally listed threatened and endangered species and critical habitat, impacts relating to underwater noise and airborne noise from pile driving and other actions, loss of eelgrass and other marine habitat, decreased opportunities for migratory and transient movement of fish and wildlife within the waterfront, reduction in water quality, effects on littoral drift (shoreline sediment movement), and effects on tribal resources.

The analysis will include an evaluation of direct, indirect, short-term, and long-term impacts of construction and operation of each project as well as cumulative impacts from other DoN and non-DoN activities in the project area.

The DoN is initiating the scoping process to identify community concerns and local issues to be addressed in the EIS. Federal, state, and local agencies, American Indian tribes, and interested persons are encouraged to provide written comments at scheduled public scoping meetings. All written statements will become part of the public record and will be responded to in the Draft EIS.

Written comments should be mailed to Naval Facilities Engineering Command Northwest, 1101 Tautog Circle, Silverdale, WA 98315–1101. Attention: Thomas Dildine, LWI/SPE EIS Project Manager. Comments may also be submitted online at *https://www.nbkeis.com/lwi/* during the comment period. All comments must be received by March 17, 2013 to ensure they become part of the official record.

Dated: January 28, 2013.

C.K. Chiappetta,

Lieutenant Commander, Office of the Judge Advocate General U.S. Navy, Federal Register Liaison Officer.

[FR Doc. 2013–02176 Filed 1–31–13; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

[Docket No.: ED–2013–ICCD–0008]

Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval; Comment Request; High School Longitudinal Study of 2009 (HSLS:09) High School Transcript and 2013 Update Full Scale Study and Panel Maintenance

AGENCY: Department of Education (ED), Institute of Education Sciences.

ACTION: Notice.

SUMMARY: In accordance with the Paperwork Reduction of 1995 (44 U.S.C. chapter 3501 *et seq.*), ED is proposing a revision of an existing information collection.

DATES: Interested persons are invited to submit comments on or before March 4, 2013.

ADDRESSES: Comments submitted in response to this notice should be submitted electronically through the Federal eRulemaking Portal at *http://www.regulations.gov* by selecting Docket ID number ED–2013–ICCD–0008 or via postal mail, commercial delivery, or hand delivery. Please note that comments submitted by fax or email and those submitted after the comment period will not be accepted. Written requests for information or comments submitted by postal mail or delivery should be addressed to the Director of the Information Collection Clearance Division, U.S. Department of Education, 400 Maryland Avenue SW., LBJ, Room 2E105, Washington, DC 20202–4537.

FOR FURTHER INFORMATION CONTACT: Electronically mail *ICDocketMgr@ed.gov.* Please do not send comments here.

SUPPLEMENTARY INFORMATION: The Department of Education (ED), in accordance with the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3506(c)(2)(A)), provides the general public and Federal agencies with an opportunity to comment on proposed, revised, and continuing collections of information. This helps the Department assess the impact of its information collection requirements and minimize the public's reporting burden. It also helps the public understand the Department's information collection requirements and provide the requested data in the desired format. ED is soliciting comments on the proposed information collection request (ICR) that is described below. The Department of Education is especially interested in public comment addressing the following issues: (1) Is this collection necessary to the proper functions of the Department; (2) will this information be processed and used in a timely manner; (3) is the estimate of burden accurate; (4) how might the Department enhance the quality, utility, and clarity of the information to be collected; and (5) how might the Department minimize the burden of this collection on the respondents, including through the use of information technology. Please note that written comments received in response to this notice will be considered public records.

Title of Collection: High School Longitudinal Study of 2009 (HSLS:09) High School Transcript and 2013 Update Full Scale Study and Panel Maintenance.

OMB Control Number: 1850–0852.

Type of Review: Revision of an existing information collection.

Respondents/Affected Public: State, Local or Tribal Governments; Individuals or households.

Total Estimated Number of Annual Responses: 34,184.

Total Estimated Number of Annual Burden Hours: 9,975.

Abstract: The High School Longitudinal Study of 2009 (HSLS:09) is a nationally representative, longitudinal study of more than 20,000 9th graders in 944 schools who will be followed

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report quarterly on complaints they receive.

DATES: Comments regarding this proposed information collection must be received on or before March 16, 2015. If you anticipate difficulty that you will be submitting comments, but find it difficult to do so within the period of time allowed by this notice, please advise the OMB Desk Officer of your intention to make a submission as soon as possible. The Desk Officer may be telephoned at 202–395–4718.

ADDRESSES: Written comments should be sent to the:

DOE Desk Officer, Office of Information and Regulatory Affairs, Office of Management and Budget, New Executive Office Building, Room 10102, 735 17th Street NW., Washington, DC 20503; and to

Janet N. Freimuth, HG–6, Acting Director, Office of Conflict Prevention and Resolution, U.S. Department of Energy, 1000 Independence Avenue SW., Washington, DC 20585; or by fax at 202–287–1415 or by email at *janet.freimuth@hq.doe.gov*.

FOR FURTHER INFORMATION CONTACT: Janet N. Freimuth at the address listed in **ADDRESSES**. The Web site address for the report is *http://www.energy.gov/oha/downloads/technology-transfer-reporting-form*.

SUPPLEMENTARY INFORMATION: This information collection request contains: (1) *OMB No.* 1910–5118; (2) *Information Collection Request Title:* "Technology Partnerships Ombudsman Reporting Requirements"; (3) *Type of Request:* Renewal; (4) *Purpose:* The information collected will be used to determine whether the Technology Partnerships Ombudsmen are properly helping to resolve complaints from outside organizations regarding laboratory policies and actions with respect to technology partnerships; (5) *Annual Estimated Number of Respondents:* 22; (6) Annual Estimated Number of Total Responses: 88; (7) *Annual Estimated Number of Burden Hours:* 50; (8) *Annual Estimated Reporting and Recordkeeping Cost Burden:* $ 2,500. The cost burden is based on an average hourly rate of $ 50 per hour. We expect no start up or maintenance costs.

Statutory Authority: Section 11 of the Technology Transfer Commercialization Act of 2000, Pub. L. 106–404, codified at 42 U.S.C. 7261c(c)(3)(C).

Issued in Washington, DC on February 9, 2015.

Janet N. Freimuth,

Acting Director, Office of Conflict Prevention and Resolution, Office of Hearings and Appeals, U.S. Department of Energy.

[FR Doc. 2015–03034 Filed 2–12–15; 8:45 am]

BILLING CODE 6450–01–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–9019–5]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7146 or *http://www.epa.gov/compliance/nepa/*.

Weekly receipt of Environmental Impact Statements

Filed 02/02/2015 Through 02/06/2015

Pursuant to 40 CFR 1506.9.

Notice

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other Federal agencies. EPA's comment letters on EISs are available at: *http://www.epa.gov/compliance/nepa/eisdata.html*.

EIS No. 20150028, Final EIS, USFS, ID, Clear Creek Integrated Restoration Project, *Review Period Ends:* 03/16/2015, *Contact:* Lois Hill 208–935–4257.

EIS No. 20150029, Final EIS, USFS, 00, Greater Sage Grouse Bi-State Distinct Population Segment Forest Plan Amendment, *Review Period Ends:* 04/07/2015, *Contact:* James Winfrey 775–355–5308.

EIS No. 20150030, Draft EIS, USN, WA, Land-Water Interface and Service Pier Extension at Naval Base Kitsap Bangor, *Comment Period Ends:* 04/13/2015, *Contact:* Thomas Dildine 360–396–0018.

EIS No. 20150031, Draft EIS, BLM, NV, Gold Rock Mine Project, *Comment Period Ends:* 03/30/2015, *Contact:* Dan Netcher 775–289–1872.

EIS No. 20150032, Draft EIS, BOP, KY, U.S. Penitentiary and Federal Prison Camp, Letcher County, *Comment Period Ends:* 03/30/2015, *Contact:* Issac Gaston 202–514–6470.

EIS No. 20150033, Draft EIS, USFS, ID, Salmon-Challis National Forest Invasive Plant Treatment, *Comment Period Ends:* 03/30/2015, *Contact:* Jennifer Purvine 208–879–4162.

EIS No. 20150034, Draft EIS, USACE, OR, Double-crested Cormorant Management Plan to Reduce Predation of Juvenile Salmonids in the Columbia River Estuary, *Comment Period Ends:* 03/16/2015, *Contact:* Robert Winters 503–808–4738.

Amended Notices

EIS No. 20140372, Draft EIS, DOE, 00, Plains and Eastern Clean Line Transmission Project, *Comment Period Ends:* 04/20/2015, *Contact:* Jane Summerson, 505–845– 4091, Revision to FR Notice Published 12/29/2014; Extending Comment Period from 03/19/2015 to 04/20/2015

Dated: February 10, 2015.

Cliff Rader,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 2015–03068 Filed 2–12–15; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[EPA–HQ–OPP–2015–0097; FRL–9922–89]

Pesticide Program Dialogue Committee; Notice of Public Webinar

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: Pursuant to the Federal Advisory Committee Act (FACA), the Environmental Protection Agency's (EPA's) Office of Pesticide Programs is announcing a public webinar for the Pesticide Program Dialogue Committee (PPDC) on February 25, 2015. The purpose of this webinar is to provide the PPDC with brief updates on several key topics, and to set-up discussion topics for the next in-person meeting to be held May 14–15, 2015. The PPDC provides advice and recommendations to the EPA Administrator on issues associated with pesticide regulatory development and reform initiatives, evolving public policy and program implementation issues, and science issues associated with evaluating and reducing risks from use of pesticides. The webinar is free, open to the public, and no advance registration is required.

DATES: The webinar will be held on Wednesday, February 25, 2015, from 1 p.m. to 2:30 p.m.

To request accommodation of a disability, please contact the person listed under **FOR FURTHER INFORMATION CONTACT**, preferably at least 10 days prior to the webinar, to give EPA as much time as possible to process your request.

ADDRESSES: The webinar will be available only online, at the following

Cooperating Agencies for EIS

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DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO
5090
Ser N454E/13U139593
21 February 2013

Mr. Samuel D. Rauch III
Assistant Administrator, Acting
National Marine Fisheries Service
1315 East West Highway
Silver Springs, MD 20910

Dear Mr. Rauch:

In accordance with the National Environmental Policy Act (NEPA), the Department of the Navy (Navy) is initiating the preparation of an Environmental Impact Statement (EIS) and is requesting that the National Marine Fisheries Service (NMFS) serve as a cooperating agency. The EIS will evaluate potential environmental effects associated with two proposed actions: 1) the proposed construction and operation of Land-Water Interface (LWI) structures, and; 2) the proposed construction and operation of a Service Pier Extension (SPE) at Naval Base (NAVBASE) Kitsap Bangor, Silverdale, Washington. The purpose of the LWI proposed action is to comply with Department of Defense directives to protect Navy OHIO-class ballistic missile submarines (TRIDENT submarines) from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets. The need for the LWI proposed action is to enhance security within the Waterfront Restricted Area (WRA). The purpose of the SPE proposed action is to eliminate deployment constraints and improve the maintenance of SEAWOLF-class submarines. The need for the SPE proposed action is to remove restrictions on navigating SEAWOLF-class submarines through Rich Passage under certain tidal conditions, improve long-term operational effectiveness for the three SEAWOLF-class submarines at NAVBASE Kitsap Bangor, provide berthing and logistical support at the Navy's submarine Research Development Test and Evaluation hub, and improve submarine crew training and readiness.

The LWI proposed action for the LWI SPE EIS is to:

- Construct two LWI structures and modify the existing floating Port Security Barrier system to enclose the Navy WRA in Hood Canal;

- Construction is anticipated to occur over a two year period. Construction activities occurring in the water during the first year may involve pile driving and would be conducted from July 2015 through February 2016. Once pile driving is complete, activities other than pile driving may occur in the water up until February 2017.

The SPE proposed action for the LWI SPE EIS is to:

- Relocate SEAWOLF-class submarines USS *SEAWOLF* (SSN-21) and USS *CONNECTICUT* (SSN-22) from NAVBASE Kitsap Bremerton to join USS *JIMMY CARTER* (SSN-23) at NAVBASE Kitsap Bangor;

- Extend the existing Service Pier in deeper waters of Hood Canal and construct and operate shore-based support facilities on the pier including a pier services and compressor building and a pier crane;

- Construct and operate associated land-based support facilities including a maintenance support facility and utility upgrades such as an emergency power generator facility and parking lot;

- Construction is anticipated to occur from April 2015 through March 2017. Construction in the water is planned for July through February of each year, beginning in July 2015 and concluding in February 2017.

The LWI and SPE are related actions due to their proximity, anticipated timing of construction, and potential to affect similar resources, but they are not connected projects because each proposed action would function independently. While independent in function, the projects may have the potential to affect related resources, so the Navy chose to analyze both projects in a single EIS. In order to adequately evaluate the potential environmental effects of the proposed actions, the Navy and NMFS will benefit from working together on assessing potential effects to marine species protected under the Marine Mammal Protection Act and the Endangered Species Act. It is anticipated that the effects will predominantly be related to underwater noise and airborne noise from pile driving and the loss of eelgrass and other marine habitat. Other potential effects include effects to federally listed threatened and endangered species and critical habitat, decreased opportunities for migratory and transient movement of fish and wildlife within the waterfront, reduction in water quality, effects on littoral drift (shoreline sediment movement), and effects on tribal resources.

To assist in the LWI SPE EIS planning and in accordance with the Council on Environmental Quality's (CEQ) NEPA guidelines (specifically 40 Code of Federal Regulations (CFR) Part 1501) and CEQ's 2002 guidance on cooperating agencies, the Navy requests that NMFS serve as a cooperating agency for the development of this EIS. As NMFS has jurisdiction by law and special expertise over protected marine species potentially affected by the proposed action, the Navy is requesting that NMFS be a cooperating agency as defined in 40 CFR 1501.6.

As the lead agency, the Navy will be responsible for overseeing preparation of the EIS that includes, but is not limited to, the following:

- Gather all necessary background information and prepare the EIS and all necessary permit applications.

- Work with NMFS personnel to determine the method of estimating potential effects to protected marine species, including threatened and endangered species.

2

- Use the environmental analysis and proposals of NMFS, to the maximum extent possible.

- Determine the scope of the EIS, including the alternatives evaluated with assistance of NMFS.

- Circulate the appropriate NEPA documentation to the general public and any other interested parties.

- Schedule and supervise meetings held in support of the NEPA process, and compile and respond to any comments received. Meet with NMFS at their request.

- Maintain an administrative record.

- Respond to any Freedom of Information Act requests relating to the EIS.

The Navy respectfully requests that NMFS, in its role as cooperating agency, provide support as follows:

- Provide timely comments during the public scoping period and on working drafts of the EIS documents. The Navy requests that comments on draft EIS documents be provided within 30 calendar days.

- Assist the Navy in determining appropriate avoidance, minimization, and/or mitigation measures to incorporate into the proposed action.

- Respond to Navy requests for information in a timely manner.

- Participate, as necessary, in meetings hosted by the Navy for discussion of issues related to the EIS, including public hearings and meetings.

- Adhere to the overall schedule as set forth by the Navy.

- Provide a formal, written response to this request.

The Navy views this agreement as important to the successful completion of the environmental planning process for the LWI SPE EIS. It is the Navy's goal to complete the analysis as expeditiously as possible, while using the best scientific information available. NMFS assistance will be invaluable in that endeavor.

The point of contact for this action is Ms. Karen M. Foskey, (703) 695-5193, email: Karen.Foskey@navy.mil.

3

Sincerely,

JOHN P. QUINN
Deputy Director, Energy and Environmental
Readiness Division (OPNAV N45)

Copy to:
ASN (EI&E)
DASN (Environment)
OAGC (EI&E)
CNIC WASHINGTON DC
NAVFAC WASHINGTON DC
COMNAVREG NW SILVERDALE WA (N3, N40, N45, N00L)
NAVFAC NW SILVERDALE WA (N00)
COMNAVBASE Kitsap Bangor

4

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910
THE DIRECTOR

MAR 2 6 2013

Mr. John P. Quinn
Deputy Director, Energy and Environmental
Readiness Division
Department of the Navy
2000 Navy Pentagon
Washington, DC 20350-2000

Dear Mr. Quinn:

Thank you for your letter requesting that NOAA's National Marine Fisheries Service (NMFS) be a cooperating agency in the preparation of an Environmental Impact Statement (EIS) to evaluate potential environmental effects associated with the proposed construction and operation of Land-Water Interface structures and a Service Pier Extension at Naval Base Kitsap Bangor. We support the Navy's decision to prepare an EIS on these activities and agree to be a cooperating agency, due, in part, to our responsibilities under section 101(a)(5) of the Marine Mammal Protection Act and section 7 of the Endangered Species Act.

We will make every effort to support the Navy in the specific ways described in your letter. Therefore, to the maximum extent practicable, NMFS will:

- Provide timely comments during the public scoping period and on working drafts of the EIS documents.
- Assist the Navy in determining appropriate avoidance, minimization, and/or mitigation measures to incorporate into the proposed action.
- Respond to Navy requests for information in a timely manner.
- Participate, as necessary, in meetings hosted by the Navy for discussion of issues related to the EIS, including public hearings and meetings.
- Adhere to the overall schedule as set forth by the Navy to the degree possible.

If you have any questions or need additional information, please contact Ms. Helen Golde, NMFS Office of Protected Resources, at (301) 427-8420.

Sincerely,

Samuel D. Rauch III
Deputy Assistant Administrator
for Regulatory Programs,
performing the functions and duties of the
Assistant Administrator for Fisheries

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00271
15 Feb 13

From: Commanding Officer, Naval Base Kitsap
To: Colonel Bruce Estok, Commander and District Engineer, U.S. Army Corps of Engineers, Seattle District

SUBJ: REQUEST U.S. ARMY CORPS OF ENGINEERS SERVE AS COOPERATING AGENCY FOR ENVIRONMENTAL IMPACT STATEMENT

ENCL: (1) Naval Base Kitsap Notice of Intent to prepare an EIS
(2) LWI/SPE EIS Proposed Action and Alternatives Fact Sheet

1. The Department of the Navy (Navy) is preparing an Environmental Impact Statement (EIS) to evaluate potential environmental impacts of constructing and operating the Land-Water Interface and Service Pier Extension (LWI/SPE) at Naval Base Kitsap Bangor. In order to adequately evaluate the potential environmental effects of the proposed action and comply with the Clean Water Act, the Navy wishes to initiate enhanced coordination with the Army Corps of Engineers (the Corps) and therefore requests that the Corps consider acting as a cooperating agency for the development of the LWI/SPE EIS in accordance with 40 CFR Part 1501 and the Council on Environmental Quality Cooperating Agency guidance issued on January 30, 2002. Note that the Environmental Impact Statement will include a classified annex.

2. Enclosure (1) contains details about the Navy's Notice of Intent to prepare an EIS. Enclosure (2) is a fact sheet describing the proposed action and alternatives.

3. The Navy values the Corps' knowledge and expertise in wetlands and waters, and views that the Corps participation would beneficial for both the Navy's EIS process and the Corps' permitting process.

4. The proposed action would add additional overwater structures in Hood Canal and could involve installation of over 800 pilings. The Navy would welcome collaboration with the Corps on data analysis, permitting requirements, and measures to avoid, minimize, and/or mitigate impacts.

SUBJ: REQUEST U.S. ARMY CORPS OF ENGINEERS SERVE AS COOPERATING AGENCY FOR ENVIRONMENTAL IMPACT STATEMENT

5. As a cooperating agency, the Navy requests the Corps support the Navy in the following manner:

a. Attending public scoping meetings.

b. Providing timely comments during the scoping period and timely review and comments on working drafts of the EIS documents (comments within 3 weeks).

c. Assisting the Navy in determining appropriate avoidance, minimization and/or mitigation measures to incorporate into the proposed action.

d. Responding to Navy requests for information in a timely manner.

e. Participating, as necessary, in meetings hosted by the Navy to discuss wetland and waters issues.

f. Adhering to the overall schedule as set forth by the Navy.

g. Providing a formal, written response to this request, agreeing to the support listed in the above bullets.

As lead agency, the Navy will be responsible for preparing the EIS, which will include, but is not limited to:

a. Gathering all necessary background information and preparing the EIS and all necessary permit applications;

b. Working with Corps personnel to determine the potential effects to wetlands and waters;

c. Determining the scope of the EIS, including the alternatives evaluated;

d. Circulating the appropriate NEPA documentation to the general public and any other interested parties;

e. Scheduling and supervising meetings held in support of the NEPA process and compiling any comments received; and

f. Maintaining an administrative record and responding to any Freedom of Information Act requests relating to the EIS.

2

SUBJ: REQUEST U.S. ARMY CORPS OF ENGINEERS SERVE AS COOPERATING AGENCY FOR ENVIRONMENTAL IMPACT STATEMENT

6. The Navy views this relationship as important to the successful completion of the NEPA process for the LWI/SPE EIS. It is the Navy's goal to complete the analysis as expeditiously as possible, while using the best scientific information available.

7. The Corps' assistance will be invaluable in this endeavor.

8. Points of contact for this action are: Mr. Gregory Leicht, Naval Base Kitsap at (360) 315-4451, gregory.leicht@navy.mil and Mr. Thomas Dildine, Naval Facilities Engineering Command Northwest at (360) 396-0018, thomas.dildine@navy.mil.

P. M. DAWSON

Copy to:
Deputy Assistant Secretary of the Navy (Environment)
Office of Assistant General Counsel (Installations & Environment)
Commander, Naval Installations Command (N46)
Commander, Navy Region Northwest (N40)
Commander, Naval Facilities Engineering Command Northwest (N45)

3

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

REPLY TO
ATTENTION OF

JUL 2 6 2013

Regulatory Branch

Captain Peter M. Dawson
Naval Base Kitsap
120 South Dewey Street
Bremerton, Washington 98314-5020

Reference: NWS-2013-243
U.S. Navy – Bangor
(Land Water Interface)

NWS-2013-244
U.S. Navy – Bangor
(Service Pier Extension)

Dear Captain Dawson:

The U.S. Army Corps of Engineers (Corps), Seattle District, Regulatory Branch, agrees to participate as a cooperating agency in the preparation of the Environmental Impact Statement (EIS) for the proposed Land-Water Interface project and Service Pier Extension project at Naval Base Kitsap – Bangor. The Land-Water Interface and Service Pier Extension are not connected projects, but are related due to their proximity, anticipated timing of construction, and potential to affect similar environmental resources. Therefore, both proposals are being analyzed in one EIS. Since these projects have independent utility, the Corps will process each permit application for a separate Department of the Army permit. We ask that you send two copies of documents so that a copy could be placed in each permit application's respective administrative record.

After an application is received from you, the Corps would likely process it as an Individual Permit under Section 10 of the Rivers and Harbors Act of 1899. If either action would result in a discharge of dredged or fill material within the mean higher high water line, the action would also be processed under Section 404 of the Clean Water Act. We will incorporate certain parts of the EIS by reference in our application review process.

As a cooperating agency, the Corps would support the Navy by:

a. Attending public scoping meetings.

-2-

b. Providing timely comments during the scoping period and timely review and comments on working drafts of the Environmental Impact Sttatement documents.

c. Assisting the Navy in determining appropriate avoidance, minimization, and/or mitigation measures to incorporate into the proposed action.

d. Responding to Navy requests for information in a timely manner.

e. Participating, as necessary, in meetings hosted by the Navy to discuss issues related to waters of the U.S.

f. Adhering to the overall schedule set by the Navy.

A copy of this letter will be furnished to Mr. Gregory Leicht, Naval Base Kitsap, 7001 Finback Circle, Room E-300, Silverdale, Washington 98315 and Mr. Thomas Dildine, Naval Facilities Engineering Command Northwest, 1101 Tautog Circle, Silverdale, Washington 98315. Ms. Karen Urelius, Project Manager, will be the Corps' point of contact for this project. You can reach her at (206) 764-3482, or via email at karen.m.urelius@usace.army.mil.

Sincerely,

Michelle Walker

for Bruce A. Estok
Colonel, Corps of Engineers
District Engineer

Tribes and Cultural Resources

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00647
17 Aug 11

Allyson Brooks, PhD
State Historic Preservation Officer
Department of Archaeology and Historic Preservation
P.O. Box 48343
Olympia, WA 98504-8343

Dear Dr. Brooks:

SUBJECT: REQUEST FOR CONCURRENCE WITH AREA OF POTENTIAL EFFECT AND A DETERMINATION OF NO HISTORIC PROPERTIES AFFECTED BY GEOTECHNICAL INVESTIGATIONS FOR THE LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

The U.S. Navy proposes to perform geotechnical testing at two locations on the shoreline of Naval Base Kitsap Bangor, Kitsap County, Washington (Enclosure 1). The purpose of the study is to provide data for design of a Land-Water Interface between existing waterborne security barriers and the Waterfront Enclave fence (DAHP Log. No. 051209-25-USN). The Navy will initiate separate consultation on the Land-Water Interface project, but the proposed geotechnical testing is required to provide information to support the project design. In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f), and its implementing regulation, 36 CFR 800, the Navy is submitting a determination of effects to historic properties from this proposed undertaking.

The Navy proposes to conduct geotechnical testing with eight bore holes at two locations (three at the northern area and five at the southern)(Enclosures 2 and 3). The testing will be conducted from a barge and two steel spuds will be deployed to fix the barge's position at each designated boring location. Sediment samples will be collected by a mud-rotary drill attached to a track mounted drill rig. A 6-inch casing will be placed using an impact hammer to a depth of 2 to 5 feet into the sediment, to prevent turbidity from entering surface waters during drilling activities. Once the casing is in place, a 5-inch rotary tricone drill bit will be used to drill within the confines of the casing.

SUBJECT: REQUEST FOR CONCURRENCE WITH AREA OF POTENTIAL EFFECT AND A DETERMINATION OF NO HISTORIC PROPERTIES AFFECTED BY GEOTECHNICAL INVESTIGATIONS FOR THE LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

The area of potential effect (APE) for this proposed undertaking comprises the drill sites for the eight 6-inch diameter casings and 5-inch bore holes and the surface disturbance caused the placement of the steel spuds. The bore holes will extend approximately 60 feet below the mudline.

There are no recorded submerged historic properties, downed aircraft, shipwrecks, traditional fishing features or other structures in the offshore area. There are, however, three prehistoric shell middens located along the waterfront at Naval Base Kitsap at Bangor (45KP106, the Floral Point Shell Midden, 45KP107, the Amberjack Road Shell Midden, and 45KP108, the Carlson Spit Shell Midden) but these are well removed from the APE. Owing to the small volume of disturbance a low probability for the presence of intact archaeological deposits or features in the APE, the Navy has determined a historic inventory survey is not warranted.

The Navy requests your concurrence on our determination of the APE and *No Historic Properties Affected* from the geotechnical study for the Land-Water Interface project. If you require further information or have any questions, please contact Bill Kalina at (360) 396-5353 or william.kalina@navy.mil.

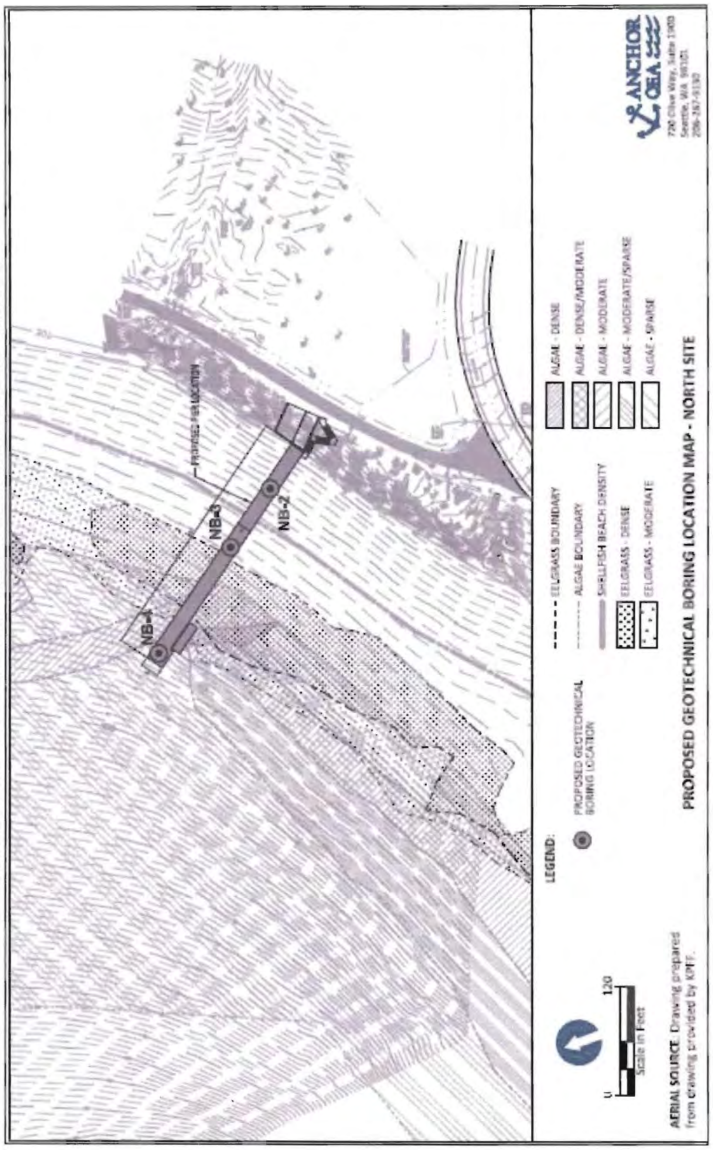
Sincerely,

P. M. DAWSON
Captain, U.S. Navy
Commanding Officer

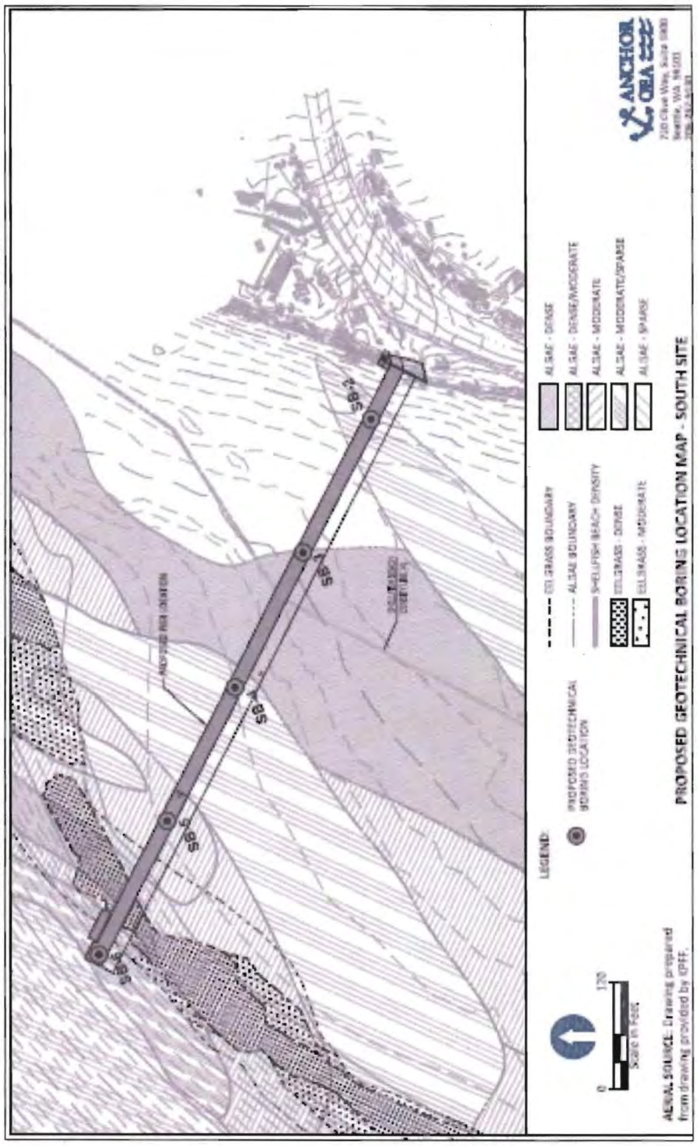
Enclosures:
1. Project Location
2. North Area Geotechnical Tests
3. Southern Area Geotechnical Tests

Enclosure 1. Project Location Map

Enclosure 2. North Area Geotechnical Tests



Enclosure 3. Southern Area Geotechnical Tests



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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00118
30 Jan 13

Jamestown S'Klallam Tribe
The Honorable W. Ron Allen
1033 Old Blyn Hwy
Sequim, WA 98382

Dear Chairman Allen:

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

During August 2012 in government-to-government consultations the Navy briefed you on two proposed projects, the Land Water Interface and the Service Pier Extension. The Navy's planning for these projects has progressed and the Navy is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts from the Navy's proposed construction and operation of new security structures, relocation of submarines and extension of an existing pier on the Naval Base (NAVBASE) Kitsap Bangor waterfront.

Pursuant to the Navy's policy for American Indian/Alaska Native tribal government-to-government consultation, I would like to extend the opportunity for you to review the proposed actions and to evaluate whether you believe there would be a potential to significantly affect tribal treaty harvest rights or cultural resources as a result of the implementation of the proposed actions.

The Navy proposes two projects on the NAVBASE Kitsap Bangor waterfront. The purpose of the proposed actions is to: 1) comply with Department of Defense directives to protect OHIO Class ballistic missile submarines from increased and evolving threats and to prevent the seizure, damage or destruction of military assets and 2) eliminate deployment constraints and improve maintenance of the SEAWOLF Class submarines.

The proposed actions include: 1) a Land-Water Interface and Port Security Barrier modifications and 2) a Service Pier Extension. The Land-Water Interface and Service Pier Extension are not connected projects, but are related due to their

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

proximity, anticipated timing of construction and potential to affect similar environmental resources. The Navy will therefore analyze these separate actions in the Land-Water Interface and Service Pier Extension on NAVBASE Kitsap Bangor EIS.

The Navy proposes the following actions:

Land-Water Interface:

- Construct two pile-supported piers or modify/lengthen the existing Port Security Barriers across the intertidal zone to enclose the Waterfront Restricted Area on NAVBASE Kitsap Bangor

Service Pier Extension:

- Relocate two SEAWOLF Class submarines from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor
- Extend the existing Bangor waterfront Service Pier
- Construct associated facilities and a parking lot

The proposed Land-Water Interface and Port Security Barriers are needed to enhance security within the Waterfront Restricted Area on NAVBASE Kitsap Bangor. Construction of the proposed Service Pier Extension and support facilities is needed to remove restrictions on navigating SEAWOLF Class submarines through Rich Passage under certain tidal conditions; improve long-term operational effectiveness for the proposed three SEAWOLF Class submarines at NAVASE Kitsap Bangor; provide berthing and logistical support at the Navy's submarine research, development, test and evaluation hub, located on NAVBASE Kitsap Bangor; and improve submarine crew training and readiness through co-location of SEAWOLF Class submarines and crew with command functions at the NAVBASE Kitsap Bangor submarine training center.

The EIS will include an analysis of potential impacts on a range of environmental resources including, but not limited to: water quality and littoral drift, marine vegetation and invertebrates, fish, marine mammals, marine birds, terrestrial biological resources, geology, soils and water resources, land use and recreation, acoustic environment, aesthetics and visual quality, socioeconomics, environmental justice and protection of children, cultural resources, American Indian traditional resources, traffic, air quality and public safety. Your input

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

in identifying specific issues and concerns that should be assessed in these areas, and any additional areas, is important to the process.

The Navy is holding two open house information sessions to support an early and open public process for determining the scope of concerns to be addressed and identifying potentially significant concerns related to the proposed actions. You may arrive at any time from 5 p.m. to 8 p.m. during each open house information session. There will not be a presentation or formal oral comment period; however, a digital voice recorder will be available for oral comments. Navy representatives will be available to discuss the projects and answer questions. You will also have an opportunity to submit comments on environmental concerns and potential alternatives to be addressed in the Draft EIS. Your input will be used to help identify potentially significant concerns to be analyzed.

The open house information sessions will be held from 5 p.m. to 8 p.m. at the following locations:

Date: **Wednesday, Feb. 20, 2013**
Location: Chimacum High School Commons
91 W. Valley Road
Chimacum, WA 98325

Date: **Thursday, Feb. 21, 2013**
Location: North Kitsap High School Commons
1780 NE Hostmark St.
Poulsbo, WA 98370

Regardless of whether you are able to participate in an open house information session, you may send written comments to the following address:

Naval Facilities Engineering Command Northwest
Attention: LWI/SPE EIS Team
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

3

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

You may also submit comments online at **www.nbkeis.com/lwi**. All comments must be received by **Sunday, March 17, 2013**, to be considered in the development of the Draft EIS.

For more information about the EIS, please visit the project website at **www.nbkeis.com/lwi**.

While the Navy has already briefed you on the proposed projects, we are interested in discussing these projects with you further as details of the projects emerge. I am aware of the significant value of natural and cultural resources of your Tribe within the EIS Study Area, and I look forward to discussing your questions and concerns about the proposed projects. I am available to meet with you at your convenience. Please feel free to contact me directly at (360) 627-4000 or peter.m.dawson@navy.mil, or contact my Environmental Director, Mr. Greg Leicht, at 360-315-5411 or gregory.leicht@navy.mil.

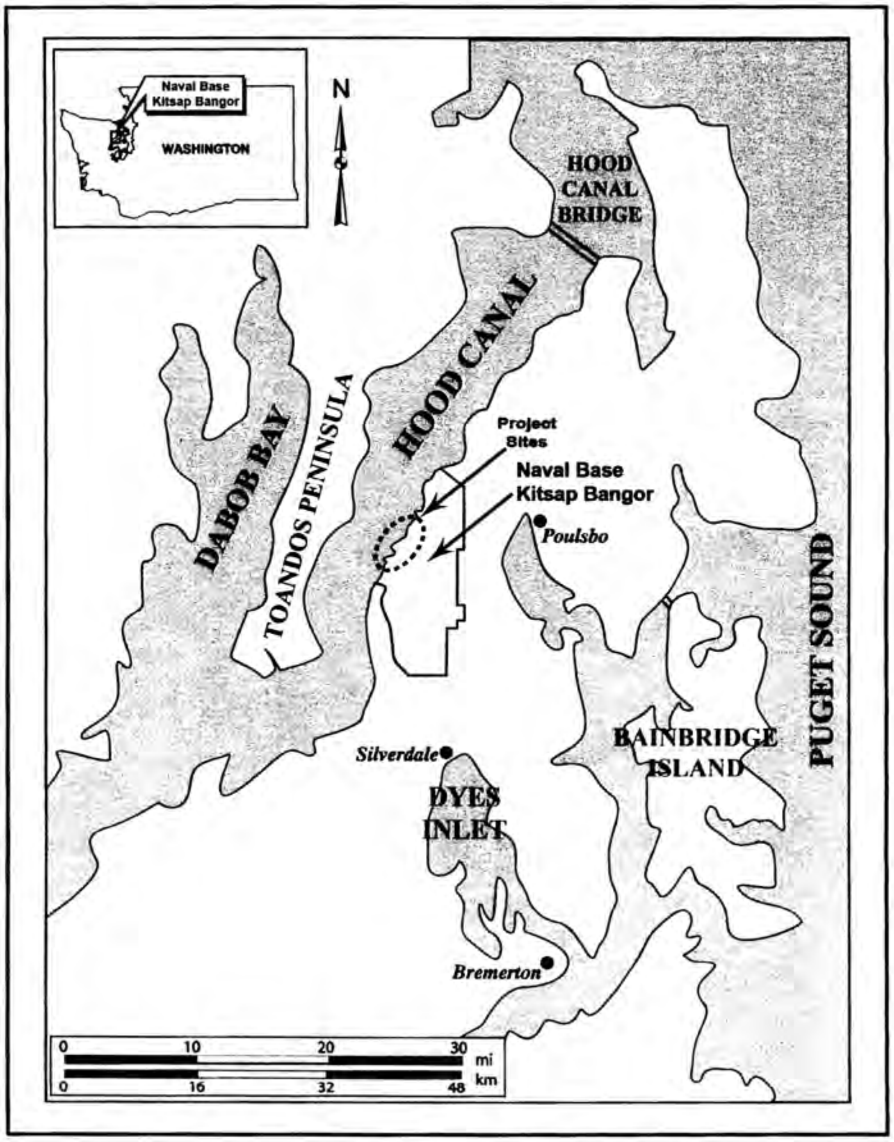
Sincerely,

P. M. DAWSON
Captain, U. S. Navy
Commanding Officer

Enclosure: 1. Site location map for Naval Base Kitsap Bangor

4

Enclosure 1: Site location map for
Naval Base Kitsap Bangor



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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00119
30 Jan 13

The Lower Elwha Klallam Tribe
The Honorable Frances Charles
2851 Lower Elwha Road
Port Angeles WA 98362

Dear Chairwoman Charles:

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

During August 2012 in government-to-government consultations the Navy briefed you on two proposed projects, the Land Water Interface and the Service Pier Extension. The Navy's planning for these projects has progressed and the Navy is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts from the Navy's proposed construction and operation of new security structures, relocation of submarines and extension of an existing pier on the Naval Base (NAVBASE) Kitsap Bangor waterfront.

Pursuant to the Navy's policy for American Indian/Alaska Native tribal government-to-government consultation, I would like to extend the opportunity for you to review the proposed actions and to evaluate whether you believe there would be a potential to significantly affect tribal treaty harvest rights or cultural resources as a result of the implementation of the proposed actions.

The Navy proposes two projects on the NAVBASE Kitsap Bangor waterfront. The purpose of the proposed actions is to: 1) comply with Department of Defense directives to protect OHIO Class ballistic missile submarines from increased and evolving threats and to prevent the seizure, damage or destruction of military assets and 2) eliminate deployment constraints and improve maintenance of the SEAWOLF Class submarines.

The proposed actions include: 1) a Land-Water Interface and Port Security Barrier modifications and 2) a Service Pier Extension. The Land-Water Interface and Service Pier Extension are not connected projects, but are related due to their

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

proximity, anticipated timing of construction and potential to affect similar environmental resources. The Navy will therefore analyze these separate actions in the Land-Water Interface and Service Pier Extension on NAVBASE Kitsap Bangor EIS.

The Navy proposes the following actions:

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- Extend the existing Bangor waterfront Service Pier
- Construct associated facilities and a parking lot

The proposed Land-Water Interface and Port Security Barriers are needed to enhance security within the Waterfront Restricted Area on NAVBASE Kitsap Bangor. Construction of the proposed Service Pier Extension and support facilities is needed to remove restrictions on navigating SEAWOLF Class submarines through Rich Passage under certain tidal conditions; improve long-term operational effectiveness for the proposed three SEAWOLF Class submarines at NAVASE Kitsap Bangor; provide berthing and logistical support at the Navy's submarine research, development, test and evaluation hub, located on NAVBASE Kitsap Bangor; and improve submarine crew training and readiness through co-location of SEAWOLF Class submarines and crew with command functions at the NAVBASE Kitsap Bangor submarine training center.

The EIS will include an analysis of potential impacts on a range of environmental resources including, but not limited to: water quality and littoral drift, marine vegetation and invertebrates, fish, marine mammals, marine birds, terrestrial biological resources, geology, soils and water resources, land use and recreation, acoustic environment, aesthetics and visual quality, socioeconomics, environmental justice and protection of children, cultural resources, American Indian traditional resources, traffic, air quality and public safety. Your input

2

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

in identifying specific issues and concerns that should be assessed in these areas, and any additional areas, is important to the process.

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Location: Chimacum High School Commons
91 W. Valley Road
Chimacum, WA 98325

Date: **Thursday, Feb. 21, 2013**
Location: North Kitsap High School Commons
1780 NE Hostmark St.
Poulsbo, WA 98370

Regardless of whether you are able to participate in an open house information session, you may send written comments to the following address:

Naval Facilities Engineering Command Northwest
Attention: LWI/SPE EIS Team
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

2

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

You may also submit comments online at **www.nbkeis.com/lwi**. All comments must be received by **Sunday, March 17, 2013**, to be considered in the development of the Draft EIS.

For more information about the EIS, please visit the project website at **www.nbkeis.com/lwi**.

While the Navy has already briefed you on the proposed projects, we are interested in discussing these projects with you further as details of the projects emerge. I am aware of the significant value of natural and cultural resources of your Tribe within the EIS Study Area, and I look forward to discussing your questions and concerns about the proposed projects. I am available to meet with you at your convenience. Please feel free to contact me directly at (360) 627-4000 or peter.m.dawson@navy.mil, or contact my Environmental Director, Mr. Greg Leicht, at 360-315-5411 or gregory.leicht@navy.mil.

Sincerely,

P. M. DAWSON
Captain, U. S. Navy
Commanding Officer

Enclosure: 1. Site location map for Naval Base Kitsap Bangor

4

DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00117
30 Jan 13

The Honorable Jeromy Sullivan
Chairman, Port Gamble S'Klallam Tribe
31912 Little Boston Road NE
Kingston, WA 98346

Dear Chairman Sullivan:

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

During August 2012 in government-to-government consultations the Navy briefed you on two proposed projects, the Land Water Interface and the Service Pier Extension. The Navy's planning for these projects has progressed and the Navy is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts from the Navy's proposed construction and operation of new security structures, relocation of submarines and extension of an existing pier on the Naval Base (NAVBASE) Kitsap Bangor waterfront.

Pursuant to the Navy's policy for American Indian/Alaska Native tribal government-to-government consultation, I would like to extend the opportunity for you to review the proposed actions and to evaluate whether you believe there would be a potential to significantly affect tribal treaty harvest rights or cultural resources as a result of the implementation of the proposed actions.

The Navy proposes two projects on the NAVBASE Kitsap Bangor waterfront. The purpose of the proposed actions is to: 1) comply with Department of Defense directives to protect OHIO Class ballistic missile submarines from increased and evolving threats and to prevent the seizure, damage or destruction of military assets and 2) eliminate deployment constraints and improve maintenance of the SEAWOLF Class submarines.

The proposed actions include: 1) a Land-Water Interface and Port Security Barrier modifications and 2) a Service Pier Extension. The Land-Water Interface and Service Pier Extension are not connected projects, but are related due to their

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

proximity, anticipated timing of construction and potential to affect similar environmental resources. The Navy will therefore analyze these separate actions in the Land-Water Interface and Service Pier Extension on NAVBASE Kitsap Bangor EIS.

The Navy proposes the following actions:

Land-Water Interface:

- Construct two pile-supported piers or modify/lengthen the existing Port Security Barriers across the intertidal zone to enclose the Waterfront Restricted Area on NAVBASE Kitsap Bangor

Service Pier Extension:

- Relocate two SEAWOLF Class submarines from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor
- Extend the existing Bangor waterfront Service Pier
- Construct associated facilities and a parking lot

The proposed Land-Water Interface and Port Security Barriers are needed to enhance security within the Waterfront Restricted Area on NAVBASE Kitsap Bangor. Construction of the proposed Service Pier Extension and support facilities is needed to remove restrictions on navigating SEAWOLF Class submarines through Rich Passage under certain tidal conditions; improve long-term operational effectiveness for the proposed three SEAWOLF Class submarines at NAVASE Kitsap Bangor; provide berthing and logistical support at the Navy's submarine research, development, test and evaluation hub, located on NAVBASE Kitsap Bangor; and improve submarine crew training and readiness through co-location of SEAWOLF Class submarines and crew with command functions at the NAVBASE Kitsap Bangor submarine training center.

The EIS will include an analysis of potential impacts on a range of environmental resources including, but not limited to: water quality and littoral drift, marine vegetation and invertebrates, fish, marine mammals, marine birds, terrestrial biological resources, geology, soils and water resources, land use and recreation, acoustic environment, aesthetics and visual quality, socioeconomics, environmental justice and protection of children, cultural resources, American Indian traditional resources, traffic, air quality and public safety. Your input

2

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

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Attention: LWI/SPE EIS Team
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

3

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

You may also submit comments online at **www.nbkeis.com/lwi**. All comments must be received by **Sunday, March 17, 2013**, to be considered in the development of the Draft EIS.

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Sincerely,

P. M. DAWSON
Captain, U. S. Navy
Commanding Officer

Enclosure: 1. Site location map for Naval Base Kitsap Bangor

DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00120
30 Jan 13

The Skokomish Tribe
The Honorable Guy Miller
North 80 Tribal Center Road
Skokomish WA 98584

Dear Chairman Miller:

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

During August 2012 in government-to-government consultations the Navy briefed you on two proposed projects, the Land Water Interface and the Service Pier Extension. The Navy's planning for these projects has progressed and the Navy is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts from the Navy's proposed construction and operation of new security structures, relocation of submarines and extension of an existing pier on the Naval Base (NAVBASE) Kitsap Bangor waterfront.

Pursuant to the Navy's policy for American Indian/Alaska Native tribal government-to-government consultation, I would like to extend the opportunity for you to review the proposed actions and to evaluate whether you believe there would be a potential to significantly affect tribal treaty harvest rights or cultural resources as a result of the implementation of the proposed actions.

The Navy proposes two projects on the NAVBASE Kitsap Bangor waterfront. The purpose of the proposed actions is to: 1) comply with Department of Defense directives to protect OHIO Class ballistic missile submarines from increased and evolving threats and to prevent the seizure, damage or destruction of military assets and 2) eliminate deployment constraints and improve maintenance of the SEAWOLF Class submarines.

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SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

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The Navy proposes the following actions:

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The proposed Land-Water Interface and Port Security Barriers are needed to enhance security within the Waterfront Restricted Area on NAVBASE Kitsap Bangor. Construction of the proposed Service Pier Extension and support facilities is needed to remove restrictions on navigating SEAWOLF Class submarines through Rich Passage under certain tidal conditions; improve long-term operational effectiveness for the proposed three SEAWOLF Class submarines at NAVASE Kitsap Bangor; provide berthing and logistical support at the Navy's submarine research, development, test and evaluation hub, located on NAVBASE Kitsap Bangor; and improve submarine crew training and readiness through co-location of SEAWOLF Class submarines and crew with command functions at the NAVBASE Kitsap Bangor submarine training center.

The EIS will include an analysis of potential impacts on a range of environmental resources including, but not limited to: water quality and littoral drift, marine vegetation and invertebrates, fish, marine mammals, marine birds, terrestrial biological resources, geology, soils and water resources, land use and recreation, acoustic environment, aesthetics and visual quality, socioeconomics, environmental justice and protection of children, cultural resources, American Indian traditional resources, traffic, air quality and public safety. Your input

2

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

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3

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

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Sincerely,

P. M. DAWSON
Captain, U. S. Navy
Commanding Officer

Enclosure: 1. Site location map for Naval Base Kitsap Bangor

4

DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00116
30 Jan 13

The Honorable Leonard Forsman
The Suquamish Tribe
PO Box 498
Suquamish, WA 98392

Dear Chairman Forsman:

SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

During October 2012 in government-to-government consultations the Navy briefed you on two proposed projects, the Land Water Interface and the Service Pier Extension. The Navy's planning for these projects has progressed and the Navy is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts from the Navy's proposed construction and operation of new security structures, relocation of submarines and extension of an existing pier on the Naval Base (NAVBASE) Kitsap Bangor waterfront.

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SUBJECT: LAND-WATER INTERFACE AND SERVICE PIER EXTENSION ON NAVAL BASE KITSAP BANGOR, ENVIRONMENTAL IMPACT STATEMENT

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Sincerely,

P. M. DAWSON
Captain, U. S. Navy
Commanding Officer

Enclosure: 1. Site location map for Naval Base Kitsap Bangor

4

DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00115
24 Jan 14

Allyson Brooks, PhD
State Historic Preservation Officer
Department of Archaeology and Historic Preservation
P.O. Box 48343
Olympia, WA 98504-8343

Dear Dr. Brooks:

SUBJECT: REQUEST FOR CONCURRENCE WITH THE AREA OF POTENTIAL EFFECT FOR THE LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

The U.S. Navy proposes to construct the Land-Water Interface Project (Undertaking) between existing waterborne security barriers and the Waterfront Enclave fence (DAHP Log. No. 051209-25-USN) at Naval Base (NAVBASE) Kitsap Bangor, Kitsap County, Washington (Enclosure 1). The Navy received concurrence on the Area of Potential Effect (APE) and Determination of No Historic Properties Affected for geotechnical testing associated with this Undertaking in August 2011 (DAHP Log No.:082311-09-USN). In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f), and its implementing regulation, 36 CFR 800, and the consultation of August 2011, the Navy is submitting a definition of APE for the proposed Undertaking.

The purpose of this proposed Undertaking is to secure the perimeter of the Waterfront Restricted Area (WRA) at NAVBASE Kitsap Bangor by extending an existing floating Port Security Barrier (PSB) system to the shoreline at the northern and southern extent of the WRA, thereby securing the entire perimeter of the WRA. Specifically, the Undertaking would modify the existing PSB system to extend across the intertidal zone to attach to concrete abutments at the shoreline at the north and south ends of the existing Waterfront Enclave fence.

The area of potential effect (APE) for this proposed Undertaking comprises two parts: (1) submerged, intertidal, and upland footprint of the proposed undertaking (areas in red, Enclosures 2 and 3) and (2) the view shed (areas in cross-hatch, Enclosures 2 and 3) within which visual changes associated with

SUBJECT: REQUEST FOR CONCURRENCE WITH THE AREA OF POTENTIAL EFFECT FOR THE LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

the undertaking may affect historic properties such as historic buildings and structures and properties of traditional religious and cultural importance to affected tribes.

The Navy is currently consulting with the five affected tribes with interests along the NAVBASE Kitsap Bangor shoreline. The Navy's definition of the APE is being provided to the Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam and Suquamish Tribes for their review and comment.

The Navy requests your concurrence on our determination of the APE for the proposed Undertaking (construction of the Land-Water Interface project). If you require further information or have any questions, please contact David Grant at (360) 396-0919 or dave.m.grant@navy.mil.

Sincerely,

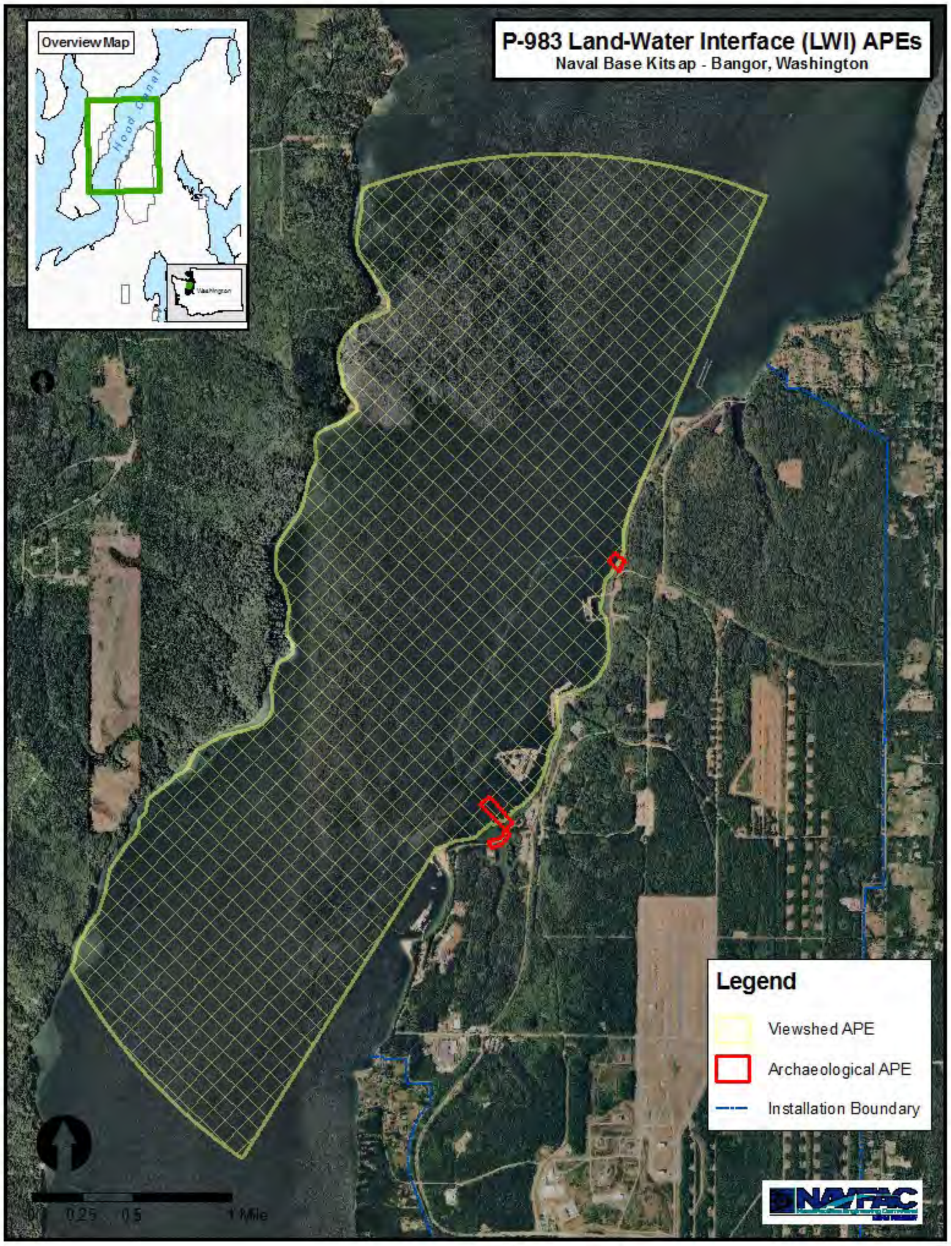
T.A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosures:
1. Project Location Map
2. Proposed APE on Aerial Imagery
3. Proposed APE on USGS Topographic Map

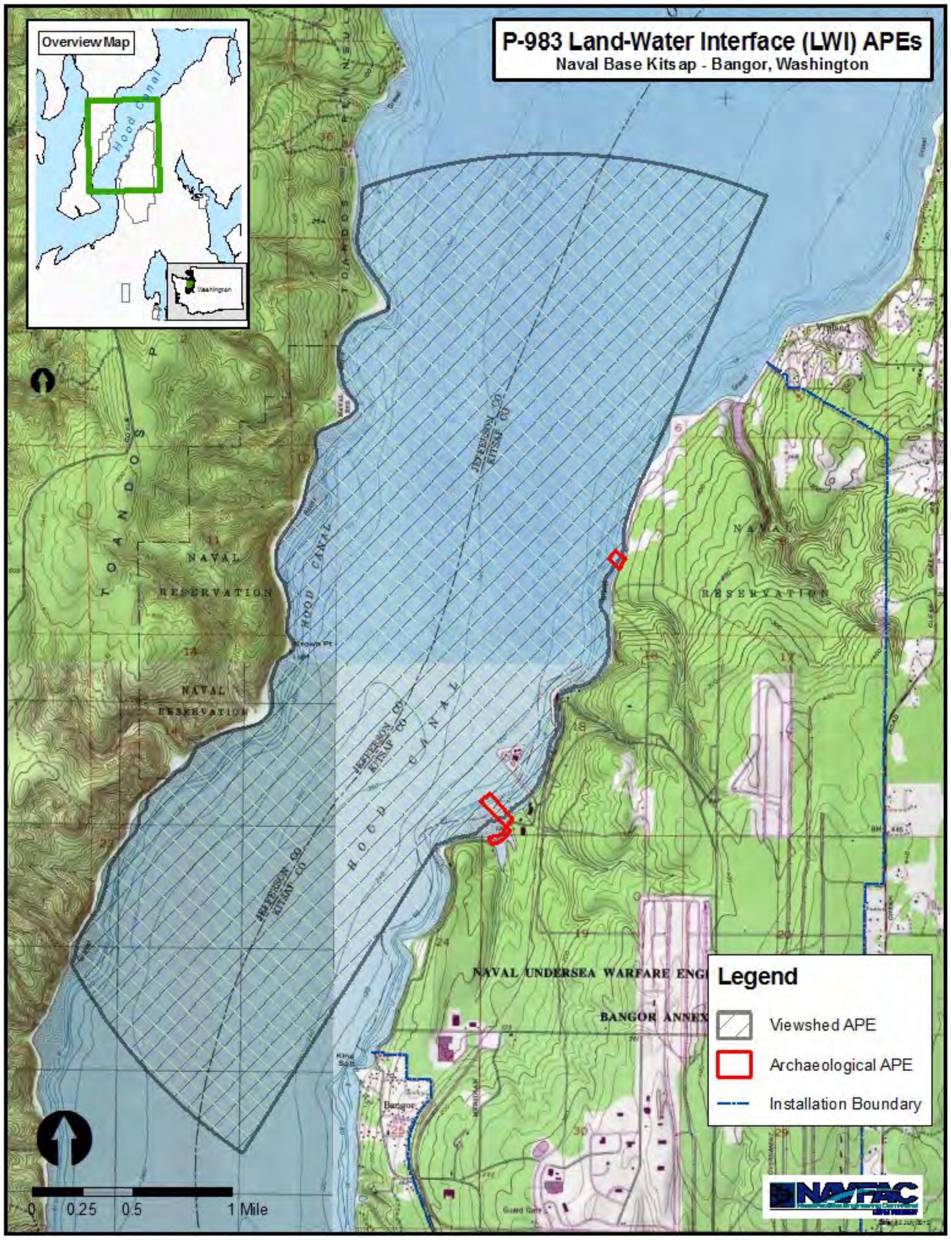
Enclosure 1. Project Location Map

Land-Water Interface Project Location

Enclosure 2. Proposed APE on Aerial Imagery



Enclosure 3. Proposed APE on USGS Topographic Map



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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00114
24 Jan 14

The Skokomish Tribe
The Honorable Guy Miller
North 80 Tribal Center Road
Skokomish WA 98584

Dear Chairman Miller:

SUBJECT: REQUEST FOR CONCURRENCE WITH THE AREA OF POTENTIAL EFFECT FOR THE LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

The U.S. Navy proposes to construct the Land-Water Interface Project between existing waterborne security barriers and the Waterfront Enclave fence at Naval Base (NAVBASE) Kitsap Bangor, Kitsap County, Washington (Enclosure 1). In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f), and its implementing regulation, 36 CFR 800, the Navy is proposing an Area of Potential Effect for the proposed project for your review and consideration.

The purpose of this proposed Undertaking is to secure the perimeter of the Waterfront Restricted Area (WRA) at NAVBASE Kitsap Bangor by extending an existing floating Port Security Barrier (PSB) system to the shoreline at the northern and southern extent of the WRA, thereby securing the entire perimeter of the WRA. Specifically, the Undertaking would modify the existing PSB system to extend across the intertidal zone to attach to concrete abutments at the shoreline at the north and south ends of the existing Waterfront Enclave fence.

The area of potential effect (APE) for this proposed Undertaking comprises two parts. First, the submerged, intertidal, and upland footprint of the proposed (areas in red, Enclosures 2 and 3) and, second, the view shed (areas in cross-hatch, Enclosures 2 and 3) within which visual changes associated with the undertaking may affect historic properties such as historic buildings and structures and properties of traditional religious and cultural importance to your tribe.

SUBJECT: REQUEST FOR CONCURRENCE WITH THE AREA OF POTENTIAL EFFECT FOR THE LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

The Navy requests your concurrence on our definition of the APE for the proposed construction of the Land-Water Interface project. If you require further information or have any questions, please contact David Grant at (360) 396-0919 or dave.m.grant@navy.mil.

Sincerely,

T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

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Land-Water Interface Project Location

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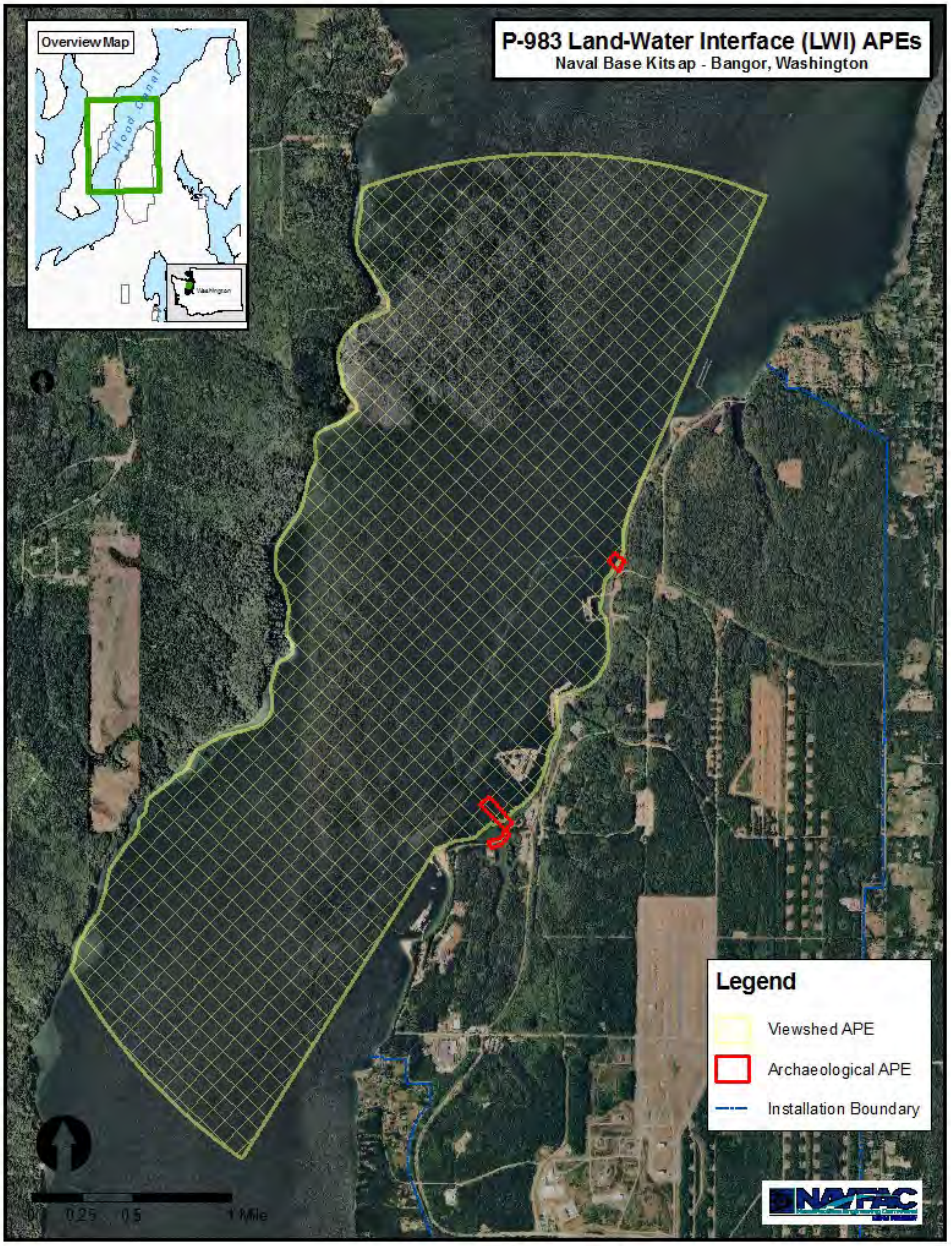

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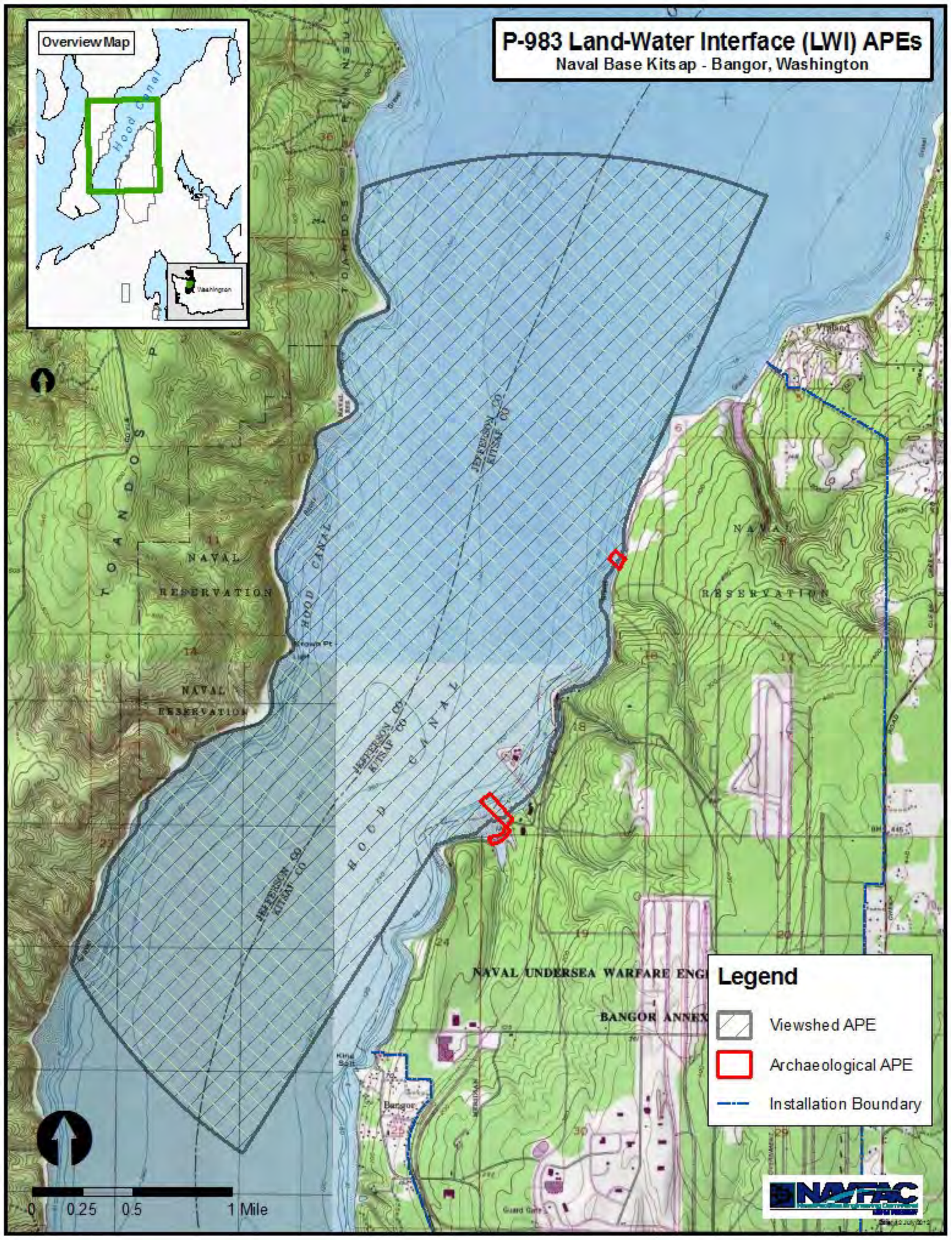

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00110
24 Jan 14

The Honorable Leonard Forsman
The Suquamish Tribe
PO Box 498
Suquamish, WA 98392

Dear Chairman Forsman:

SUBJECT: REQUEST FOR CONCURRENCE WITH THE AREA OF POTENTIAL EFFECT FOR THE LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

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The purpose of this proposed Undertaking is to secure the perimeter of the Waterfront Restricted Area (WRA) at NAVBASE Kitsap Bangor by extending an existing floating Port Security Barrier (PSB) system to the shoreline at the northern and southern extent of the WRA, thereby securing the entire perimeter of the WRA. Specifically, the Undertaking would modify the existing PSB system to extend across the intertidal zone to attach to concrete abutments at the shoreline at the north and south ends of the existing Waterfront Enclave fence.

The area of potential effect (APE) for this proposed Undertaking comprises two parts. First, the submerged, intertidal, and upland footprint of the proposed (areas in red, Enclosures 2 and 3) and, second, the view shed (areas in cross-hatch, Enclosures 2 and 3) within which visual changes associated with the undertaking may affect historic properties such as historic buildings and structures and properties of traditional religious and cultural importance to your tribe.

SUBJECT: REQUEST FOR CONCURRENCE WITH THE AREA OF POTENTIAL EFFECT FOR THE LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

The Navy requests your concurrence on our definition of the APE for the proposed construction of the Land-Water Interface project. If you require further information or have any questions, please contact David Grant at (360) 396-0919 or dave.m.grant@navy.mil.

Sincerely,

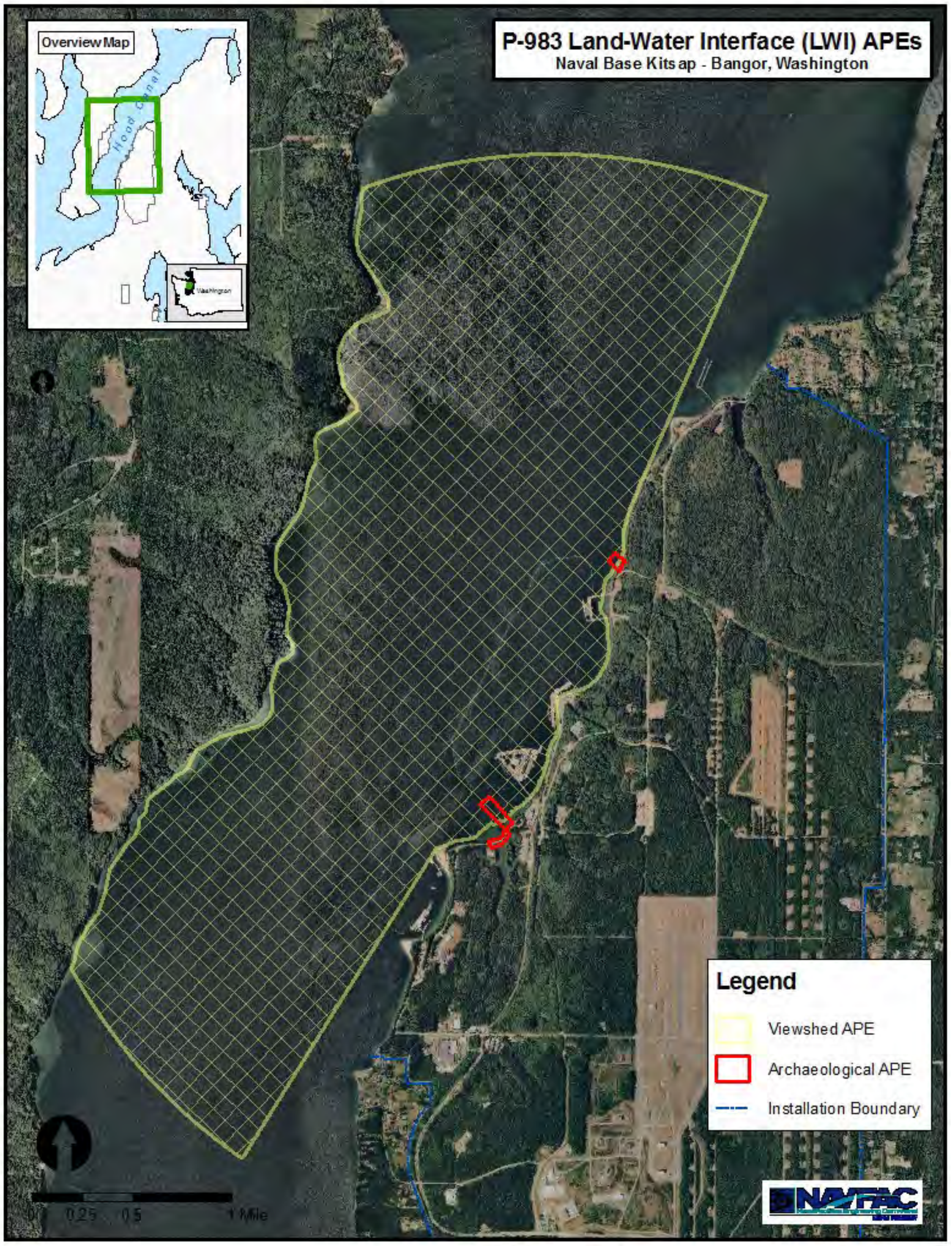
T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosures:
1. Project Location Map
2. Proposed APE on Aerial Imagery
3. Proposed APE on USGS Topographic Map

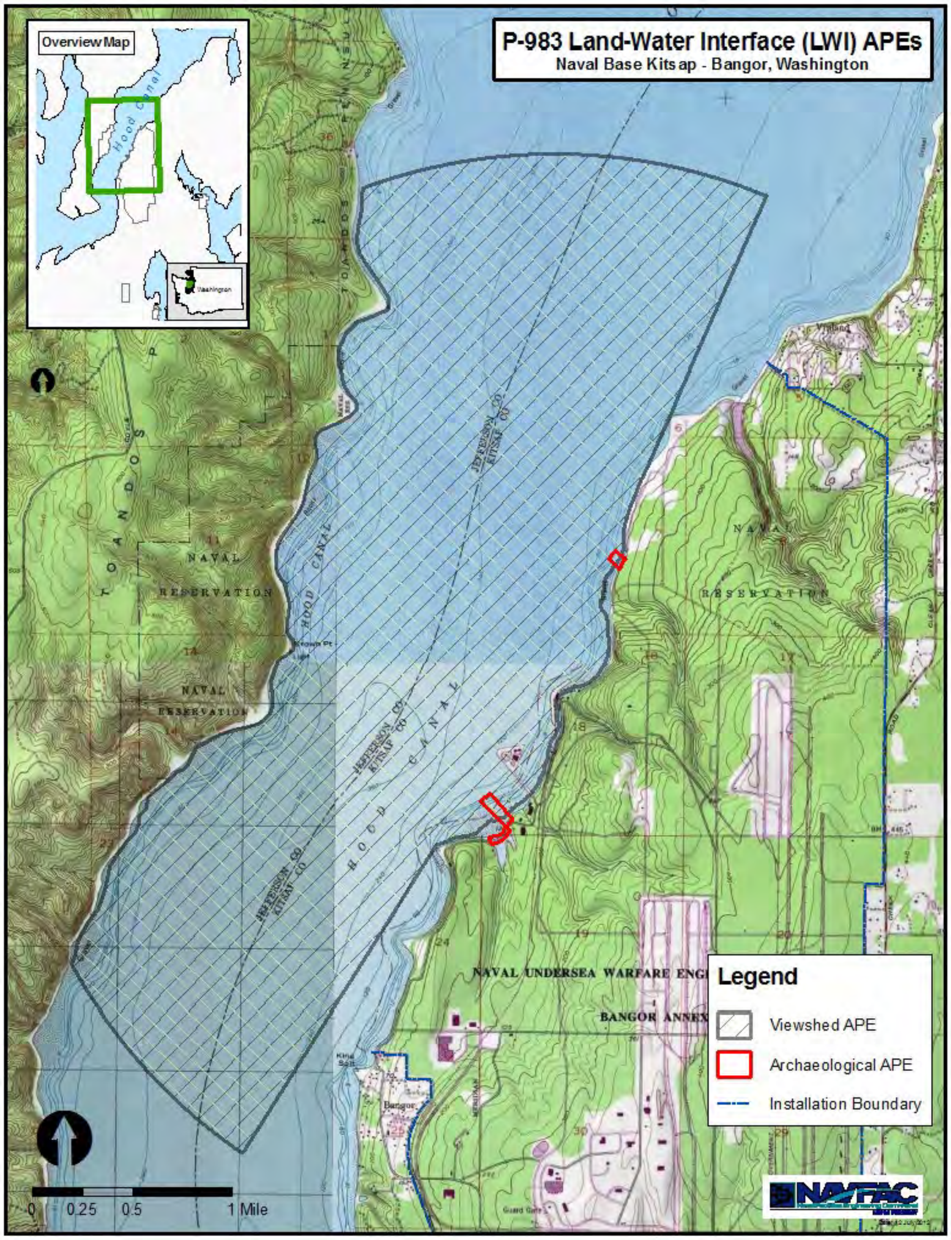
Enclosure 1. Project Location Map

Land-Water Interface Project Location

Enclosure 2. Proposed APE on Aerial Imagery



Enclosure 3. Proposed APE on USGS Topographic Map



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DEPARTMENT OF
ARCHAEOLOGY &
HISTORIC PRESERVATION
Protect the Past, Shape the Future

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

January 13, 2014

Captain T.A. Zwolfer
Naval Base Kitsap
Department of the Navy
120 South Dewey Street
Bremerton, Washington 98314

RE: Land-Water Interface Project
Log No. 012814-11-USN

Dear Commander Zwolfer;

Thank you for contacting our department. We have reviewed the materials you provided for the proposed Land-Water Interface Project at Naval Base Kitsap Bangor, Kitsap County, Washington.

We concur with your determination of the Area of Potential Effect (APE) as described and presented in your figures and text.

We look forward to the results of your professional cultural resources review, your consultations with concerned tribes, and Determination of Effect.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: *rob.whitlam@dahp.wa.gov*

State of Washington • **Department of Archaeology & Historic Preservation**
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

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JAMESTOWN S'KLALLAM TRIBE

1033 Old Blyn Highway, Sequim, WA 98382 360/683-1109 FAX 360/681-4643

July 30, 2015

Cmdr. Anthony Pecoraro, Executive Officer
Dept. of the Navy
Naval Base Kitsap
120 South Dewey St.
Bremerton, WA 98314-5020

RE: Request for concurrence with a determination of eligibility and finding of effect for land-water interface project at Naval Base Kitsap Bangor

The Jamestown S'Klallam Tribe concurs with the determination and finding referenced above. However, should project implementation reveal new information or results, please notify us.

Thank you for the opportunity to review this project. If you need any additional information, please contact me at 360-681-4669 or ljenkins@jamestowntribe.org .

Sincerely,

Leanne Jenkins
Planning Director

cc: W. Ron Allen, Tribal Chairman/CEO
Amanda.j.bennett@navy.mil

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Allyson Brooks Ph.D., Director
State Historic Preservation Officer

July 30, 2015

Capt. T.A. Zwolfer
Commanding Officer
U.S. Navy, Naval Base Kitsap Bremerton
120 South Dewey St
Bremerton, WA 98134-5020

In future correspondence please refer to:
Log: 012814-11-USN
Property: Land-Water Interface Project
Re: No Historic Properties Affected

Dear Capt. Zwolfer:

Thank you for contacting the Washington State Department of Archaeology and Historic Preservation (DAHP). The above referenced project has been reviewed on behalf of the State Historic Preservation Officer under provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800. My review is based upon documentation contained in your communication.

We concur that no historic properties will be affected by the current project as proposed. If additional information on the project becomes available, or if any archaeological resources are uncovered during construction, please halt work in the area of discovery and contact the appropriate Native American Tribes and DAHP for further consultation.

Thank you for the opportunity to review and comment. Should you have any questions, please contact me.

Sincerely,

Russell Holter

Russell Holter
Project Compliance Reviewer
(360) 586-3533
russell.holter@dahp.wa.gov

State of Washington • **Department of Archaeology & Historic Preservation**
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/ 01829
11 Sep 15

Allyson Brooks, PhD
State Historic Preservation Officer
Washington Department of Archaeology and Historic Preservation
1063 South Capital Way Ste 106
PO Box 48343
Olympia, WA 98504-8343

Dear Dr. Brooks:

SUBJECT: DAHP LOG # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

In accordance with Section 106 of the National Historic Preservation Act, the Navy would like to continue consultation regarding the proposed undertaking to make a variety of improvements to the southern end of the Bangor waterfront including an extension to the Service Pier, new waterfront support facility building, new parking lot and associated utilities (Enclosure 1). The area of potential effects (APE) for this undertaking was previously defined with State Historic Preservation Officer's (SHPO) concurrence (DAHP Log # 081215-09-USN_081215).

The proposed project is to eliminate deployment constraints and improve maintenance of the SEAWOLF Class (SSN) submarine fleet by transferring two of the SSNs from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor. The Undertaking would extend the existing Service Pier by 540 feet and extend the existing Port Security Barrier system to attach to the end of the pier extension. The upland portion of the project includes the construction of facilities to support the two additional SSNs; a new maintenance support facility, compressor building, utility upgrades that include an emergency power generator, and a 421-space parking lot. The new Maintenance Support Facility would be built at the site of an existing parking lot. The new 6-acre parking lot and utility pad would be constructed within a forested area, and road/entry improvements would be constructed in the vicinity (Enclosure 2). A new electrical duct bank would be installed within the road prism of Sealion Road and Sturgeon Street between two substations replacing an overhead feed, providing redundancy, increased capacity and reliability.

The Navy located 15 buildings/structures, 4 archeological sites, 10 isolate tree stumps, and 1 orchard within the APE that may be directly or indirectly affected by the proposed project (Enclosures 3-5). The Navy has determined there are no buildings/structures or archeological sites that will be directly or indirectly affected by the portion of the project within the linear APE south and west of the Service Pier, support facilities and parking lot. The proposed duct bank within the linear APE will be located below grade in the already disturbed existing road prism. Three cultural resources review reports inform this consultation. The Navy is providing three enclosed reports for your review. The fourth, *Archaeological Survey at Naval Base Kitsap*

SUBJECT: DAHP LOG # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

Bangor, Kitsap County, Washington, which is not specific to this project but covers portions of the APE, was recently provided to your office.

The report titled *Cultural Resource Investigation in Support of Environmental Requirements for Subdevron Five Homeporting Pier Extension and Waterfront Support Facility* was prepared by CardoTEC in 2013 to support the Section 106 consultation for the proposed project (Enclosure 7). It covers archeological and architectural resources within the original APE. However, the project APE has been expanded since this report was completed as a result of changes to project scope and consideration of potentially affected resources. As such, not all archeological and architectural resources within the current APE are covered in this report. All building, structures and archeological isolates covered in this report were recommended Not Eligible for the NRHP. The buildings surveyed within the current APE were less than 50 years of age and lack exceptional importance under Criteria Consideration G. The landscape features primarily lack integrity of setting, feeling and association with the early homesteading and logging activities. The following tables list the resources within the APE that were surveyed and evaluated for eligibility as part of the *Cultural Resource Investigation*. Historic Property Inventories (HPIs) were input into the Washington Information System for Architectural and Archaeological Records Data (WISAARD) for all of the buildings and structures.

BUILDINGS & STRUCTURES				
FACILITY NO.	FACILITY NAME	BUILD DATE	ELIGIBILITY	CORRESPONDING REPORT
7041	SEWAGE PUMP/LIFT STATION	1981	Recommended Not Eligible	CR Investigation
7043/7102	SERVC CRAFT UTILITY BLDG	1981	Recommended Not Eligible	CR Investigation
7050	SEWAGE PUMP/LIFT STATION	1981	Recommended Not Eligible	CR Investigation
7055	BUS SHELTER	1980	Recommended Not Eligible	CR Investigation
7065	VOLTAGE REGULATOR/SERVC PIER	1981	Recommended Not Eligible	CR Investigation
7076	GUARD SHELTER SERV PIER	1984	Recommended Not Eligible	CR Investigation
7101	SERVC CRAFT OPER BLDG	1981	Not Eligible - 030911-62-USN determined on 2/16/2012	CR Investigation
7108	HAZARDOUS WASTE STORAGE	1989	Recommended Not Eligible	CR Investigation
	RETAINING WALL	unknown	Recommended Not Eligible	CR Investigation
ARCHEOLOGICAL ISOLATES				
	CULTURALLY MODIFIED TREE #1	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #2	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #3	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #4	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #5	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #6	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #7	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #8	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #9	ca. 1900	Recommended Not Eligible	CR Investigation

SUBJECT: DAHP LOG # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

	CULTURALLY MODIFIED TREE #10	ca. 1900	Recommended Not Eligible	CR Investigation

The Section 110 archeology report titled *Archaeological Survey at Naval Base Kitsap Bangor, Kitsap County, Washington* was prepared by Stell Environmental Enterprises, Inc. in 2013. This report covers three portions of the APE that were not covered in the *Cultural Resource Investigation,* Carlson Spit south of the Service Pier, the area east of the Service Pier and the orchard area at the corner of Sealion Road and Sturgeon Street. The survey re-evaluated a prehistoric site that was originally surveyed in 1992 (KP00108) and recommends the site continue to remain Eligible for the NRHP for being an intact shell midden with potential to yield information important in history. Three additional historic sites were found and recommended Not Eligible for the NRHP for lack of significance and integrity. The following table lists the resources within the APE that were surveyed and evaluated for eligibility as part of this survey. Archeological Site Inventory Forms were input into WISAARD for all of these resources.

ARCHEOLOGICAL SITES				
SITE NO.	SITE NAME	PREHISTORIC / HISTORIC	ELIGIBILITY	CORRESPONDING REPORT
KP00108	CARLSON SPIT SHELL MIDDEN	prehistoric	Recommended Eligible	Archaeological Survey
KP00263	HISTORIC DEBRIS SCATTER, GLASS, LEATHER SHOES, 35 X 17FT	historic	Recommended Not Eligible	Archaeological Survey
KP00266	HISTORIC DEBRIS SCATTER	historic	Recommended Not Eligible	Archaeological Survey
KP00267	HISTORIC DEBRIS SCATTER, HOMESTEAD, CONCRETE FIREPLACE BACK, 400 X 115FT	historic	Recommended Not Eligible	Archaeological Survey

The report titled *Early Settlement and Historic Context Study in Support of Environmental Requirements for Subdevron Five Homeporting Pier Extension and Waterfront Support Facility* was prepared by CardnoTEC in 2013 (Enclosure 8). This report covers the historic context of early settlement at Bangor from 1840 to 1944 and evaluates the associated property types in order to identify and assess National Register of Historic Places (NRHP) eligibility requirements and potential for early settlement properties within NBK Bangor. The report concluded that there are not any Early Settlement NRHP-eligible properties or sites located on NBK Bangor, at this time, which meet the NRHP-eligibility criteria due to a loss of integrity and a lack of significance. Because this study only inventoried property types and probability, no data was input into WISAARD.

The report titled *Orchard Evaluation Report* was prepared for the Navy by Leidos in 2014 (Enclosure 9). The report evaluates the resources within the historic orchard that the *Cultural Resource Investigation* did not cover. The survey mapped and evaluated 114 trees or clusters of seedlings and performed genetic testing on 40 tree samples that were established by area homesteaders in the late nineteenth or early twentieth centuries. The report concluded that the orchard is not significant as a representation of a historic horticultural system, style, or design and the cultivated varieties on the site were commonly available during the time it was established. The report also found that the orchard does not retain sufficient integrity to tell the

3

SUBJECT: DAHP LOG # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

story of the early homesteads with which it was once associated and recommended it as Not Eligible for listing in the NRHP.

Because the APE has been expanded since the *Cultural Resource Investigation*, 5 buildings and structures within the APE were not included in that initial survey. Navy Cultural Resources staff surveyed and evaluated 4 these structures for this consultation and input the data into WISAARD (Enclosure 6). All 4 are recommended to be Not Eligible for the NRHP due to a lack of significance or exceptional importance under Criteria Consideration G. HPIs have been prepared for these and input into WISSARD (Enclosure 6). Building 7100, the Service Pier, was previously consulted on as part of another project and determined to be Not Eligible for the NRHP. The following table lists the resources within the APE not covered by project-specific reports that were surveyed and evaluated for eligibility.

BUILDINGS & STRUCTURES (not included in the *Cultural Resource Investigation*)

BLDG. NO.	FACILITY NAME	BUILD DATE	ELIGIBILITY	CORRESPONDING REPORT
7042	PIER UTILITY BLDG	1981	Recommended Not Eligible	No – see Enclosure 6
7100	SERVICE PIER	1981	Not Eligible - 030911-62-USN determined on 2/16/2012	No
7103	SUBSTATION	1981	Recommended Not Eligible	No – see Enclosure 6
7105	BOAT SHED SERVICE PIER	1985	Recommended Not Eligible	No – see Enclosure 6
7130	BOAT RAMP CARLSON SPIT	1970	Recommended Not Eligible	No – see Enclosure 6

Eleven buildings and structures within the APE were constructed in 1990 or more recently. As such, those resources are not considered for eligibility for this consultation. The following table lists the buildings and structures within the APE that were not surveyed and evaluated for eligibility as a result of their young age. Some of these resources were surveyed in the *Cultural Resource Investigation*, however the HPIs have been removed from WISAARD per communication with Greg Griffith.

BLDG. NO.	FACILITY NAME	BUILD DATE	ELIGIBILITY	CORRESPONDING REPORT
7107	WATCH HOUSE	1990	No Recommendation - Post Cold War	No
7109	COVERED BOAT MTCE FACILITY	1993	No Recommendation - Post Cold War	CR Investigation
7110	WELDING SHOP / INSIDE MACHINING SHOP	1997	No Recommendation - Post Cold War	CR Investigation
7112	COMPRESSOR BLDG	1995	No Recommendation - Post Cold War	No
7113	OIL WATER SEPARATOR	1996	No Recommendation - Post Cold War	CR Investigation
7114	WATERFRONT SUPPORT BLDG	2005	No Recommendation - Post Cold War	No
7120	SERVICE PIER SECURITY GATE	2009	No Recommendation - Post Cold War	No
7121	SERVICE PIER GUARD SHACK	2009	No Recommendation - Post Cold War	CR Investigation

4

SUBJECT: DAHP LOG # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

7122	SERVICE PIER SEC BARRIER (next to guard shack)	2009	No Recommendation - Post Cold War	CR Investigation
7132	NSWCCD PIER AND TRESTLE	2008	No Recommendation - Post Cold War	No
7133	NSWCCD SHIPS STORAGE	2008	No Recommendation - Post Cold War	No

The assessments included in the four contributing reports, along with additional survey and evaluation, have found that no buildings or structures within the APE are eligible for the NRHP. As such the Navy finds the proposed project will have No Effect on Historic Properties.

The one Eligible archeological site on Carlson Spit is located within the APE, but no construction will be taking place on the Spit or in close proximity to the site. The Service Pier extension will not adversely affect the viewshed of the midden. As such the Navy finds that the proposed project will have No Adverse Effect on KP00108. If any archaeological resources are uncovered during construction, project work will be halted in the area of discovery and appropriate Native American Tribes and the Department of Archaeology and Historic Preservation will be contacted for further consultation. The Navy is providing this letter and the enclosed reports to the Skokomish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam and Suquamish Tribes for their review and comment.

The Navy requests your concurrence on the determinations of eligibility and findings of effect for the proposed undertaking. If you require any further information or have any questions, please contact Ms. Amanda J. Bennett at (360) 476-6613 or e-mail: amanda.j.bennett@navy.mil.

Sincerely,

T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

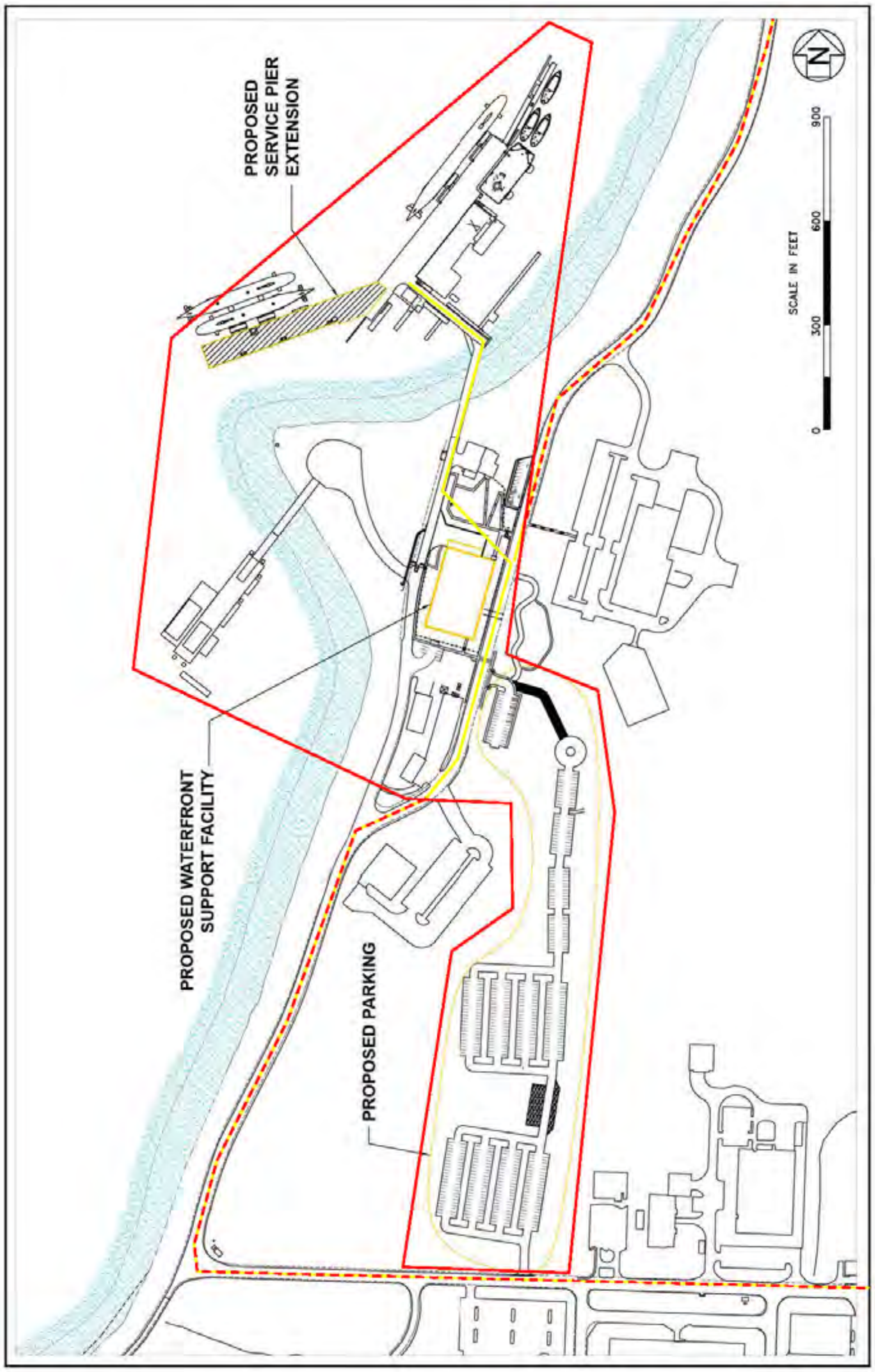
Enclosures:
1. Project Area of Potential Effect & Orchard Location
2. Project Plan
3. Buildings & Structures in the northern APE
4. Buildings & Structures in the central APE
5. Archeological resources within the APE
6. Historic Property Inventory Forms (not included in *Cultural Resource Investigation)* :
   - Building 7042
   - Building 7100
   - Building 7103
   - Building 7105
   - Building 7130

5

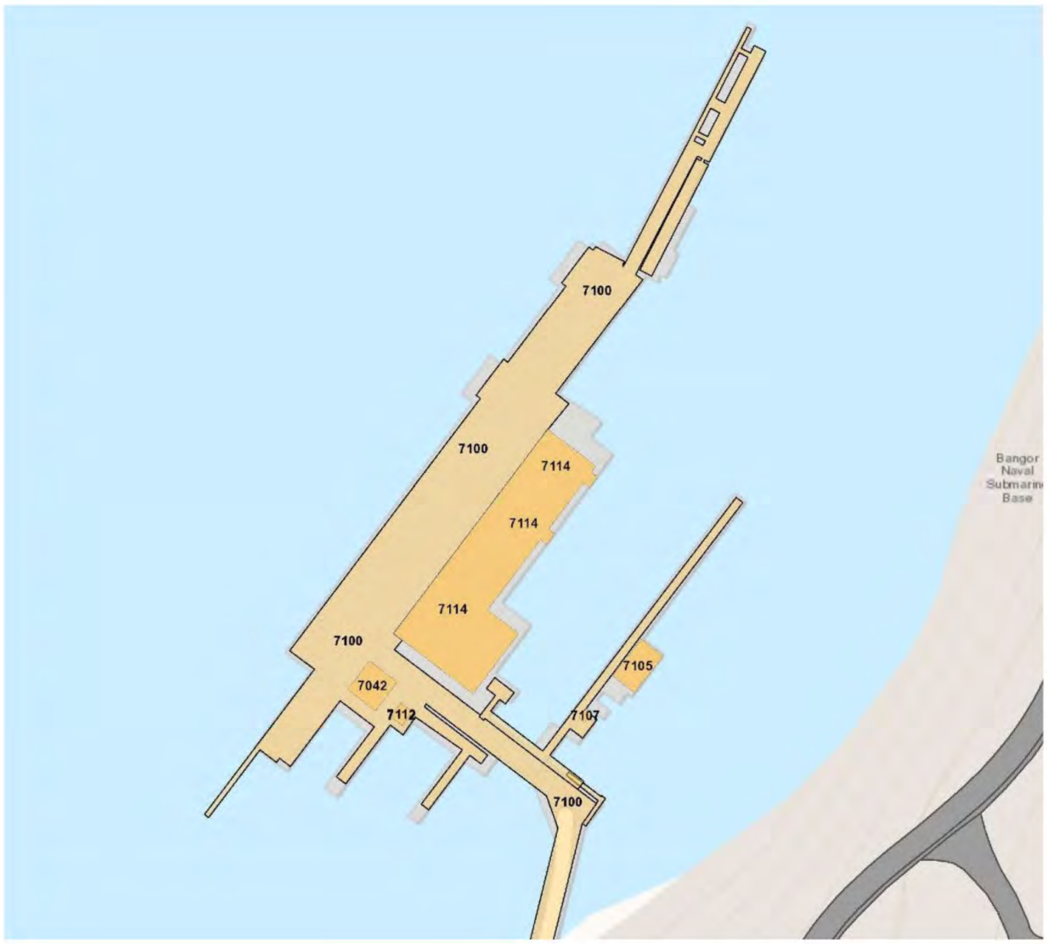
SUBJECT: DAHP LOG # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

7. *Cultural Resource Investigation in Support of Environmental Requirements for Subdevron Five Homeporting Pier Extension and Waterfront Support Facility*
8. *Early Settlement and Historic Context Study in Support of Environmental Requirements for Subdevron Five Homeporting Pier Extension and Waterfront Support Facility*
9. *Orchard Evaluation Report*

Enclosure 1. Project Area of Potential Effect & Orchard Location



Enclosure 2. Project Plan



Enclosure 3. Buildings & Structures in the northern APE

Enclosure 4. Buildings & Structures in the central APE

Enclosure 5. Archeological resources within the APE

Enclosure 6.
Historic Property Inventory Forms:

Building 7042
Building 7100
Building 7103
Building 7105
Building 7130

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

October 7, 2015

Captain T.A. Zwolfer
Department of the Navy
Naval Base Kitsap
120 South Dewey Street
Bremerton, Washington 98314-5020

Re: Improvements to Service Pier & Waterfront Project
Log No.: 081215-09-USN

Dear Captain Zwolfer

Thank you for contacting our department. We have reviewed the professional archaeological survey report you provided for the proposed Improvements to Service Pier & Waterfront Project at Naval Base Kitsap Bangor, Kitsap County, Washington.

We concur with your Determination of No Adverse Effect.

We would appreciate any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4). Such documents can be provided in a pdf format.

In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity must stop, the area secured, and the concerned tribe's cultural staff and cultural committee and this department notified.

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised.

Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 890-2615
email: *rob.whitlam@dahp.wa.gov*

State of Washington • **Department of Archaeology & Historic Preservation**
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

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LOWER ELWHA KLALLAM TRIBE

ʔəʔɬx̣ʷə nəxʷsƛ̓ay̓ əm "Strong People"

2851 Lower Elwha Road
Port Angeles, WA 98363

(360) 452-8471
Fax: (360) 452-3428

September 15, 2015

T.A. Zwolfer
Captain, U.S. Navy
Commanding Officer
Department of the Navy
Naval Base Kitsap
120 South Dewey Street
Bremerton, WA 98314-5020

Re: Initiation of Government to Government Consultation for
Improvements to Service Pier and Waterfront at Silverdale, Washington
Kitsap County, WA

Dear Captain Zwolfer:

Thank you for your recent inquiry requesting Government to Government consultation under the National Historic Preservation Act of 1966 as amended and acknowledging our interest in the improvements to the Service Pier and Waterfront at Silverdale, Washington. The proposed action lies outside of the ancestral lands of the Lower Elwha Klallam Tribe we therefore respectfully defer to the Port Gamble S'Klallam Tribe and Suquamish Tribe as the primary tribes in the project area for comment concerning cultural resources. The Lower Elwha Klallam Tribe is in receipt of your letter of August 8, 2015 and is pleased to provide you our comments regarding consultation under the National Historic Preservation Act as amended.

Thank you again for the opportunity to provide comment on the proposed project.

Sincerely,

William S. White
Tribal Archaeologist, MA
Cultural Resources
Lower Elwha Klallam Tribe

cc: Frances Charles, Tribal Chairwoman, Lower Elwha Klallam Tribe
LEKT Business Committee
Michael Peters, Chief Executive Officer
File

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/01469
3 Aug 15

The Lower Elwha Klallam Tribe
The Honorable Frances Charles
2851 Lower Elwha Road
Port Angeles WA 98362

Dear Chairwoman Charles:

SUBJECT: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

In accordance with Section 106 of the National Historic Preservation Act, the Navy would like to initiate consultation regarding a proposed Undertaking at Naval Base (NAVBASE) Kitsap Bangor (Enclosure 1). The Undertaking proposes to make a variety of improvements to the southern end of the Bangor waterfront including an extension to the Service Pier, new waterfront support facility building, new parking lot and associated utilities.

The Navy has determined the area of potential effect (APE) for this Undertaking to include the area that encompasses the three major project components as well as a linear portion to the north and south where a new underground duct bank will be installed along Sealion Road and Sturgeon Street (Enclosure 2).

The primary purpose of this Undertaking is to eliminate deployment constraints and improve maintenance of the SEAWOLF Class (SSN) submarine fleet by transferring two of the SSNs from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor. The Undertaking would extend the existing Service Pier by 540 feet and extend the existing Port Security Barrier system to attach to the end of the pier extension. The upland portion of the project would include the construction of facilities to support the two additional SSNs; a new maintenance support facility, compressor building, utility upgrades that include an emergency power generator, and a 421-space parking lot. The new Maintenance Support Facility would be built at the site of an existing parking lot. The new 6-acre parking lot and utility pad would be constructed within a nearby forested area, and road/entry improvements would be constructed in the project vicinity. A new electrical duct bank would be installed within the road prism of Sealion Road and Sturgeon Street between two existing substations replacing an overhead feed, providing redundancy, increased capacity and reliability.

The APE includes over 20 buildings and structures ranging from 45 to 6 years old, as well as a handful of prehistoric and historic sites that have been covered by various surveys and will be addressed as consultation continues. The Navy is currently consulting with the Washington State Historic Preservation Officer for review and concurrence.

SUBJECT: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

will be addressed as consultation continues. The Navy is currently consulting with the Washington State Historic Preservation Officer for review and concurrence.

The Navy requests your concurrence on the APE and looks forward to working with you on this proposed Undertaking. If you have any further questions, please contact Ms. Amanda J. Bennett. She can be reached at (360) 476-6613, or at amanda.j.bennett@navy.mil.

Sincerely,

T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosures: 1. NBK Bangor Location Maps
2. Area of Potential Effect Map

Enclosure 1. NBK Bangor Location Maps

Enclosure 2. Project Area of Potential Effect

DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/ 01850
14 Sep 15

The Lower Elwha Klallam Tribe
The Honorable Frances Charles
2851 Lower Elwha Road
Port Angeles WA 98362

Dear Chairwoman Charles:

SUBJECT: DAHP Log # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

In accordance with Section 106 of the National Historic Preservation Act, the Navy would like to continue consultation regarding the proposed undertaking to make a variety of improvements to the southern end of the Bangor waterfront including an extension to the Service Pier, new waterfront support facility building, new parking lot and associated utilities (Enclosure 1). The area of potential effects (APE) for this undertaking was previously defined with Washington State Historic Preservation Officer's (SHPO) concurrence (DAHP Log # 081215-09-USN_081215).

The proposed project is to eliminate deployment constraints and improve maintenance of the SEAWOLF Class (SSN) submarine fleet by transferring two of the SSNs from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor. The Undertaking would extend the existing Service Pier by 540 feet and extend the existing Port Security Barrier system to attach to the end of the pier extension. The upland portion of the project includes the construction of facilities to support the two additional SSNs; a new maintenance support facility, compressor building, utility upgrades that include an emergency power generator, and a 421-space parking lot. The new Maintenance Support Facility would be built at the site of an existing parking lot. The new 6-acre parking lot and utility pad would be constructed within a forested area, and road/entry improvements would be constructed in the vicinity (Enclosure 2). A new electrical duct bank would be installed within the road prism of Sealion Road and Sturgeon Street between two substations replacing an overhead feed, providing redundancy, increased capacity and reliability.

The Navy located 15 buildings/structures, 4 archeological sites, 10 isolate tree stumps, and 1 orchard within the APE that may be directly or indirectly affected by the proposed project (Enclosures 3-5). The Navy has determined there are no buildings/structures or archeological sites that will be directly or indirectly affected by the portion of the project within the linear APE south and west of the Service Pier, support facilities and parking lot. The proposed duct bank within the linear APE will be located below grade in the already disturbed existing road prism. Three cultural resources review reports inform this consultation. The Navy is providing four enclosed reports for your review.

SUBJECT: DAHP Log # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

The report titled *Cultural Resource Investigation in Support of Environmental Requirements for Subdevron Five Homeporting Pier Extension and Waterfront Support Facility* was prepared by CardoTEC in 2013 to support the Section 106 consultation for the proposed project (Enclosure 8). It covers archeological and architectural resources within the original APE. However, the project APE has been expanded since this report was completed as a result of changes to project scope and consideration of potentially affected resources. As such, not all archeological and architectural resources within the current APE are covered in this report. All building, structures and archeological isolates covered in this report were recommended Not Eligible for the NRHP. The buildings surveyed within the current APE were less than 50 years of age and lack exceptional importance under Criteria Consideration G. The landscape features primarily lack integrity of setting, feeling and association with the early homesteading and logging activities. The following tables list the resources within the APE that were surveyed and evaluated for eligibility as part of the *Cultural Resource Investigation*. Historic Property Inventories (HPIs) were input into the Washington Information System for Architectural and Archaeological Records Data (WISAARD) for all of the buildings and structures. Archeological Isolate Inventory Forms are provided for the Culturally Modified Tree stumps (Enclosure 7).

BUILDINGS & STRUCTURES				
FACILITY NO.	FACILITY NAME	BUILD DATE	ELIGIBILITY	CORRESPONDING REPORT
7041	SEWAGE PUMP/LIFT STATION	1981	Recommended Not Eligible	CR Investigation
7043/7102	SERVC CRAFT UTILITY BLDG	1981	Recommended Not Eligible	CR Investigation
7050	SEWAGE PUMP/LIFT STATION	1981	Recommended Not Eligible	CR Investigation
7055	BUS SHELTER	1980	Recommended Not Eligible	CR Investigation
7065	VOLTAGE REGULATOR/SERVC.PIER	1981	Recommended Not Eligible	CR Investigation
7076	GUARD SHELTER,SERV PIER	1984	Recommended Not Eligible	CR Investigation
7101	SERVC CRAFT OPER BLDG	1981	Not Eligible - 030911-62-USN determined on 2/16/2012	CR Investigation
7108	HAZARDOUS WASTE STORAGE	1989	Recommended Not Eligible	CR Investigation
	RETAINING WALL	unknown	Recommended Not Eligible	CR Investigation
ARCHEOLOGICAL ISOLATES				
	CULTURALLY MODIFIED TREE #1	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #2	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #3	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #4	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #5	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #6	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #7	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #8	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #9	ca. 1900	Recommended Not Eligible	CR Investigation
	CULTURALLY MODIFIED TREE #10	ca. 1900	Recommended Not Eligible	CR Investigation

2

SUBJECT: DAHP Log # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

The Section 110 archeology report titled *Archaeological Survey at Naval Base Kitsap Bangor, Kitsap County, Washington* was prepared by Stell Environmental Enterprises, Inc. in 2013 (Enclosure 9). This report covers three portions of the APE that were not covered in the *Cultural Resource Investigation*, Carlson Spit south of the Service Pier, the area east of the Service Pier and the orchard area at the corner of Sealion Road and Sturgeon Street. The survey re-evaluated a prehistoric site that was originally surveyed in 1992 (KP00108) and recommends the site continue to remain Eligible for the NRHP for being an intact shell midden with potential to yield information important in history. Three additional historic sites were found and recommended Not Eligible for the NRHP for lack of significance and integrity. The following table lists the resources within the APE that were surveyed and evaluated for eligibility as part of this survey. Archeological Site Inventory Forms were input into WISAARD for all of these resources.

ARCHEOLOGICAL SITES				
SITE NO.	SITE NAME	PREHISTORIC / HISTORIC	ELIGIBILITY	CORRESPONDING REPORT
KP00108	CARLSON SPIT SHELL MIDDEN	prehistoric	Recommended Eligible	Archaeological Survey
KP00263	HISTORIC DEBRIS SCATTER, GLASS, LEATHER SHOES, 35 X 17FT	historic	Recommended Not Eligible	Archaeological Survey
KP00266	HISTORIC DEBRIS SCATTER	historic	Recommended Not Eligible	Archaeological Survey
KP00267	HISTORIC DEBRIS SCATTER, HOMESTEAD, CONCRETE FIREPLACE BACK, 400 X 115FT	historic	Recommended Not Eligible	Archaeological Survey

The report titled *Early Settlement and Historic Context Study in Support of Environmental Requirements for Subdevron Five Homeporting Pier Extension and Waterfront Support Facility* was prepared by CardnoTEC in 2013 (Enclosure 10). This report covers the historic context of early settlement at Bangor from 1840 to 1944 and evaluates the associated property types in order to identify and assess National Register of Historic Places (NRHP) eligibility requirements and potential for early settlement properties within NBK Bangor. The report concluded that there are not any Early Settlement NRHP-eligible properties or sites located on NBK Bangor, at this time, which meet the NRHP-eligibility criteria due to a loss of integrity and a lack of significance. Because this study only inventoried property types and probability, no data was input into WISAARD.

The report titled *Orchard Evaluation Report* was prepared for the Navy by Leidos in 2014 (Enclosure 11). The report evaluates the resources within the historic orchard that the *Cultural Resource Investigation* did not cover. The survey mapped and evaluated 114 trees or clusters of seedlings and performed genetic testing on 40 tree samples that were established by area homesteaders in the late nineteenth or early twentieth centuries. The report concluded that the orchard is not significant as a representation of a historic horticultural system, style, or design and the cultivated varieties on the site were commonly available during the time it was established. The report also found that the orchard does not retain sufficient integrity to tell the

3

SUBJECT: DAHP Log # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

story of the early homesteads with which it was once associated and recommended it as Not Eligible for listing in the NRHP.

Because the APE has been expanded since the *Cultural Resource Investigation*, 5 buildings and structures within the APE were not included in that initial survey. Navy Cultural Resources staff surveyed and evaluated 4 these structures for this consultation and input the data into WISAARD (Enclosure 6). All 4 are recommended to be Not Eligible for the NRHP due to a lack of significance or exceptional importance under Criteria Consideration G. HPIs have been prepared for these and input into WISSARD (Enclosure 6). Building 7100, the Service Pier, was previously consulted on as part of another project and determined to be Not Eligible for the NRHP. The following table lists the resources within the APE not covered by project-specific reports that were surveyed and evaluated for eligibility.

BUILDINGS & STRUCTURES (not included in the *Cultural Resource Investigation*)

BLDG. NO.	FACILITY NAME	BUILD DATE	ELIGIBILITY	CORRESPONDING REPORT
7042	PIER UTILITY BLDG	1981	Recommended Not Eligible	No – see Enclosure 6
7100	SERVICE PIER	1981	Not Eligible - 030911-62-USN determined on 2/16/2012	No
7103	SUBSTATION	1981	Recommended Not Eligible	No – see Enclosure 6
7105	BOAT SHED SERVICE PIER	1985	Recommended Not Eligible	No – see Enclosure 6
7130	BOAT RAMP CARLSON SPIT	1970	Recommended Not Eligible	No – see Enclosure 6

Eleven buildings and structures within the APE were constructed in 1990 or more recently. As such, those resources are not considered for eligibility for this consultation. The following table lists the buildings and structures within the APE that were not surveyed and evaluated for eligibility as a result of their young age. Some of these resources were surveyed in the *Cultural Resource Investigation*, however the HPIs have been removed from WISAARD per communication with Greg Griffith.

BLDG. NO.	FACILITY NAME	BUILD DATE	ELIGIBILITY	CORRESPONDING REPORT
7107	WATCH HOUSE	1990	No Recommendation - Post Cold War	No
7109	COVERED BOAT MTCE FACILITY	1993	No Recommendation - Post Cold War	CR Investigation
7110	WELDING SHOP / INSIDE MACHINING SHOP	1997	No Recommendation - Post Cold War	CR Investigation
7112	COMPRESSOR BLDG	1995	No Recommendation - Post Cold War	No
7113	OIL WATER SEPARATOR	1996	No Recommendation - Post Cold War	CR Investigation
7114	WATERFRONT SUPPORT BLDG	2005	No Recommendation - Post Cold War	No
7120	SERVICE PIER SECURITY GATE	2009	No Recommendation - Post Cold War	No
7121	SERVICE PIER GUARD SHACK	2009	No Recommendation - Post Cold War	CR Investigation

4

SUBJECT: DAHP Log # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

7122	SERVICE PIER SEC BARRIER (next to guard shack)	2009	No Recommendation - Post Cold War	CR Investigation
7132	NSWCCD PIER AND TRESTLE	2008	No Recommendation - Post Cold War	No
7133	NSWCCD SHIPS STORAGE	2008	No Recommendation - Post Cold War	No

The assessments included in the four contributing reports, along with additional survey and evaluation, have found that no buildings or structures within the APE are eligible for the NRHP. As such the Navy finds the proposed project will have No Effect on Historic Properties.

The one Eligible archeological site on Carlson Spit is located within the APE, but no construction will be taking place on the Spit or in close proximity to the site. The Service Pier extension will not adversely affect the viewshed of the midden. As such the Navy finds that the proposed project will have No Adverse Effect on KP00108. If any archaeological resources are uncovered during construction, project work will be halted in the area of discovery and appropriate Native American Tribes and the Department of Archaeology and Historic Preservation will be contacted for further consultation.

The Navy requests your concurrence on the determinations of eligibility and findings of effect for the proposed undertaking. If you require any further information or have any questions, please contact Ms. Amanda J. Bennett at (360) 476-6613 or e-mail: amanda.j.bennett@navy.mil.

Sincerely,

T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosures:
1. Project Area of Potential Effect & Orchard Location
2. Project Plan
3. Buildings & Structures in the northern APE
4. Buildings & Structures in the central APE
5. Archeological resources within the APE
6. Historic Property Inventory Forms (not included in *Cultural Resource Investigation*) :
   - Building 7042
   - Building 7100
   - Building 7103
   - Building 7105
   - Building 7130

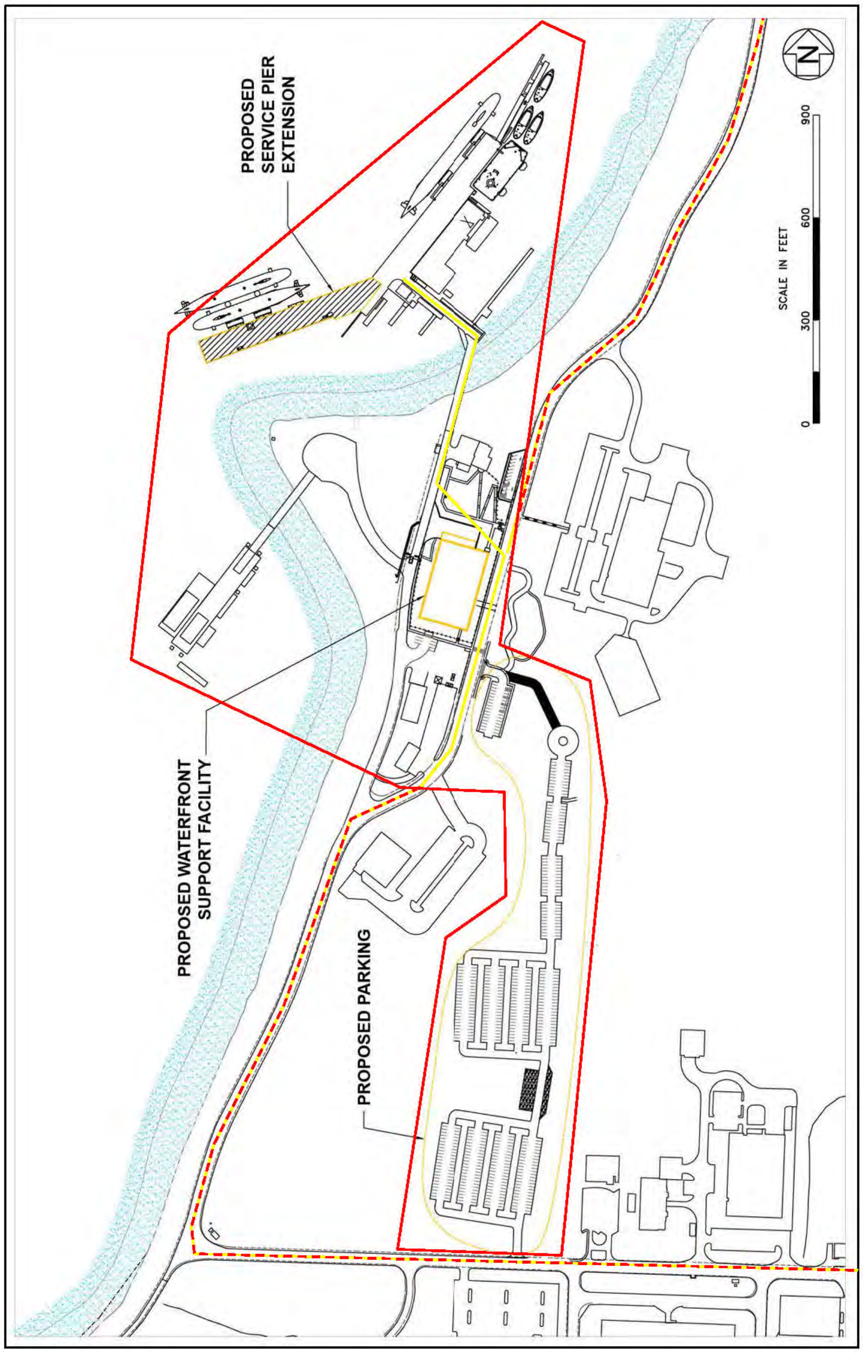
5

SUBJECT: DAHP Log # 081215-09-USN: PROPOSED IMPROVEMENTS TO THE SERVICE PIER AND WATERFRONT, NAVAL BASE KITSAP BANGOR, SILVERDALE, WA

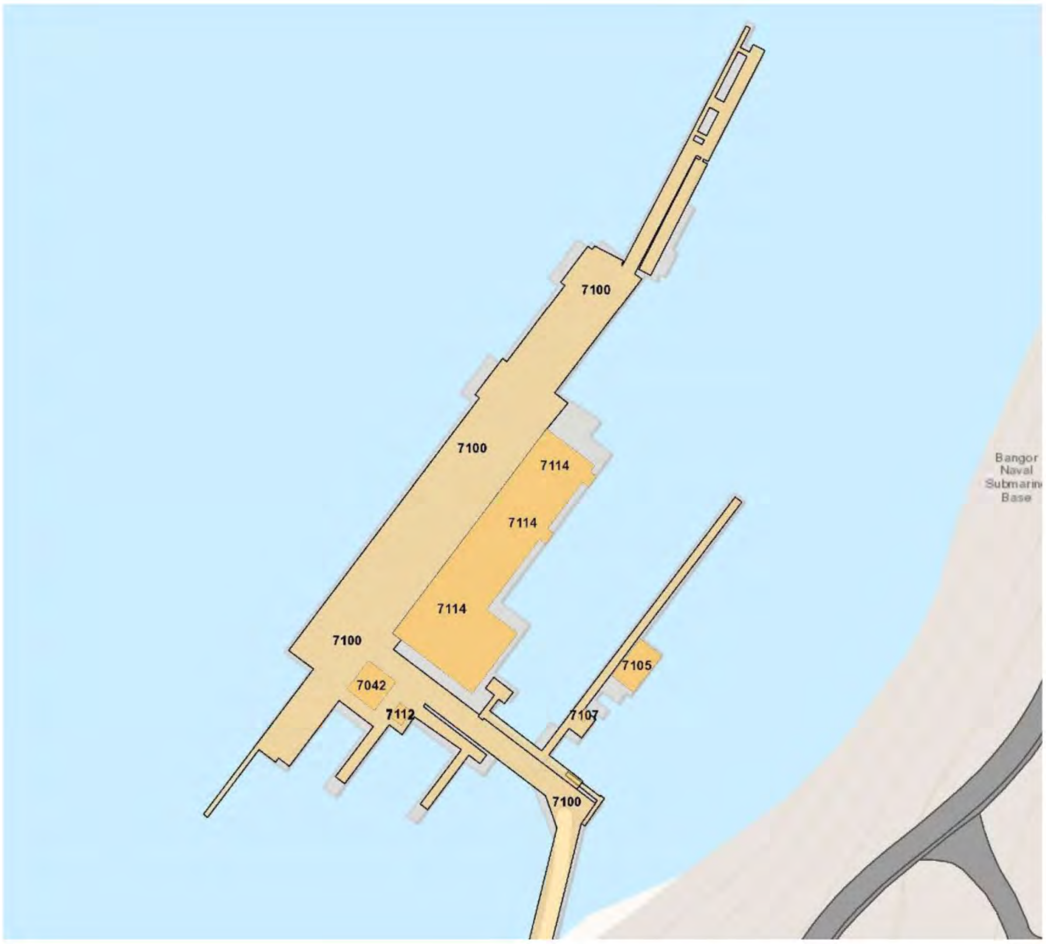
8. *Cultural Resource Investigation in Support of Environmental Requirements for Subdevron Five Homeporting Pier Extension and Waterfront Support Facility*
9. *Archaeological Survey at Naval Base Kitsap Bangor, Kitsap County, Washington*
10. *Early Settlement and Historic Context Study in Support of Environmental Requirements for Subdevron Five Homeporting Pier Extension and Waterfront Support Facility*
11. *Orchard Evaluation Report*

6

Enclosure 1. Project Area of Potential Effect & Orchard Location



Enclosure 2. Project Plan



Enclosure 3. Buildings & Structures in the northern APE

Enclosure 4. Buildings & Structures in the central APE

Enclosure 5. Archeological resources within the APE

Enclosure 6.
Historic Property Inventory Forms:

Building 7042
Building 7100
Building 7103
Building 7105
Building 7130

Regulatory Consultations

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/ 02013
17 Nov 14

Mr. Ben Laws
NOAA Fisheries Service
Office of Protected Resources
1315 East West Highway, F/PR1
Silver Spring, MD 20910

Dear Mr. Laws:

SUBJECT: PRELIMINARY DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE LAND-WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR, WASHINGTON

The National Oceanic and Atmospheric Administration Fisheries Service (NOAA) is one of the Cooperating Agencies in the preparation of the Navy's Environmental Impact Statement (EIS) for the construction and operation of two separate projects at Naval Base (NAVBASE) Kitsap Bangor, Washington: the Land-Water Interface (LWI) and the Service Pier Extension (SPE). Enclosed is Version 3 draft EIS for NOAA's review and comment. Please provide review comments by 4 Dec 2014. NOAA's review will be valuable in determining compliance with the Endangered Species Act and the Marine Mammal Protection Act as well as improving the overall quality of the document. We appreciate NOAA's continued review and assistance.

The current EIS schedule anticipates public review, with public hearings of the Draft EIS, occurring between 24 and 25 Feb 2015. Meetings with your regional staff will be scheduled during that timeframe if requested.

The point of contact for this EIS is Mr. Thomas Dildine, Naval Facilities Engineering Command Northwest. He can be reached at (360) 396-0018, or at thomas.dildine@navy.mil.

Sincerely,

T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosures: 1. LWI SPE Preliminary Draft Environmental Impact Statement

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/02068
24 Nov 14

Mr. Ben Laws
NOAA Fisheries Service
Office of Protected Resources
1315 East West Highway, F/PR1
Silver Spring, MD 20910

Dear Mr. Laws:

SUBJECT: INCIDENTAL HARASSMENT AUTHORIZATION REQUEST FOR THE SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR, SILVERDALE, WASHINGTON

In accordance with the Marine Mammal Protection Act, as amended and 50 Code of Federal Regulations Part 216.016, the United States Navy requests an Incidental Harassment Authorization for the take of marine mammals associated with the Service Pier Extension project at Naval Base Kitsap Bangor from July 16, 2016 through July 15, 2017.

The proposed action would expose marine mammals in Hood Canal to sound from pile driving. Enclosures (1) and (2) contain information required by the National Marine Fisheries Service for consideration of an incidental take request. The monitoring plan will be developed by the construction contractor and submitted to NMFS prior to In-Water Work commencing.

We appreciate your continued support in helping the Navy to meet its environmental responsibilities. For additional comments or questions the Navy's point of contact is Mr. Thomas Dildine, Naval Facilities Engineering Command Northwest. He can be reached at (360) 396-0018, or by e-mail at thomas.dildine@navy.mil.

Sincerely,

T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosures: 1. Incidental Harassment Authorization Application
2. CD-ROM of IHA application & transmittal letter (2 copies)

Copy to:
Chief of Naval Operations (N45)
Navy Region Northwest (N45)

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00444
10 Mar 15

Mr. Matthew Logenbaugh
National Marine Fisheries Service
510 Desmond Dr. SE, Suite 103
Lacey, WA 98503

Dear Mr. Logenbaugh:

SUBJECT: BIOLOGICAL ASSESSMENT AND ESSENTIAL FISH HABITAT ASSESSMENT FOR THE LAND WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR, WASHINGTON

The United States Department of the Navy (Navy) proposes to construct and operate two separate projects at Naval Base (NAVBASE) Kitsap Bangor, Washington: the Land-Water Interface (LWI) and the Service Pier Extension (SPE). The purpose of the LWI is to comply with Navy and Department of Defense directives to protect Navy TRIDENT submarines from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets. The purpose of the SPE is to eliminate deployment constraints and improve maintenance of the SEAWOLF Class (SSN) submarine fleet.

The following project activities are proposed in Hood Canal for the LWI Project:

- Modify and lengthen the existing floating Port Security Barrier (PSB) system to extend across the intertidal zone at two locations.
- Build abutments at the shoreline cliff at two locations along the Bangor waterfront to attach the modified PSB system.

Construction for LWI is proposed to begin in 2016 and end in 2018. Construction is estimated to last for 24 months and will be accomplished through two separate in-water work seasons in conformance with the U.S. Army Corps of Engineers approved work window of July 16 through January 15. Work in the intertidal zone will require driving of steel pile on no more than 144 days during the in-water work season. However, piles would be driven at low tide when water is not present.

The following project activities are proposed in Hood Canal for the SPE Project:

- Extend the existing Service Pier by 540 feet.

SUBJECT: BIOLOGICAL ASSESSMENT AND ESSENTIAL FISH HABITAT ASSESSMENT FOR THE LAND WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR, WASHINGTON

- Transfer two SSN submarines currently berthed at NAVBASE Kitsap Bremerton to the Service Pier extension.

In addition, upland work will include construction of a new Waterfront Ship Support Building, a new parking lot, road improvements, and a utility pad totaling 7 acres in size.

Construction of SPE is proposed to begin in 2018 and end in 2020. Construction is estimated to last for 24 months and will be accomplished through two separate in-water work seasons in conformance with the U.S. Army Corps of Engineers approved work window of July 16 through January 15. In-water work will require driving of steel piles on no more than 144 days during the first in-water work season and driving of concrete piles on no more than 36 days during the second in-water work season.

A review of federally listed species under the jurisdiction of the National Marine Fisheries Service (NMFS) indicates the following species potentially occur within each project's action area:

- Hood Canal Evolutionarily Significant Unit(ESU)summer-run chum salmon (*Oncorhynchus keta*)
- Puget Sound ESU Chinook salmon (*O. tshawytscha*)
- Puget Sound Distinct Population Segment(DPS)steelhead (*O. mykiss*)
- Puget Sound/Georgia Basin DPS bocaccio (*Sebastes paucispinis*)
- Puget Sound/Georgia Basin DPS canary rockfish (*S. pinniger*)
- Puget Sound/Georgia Basin DPS yelloweye rockfish (*S. ruberrimus*)
- Humpback whale (*Eschrichtius robustus*)

Southern Resident killer whale (*Orcinus Orca*) does not occur in the action area, but were included in the analyses based on potential effects to their forage base.

The Navy analyzed potential impacts of each of the proposed projects to federally listed species using the best scientific and commercial data available, as required under Section 7(c) of the Endangered Species Act. In addition, the Navy met with the NMFS and USFWS to discuss potential project effects to federally listed species, as well as potential avoidance and minimization measures. Based on the Navy's analyses, the Navy concluded that with implementation of the proposed avoidance and minimization measure, both the LWI and SPE projects *may affect, but are not likely to adversely affect* the above listed species. Critical habitat was

2

SUBJECT: BIOLOGICAL ASSESSMENT AND ESSENTIAL FISH HABITAT ASSESSMENT FOR THE LAND WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR, WASHINGTON

also analyzed, but it was determined that there is no critical habitat designated within the action area and concluded a no effect determination. The Navy also determined that the LWI or SPE projects *will not destroy or adversely modify* proposed critical habitat for Puget Sound steelhead.

The Navy requests informal consultation for the above listed species and concurrence with our effect determination. Enclosed is a biological assessment (Enclosure 1) that documents our analyses. The Navy understands that within 30 days of this request, you will notify us in writing if additional information is required.

In compliance with the Magnuson-Stevens Fishery Conservation and Management Act, essential fish habitat (EFH) was assessed for each project. Based on the conclusions of the EFH assessments (Enclosure 2), it is the Navy's conclusion that construction and operation of the projects may adversely affect Pacific salmon, coastal pelagic, and Pacific groundfish EFH.

It is our understanding that with federal concurrence this satisfies our responsibilities under Section 7(c) of the Endangered Species Act at this time. We will continue to remain aware of any change in status of these species and will be prepared to reevaluate potential project impacts if necessary. If you have any questions about these projects, or need additional clarification, please contact the Navy point-of-contact Ms. Stephanie Sparks. She can be reached at (360) 396-0023 or stephanie.sparks@navy.mil.

Sincerely,

T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosures: 1. Biological Assessment
2. Essential Fish Habitat Analysis

3

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/00445
10 Mar 15

Mr. Eric Rickerson
U.S. Fish and Wildlife Service
510 Desmond Dr. SE, Suite 102
Lacey, WA 98503

Dear Mr. Rickerson:

SUBJECT: BIOLOGICAL ASSESSMENT FOR THE LAND WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR, WASHINGTON

The United States Department of the Navy (Navy) proposes to construct and operate two separate projects at Naval Base (NAVBASE) Kitsap Bangor, Washington: the Land-Water Interface (LWI) and the Service Pier Extension (SPE). The purpose of the LWI is to comply with Navy and Department of Defense directives to protect Navy TRIDENT submarines from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets. The purpose of the SPE is to eliminate deployment constraints and improve maintenance of the SEAWOLF Class (SSN) submarine fleet.

The following project activities are proposed in Hood Canal for the LWI Project:

- Modify and lengthen the existing floating Port Security Barrier (PSB) system to extend across the intertidal zone at two locations.
- Build abutments at the shoreline cliff at two locations along the Bangor waterfront to attach the modified PSB system.

Construction for LWI is proposed to begin in 2016 and end in 2018. Construction is estimated to last for 24 months and will be accomplished through two separate in-water work seasons in conformance with the U.S. Army Corps of Engineers approved work window of July 16 through January 15. Work in the intertidal zone will require driving of steel pile on no more than 144 days during the in-water work season. However, piles would be driven at low tide when water is not present.

SUBJECT: BIOLOGICAL ASSESSMENT FOR THE LAND WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR, WASHINGTON

The following project activities are proposed in Hood Canal for the SPE Project:

- Extend the existing Service Pier by 540 feet.
- Transfer two SSN submarines currently berthed at NAVBASE Kitsap Bremerton to the Service Pier extension.

In addition, upland work will include construction of a new Waterfront Ship Support Building, a new parking lot, road improvements, and a utility pad totaling 7 acres in size.

Construction of SPE is proposed to begin in 2018 and end in 2020. Construction is estimated to last for 24 months and will be accomplished through two separate in-water work seasons in conformance with the U.S. Army Corps of Engineers approved work window of July 16 through January 15. In-water work will require driving of steel piles on no more than 144 days during the first in-water work season and driving of concrete piles on no more than 36 days during the second in-water work season.

A review of federally listed species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) indicates the following species potentially occur within each project's action area:

- Bull Trout (*Salvelinus confluentus*)
- Marbled murrelet (*Brachyramphus marmoratus*)

The Navy analyzed potential impacts of each of the proposed projects to federally listed species using the best scientific and commercial data available, as required under Section 7(c) of the Endangered Species Act. In addition, the Navy met with the NMFS and USFWS to discuss potential project effects to federally listed species, as well as potential avoidance and minimization measures. Based on the Navy's analyses, the Navy concluded that with implementation of the proposed avoidance and minimization measure, both the LWI and SPE projects *may affect, but are not likely to adversely affect* the above listed species. Critical habitat was also analyzed, but it was determined that there is no critical habitat designated within the action area and concluded a no effect determination.

SUBJECT: BIOLOGICAL ASSESSMENT FOR THE LAND WATER INTERFACE AND SERVICE PIER EXTENSION AT NAVAL BASE KITSAP BANGOR, WASHINGTON

The Navy requests informal consultation for the above listed species and concurrence with our effect determination. Enclosed is a biological assessment (Enclosure 1) that documents our analyses. The Navy understands that within 30 days of this request, you will notify us in writing if additional information is required.

It is our understanding that with federal concurrence this satisfies our responsibilities under Section 7(c) of the Endangered Species Act at this time. We will continue to remain aware of any change in status of these species and will be prepared to reevaluate potential project impacts if necessary. If you have any questions about these projects, or need additional clarification, please contact the Navy point-of-contact Ms. Stephanie Sparks. She can be reached at (360) 396-0023 or stephanie.sparks@navy.mil.

Sincerely,

T. A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosure: 1. Biological Assessment

3

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, Washington 98115

Refer to NMFS No:
WCR-2015-2308

November 13, 2015

Captain T.A. Zwolfer
Commanding Officer
Department of the Navy
Naval Base Kitsap
120 South Dewey Street
Bremerton, WA 98314-5020

Re: Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Land Water Interface (LWI) and Service Pier Extension (SPE) Projects at Naval Base Kitsap Bangor, Kitsap County, Washington, 6th Field HUC 171100180108).

Dear Captain Zwolfer:

On March 13, 2015, the National Marine Fisheries Service (NMFS) received your request for a written concurrence that the US Navy (Navy) proposed two nearby actions at Bangor are not likely to adversely affect (NLAA) species listed as threatened or endangered, or critical habitats designated under the Endangered Species Act (ESA). Specifically the proposed actions are to (1) construct physical security barriers Land-Water Interface (LWI) through shallow waters and onto upland areas at the north and south extent of the water restricted area (WRA), and (2) extend the existing service pier and construct associated support facilities (service pier extension or SPE). This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.[1]

This letter will serve as a Letter of Concurrence for the LWI part of this proposed project and a non-concurrence letter for the SPE part of the proposed project. Because rockfish may be exposed to adverse effects of pile driving from only the SPE, we will need to analyze effects of the SPE separately and ask the Navy to request formal consultation for that project.

NMFS also reviewed the proposed action for potential effects on essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), including conservation measures and any determination that you made regarding the potential effects of the action. This review was pursuant to section 305(b) of the MSA, implementing

[1] Memorandum from D. Robert Lohn, Regional Administrator, to ESA consultation biologists (guidance on informal consultation and preparation of letters of concurrence) (January 30, 2006).

regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation.[2]

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal year 2001, Public Law 106-554). A complete record of this consultation is on file at Oregon-Washington Coastal Office in Lacey, Washington.

Proposed Action and the Action Area

The Navy is proposing to modify the existing port security barrier (PSB) across the intertidal, and construct a north LWI and south LWI above the intertidal.

Land-Water Interface (LWI)

The LWI project would extend the existing PSB across the intertidal zone and attach it to the proposed shoreline concrete abutments. While floating PSBs would be modified in water, all of the LWI construction will be done from land, which may include cutting a bench into the hillside for the construction equipment. For the north LWI, approximately 1,200 feet of the existing PSB system will be relocated and 100 feet of new PSB would be added, including removal and relocation of three buoys and associated anchors all in deep water. The mooring system of one of the three relocated buoys would be reduced from 3 to 2 anchors. One new buoy would be installed with two anchors. For the south LWI, approximately 1,200 feet would be relocated and 200 feet of new PSB would be added. Relocation and reconfiguration of three of the south LWI existing buoys and anchors, and the addition of one new buoy and anchors, would be the same as those for the north LWI.

Each floating PSB unit would be 50 feet long and support an 8-foot high fence on a metal frame. Each unit would be supported on three 42-inch diameter pontoons (center 18 feet long and two end pontoons each 6 feet long). A 42-inch metal grating would be suspended below the metal frame between the pontoons. To minimize effects on aquatic biota, the guard panel and the pontoons would extend into the water less than 1 foot. Vessel passage though the PSB would be done by disconnecting adjacent PSB units and towing the floating barrier out of the way, then reconnecting. To minimize the low-tide grounding of approximately 11 PSB units with 33 pontoons, center pontoons will be fitted with 3 pads and outer pontoons fitted with two pads (each 12 by 24 inches), which would prevent the entire pontoon from contacting the beach.

The two proposed shoreline concrete abutments would be at the upper intertidal elevation and constructed within temporary cofferdams of sheet-pile. Cofferdams will be constructed at low tides to build the two pile-supported abutments in the dry. Also, all 8 temporary piles will be installed and removed in the dry at low tide. Cofferdams at 10 feet depth and above tide waters

[2] Memorandum from William T. Hogarth, Acting Administrator for Fisheries, to Regional Administrators (national finding for use of Endangered Species Act section 7 consultation process to complete essential fish habitat consultations) (February 28, 2001).

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will be constructed at four sites: the north abutment cofferdam will be 100 feet long with two 20-foot wing walls on each side of the long edge; the north stairs cofferdam 40 feet long with two 40-foot wing walls; the south abutment cofferdam 150 feet long with a 40-foot wing wall; and the south stairs cofferdam 40 feet long with two 40-foot wing walls.

The completed north LWI abutment would be 40 feet high and 72 feet long extending about 10 feet above low tide to the top of the slope, 40 feet above. The south LWI abutment would be 20 feet high and 72 feet long extending from about 8 feet above low tide to the top of the slope 16 feet above. Each abutment would include a stairway on one end, from the abutment top to the LWI deck and base of the bluff, with an observation post (15 by 20 feet with a stairway to the bluff base) installed on the other end adjacent to the abutment at the cliff base. The north LWI abutment site will have 15 36-inch piles; its stairs will use five 36-inch piles (three for the beach stairs and two to the observation post); 10 24-inch piles for the observation post; and five 24-inch piles to support the forms for placing the concrete deck for the observation post. Except for the abutment, which will use 16 36-inch piles, the south LWI will use the same number of and arrangement of piles as the north LWI. Each abutment would be supported on 15 (north) or 16 (south) 36-inch piles placed into auger dug holes with a solid concrete base, all constructed inside cofferdams in the upper intertidal.

The stairs would be attached to the abutment wall or supported on piles driven to grade. Stairway and observation post piles would be driven in the dry at low tide using an upland crane. Portions of the abutments, stairs and observation posts (see Table 1) would extend below mean higher high water (MHHW). Abutment construction at the south LWI would require removal of 25 feet of creosoted timber seawall at the base of the bluff. Construction of the stairway, observation post piles, abutment, and observation post would all be done at low tide. All steep areas of uplands disturbed by abutment construction would be stabilized using riprap placed above MHHW. Within the intertidal, soft armoring techniques will be implemented with all toe rock buried well below the beach grade. Armor rock will be placed below grade approximately 10 feet waterward from the abutments for their entire length. Armor rock will also be placed below grade approximately 10 feet out for 80 feet from the beach stairs for both the north LWI and south LWI. At grade, the project will use the existing beach sediment (removed for LWI construction) to cap the protective armor rock in order to avoid effects on the natural shoreline dynamics. Several tidal cycles will be required to sort the material, and the Navy expects that the beach sediment will mimic existing conditions when the project is completed. If more toe protection is needed to prevent erosion at the base of the abutments, the Navy will implement soft armoring techniques like the placement of large wood (tree trunks/rootwads). The use of nighttime artificial lights at either LWI site is expected to be infrequent with lighting of the LWIs only in response to a security event. Construction on the LWI project is scheduled to begin May 2016 and end May 2018.

Interrelated or interdependent activities associated with this project include habitat mitigation in Hood Canal to compensate for the shading of eelgrass and impacts to other marine habitats resulting from project actions as stated in Table 1 (excerpted from the project EIS). The Navy will compensate for project effects through the Hood Canal In-Lieu Fee (ILF) Program, which will be used to provide compensatory mitigation for the unavoidable effects on aquatic resources

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listed in Table 1. The ILF program was established to provide the greatest benefit to aquatic habitats in Hood Canal from individual actions within the ILF Service Area. The primary goal of the ILF Program for Hood Canal is to increase aquatic resource functions in the Hood Canal watershed by focusing on salmon conservation actions described in the Hood Canal Summer-Run Chum Salmon Recovery Plan. To offset effects of this proposed action, the Navy will fund 0.46 acres of aquatic habitat restoration.

Table 1. LWI Impacts on Aquatic Habitat and Waters[1]

LWI Impact	Area
Habitat displaced by piles and/or anchors in shallow water (< 30 feet)	142 square feet
Over-water area (shading) in shallow water[2]	5,070 square feet
Eelgrass covered by buoy mooring anchors or degraded by PSB pontoons and buoy grounding	580 square feet
Fill in waters of the U.S. (shoreline abutment stair landings and riprap)[3]	4,124 square feet
Excavation in waters of the U.S. (shoreline abutments)	15,600 square feet
Total[4]	20,670 square feet

N/A = not applicable; USACE = U.S. Army Corps of Engineers
1. Final mitigation requirements for the selected alternative will be determined through the CWA permitting process.
2. No full shading of eelgrass is expected from either alternative.
3. Impact is from excavation during construction of the abutments and concrete fill from the abutment stair landings.
4. Total is the sum of the overwater area plus the excavation for the abutments; the abutment stair landing fill areas are included in the excavation areas; all other items are included in the overwater shading area.

The project location is at Bangor on Naval Base Kitsap in Kitsap County, Washington. The north LWI is at Lat 47.75775/Long -122.72467; south LWI at Lat 47.74011/Long -122.73515, 6th Field HUC 171100180108). The action area is determined by the greatest extent of effects stemming from the project. The action area for the north and south LWI is a 600-foot radius from the extent of the work area.

Action Agency's Effects Determination

The Navy requested informal consultation and concurrence with the determinations of "may affect, is not likely to adversely affect" for Puget Sound (PS) Chinook salmon, PS steelhead, HC summer-run chum salmon, PS/GB bocaccio, PS/GB canary rockfish, and PS/GB yelloweye rockfish, SRKW, and humpback whale. The Navy preliminarily determined that the two nearby projects may affect SRKWs and humpback whales. However, due to the lack of sightings in the action area for LWI, we have concluded no effect on marine mammals for the LWI.

The NMFS listed PS Chinook salmon as threatened under the ESA on March 24, 1999 (64 FR 14308). On June 11, 2007, NMFS listed the PS steelhead Distinct Population Segment (DPS) as

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threatened under the ESA (72 FR 26722). Critical Habitat for PS steelhead was proposed on January 14, 2013 (78 FR 2725), which does not include the action area. The NMFS listed Hood Canal (HC) summer-run chum salmon as threatened under the ESA on June 28, 2005 (70 FR 37160) and updated this listing on April 14, 2014 (79 FR 20802). Puget Sound/Georgia Basin (PS/GB) canary rockfish and yelloweye rockfish DPSs were listed as threatened and bocaccio DPS was listed as endangered under the ESA on April 28, 2010 (75 FR 22276, updated 79 20802, April 14, 2014).

Potential construction effects from the project include positioning and anchoring construction barges, in-water structure placement would locally increase turbidity, disturb benthic habitats, and partially shade marine vegetation in the immediate project vicinity during construction. Effects from construction activities would occur from up to two seasons of in-water work, such as the addition of new buoys, anchors, structures, etc. There are no identified effects from operation and minor maintenance of the completed facilities. Little or no delay of the overall fish migration rate is anticipated from the LWI part of the project. The floating sections of PSB with pontoons and pads would be placed over intertidal and shallow subtidal habitats. As a result, a band of slight nearshore shade would occur from these structures across the migratory pathway for juvenile salmonids and forage fish. The portions of LWI structures located in intertidal habitats would decrease habitat value within the footprint in the upper intertidal zone.

Consultation History

NMFS received a Biological Assessment (BA) from the Navy, Naval Base Kitsap, on March 13, 2015. The first of several additional information requests was emailed to the Navy on March 19, 2015, with the last request on November 9, 2015. In 2015, we discussed details of the proposed action with the Navy at meetings in February, March and August. Additional information was requested on October 6, 2015, with a response received on October 26, 2015. All needed additional information was received from the Navy and we started informal consultation on the LWI part of the proposed project on November 12, 2015.

A complete record of this consultation is on file at the NMFS office in Lacey, Washington.

ENDANGERED SPECIES ACT

Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

North LWI and South LWI

Hood Canal summer-run chum salmon
Puget Sound Chinook salmon
Puget Sound steelhead

Several of the small streams on the western Toandos Peninsula are documented spawning habitat for steelhead. Migration to and from those streams would be outside the in-water work window. The nearest natal streams for Chinook and summer-run chum salmon are more than 5 miles from the action area.

During construction, we expect slight disturbances described above that would all be insignificant on ESA-listed salmonids. Adult or larger juvenile listed salmonids that occur in the action area during construction will be farther offshore and may enter the action area. If individuals of listed species were present, construction effects would be insignificant because the turbidity will be localized, short-term, and of low intensity. All disturbance from activities associated with the project will cease at the end of construction. Any suspended sediment impacts will be localized and temporary in duration, limiting the area of potential effects of suspended sediment increases to immediate the area of the construction and/or installation of the anchors and PSBs.

The NMFS designated critical habitat for the PS Chinook salmon and HC chum salmon on September 2, 2005 (70 FR 52630). In estuarine and nearshore marine areas, critical habitat includes areas contiguous with the shoreline from the line of extreme high water out to a depth no greater than 98 feet. No critical habitat for these two species occurs within the LWI action area, which is all within the excluded area on Navy lands.

PS/GB canary rockfish
PS/GB yelloweye rockfish
PS/GB bocaccio

The depth for adult bocaccio and canary rockfish are 160 to 820 feet deep and for yelloweye rockfish are 300 to 590 feet deep. The action area has no deep rocky habitats and low likelihood distribution of any rockfish. The potential for exposure of adult rockfish to project impacts from the construction is discountable.

PS/GB bocaccio, PS/GB canary rockfish and PS/GB yelloweyed rockfish, born as free-swimming planktonic larvae, remain in open waters for several months before settling to the seafloor as juveniles. Juvenile bocaccio and canary rockfish may settle to nearshore habitat. While the action area lacks the rugosity and structure that juvenile rockfish prefer, the action area is near waters that are suitable depth for rockfish: juveniles or larvae could inhabit the action area and be exposed to minor effects of construction. There is a low likelihood of juvenile rockfish being exposed to insignificant effects in the action area during project construction. A small number of rockfish larvae may be in the action area during the in-water work window. Construction-related effects on the water quality will be short-term and localized, and return to pre-construction conditions following the cessation of activity. Due to limited rockfish presence in the action area, any project effects are therefore insignificant on juvenile and larval rockfish.

The final rule designating critical habitat for PS/GB rockfishes was published on November 13, 2014 (71 FR 69054). No critical habitat for these species occurs within the LWI action area, which is within the Navy's excluded area.

Conclusion

Based on this analysis, NMFS concurs with the Navy that the proposed LWI action is not likely to adversely affect the subject ESA listed species of salmon, steelhead, and rockfish.

Reinitiation of Consultation

Reinitiation of consultation is required and shall be requested by the Federal agency, or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA portion of this consultation.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Federal and other consulting agencies operating under Federal authority are required, under section 305(b)(2) of the MSA and its implementing regulations (50 CFR 600 Subpart K), to consult with NMFS regarding actions that are authorized, funded, or undertaken by that agency that may adversely affect essential fish habitat (EFH). For purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the associated physical, chemical, and biological properties that are used by fish (50 CFR 600.10), and "adverse effect" means any impact which reduces either the quality or quantity of EFH (50 CFR 600.910(a). Adverse effects may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. If an action would adversely affect EFH, NMFS is required to provide the Federal action agency with EFH conservation recommendations (section 305(b)(4)(A)). This consultation is based, in part, on information provided by the Federal agency and descriptions of EFH for Pacific salmon contained in the Fishery Management Plans developed by the Pacific Fishery Management Council and approved by the Secretary of Commerce.

The action area includes marine and marine nearshore waters. The project area includes habitat that has been designated as EFH for various life stages of coastal pelagic species, Pacific coast groundfish, and Pacific salmon. During construction, the adverse short-term effects of the project will include disturbance of upper intertidal habitat, benthic habitat, and eelgrass habitat.

We determined that the proposed action would adversely affect EFH by long-term loss of upper intertidal habitat and short-term disturbance of intertidal habitat.

NMFS has no conservation recommendations for this project since we determined that the implementation of best management practices and the measures to avoid, reduce, or mitigate as stated in the BA, the EFH assessment, and included in the additional information received by NMFS on October 26, 2015, are sufficient to avoid, mitigate, or offset the impact(s) of the proposed action on intertidal EFH.

The Navy must reinitiate EFH consultation with us if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for our EFH conservation recommendations (50 CFR 600.920(l)). This concludes the MSA portion of this consultation.

This concludes consultation under the ESA and MSA. If you have questions concerning these consultations, please contact Valerie Elliott of the Oregon Washington Coastal Office at 360-753-5834, or by e-mail at Valerie. Elliott@noaa.gov.

Sincerely,

for William W. Stelle, Jr.
Regional Administrator

cc: Sharon Rainsberry, DON
Stephanie Sleeman, DON
Jim Muck, USFWS

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

MAR -4 2016

In Reply Refer To:
01EWFW00-2015-I-0412

Captain T.A. Zwolfer
U.S. Naval Base Kitsap
ATTN: Stephanie Sparks
120 South Dewey St.
Bremerton, Washington 98314-5020

Dear Captain Zwolfer:

Subject: Land-Water Interface and Service Pier Extension Projects

This letter is in response to your March 10, 2015, request for the U.S. Fish and Wildlife Service's (Service) concurrence with your determination that the Land-Water Interface and Service Pier Extension Projects "may affect, but are not likely to adversely affect" bull trout (*Salvelinus confluentus*) and marbled murrelet (*Brachyramphus marmoratus*). The projects are located within Hood Canal at Naval Base Kitsap Bangor (Bangor). We received your letter and Biological Assessment, dated March 10, 2015, on March 12, 2015. The Service requested additional information on April 16 and 17; July 8, 23, and 24; and August 5 and 10, 2015, regarding removal of the creosote-treated timber piles, sound attenuation, compensatory mitigation, location of abutments related to the mean higher high water (MHHW) line, and pile driving sound analysis. The Service received replies to our request, including revised Biological Assessments, on June 10, July 10, 23, 30, and August 8, 2015.

Due to the U.S. Navy's (Navy) Northwest Testing and Training consultation, the Service was unable to attend a meeting that was held on August 25, 2015, between the National Marine Fisheries Service (NMFS) and the Navy. A summary of the meeting was provided by Valerie Elliott (NMFS) on August 26, 2015. The Navy provided changes to the summary on August 27, 2015. Additional emails between NMFS and the Navy on the project were sent on August 31, and September 23 and 24, 2015. The Navy provided a summary of the project changes and updated drawings to the Service on January 12, 2016. The Service initiated consultation on January 12, 2016. This informal consultation has been conducted in accordance with section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

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The Navy is proposing to construct two separate projects at Bangor. The Land-Water Interface Project includes modifying the existing port security barrier system to extend across the intertidal zone and attach to concrete abutments at the shoreline. The Service Pier Extension Project involves construction of an extension to the existing Service Pier to accommodate the berthing of submarines for maintenance. The two projects involve the following elements:

1) Land-Water Interface Project

- Construct two abutments, with nearby observation posts and stairs, for the attachment of the port security barrier. The north abutment will be approximately 72 feet long by 40 feet high, and the south abutment is designed to be approximately 72 feet long and 20 feet high. Each abutment will have 20-foot-long wing walls on each side. Both abutments will be located above the MHHW line. The abutments will be made of concrete. All Land-Water Interface Project construction will be conducted on land which may involve cutting a bench into the hillside to create space for the equipment to operate from. All in-water work will occur in the dry and/or during low tide.

    - Abutments will be supported by 36-inch diameter steel piles, 15 for the north abutment and 16 for the south abutment. Piles will be placed in auger dug holes with a solid concrete base.

    - Observation posts, each approximately 15 by 20 feet, will be supported by ten 24-inch diameter steel piles. Five 24-inch diameter temporary piles will be installed to construct the observation post. Piles will be installed with a vibratory hammer and proofed to load bearing weight.

    - Each abutment will have two sets of stairs. One to the observation post and one to the base of the abutment. Five 36-inch diameter piles will be installed for both sets of stairs at each abutment. Piles will be installed with a vibratory hammer and proofed to load bearing weight.

    - Temporary sheet-pile cofferdams will be constructed to isolate the work area and create a dry area to install the piles for both the abutments and the stairs that lead to the base of the abutment. The length of the cofferdams will be 140 feet and 190 feet for the north and south cofferdams respectively. Cofferdams will be installed in the dry with vibratory pile drivers.

    - Riprap armor rock will be placed at the base of each of the abutments and stairs to protect the structures from erosion. Riprap and armor rock will be placed 10 feet out for the entire length of each abutment and each set of stairs. The riprap and armor rock will be covered with excavated beach material. If additional armoring is needed to protect the toe of the abutments from erosion, the Navy will implement soft armoring techniques, such as the use of large woody material.

Captain T.A. Zwolfer 3

- Relocate 1,200 feet of the existing port security barrier, along with three existing buoy and anchor systems, and add 100 feet of new port security barrier (two units) and one new buoy and anchor system at the north abutment. Relocate 1,200 feet of existing port security barrier, along with the three existing buoy and anchor systems, and add 200 feet of new port security barrier (four units) and one new buoy and anchor system at the south abutment.
    - Each of the new port security barrier units is 50 feet long and supports a 9-foot high fence. Each unit is supported on three pontoons; a center pontoon 18 feet long, and two end pontoons, each 6 feet long. A metal-grating guard panel 42 inches high is suspended between the pontoons.

Summary: The existing port security barrier at Bangor will be modified by relocating a total of 2,400 feet of barrier fencing and six buoy and anchor systems and installing 300 feet of new fencing and two new buoy and anchor systems. Two abutments with observation posts will be constructed. The abutments will be constructed above the MHHW line. To protect the footings of new structures, approximately 1,440 square feet of new armor rock will be placed at the base of the abutments and 1,600 square feet at the base of the stairs. All of the armored rock will be covered by beach material and is located in the upper intertidal area except for 720 square feet which is above the MHHW line.

2) Service Pier Extension

- Remove an existing wave screen, including 36 creosote-treated timber piles. Piles will be removed with a clam shell or similar method and will be cut at the mud line if splitting or breakage occurs.
- Construct a new 540-foot-long and 68-foot-wide extension to the existing Service Pier.
    - Install 230 36-inch diameter steel piles for the extension pier, 50 24-inch diameter steel piles for small craft mooring, and 105 18-inch square concrete fender piles. Steel piles will be installed with a vibratory pile driver and proofed with an impact pile driver as needed. Concrete piles will be installed with an impact pile driver.
    - Install a new 200-foot-long wave screen under the existing Service Pier. The height of the screen will be 27 feet below to 7 feet above the mean lower low-water (MLLW) line. The screen will be attached to existing support piles.
- Attach a new 150-foot-long and 15-foot-wide float to the south side of the existing Service Pier.
- Construct the following new facilities on the pier or on land: 1) a Pier Services and Compressor Building at the south end of the existing Service Pier, 2) Waterfront Ship Support Building on the existing parking lot, a 3) new 421-space parking lot, 4) a 1,800-square foot utility pad, and 5) road improvements.

Summary: The Service Pier Extension includes removal of an existing wave screen and installing a new screen under the existing Service Pier. The Service Pier will be extended by 540 feet and a new float, 150 by 15 feet, will be installed on the south side of the exiting pier.

The Navy will provide compensatory mitigation funds to the Hood Canal Coordinating Council's In Lieu Fee Mitigation Program to compensate for the permanent loss of nearshore habitat and shading of eelgrass and impacts to other marine habitats associated with the new 44,000 square foot service pier, impacts to forage fish spawning habitat and nearshore drift associated with placement of armor rock in the upper intertidal area, and grounding of the new sections of the PSB on the beach and in shallow water at low tide. No information is available on location or mitigation ratios for the project. The project involves numerous conservation measures to minimize project impacts. Some conservation measures are described above under the Land-Water Interface Project, other conservation measures include the following:

- In-water work will be limited to the July 16 to January 15 work window.
- To minimize beach substrate disturbance of the intertidal zone when the security barrier grounds out during low tide, each center pontoon of the port security barrier units would be fitted with three "feet" and the two outer pontoons would be fitted with two "feet."
- A Stormwater Pollution Prevention Plan will be implemented to control stormwater discharges.
- An absorbent oil containment boom will be placed around all construction activities.
- A bubble curtain or other noise attenuating device will be used during impact pile driving.
- All trees that need to be removed to clear areas for buildings or parking lots will be cut down outside of the marbled murrelet nesting season (April 1 to September 23).
- At sea monitoring for marbled murrelets will occur during impact pile driving.

The action area is defined by the farthest reaching physical, chemical, and biotic effects of the action on the environment. The project involves vibratory and impact pile driving that will result in increased sound pressure levels. The action areas, both in-water and terrestrial, are based on the geographic extent of increased sound pressure levels generated during construction (impact and vibratory pile driving) attenuating to background levels. The measures of the farthest-reaching effects include the distance that underwater sound generated by the action intersects with a land mass or where it attenuates to background levels. The Service assumes that sound travels in a straight line and is absorbed by land and does not reflect or bend. The in-water action area is defined as Hood Canal from the Hood Canal Floating Bridge to a line between Misery Point, near Seabeck, Washington, and Oak Head at the south end of Toandos Peninsula. The terrestrial action area is defined as a distance of 3,200 feet surrounding the construction area.

Bull Trout

Bull trout use of Hood Canal is considered extremely rare. There are no records of bull trout in in the marine nearshore areas of the Kitsap Peninsula and eastern shore of Hood Canal. Bull trout have been documented in estuaries and lower rivers of Hood Canal, including the Quilcene, Dosewallips, Duckabush, and Hamma Rivers on the western side of Hood Canal. Since the only known spawning area in Hood Canal is in the Skokomish River, these individuals would have moved along the marine nearshore areas to forage or overwinter in these rivers. It is unlikely these rivers provide spawning and rearing habitat but they have abundant prey base and may provide important foraging and overwintering habitat for bull trout originating from the Skokomish River. The Skokomish River, approximately 36 miles south of the project area, has the closest known bull trout population to the action area. Based on tagging information, bull trout in the South Fork Skokomish River appear to be fluvial (there is no documentation of anadromy based on tagged fish). Cushman Dam currently blocks all upstream access and most downstream access to the marine environment for bull trout in the North Fork Skokomish River.

The action will result in temporary impacts to increased sound pressure levels, water quality, native substrates, aquatic vegetation, the benthic invertebrate community, and decrease the complexity of the shoreline habitat. Over the long term, the project will have permanent impacts to the benthic invertebrate community and aquatic vegetation. The project will result in increased sound pressure levels during vibratory and impact pile driving. The Navy has performed acoustic testing on pile driving and bubble curtain attenuation. The Navy achieved an average peak sound pressure level attenuation reduction of 8 to 10 dB. The Navy assumes an 8 dB level of attenuation during impact pile driving will be achievable. Based on the sound analysis, the distance to bull trout injury thresholds are: 185 m for adult and subadult bull trout and 2,512 m for behavioral response. Because bull trout use of Hood Canal is rare, we do not expect bull trout to be present during the in-water work window within the area of potential harm and harassment. Therefore, effects to bull trout associated with potential exposure to injurious levels of underwater sound during impact pile driving are considered discountable.

The action will result in short-term localized increased turbidity, suspended sediment, and contaminants (creosote) during removal of the creosote-treated timber piles, installation of the steel, concrete, and sheet piles, and when incoming tides inundate disturbed areas where construction was conducted in the dry. Water quality may also be impacted through fuel or oil spills from construction equipment that operate within the project site. These effects will be intermittent and limited in physical extent and duration. Degraded water quality from these activities could result in temporary behavioral changes to bull trout through decreased visibility and foraging opportunities, and abandonment or avoidance of selected habitats within Hood Canal. In-water work including removal and installation of piles and anchors, and construction that occurs in the dry including installation of the cofferdams, installation of piles, and placement of riprap, armor rock and beach material will result in temporary or minimal loss of native substrates, aquatic vegetation, and prey abundance.

Eelgrass is present along the shoreline of the Bangor waterfront. Eelgrass beds are found from the MLLW line to water depths of about 14 feet below MLLW. Project construction will result in temporary impacts to eelgrass through increases in turbidity and suspended solids and minor disturbance during construction. The Land-Water Interface Project will result in full and partial shading of approximately 370 square feet of eelgrass.

The project is located in and near documented Pacific sand lance (*Ammodytes hexapterus*) spawning locations. For the Land-Water Interface Project, the south abutment is located approximately 500 feet south of known Pacific sand lance spawning. At the north abutment, documented Pacific sand lance spawning begins at the proposed location of the abutment and extends 1,000 feet south. Pacific sand lance spawning also occurs along the shoreline of the Service Pier extension project. The proposed abutments will be constructed from land and will be above the MHHW line. The new shoreline armor rock will be covered by excavated beach material to provide soft armor and restore the intertidal substrate to its original substrate. The observation post at the north abutment will result in shading of 300 square feet of intertidal spawning habitat. The piles for the observation post may result in a small localized effect to sediment movement along the shore. For the Service Pier Extension Project, all new facilities will occur in waters greater than 30 feet below MLLW and will have minimal effects to forage fish. Because impacts to bull trout and their prey resources will not be measurable, the Service considers the effects of the project to bull trout to be insignificant.

Marbled Murrelets

Marbled murrelets have been documented in the nearshore areas of Bangor, including the project area, since 2001 when the Kitsap Audubon Society conducted three annual Christmas Bird Counts surveys. In April and May 2007, eight pairs of marbled murrelets were recorded during shoreline surveys. In surveys beginning in 2008 along the nearshore and deeper waters of the Bangor waterfront, marbled murrelets were found along the entire 4.3-miles waterfront, including one immature marbled murrelet that that swam under the Explosive Handling Wharf in September, 2008.

Based on the survey data for the at sea sampling unit across from Bangor, the mean density of marbled murrelets in the summer ranges from less than one to three birds per km^2 (http://www.reo.gov/monitoring/reports/murrelet/WA_PSU_density_00_07_detailed.pdf). No summer surveys are conducted immediately adjacent to the proposed project. In Conservation Zone 1 (Puget Sound and Hood Canal), marbled murrelet densities are greater in the winter than during the breeding season, which is partially attributed to immigration of marbled murrelets from British Columbia and juveniles on the water. Based on monitoring conducted by the Washington Department of Fish and Wildlife in the winter, from 0.4 to 5.2 marbled murrelets per km^2 were documented near the project site. However, these winter surveys were conducted from fixed wing aircraft in the 1990's and are not an accurate sampling method for detecting marbled murrelets. Based on the data from Nysewander et al. (2005, pp. 10, 13), we estimate a 1.84 increase in marbled murrelets densities in the winter compared to summer densities.

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During surveys conducted by the Navy as part of the Test Pile Program (September and October 2011), no marbled murrelets were observed. During surveys conducted by the Navy for the Carderock Dock, one to eight marbled murrelets were frequently observed and 12 to 31 marbled murrelets were intermittently sighted within a 1,000 m survey area. One marbled murrelet was observed during the construction of the second Explosive Handling Wharf between September 2012 and October 2013. This observation was in the vicinity of the Land-Water Interface and Service Pier Extension Projects. Based on the available data, the Service anticipates that marbled murrelets could be present within the project area at any time of the year in moderate to high densities.

Upland construction of the new facilities involves the removal of approximately seven acres of potential marbled murrelet nesting habitat. The Service conducted an onsite survey of potential nest trees in 2013. The Service identified a few trees with potential nesting platforms, but they occur in very low density and the stand is considered marginal habitat. Based on the Service's recommendation, the Navy relocated the parking lot to an area that would minimize impacts to potential nesting habitat. The Navy has also indicated that they will not fell any trees during the marbled murrelet nesting season (April 1 to September 23).

As described above under bull trout, the project will result in temporary increased sound pressure levels, impacts to water quality, native substrates, aquatic vegetation, forage fish, and the benthic invertebrate community, and will permanently degrade the complexity of the shoreline habitat. Monitoring for marbled murrelets will occur 19 meters from each pile during impact pile driving and will be conducted according to an approved monitoring protocol. If any marbled murrelets are detected in the area of potential injury, pile driving will cease until the bird(s) leave the area volitionally. The monitoring is intended to prevent injury of marbled murrelets from underwater sound pressure levels. With monitoring, the likelihood of marbled murrelets being exposed to injurious levels of underwater sound levels at any time of year is extremely low.

Because impacts to marbled murrelets and their prey resources will not be measurable, effects to marbled murrelets associated with impacts to forage fish and nearshore habitats are considered insignificant. Because the conifer stands at Bangor are relatively young and marginal habitat and tree removal within potentially suitable habitat will occur outside of the breeding season, the Service considers the effects of the project to nesting marbled murrelets to be discountable.

This concludes informal consultation pursuant to the regulations implementing the ESA (50 CFR 402.13). This project should be re-analyzed and re-initiation may be necessary if 1) new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation, 2) if the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this consultation, and/or 3) a new species is listed or critical habitat is designated that may be affected by this project.

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The Service requests that the Navy notifies us of the amount of mitigation funds provided to the Hood Canal In-Lieu Fee Program for project impacts and if at any time large woody material is used to protect the toe of the abutments. If you have any questions about this letter or our joint responsibilities under the ESA, please contact Jim Muck at (206) 526-4740 or email at jim_muck@fws.gov.

Sincerely,

Martha L. Jensen

for Eric V. Rickerson, State Supervisor
Washington Fish and Wildlife Office

DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/01092
25 May 16

Ms. Rebekah Padgett
Washington Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008

SUBJECT: FEDERAL CONSISTENCY DETERMINATION FOR THE LAND-WATER INTERFACE AT NAVAL BASE KITSAP BANGOR

Dear Ms. Padgett:

In accordance with the Coastal Zone Management Act (CZMA), Naval Base Kitsap is submitting the attached Federal Consistency Determination for a proposed action to construct a Land-Water Interface (LWI) at Naval Base Kitsap Bangor, Silverdale, WA. The proposed action would enhance security at the perimeter of the Waterfront Restricted Area (WRA) by constructing physical barriers through shallow waters and onto the immediate upland areas at the northern and southern extent of the WRA.

Pursuant to Section 307 of the CZMA, the Navy has determined that implementing the LWI project would be consistent to the maximum extent practicable with Washington's Coastal Zone Management Program.

If you require further information or have any questions, please contact Dr. Robert Senner at (360) 396-0029 or robin.senner@navy.mil.

Sincerely,

T.A. ZWOLFER
Captain, U.S. Navy
Commanding Officer

Enclosure: 1. Federal Consistency Determination

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COASTAL ZONE MANAGEMENT ACT
FEDERAL CONSISTENCY DETERMINATION

Land-Water Interface (LWI)

NAVAL BASE KITSAP BANGOR
SILVERDALE, WA

May 2016

Prepared By:

Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315

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List of Acronyms and Abbreviations

CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FLUPSY	floating upweller system
LWI	Land-Water Interface
MHHW	mean higher high water
MLLW	mean lower low water
NAVBASE	Naval Base
Navy	U.S. Department of the Navy
PSB	port security barrier
RCW	Revised Code of Washington
SMP	Shoreline Master Program
USEPA	U.S. Environmental Protection Agency
WDOE	Washington Department of Ecology
WRA	Waterfront Restricted Area

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1.0 INTRODUCTION

The U.S. Department of the Navy (Navy) proposes to complete the perimeter of the Waterfront Restricted Area (WRA) at the Naval Base (NAVBASE) Kitsap Bangor waterfront, Silverdale, in Hood Canal, by constructing a land-water interface (LWI) connecting the existing on-water Port Security Barrier (PSB) system to the existing on-land Waterfront Security Enclave. This document provides the State of Washington with the Navy's Federal Consistency Determination under Coastal Zone Management Act (CZMA) Section 307(c)(l) and Title 15 of the Code of Federal Regulations (CFR), Part 930, sub-part C (15 CFR 930 C). NAVBASE Kitsap Bangor is, by law and Washington State policy, not part of the coastal zone. In accordance with Washington's Coastal Zone Management Program (Washington Department of Ecology [WDOE] 2001):

> "The Coastal Zone Management Act specifically excludes from the coastal zone, those lands that are, by law, subject solely to the discretion of, or held in trust by, the federal government. The CZMA's regulations provide that states must exclude from their coastal zone designations the lands that the federal government owns, leases, holds in trust, or otherwise has sole discretion to determine their use. These "excluded federal lands" within the boundaries of Washington's coastal zone are:
>
> - Military reservations and other defense installations (e.g., Fort Lewis, Bangor Naval Submarine Station, Naval Air Station Whidbey Island)…"

Since both in-water and land-based construction and operation of the proposed action could have effects on resources within the coastal zone (outside of the base boundaries), this Consistency Determination evaluates the potential effects of all project components.

2.0 SUMMARY DETERMINATION

Pursuant to Section 307 of the CZMA, 16 United States Code § 1456, as amended, and its implementing regulations (15 CFR 930), this is a Federal Consistency Determination for constructing a LWI on NAVBASE Kitsap Bangor. The Navy has evaluated the proposed action and has found that it is consistent to the maximum extent practicable with the Enforceable Policies of the Washington State Coastal Zone Management Program (CZMP). The proposed action occurs within the existing Hood Canal Naval Restricted Area No. 1 as defined in 33 CFR 334.1220. NAVBASE Kitsap Bangor is a restricted naval facility located on the east shore of Hood Canal, in Kitsap County, Washington (Figures 1 and 2). The proposed action includes mitigation to compensate for impacts to aquatic resources. The Navy's compensatory mitigation is the payment of fees to the proposed Hood Canal Coordinating Council In-Lieu Fee program. The Navy will also provide treaty mitigation for impacts to tribal treaty resources.

The Navy's review is provided below.

3.0 PROPOSED FEDERAL AGENCY ACTION

The Navy proposes to construct and operate the LWI at the north and south seaward ends of the existing Waterfront Security Enclave at the NAVBASE Kitsap Bangor waterfront (Figure 3). The proposed action consists of in-water and land-based construction and operations. The Navy would construct two concrete abutments at the shore bluff to which the LWI structures would attach; each abutment would also include a stairway, an observation post, and a lighting tower. The new and relocated PSB pontoons would shade approximately 2,730 square feet of nearshore habitat. The new stairways and observation posts would cover approximately 2,340 square feet of upper intertidal habitat. Up to 65 permanent hollow steel piles would be needed to construct the abutments, stairways, and observation posts. A third, existing observation post on Marginal Wharf would be demolished and replaced without in-water work. Some project elements would affect the surrounding upland landscape.

Construction is planned to start in 2016. The in-water and terrestrial construction would occur over approximately 2 years. In-water work would be subject to timing and seasonal restrictions.

3.1 PSB INSTALLATION

The Navy proposes to modify the existing PSB system to extend across the intertidal zone to attach to concrete abutments that would be built at the shoreline (Figure 4). For the north LWI, approximately 1,200 feet of the existing PSB system would be relocated and 100 feet of new PSB would be added (Figure 5). Four existing buoys and associated anchors (Figure 6) would be relocated. The mooring system for two of the four relocated buoys would be reduced from three anchor legs to two anchor legs, each with one clump anchor and one 10-ton anchor. For the south LWI, approximately 1,200 feet of the existing PSB system would be relocated and 200 feet of new PSB would be added (Figure 7). Three existing buoys and associated anchors would be relocated. One of these would have its anchor legs reduced from three to two, each with one clump anchor and one 10 ton anchor. One new buoy would be installed with two mooring legs (each with one clump anchor and one 10-ton anchor). Existing PSBs that are still serviceable would be configured into the new PSB alignment. When PSBs would be removed, they would be disassembled and recycled as scrap metal.

Each PSB unit would be 50 feet long and would support an 8-foot high fence on a metal frame (Figure 8). Each unit would be supported on three pontoons: a center pontoon 18 feet long, and two end pontoons each 6 feet long. The pontoons would be 42 inches in diameter. A metal grating (guard panel) 42 inches high would be suspended below the metal frame, between the pontoons. Because the height of this guard panel would be the same as the diameter of the pontoons, it would extend into the water the same distance as the pontoons (less than 1 foot). Openings to allow vessel passage through the barrier system would be created by disconnecting adjacent PSB units and towing the barrier out of the way.

On an average low tide, approximately 11 PSB units including 33 pontoons (north and south LWI combined) would "ground out" in the intertidal zone. Over the long term, which would include extreme low tides, approximately 18 PSB units including 54 pontoons would ground out in the intertidal zone. Five of these PSB units would ground out at the north LWI and 13 would ground out at the south LWI. To minimize the resulting disturbance of the intertidal zone, each center pontoon would be fitted with three "feet" and the outer pontoons would be fitted with two "feet" that would prevent an entire pontoon from contacting the sediment surface (Figure 8). These feet would be 12 by 24 inches in size and constructed of high-density polyethylene, a durable, inert plastic often used for water mains and sewer systems. Considering a total of 126 such feet (18 intertidal PSBs with 7 feet each), and that these feet would not always ground out at the same location, it is estimated that approximately 2,520 square feet of the intertidal zone would be disturbed over the long term (700 square feet at the north LWI, and 1,820 square feet at the south LWI). In addition, one buoy at the south LWI would ground out on an average low tide. Over the long term, including extreme low tides, three buoys (one at the north LWI and two at the south LWI) would ground out at low tide. These buoys are 30 inches in diameter. Over the long term, grounding out by these buoys would disturb approximately 74 square feet of seafloor.

The Navy has implemented design measures to minimize and avoid impacts to aquatic resources. Much of the overwater area is in the deep water environment, where little or no functional loss would occur as a result of the overwater structure. Substantial effort was made to minimize and avoid impacts that occur in the nearshore and shallow marine environment, particularly where marine vegetation such as eelgrass and macroalgae occur. In addition to design measures, measures to minimize and avoid construction impacts to aquatic resources are also included (Sections 5.1 and 5.2 below).

3.2 Abutment and Upland Construction

The north abutment would be approximately 40 feet high and 72 feet long. It would extend from an approximate elevation of 13 feet above mean lower low water (MLLW) to the top of the slope at elevation 50 feet. The south abutment would be approximately 20 feet high and 72 feet long. This abutment would extend from an elevation of approximately 11 feet above MLLW to the top of the slope at elevation 24 feet. The upper limit of the intertidal zone is considered to be mean higher high water (MHHW), approximately 11 feet above MLLW at NAVBASE Kitsap Bangor.

The north abutment would be supported on 15 36-inch steel piles and the south abutment would be supported on 16 36-inch steel piles. All piles would be driven on land by vibratory and impact methods. Each abutment would include a stairway on one end, from the top of the abutment to the LWI deck and base of the bluff, and on the other end an observation post installed adjacent to the abutment at the base of the cliff. At each abutment the stairs would be attached to the abutment wall and supported on five 24-inch steel piles driven to grade plus 6- by 2-foot concrete pads. Each observation post would be approximately 25 by 45 feet, supported on 12 30-inch steel piles, and include a second stairway to the base of the bluff. The piles for the stairways and observation posts would be driven at low tide ("in the dry") using a crane mounted on top of the bluff. Pile driving for the abutments and observation posts would take a maximum of 30 work days. One 30-foot tall, on-land lighting tower would be installed on each abutment by bolting them to concrete foundations. These towers would be located within the extension of the Waterfront Security Enclave; no additional ground would be disturbed for the towers.

The abutment stair landings and observation posts would extend below MHHW; the area below MHHW occupied by these new structures would be approximately 142 square feet for both the north and south LWIs. The total area excavated below MHHW during abutment construction would be approximately 15,600 square feet. The total volume of material below MHHW for abutment construction would be approximately 2,889 cubic yards and the fill volume would be 2,911 cubic yards. Riprap placed below MHHW would cover approximately 4,100 square feet, with a volume of 303 cubic yards. Construction of the abutment and observation post at the south LWI would require removal of a portion of the existing creosote timber seawall. Similar to stairway and observation post piles, abutment, stair, and observation post work would also be conducted at low tide in the dry. Beach contours would be returned to pre-construction conditions following construction, except for the areas occupied by the new structures. The areas where riprap is placed will be covered in a sandy beach material. All bluff slopes disturbed by construction of the abutment would be stabilized using riprap. The riprap would be placed below the abutment walls to elevations just below MHHW. A temporary sheet pile cofferdam would be constructed to create a dry area to install piles for the abutment. The lengths of the proposed coffer dams are 140 feet for the north abutment, 160 feet for the north stairs, 190 feet for the south abutment, and 160 feet long for the south stairs. The observation posts would be provided with a potable water line, and with a wastewater line connecting to the base sanitary sewer system. These lines would be attached to the walkways/trestles leading to the observation posts.

A third observation post 600 square feet (56 square meters) in area would be installed on the deck of Marginal Wharf, at the seaward apex of the wharf (Figure 3) and would include removal of an existing observation post. This new observation post would be similar in configuration but smaller than the two shoreline observation posts (Figure 4). The post would be constructed of reinforced concrete. There would be no in-water construction; no part of this observation post would extend into the water, and no new over-water area would be created. Communication cables would be installed from an existing hub under an existing roadway to access the wharf, using standard construction methods that would include patching of the roadway after construction.

Construction of the abutments would disturb a total of approximately 47,000 square feet of upland area and would require excavation of approximately 6,245 cubic yards of soil and fill of 6,966 cubic yards including the concrete. The south abutment would include a gravel path to Sealion Road. The staging area for both LWI construction sites would be a 5.4-acre site near the intersection of Archerfish and Seawolf Roads (Figure 3). This site has been used for staging other construction projects and is highly disturbed.

3.3 Construction Schedule

Upland construction would take approximately 540 days; equipment would include backhoes, bulldozers, loaders, graders, trucks, and a crane/pile driver. Overall project construction would begin in August 2016 and end in August 2018. All in-water work would take place in one in-water work season, August 1, 2016, to January 15, 2017. Materials and equipment for the in-water work would be brought in by barge, while materials and equipment for abutment construction would be brought in by truck. The number of construction workers is estimated at 100. Best management practices and impact reduction measures that would be implemented to avoid or minimize potential environmental impacts associated with the proposed action are discussed in Section 5.1 below.

4.0 PURPOSE AND NEED

The Navy proposes to complete the perimeter of the WRA at NAVBASE Kitsap Bangor by constructing and operating physical barriers through shallow waters and onto the immediate upland areas at the northern and southern extents of the WRA. The purpose of the LWI is to comply with Department of Defense directives to protect OHIO Class ballistic missile submarines from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets. The need for the LWI is to enhance security at the WRA and comply with security requirements.

5.0 COASTAL RESOURCE IMPACTS

This section describes the LWI's impacts to coastal resources outside the boundaries of NAVBASE Kitsap Bangor and associated Naval Restricted Areas (Figure 2), which are excluded from the coastal zone (WDOE 2001).

Because species occurring at NAVBASE Kitsap Bangor include migratory and other highly mobile species, impacts occurring within the boundaries of NAVBASE Kitsap Bangor could affect species occurring outside those boundaries at times and therefore within the coastal zone. Construction impacts on biological resources would include minor turbidity from PSB mooring anchor removal and placement and boat movement. Limiting abutment work below MHHW to the in-water work season of July 15 to January 15 would minimize potential impacts on Endangered Species Act (ESA)-listed salmonids. Construction of the LWI would require no in-water pile driving, thus avoiding resulting underwater noise impacts to marine biota. Marine mammals (pinnipeds) and marbled murrelets could be exposed to airborne noise from driving of the abutment piles. However, airborne pile driving noise is not expected to result in behavioral disturbance of pinnipeds or marbled murrelets, and would have no measurable impacts on ESA-listed fish.

Since no public recreational uses occur at the LWI project sites, construction would have no direct impact to recreational uses or access in the surrounding community. However, nearby recreational and residential areas may experience elevated noise levels during construction. State standards would not be exceeded. Pile-driving would occur during limited daylight hours only. The Navy would notify the public prior to construction. Operations of the LWI would be consistent with current operations at the Bangor waterfront, and would not have a direct impact to adjacent land uses or recreation in the communities of Vinland and Silverdale, the closest off-base residential areas to the proposed LWI structures

In order to maintain adequate levels of safety for vessel navigation during in-water construction activities, a Notice to Mariners would be issued to minimize navigational hazards outside the existing floating security fence. In addition, barge trips through the Hood Canal Bridge would be scheduled to avoid peak commuting hours. Additional openings of the Hood Canal Bridge for barge traffic would result in delays of 30 minutes per month on average on SR-104 during the single in-water construction season (August 1, 2016 through January 15, 2017). Construction-related road traffic would have minor impacts (a few seconds or less) on several intersections on the base during both the a.m. and p.m. peak hour. Additional traffic volumes from construction traffic may create longer wait times to enter the base, particularly during the a.m. peak hour, as vehicles queue up to pass through the security checkpoint.

Construction activities are expected to last approximately 2 years, including one in-water work season. During this period, heavy equipment (pile-drivers, tugs, skiffs, generators) would generate emissions. Additional emissions would occur from deliveries of materials by tug and barge, onshore delivery vehicles, and construction worker vehicles (approximately 100 construction workers are expected at times). Best Available Control Technology, as required by Puget Sound Clean Air Agency Regulation I, would be implemented to reduce fugitive (including visible) emissions. The proposed action is located within an attainment area for all criteria pollutants under the Clean Air Act; therefore, General Conformity would not be applicable. Construction and operations would not have a significant impact to the air quality of adjacent properties in the Kitsap County coastal zone.

5.1 Current Practices and Best Management Practices

Several measures have been identified to avoid, reduce, and mitigate the effects of the projects on sediments, water quality, and biological resources of Hood Canal. These are described in more detail in Appendix C to the Environmental Impact Statement, and are summarized here:

- **Storm Water Pollution Prevention Plan.** Construction and operations of the LWI will be conducted in accordance with Clean Water Act requirements and Storm Water Pollution Prevention Plan to ensure no violations of state water quality and to avoid and minimize potential for adverse impacts to water quality from stormwater runoff.
- **Spill Prevention Control.** Construction and operation of the LWI will be managed to minimize the likelihood of adverse impacts to water quality resulting from accidental spills and releases of petroleum products through implementation of the existing Integrated Contingency Plan. This plan is reviewed and approved by the U.S. Coast Guard and WDOE. Absorbent oil containment booms will be placed around the in-water construction area to contain accidental oil or hazardous materials spills to minimize the exposure of fish and wildlife species and their habitats to spills.
- **Construction Debris Control.** The contractor will prepare and implement construction debris management procedures as required by the Clean Water Act Section 401 Water Quality Certification for the project. Debris will be prevented from entering the water during all construction work. During in-water construction activities, the contractor will deploy and maintain floating booms no farther seaward than the 100-foot designated construction corridor to collect and contain floatable materials. Any accidental release of equipment or materials will be immediately retrieved and removed from the water.
- **Propeller Wash Control.** To minimize disturbances of the seafloor from propeller wash, vessel traffic will be excluded from shallow areas outside of the 100-foot construction zone, which would be marked using temporary buoys or other visual guides. Additionally, shallow draft, low horsepower tugboats would be used in the nearshore area and for extended operations in areas shallower than about 40 feet below MLLW.
- **Work Vessel Grounding Control.** Construction barges will avoid grounding during low tides. Spudding/anchoring in existing eelgrass habitat will be avoided wherever possible.

Vessel operators will be provided with maps of the project site with eelgrass beds clearly marked. The abutments and observation posts will be built from land.

- **Mooring and Anchoring Plan.** To minimize the potential for seafloor disturbances, the contractor will submit a mooring and anchoring plan for approval by the Contracting Officer. The plan will identify measures to avoid or minimize impacts on bottom habitats from line or anchor drag.
- **Protection of Water Quality During Construction and Operation.** Construction activities will be in accordance with the U.S. Environmental Protection Agency (USEPA) Construction General Permit. For compliance with the Energy Independence and Security Act of 2007, the Navy will maintain site hydrology to the maximum extent feasible. Design of upland features (e.g., laydown area) will consider the USEPA guidance for compliance with the Energy Independence and Security Act (USEPA 2009) as well as other relevant technical information regarding methods to improve stormwater retention and quality.
- **In-water Work Timing Window.** To avoid impacts on ESA-listed fish species, abutment construction will be conducted within the in-water work window (July 15 through January 15).

5.2 Mitigation Measures

Construction noise would likely result in behavioral disturbance of ESA-listed fish (salmonids and rockfish), ESA-listed marbled murrelet, birds protected under the Migratory Bird Treaty Act, and marine mammals protected under the ESA and/or Marine Mammal Protection Act. The following mitigation measures would be used to minimize the potential for noise-related impacts to marine species during construction of the LWI:

- **Use of Vibratory Driver in Lieu of Impact Hammer.** Pile driving would occur on land or at low tide ("in the dry"). A vibratory pile driver would be the primary method for driving piles; an impact hammer would be used primarily to proof vibratory driven piles, but also to drive piles which cannot be driven to the required depth using a vibratory pile driver because of geotechnical conditions.
- **Soft-Start.** During impact pile driving, a soft-start approach would be used to induce marine mammals to leave the immediate area. This soft-start approach requires contractors to initiate noise from hammers at reduced energy, followed by a waiting period. Due to mechanical limitations, soft starts for vibratory driving will be conducted only with drivers equipped with variable moment features. Typically, this feature is not available on larger, high-power drivers. The Navy will use the driver model most appropriate for the geologic conditions at the project location, and will perform soft starts if the hammer is equipped to conduct them safely.
- **Timing Restrictions.** Construction activities would not be conducted between the hours of 10:00 p.m. and 7:00 a.m. Between July 15 and September 23, impact pile driving would occur only between 2 hours after sunrise and 2 hours before sunset to protect foraging marbled murrelets during the breeding season. Between September 24 and January 15, in-water construction activities would occur during daylight hours (sunrise to sunset). The Navy would notify the public about upcoming construction activities and noise at the beginning of each construction season.

5.3 Proposed Compensatory Mitigation

5.3.1 In-Lieu Fee Program

The Navy will, as part of the proposed action, undertake compensatory habitat mitigation in accordance with the Mitigation Action Plan. The Navy will purchase habitat credits from the Hood Canal In-Lieu Fee Program, which would implement appropriate mitigation actions in the Hood Canal watershed.

5.3.2 Treaty Mitigation

For Treaty impacts to the Skokomish Indian Tribe, the Navy would fund a portion of the Tribe's non-federal share of the Skokomish River Restoration project. The Skokomish River Restoration project is being managed by the U.S. Army Corps of Engineers.

For Treaty impacts to the Port Gamble S'Klallam, Jamestown S'Klallam and Lower Elwha Klallam Tribes, the Navy will fund one or more of the following projects:

- Beach enhancement and shellfish seeding and at locations off Navy property. In this project, the Navy would enter into a cooperative agreement with the Port Gamble S'Klallam Tribe, or another entity, who would enhance beach substrate by the placement of appropriately sized gravel, sands, and shellfish seed. The placement would be likely done by barge.
- Development and implementation of a floating upweller system (FLUPSY) management plan. In this project, the Navy would enter into a cooperative agreement with the Port Gamble S'Klallam Tribe or another entity, who would hire an experienced and qualified consultant to develop operational procedures for the FLUPSY and provide start-up and operational advice. The project will also fund incidental equipment purchases and shellfish seed.
- Kilisut Harbor Restoration Project. This project will construct a bridge, replacing the causeway on State Route 116. The Navy would partner with the project sponsor, the North Olympic Salmon Coalition, to fund a portion of the project.

6.0 CONSISTENCY WITH ENFORCEABLE POLICIES

6.1 Shoreline Management Act – Chapter 90.58 Revised Code of Washington (RCW)

The project site is located within Kitsap County. Kitsap County has adopted the County of Kitsap Shoreline Master Program (SMP), consistent with the Washington State Shoreline Management Act and approved by WDOE. The Kitsap County SMP does not apply to lands owned by federal government, and Kitsap County considers NAVBASE Kitsap Bangor as non-designated (Kitsap County Code Title 22). Therefore, the policies of the Kitsap County SMP are not addressed in this coastal consistency determination.

6.2 Washington State

The Navy reviewed use preferences for shorelines of statewide significance within the Washington State's Revised Code of Washington (RCW) 90.58.020; consistency is discussed below.

(1) Recognize and protect the statewide interest over local interest;

The TRIDENT submarine program remains a vital part of the nation's sea-based strategic deterrence mission. The LWI project is needed to enhance security within the WRA and comply with security requirements.

(2) Preserve the natural character of the shoreline;

The impacts from the project will occur on NAVBASE Kitsap Bangor, which is by definition outside of the coastal zone. Nevertheless, the proposed action has been designed to minimize impacts to the base shoreline. The natural character of the shoreline, off of Bangor, will be preserved.

(3) Result in long-term over short-term benefit;

The compensatory mitigation action will mitigate for impacts from the proposed action and will result in long-term benefits to Hood Canal.

(4) Protect the resources and ecology of the shoreline;

The proposed action has been designed to minimize impacts to the shoreline. The Navy's compensatory mitigation action will result in long-term protection of resources and ecology.

(5) Increase public access to publicly owned areas of the shorelines;

The proposed action would occur within the existing Hood Canal Naval Restricted area. Due to security restrictions, no public access currently occurs at the LWI project sites and none would occur after construction.

(6) Increase recreational opportunities for the public in the shoreline;

Due to security restrictions, no public recreational opportunities are currently available at the LWI project sites and none would occur after construction.

(7) Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary.

RCW 90.58.100 provides guidelines for the development of local SMPs and does not apply to specific shoreline actions.

6.3 Other Policies

6.3.1 State Environmental Policy Act – Chapter 43.21C RCW

The proposed action is a federal action subject to the National Environmental Policy Act and therefore, the State Environmental Policy Act is not applicable.

6.3.2 Ocean Resource Management Act – Chapter 43.143 RCW

The proposed action is located on Hood Canal, an estuarine tributary of Puget Sound, in Kitsap County, Washington. The enforceable policies of Chapter 43.143 RCW apply only to coastal waters of the Pacific Ocean, and do not apply to the proposed action.

6.3.3 Clean Water Act – Chapter 90.48 RCW

The Washington Clean Water Act, as amended, regulates discharges to the waters of the United States, including wetlands within Washington State. The design and implementation of the proposed action, including handling, storage, and disposal of hazardous materials and petroleum products, would adhere to applicable permit conditions and the water quality guidelines, policies, standards, and regulations of water quality management programs and regulatory agencies. The project would result in temporary construction actions including excavation below MHHW. These impacts would be mitigated through the proposed compensatory mitigation. The Navy has applied to the U.S. Army Corps of Engineers for a permit under Section 404 of the Clean Water Act, as well as Section 10 of the Rivers and Harbors Act, and to WDOE for a Section 401 Water Quality Certification. The Navy will comply with all permit requirements.

6.3.4 Clean Air Act – Chapter 70.94 RCW

The Washington Clean Air Act, as amended, provides for protection and enhancement of the state's air resources. The proposed action would not result in any permanent new sources of air pollutant emissions so a permit for a new source would not be required. Since the project is within an attainment area for all National Ambient Air Quality Standards, a conformity determination outlined in Section 176 (c) of the 1990 Federal Clean Air Act would not be required.

6.3.5 Washington State Energy Facility Site Evaluation Council – Chapter 80.50 RCW

The proposed action does not include the addition of any new energy facilities. The enforceable policies within Chapter 80.50 RCW do not apply.

7.0 CONCLUSION

Based on this information, data, and analysis, the proposed action is determined to be consistent to the maximum extent practicable with the enforceable policies of the Washington State Coastal Zone Management Program.

8.0 REFERENCES

USEPA. 2009. Technical guidance on implementing the stormwater runoff requirements for Federal Projects under section 438 of the Energy Independence and Security Act. EPA 841-B-09-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC. December 2009. http://www.epa.gov/owow/NPS/lid/section438/pdf/final_sec438_eisa.pdf.

WDOE (Washington Department of Ecology). 2001. Managing Washington's Coast: Washington State's Coastal Zone Management Program. Publication 00-06-029. Washington Department of Ecology, Olympia, WA.

FIGURES

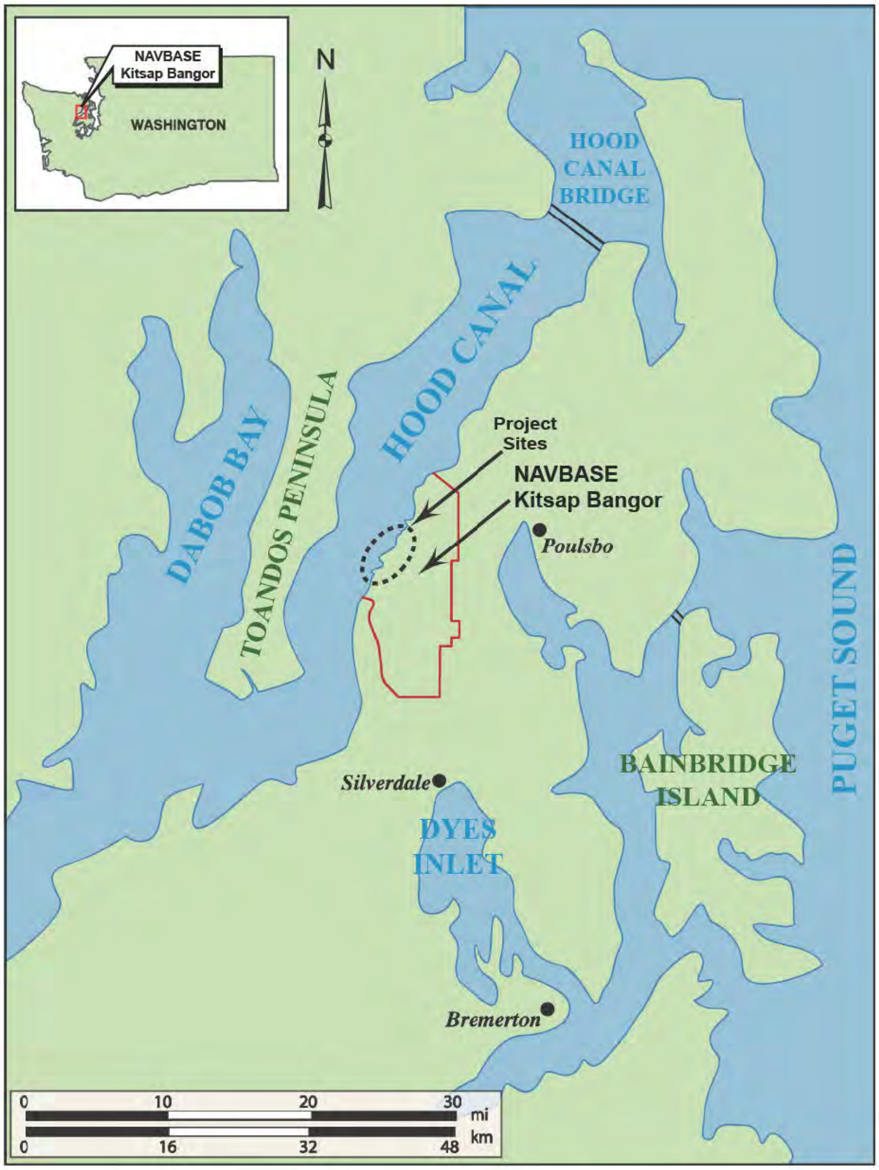

Figure 1. Site Location Map for NAVBASE Kitsap Bangor

Figure 2. NAVBASE Kitsap Bangor Restricted Areas

Naval Base Kitsap Bangor Land-Water Interface

Figure 3. Location of the LWI Project

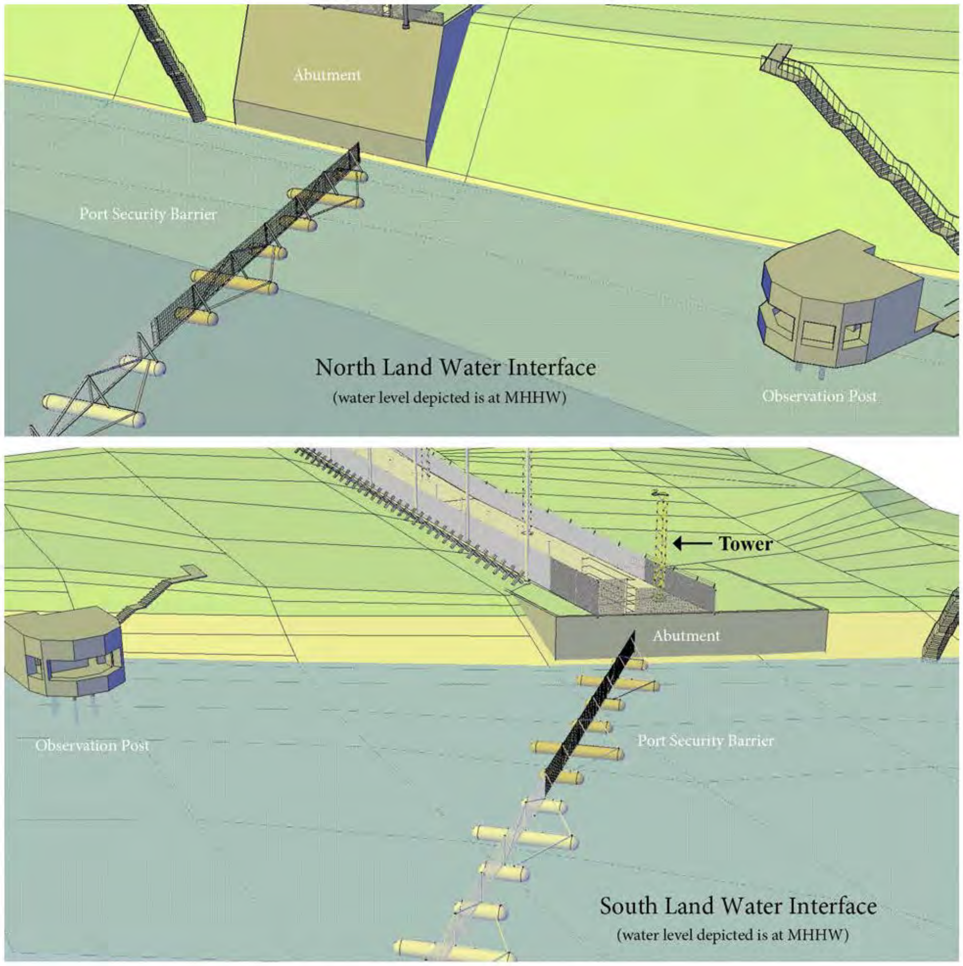

Figure 4. Depiction of LWI Features

Figure 5. North LWI PSB Layout

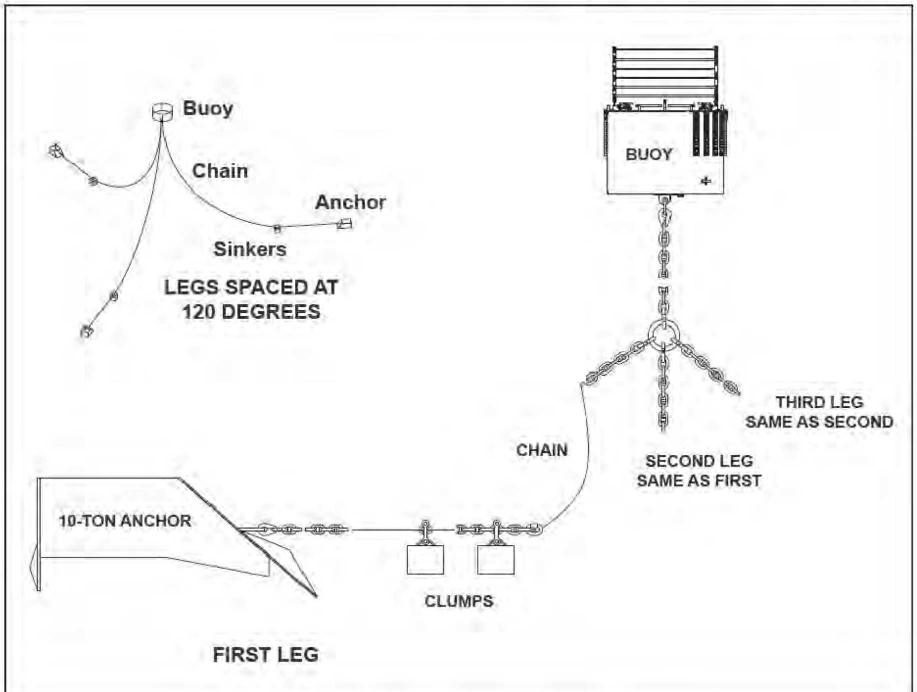

Figure 6. Typical 3-Leg Mooring Buoys

Figure 7. South LWI PSB Layout

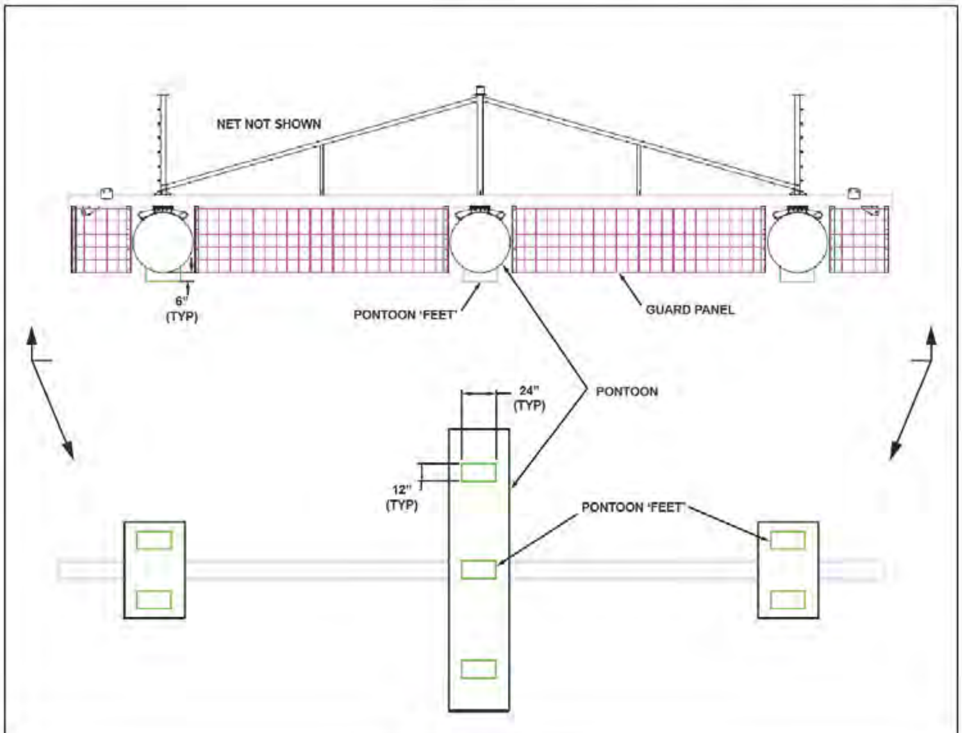

Figure 8. PSB Unit

DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/01218
13 Jun 16

From: Commanding Officer, Naval Base Kitsap
To: Mr. Brian Hooper, Department of the Army, Seattle District, Corps of Engineers

Subj: LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

Encl: (1) Joint Aquatic Resources Permit Application
(2) Endangered Species Act Section 7 Biological Assessment
(3) State Historic Preservation Officer (SHPO) Section 106 Concurrence

1. The Department of the Navy (Navy) proposes to construct a construct a Land-Water Interface (LWI) at Naval Base Kitsap Bangor, Silverdale, WA. The proposed action would enhance security at the perimeter of the Waterfront Restricted Area (WRA) by constructing physical barriers through shallow waters and onto the immediate upland areas at the northern and southern extent of the WRA.

2. A Joint Aquatic Resources Permit Application is enclosed for your use. Also enclosed are the Biological Assessment submitted to USFWS and NMFS pursuant to Section 7 of the Endangered Species Act and the Section 106 SHPO letter of concurrence with the findings of no adverse effect to cultural resources.

3. If you require further information or have any questions, please contact Dr. Robert Senner at (360) 396-0029 or robin.senner@navy.mil.

T. A. ZWOLFER

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DEPARTMENT OF THE NAVY
NAVAL BASE KITSAP
120 SOUTH DEWEY ST
BREMERTON, WA 98314-5020

5090
Ser PRB4/ 01217
13 Jun 16

Ms. Rebekah Padgett
Washington Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008

Subj: LAND-WATER INTERFACE PROJECT AT NAVAL BASE KITSAP BANGOR

Dear Ms. Padgett:

The Department of the Navy (Navy) proposes to construct a construct a Land-Water Interface (LWI) at Naval Base Kitsap Bangor, Silverdale, WA. The proposed action would enhance security at the perimeter of the Waterfront Restricted Area (WRA) by constructing physical barriers through shallow waters and onto the immediate upland areas at the northern and southern extent of the WRA.

A Joint Aquatic Resources Permit Application is enclosed for your use. Also enclosed are the Biological Assessment submitted to USFWS and NMFS pursuant to Section 7 of the Endangered Species Act and the Section 106 SHPO letter of concurrence with the findings of no adverse effect to cultural resources.

If you require further information or have any questions, please contact Dr. Robert Senner at (360) 396-0029 or robin.senner@navy.mil.

T. A. ZWOLFER

Encl: (1) Joint Aquatic Resources Permit Application
(2) Endangered Species Act Section 7 Biological Assessment
(3) State Historic Preservation Officer (SHPO) Section 106 Concurrence

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APPENDIX H

PROXY SOURCE SOUND LEVELS AND POTENTIAL BUBBLE CURTAIN ATTENUATION FOR ACOUSTIC MODELING OF NEARSHORE MARINE PILE DRIVING AT NAVY INSTALLATIONS IN PUGET SOUND

Proxy Source Sound Levels and Potential Bubble Curtain Attenuation for Acoustic Modeling of Nearshore Marine Pile Driving at Navy Installations in Puget Sound

Revised
January 2015

Prepared By:

NAVFAC
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NAVFAC NORTHWEST

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Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

Suggested citation: United States Navy. 2015. Proxy source sound levels and potential bubble curtain attenuation for acoustic modeling of nearshore marine pile driving at Navy installations in Puget Sound. Prepared by Michael Slater, Naval Surface Warfare Center, Carderock Division, and Sharon Rainsberry, Naval Facilities Engineering Command Northwest. Revised January 2015.

Acknowledgements: The final version of this document was produced in cooperation with Danielle Buonantony (Marine Resources Specialist, Office of the Chief of Naval Operations) and Cara Hotchkin (Marine Bioacoustician, Naval Facilities Atlantic). Their review and input were invaluable to the final document.

For comments or questions, contact:

Sharon Rainsberry
Naval Facilities Engineering Command Northwest
360.315.2812; Sharon.rainsberry@navy.mil

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1.0 BACKGROUND

The National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) issue incidental take for Endangered Species Act (ESA)-listed species potentially adversely affected by the Navy's activities. This includes sound pressure levels (SPLs) produced from pile driving. Incidental take statements (ITS) are an outcome of Section 7 consultations and addressed in the Biological Opinions. The NMFS also issues authorizations for noninjurious take (Level B) for marine mammals for noise produced by pile driving. Such take provisions are authorized by the Marine Mammal Protection Act.[1]

ITS often authorize incidental take by the area encompassed within zones above noise thresholds for ESA-listed fish. ITS for other animals such as marbled murrelets and marine mammals are based upon the number of animals anticipated to occur in the zones above the noise thresholds. For example, the peak SPL for the onset of injury threshold for fish is 206 dB referenced to 1 micropascal (μPa)[2]. If actual project noise exceeds the extent of the modeled authorized area, the project would exceed authorized incidental take allotted in the ITS. Consequently, the project would be required to reinitiate consultation under Section 7 of the ESA and a shut-down of impact pile driving would occur until a new ITS is issued. For marbled murrelets and marine mammals, injurious incidental take is avoided by monitoring areas exceeding the injury thresholds. If an animal enters this area, pile driving is shut down until it leaves. In addition, there can be provisions in an ITS or MMPA authorization allocating incidental take for potential behavioral disturbance. In this case, monitoring is required within the behavioral disturbance zones. Therefore, accurate establishment of the extent of the area exceeding established thresholds is essential to complying with the terms of an ITS or MMPA authorization.

When possible data obtained for a given site are used to predict expected source levels. However, for most project sites, prior measurements of the extent of pile driving noise have not been made. For these sites the extents of the areas where noise exceeds threshold values are modeled with an equation for sound propagation using proxy values for the source pile driving levels. Proxy source values are therefore either from prior measurements obtained on-site by installing the same type and size of piles or, when site specific information is lacking, obtained from the same or most similar type and size pile at locations with a similar sound environment. Other important factors include the type of equipment used to install the pile, substrate type, and water depth, all of which result in variations in pile driving noise levels. Detailed analyses of these factors are beyond the scope of this source document. The following section considers the

[1] New NMFS criteria using frequency weighted (filtered) responses are in development, with new standards anticipated. The current revision of this document does not include frequency weighted results; such results will be promulgated in a revised edition.
[2] All peak and root-mean-square (RMS) sound pressure levels in this document are referenced to 1 μPa. All sound exposure levels (SEL) in this document are referenced to 1 μPa^2-second. All peak SPLs in this document refer to absolute peak overpressures or under pressures.

rationale we used when reviewing proxy impact and vibratory pile driving source values for noise threshold metrics. We first discuss the available data included in the review. Second, we discuss the values for each threshold metric (peak SPL, root-mean-square [RMS], and sound exposure level [SEL]) that will result in a high likelihood of encompassing the extent of actual project noise levels. Last, we review relevant data available for various types and sizes of piles typically used for pile driving and recommend proxy source values for Navy installations in Puget Sound.

Section 2 of this document is a review of attenuation levels reported for various impact pile driving projects.

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2.0 PROXY SOURCE SOUND LEVELS FOR ACOUSTIC MODELING OF NEARSHORE MARINE PILE DRIVING AT NAVY INSTALLATIONS IN PUGET SOUND

2.1 UNDERWATER PILE DRIVING SOURCE LEVELS

2.1.1 Data Sources

Differences in underwater source levels for a given pile size and type will vary because of differences in geologic conditions, water depths where piles are installed, and pile driver type. In other words, the same size pile and type may generate different noise characteristics when installed in dissimilar environments. To obtain source values and model distances to the USFWS and NMFS thresholds for nearshore marine environments at Navy installations in Puget Sound, we reviewed available values from multiple nearshore marine projects obtained from the California Department of Transportation (CALTRANS), Washington State Department of Transportation (WSDOT), and Navy pile driving acoustic reports. Projects were located in California, Oregon, and Washington. Non-marine projects were excluded because of differences in substrate and/or acoustic conditions, and are not relevant herein due to the dissimilar nature from typical work performed at Navy marine facilities in Puget Sound. For example, a project located in Lake Washington and a freshwater bay (SR 520 Test Pile Project) was excluded due to very different substrate conditions present at those sites. Projects located in rivers were excluded because substrate characteristics, such as presence of bedrock, were not typical of Puget Sound. River projects also had different bathymetric profiles as well as increased current velocities. Of the projects reviewed, only measurements from unattenuated piles (e.g. a noise attenuation device was not operating[3]) were evaluated. Attachments 1 through 5 in Appendix A list the projects considered in this review.

All projects considered in the review had similar nearshore project depths from less than 5 m to approximately 15 m with the exception of Test Pile Program at Naval Base (NAVBASE) Kitsap Bangor where depths ranged from approximately 13 to 27 m. Impact pile driver type is listed in the attachments. Impact pile drivers can be drop, pneumatic, hydraulic, or diesel powered. With some exceptions at the Friday Harbor Ferry Terminal, all impact driven piles were installed with diesel powered drivers. Vibratory drivers vary only by size (energy) and type (variable moment/non-variable moment), but because of the limited data set, no attempt was made to distinguish between driver energies when reviewing noise levels produced from different impact or vibratory drivers.

Proxy values in similar marine sound environments can be challenging to obtain for pile driving because of variations in geologic conditions between projects and variability within project sites. Substrate types were not reported for most projects included in the review.

[3] Pile caps are routinely placed on top of piles prior to driving to cushion equipment. While they are recognized as providing some sound attenuation, they are not considered in this analysis because they are part of baseline sound measurement presented in many reports.

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Substrate types typical of Puget Sounds are sand/silt to sand/silt/cobbles overlying glacial till or hard clay layers. Therefore, projects located in the marine waters of Puget Sound, including the San Juan Islands, were considered more heavily because they would be more likely to share the same substrate characteristics than projects located in the San Francisco Bay area, the mouth of the Columbia River, or coastal bays. However, it should be noted that within Puget Sound a considerable variability in substrate conditions can exist between projects and within projects due to harder glacial layers and unforeseen encounters with glacial erratics (e.g. erratic rocks). Depending on the substrate type, piles may easily be advanced or, because of glacial till or submarine boulders, piles may require much more energy to drive. Piles driven to different tip elevations could also experience different driving conditions. For example, fender piles generally are not driven to the same depth as structural piles and may not encounter the same resistance during driving. Therefore, considerable variation in values is expected when looking from project to project or pile to pile within a project. To ensure proxy values are protective of species, conservative values were chosen to encompass regional and pile to pile variation. The following section considers the rationale we used when reviewing values for various sound metrics.

2.1.2 Other Considerations in Evaluation of Pile Driving Source Values

Proxy values need to be conservative. This ensures the area modeled above the injury thresholds is correctly assessed and remains within an ITS for fish. This approach will also preclude incidental take considered injurious based on the established injury criteria of marbled murrelets and marine mammals. In addition, proxy values are used to model the areas above the marbled murrelet and marine mammal behavioral thresholds or guidance values. Sound levels from pile driving are reported on either a per pile basis within a project, or per project summary basis. Summary data reported in acoustic reports varies, but can include one or more of the following:

- Per pile averages
- Ranges
- Minimum and maximum values
- Per project average
- Typical values
- Average range
- Minimum, maximum, average minimum
- Average maximum value
- Standard deviation.

Thus, interpretation of the reported levels may depend on the analytical methodology selected, which in turn can affect the proxy source level selected for modeling analysis. For example, one approach to choosing a source value is to pick the mean value from a number of projects reviewed. The results from the model utilizing this mean value will adequately characterize the estimated average extent of noise from pile driving. However, depending on the pile to pile variability it would only characterize the area for individual piles if the pile to pile variability in the source data were low. If the data were highly variable, the extent of the area above the threshold would be smaller or larger than described by the model on a per pile basis. Therefore, on-site monitoring of pile driving noise could exceed the modeled values on a significant portion of the piles. Another, but more conservative approach is to select the proxy source value from the highest value of all values reported. This method would ensure that most, if not all, measured values on a pile by pile basis would be below the selected value, but could significantly overestimate the area or extent of biological impact.

In the section below we outline the rationale we used for selecting proxy values from the available data for each threshold metric. Values were chosen to ensure that a reasonable worst case scenario is modeled to estimate the extent of noise from pile driving.

2.1.2.1 ROOT MEAN SQUARE

The root-mean-square (RMS) value is the metric used to define the behavioral zones for fish, marbled murrelets, and marine mammals. For piles that are impact driven, RMS values are generally reported for individual piles over the duration of the driving of a given pile; often the number of strikes is also reported on a per-pile basis. Thus, in order to best characterize a broad-base proxy SPL, average RMS pressures were computed from the reported SPL (dB) values, and then weighted by the number of pile strikes for a given pile. This weighting methodology estimates proxy values across multiple projects with differing numbers of piles or strike counts, and the effect of using weighting values ensures that a single project or pile does not overtly bias the result high or low. This proxy value represents the most likely value expected for individual pile strikes for a typical project.

For piles that are vibratory driven, RMS values are typically computed over 10-second or 30-second averaging periods, and represent the most probable typical value over a long event. Thus, recommended proxy RMS values for vibratory and impact pile driving are computed using different techniques. For vibratory piles, reported values were selected on a pile-by-pile basis for a given pile type and size. An average value was computed by converting selected SPL values (dB) into pressure values, summing them together in linear space, dividing by the total number, n, of selected piles, and converting the result back to SPL (dB). In following this approach, the proxy value represents the arithmetic average value for each pile type and size from applicable projects. Thus, for vibratory driven piles averaged RMS values were used from all applicable projects as a representative average level of long-term pile driving events.

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Weighted SPL averages are computed by first converting all SPL values to linear space, weighting pressure values by the number of events (for example, by number of strikes, *n*), normalizing by dividing by the number of events, and then converting back to SPL. Using k as an index counter for all piles, 1 = pile #1, 2 = pile #2, etc.:

$$Weighted\ SPL = 10\log_{10}\left[\frac{1}{n_{total}}\sum_{k=1}^{n_{total}}(n_k P_k)\right]$$

where

$$n_{total} = n_1 + n_2 + n_3 \ldots$$

Charts depicting the behavior of the measured data used to prepare proxy values within this document are presented in Appendix B. Two types of charts are provided. First, for all data types, a sorted chart showing amplitude for all piles included, recommended proxy value, and when available, minimum and maximum levels observed. Next, the cumulative probability distribution function charts are provided for all pile sizes, with the recommended proxy value annotated on each chart.

2.1.2.2 PEAK SOUND PRESSURE LEVEL

The peak sound pressure level (SPL) metric is used to evaluate the potential for injurious effects to fish. The barotrauma injury to fish due to peak over or under pressurization could result in instantaneous injury with a single strike. Average peak impact SPL values were selected from applicable projects, from which a weighted probability distribution function (PDF) was computed based on the number of pile strikes for each pile. To ensure a conservative proxy value, a value representing the ninetieth percentile of the PDF was selected, meaning that for a typical impact pile driving project, 90% of all pile strikes would typically occur below this proxy value. Use of this value ensures potentially injurious effects to fish would have a high likelihood of being within the area exempted for incidental take.

2.1.2.3 SOUND EXPOSURE LEVEL

The sound exposure level (SEL) metric for impact driving is used to calculate the area of cumulative exposure potentially resulting in injury to fish or marbled murrelets over a daylong pile driving event (the accumulation of energy received from all pile strikes). To compute the cumulative SEL all single strike SEL energy in a workday is summed to calculate the overall SEL. However, modeling for the SEL "dosage" generally involves estimation of a typical single pile value logarithmically added to sum the expected energy over the day. While some strikes may be lower and some higher than the mean SEL value, use of the mean value would result in the best overall estimate of expected cumulative energy over the work day. In practice, the SEL value will vary on any given workday due to variability in the levels measured for each individual strike. The acoustic reports reviewed typically provided the mean single strike SEL per pile. Therefore, the most representative estimate of the single strike SEL for a proxy value is to use a mean SEL value from data from all piles in applicable projects. Furthermore, to avoid biasing the data high or low from a single pile or project, a weighted average was computed using the number of pile strikes, *n*, in the same manner as was followed for computation of impact RMS values. This approach ensures that a single project or pile does not bias the result high or low. This proxy value represents the most likely value expected for individual pile strikes for a typical project.

2.1.3 Impact Driving Source Values

Table 2-1 summarizes projects from Attachment 1 in Appendix A that were considered in the final analysis and highlights proxy values. Theses highlighted proxy source values are reasonably conservative for modeling future Navy pile driving projects in Puget Sound. Detailed discussions of the projects considered and the values obtained for each pile type and size are provided below.

Table 2-1. Summary of Unattenuated Impact Pile Driving Levels Considered. Recommended Proxy Source SPLs at 10 m Bolded.

Pile Size	Number of Projects Considered[1]	Range of Average RMS (n-weighted pile average) dB re 1µPa	Range of Average Peak (90% PDF value) dB re 1µPa	Range of Average SEL (n-weighted pile average) dB re 1µPa
Steel				
24-inch	2	181-198 (**193**)	196-213 (**210**)	176-185 (**181**)
30-inch	3	192-196 (**195**)	203-217 (**216**)	182-187 (**186**)
36-inch (all projects)	3	185-196 (**192**)	202-211 (**211**)	173-186 (**184**)
36-inch (Bangor only)	1	185-196 (**194**)	Not reported[3]	173-183 (**181**)
All 24/30/36-inch	7	181-198 (**193**)	196-217 (**211**)	173-193 (**184**)
Concrete				
≤18-inch	3	158-173 (**170**)[2]	172-188 (**184**)[2]	147-163 (**159**)[2]
24-inch	7	167-179 (**174**)[2]	180-191 (**188**)[2]	158-167 (**164**)[2]

[1]See Appendix A, Attachment 1 and 2 for projects reviewed.
[2]Number of pile strikes, *n*, was not available for any concrete projects; all piles were equally weighted.
[3]Although absolute peak values were collected for TPP testing, average peak values were not reported; unattenuated data from EHW-2 was not collected.

2.1.3.1 24-INCH STEEL PILE IMPACT DRIVING SOURCE VALUES

Attachment 1 in Appendix A lists six marine nearshore projects reviewed for possible inclusion in the analysis. Data for one 24-inch pile installed with an impact hammer in the Test Pile Project at NBK Bangor are listed in Attachment 1. However, only 7 pile strikes were reported and measurements from this pile are lower than all of the other five projects reviewed. Therefore, these data were not considered in the selection of the most conservative value. Of the remaining five projects reviewed, the Bainbridge Island Ferry Terminal Preservation Project and the Friday Harbor Restoration Ferry Terminal project were considered as the most representative of typical glacial till and erratics encountered in Puget Sound and were carried forward in the analysis. We based this on the assumption that substrate conditions are more similar than those found in San Francisco Bay or the mouth of the Columbia River.

For the two ferry terminal sites, five piles were driven at Bainbridge Island in substrate that consisted of a mix of sand and fist-sized rocks with occasional rocks one-foot in diameter. At Friday Harbor six piles were driven into a silty sand substrate approximately 9 meters thick and underlain by a hard clay lens. Three of the piles at this site encountered a large rock ledge approximately 10.7 meters below the mudline. One of the six piles in the project had the high end of the data clipped[4] and therefore invalid, so this pile was excluded from the analysis. This project used different hammer types, but because the report noted little variation in the data, all five remaining piles were included in our review. Data from the two ferry projects only included values without a bubble curtain attenuator operating, i.e. no attenuation.

Source levels for each metric reviewed are discussed below. Table 2-1 summarizes unattenuated impact pile driving source data from Attachment 1 for the two ferry terminal projects.

RMS SPL

Weighted average proxy RMS source values for the two Puget Sound ferry terminal projects were 189 dB (range 181 dB to 193 dB) and 195 dB (range 193 dB to 198 dB) (Attachment 1), representing 1007 pile strikes. Therefore, actual RMS values would be expected to fall between 181 dB and 198 dB. The weighted average RMS value of 193 dB was chosen as a conservative value that likely encompasses the average extent of the area exceeding the injury thresholds for marine mammals and the behavioral thresholds for marine mammals, fish and marbled murrelets.

Peak SPL

Average peak SPLs reported for individual piles at the Bainbridge Island and Friday Harbor projects were 202 dB to 209 dB and 196 dB to 213 dB, with an average weighted value of 207 dB. Of the applicable projects, the 90% probability from the weighted cumulative distribution density function value of 210 dB was chosen as a conservative proxy value that likely encompasses the modeled extent of the area over the onset of injury threshold for fish. Table 2-1 summarizes the values from the two projects considered likely to be most representative.

SEL

Mean weighted SEL values for the two Puget Sound projects reviewed are each 181 dB for all piles. The mean SEL per any one pile for both projects ranged from 176 and 185 dB. These

[4] Clipping occurs when a signal exceeds the linear limits of an electronics system in essence the extreme levels of the signal are truncated or “clipped” off. For pile driving measurements, clipped data can produce results that are lower than the actual signal of interest, thus producing invalid results.

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values are higher than the values reported for the other three projects reviewed (project SEL means that ranged from 168 to 177 dB). Therefore, the Washington projects were considered the most conservative and a mean weighted SEL of 181 dB was chosen as a reasonable proxy value of the overall SEL for 24-inch piles.

2.1.3.2 30-INCH STEEL PILE IMPACT DRIVING SOURCE VALUES

Data for 30-inch steel pipe piles were available from three marine pile driving projects in Puget Sound, Washington and one project from San Francisco Bay, California. No projects from Bangor were available for analysis, and data from the California project provided only typical data, and did not provide per-pile SPL or number of strikes for each pile (see Attachment 1 in Appendix A). All available data in Attachment 1 were reviewed. However, as with the 24-inch pile source values, values from the Puget Sound projects were considered the most representative of source values because of similar substrate characteristics and are the only values considered in the Table 2-1 summary. Note that data from the Vashon Island project were acquired from 7m to 16m from the pile, and were normalized using a $15 \cdot \log_{10}(\text{range}/10\text{m})$ relationship.

RMS SPL

Average RMS source values for three Puget Sound projects ranged from 192 dB to 196 dB. The minimum average value reported for any one pile is 192 dB (Eagle Harbor Ferry Terminal) and a maximum average reported of 196 dB (Vashon Island Ferry Terminal, two piles). The RMS values from three Puget Sound projects were moderately higher than values measured from the California project considered, which reported a typical RMS value 190 dB. A conservative proxy RMS value is the weighted average value of 195 dB from the three projects in Puget Sound representing 263 pile strikes. This value would be a reasonable worst case ensuring that noise levels modeled would have a high likelihood of not exceeding this value.

Peak SPL

Average peak SPLs reported from the Puget Sound projects with available data ranged from 203 dB to 217 dB (n=3 projects) on a per-pile basis, with a computed weighted average of 214 dB. Levels from three piles at Eagle Harbor Ferry Terminal range from 7 to 11 dB quieter than those measured at two other Puget Sound sites, indicating a significant variability between sites. The typical peak SPL reported for the single California project was 205 dB, which was noted to be on the lower end of the range of data reported from Puget Sound, although the number of pile strikes was not reported, thus this data were not included in the weighted average for 30” peak values. The 90% weighted cumulative probability value of 216 dB was chosen as a reasonable and conservative proxy value.

SEL

Average per-pile SEL values were reported for the two Puget Sound Projects representing 214 pile strikes; the Eagle Harbor project did not report single strike SEL levels, and a California project did not report any SEL levels. SEL values from the two applicable projects ranged from

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182 dB to 187 dB with an overall weighted average of 186 dB. Thus, a reasonable conservative SEL source value for future projects in Puget Sound is 186 dB derived from the weighted value of reported Puget Sound levels.

2.1.3.3 36-INCH STEEL PILE IMPACT DRIVING SOURCE VALUES

Data for 36-inch steel pipe piles were available from three marine pile driving projects in Puget Sound, Washington and one project from Humboldt Bay along the California coast (Attachment 1 in Appendix A). All projects installed piles with a diesel hammer. The Humboldt Bay project did not report number of pile-strikes, and furthermore, this pile was only measured by re-striking a pile that had already been driven. Therefore, this project was excluded from the 36-inch average value computations. Data from two piles measured during the NBK Bangor Test Pile Program were at 11m and 20m from the pile, and were normalized using a $15 \cdot \log_{10}$(range/10m) relationship.

RMS SPL

Average RMS source values for the three Puget Sound projects ranged from 185 dB to 196 dB, representing 662 pile strikes, the full range of which were observed during the Test Pile Program at NBK Bangor project. The weighted average value for these projects was 192 dB, and represents a reasonable proxy RMS value for impact driven 36-inch piles. The average RMS value of 193 dB reported for the 36-inch pile from the Humboldt Bay Bridge project in California fell within the range of values for the three Washington 36-inch pile projects reviewed, although as previously discussed, this value was not included in the averaging calculations. Considering just the Test Pile Program at Bangor, 121 pile strikes produced a set of measurements ranging from 185 to 196 dB, with a weighted average value of 194 dB.

Peak SPL

Average peak SPLs reported from two Puget Sound projects ranged from 202 dB to 211 dB on a per-pile basis, representing 541 pile strikes. Average peak values were not reported for the NBK Bangor project. A proxy peak value of 211 dB was chosen representing the 90% cumulative probability SPL.

SEL

Average SEL values were reported for three Puget Sound projects, with 662 pile strikes measured. SEL values ranged from 173 dB to 186 dB with an overall weighted average of 184 dB, the recommended proxy value for piles driven in Puget Sound. Only one value was reported for the Humboldt Bay project, 183 dB, which was within the range of values reported in Puget Sound. A reasonable conservative SEL source value for future projects in Puget Sound is 184 dB derived from the weighted average of three Puget Sound projects. Analyzing data from just the NBK Bangor project resulted in a weighted average value of 181 dB, with a data range of 173 to 183 dB.

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2.1.3.4 COMBINED STEEL PIPE IMPACT DRIVING SOURCE VALUES

Review of RMS, average peak, and SEL values for steel pipe piles of 24, 30, and 36-inches shows that often only slight differences are noted across the three sizes (see Table 2-1). In some cases, weighted average values for smaller piles are higher than for larger piles, even if by only one or two decibels. For this reason a combined analysis was done for each of the metrics to investigate the potential value of preparing overall average values over multiple sizes of steel pipe piles. Each of the metrics is discussed in the following paragraphs.

RMS SPL

Average RMS values over 24, 30, and 36-inch piles ranged from 181 dB to 198 dB, although weighted averages were very close, 193, 195, and 192 dB, respectively, with an overall weighted average value of 193 dB. 30-inch piles (three projects located in Puget Sound, not including any NBK Bangor projects) produced average RMS levels of 195 dB, higher than both 24-inch and 36-inch average values. Even though few piles and a lower number of pile strikes were measured with 30-inch piles, the scatter in the points measured only ranged from 192 to 196 dB, without a large deviation. 24-inch and 36-inch piles have larger data sets, but nonetheless, the recommended proxy value for each of these sizes is only a few decibels different. Figure B-4 in Appendix B graphically shows how the scatter for each pile size compares with other pile sizes. While it is reasonable to assert that RMS impact values for steel pipe piles can be represented by a single, composite value of 193 dB, additional data is recommended to be collected to increase the size of the analysis sample set.

Peak SPL

Peak SPL values varied over a broader range than RMS values, although 24- and 36-inch 90% cumulative probability results were within 1 dB, representing 1,669 pile strikes. 30-inch results were measurably higher than either 24- or 36-inch data, represented by fewer piles, and fewer strikes (263 strikes). Furthermore, 30-inch pile data is somewhat bi-modal in behavior, with three values near 203 to 204 dB, and four in the 211 to 217 dB range, and nothing in between. Figure B-11 in Appendix B graphically shows the distribution of levels by pile size. Three piles represented in the 211 to 217 dB range were measured from distances other than the standard 10 meter de facto measurement range, which were corrected using the traditional practical spreading model. Although not necessarily incorrect, this serves to increase the uncertainty of those measurements. Since none of the 30-inch (nor 24-inch measurements) represent data acquired directly from NBK projects, it makes sense to prepare a broader analysis to consider different pile sizes for the purpose of increasing confidence in the estimated peak values. The 90% cumulative distribution value for all 24-, 30-, and 36-inch applicable projects is 211 dB, represented by 1,932 pile strikes, and is the recommended proxy value for NBK Bangor projects, especially those using 24-inch and 30-inch steel pipe piles, until such time that Bangor-specific data can be acquired using these pile sizes.

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Weighted average SEL values for 24-, 30-, and 36-inch piles also resulted in somewhat anomalous data with 30-inch steel pipe piles, with both 24-inch and 36-inch data producing lower values. As described above, the 30-inch data set includes range corrected values, and furthermore, only represented 4 piles, since single strike SEL values were not reported for one of the Puget Sound projects (Eagle Harbor Ferry Terminal). Figure B-16 in Appendix B shows the data grouping by pile size. This gives rise to increased uncertainty in the 30-inch average vales.

There is some evidence that SEL values for 36-inch piles at NBK Bangor (182 dB, weighted average) is lower than a proxy value including Puget Sound projects (184 dB). This conclusion is drawn from a modest sample size (4 piles, 121 strikes) of NBK Bangor measurements. Similar analyses could not be done with 24- and 30-inch piles, since these data did not exist for NBK Bangor projects.

Taken in summary, there is motivation to compute a single proxy value for all 24-, 30-, and 36-inch steel pipe piles, but this approach is not recommended at this time due to the uncertainty in the data scatter, and different results among RMS, SEL, and peak metrics. Additional data should be collected before using combined analyses.

2.1.3.5 18-INCH CONCRETE PILE IMPACT DRIVING SOURCE VALUES

Attachment 2 in Appendix A lists three marine nearshore projects that monitored sound levels during installation of 18-inch or similar (16-inch) concrete piles, none of which were conducted in Puget Sound. Two projects were conducted at the Berkeley Marina in San Francisco Bay, California, one in 2007 and one in 2009 using 18-inch concrete piles. Acoustic measurements were only collected for four piles total for both projects. Water depth was fairly shallow ranging from 3 to 4 meters. Source levels for each metric reviewed are discussed below. Another project located near Concord, CA at the Naval Weapons Station (NWS) drove five 16-inch concrete piles, with water depth of 10 meters. Source values for this project were similar to those for the Berkeley Marina projects, and thus data from the Concord NWS were included in the analysis. Table 2-1 summarizes unattenuated impact pile driving source data from Attachment 2 and highlights recommended proxy source values. Since the number of pile strikes for all concrete projects were not reported, pile averages were computed.

RMS SPLs

Average RMS values for three projects using 16 or 18-inch concrete piles ranged from of 158-173 dB (Table 2-1), with an average RMS value of 170 dB over 9 piles, selected as a conservative value likely to encompass the maximum extent of the area exceeding the behavioral thresholds and guidance for marine mammals, fish and marbled murrelets. No concrete pile levels exceed the RMS injury thresholds established for marine mammals (180 dB RMS for cetaceans and 190 dB RMS for pinnipeds).

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Peak SPLs

Average peak SPLs reported for all piles at the Berkeley Marina projects ranged from 172 dB to 188 dB. Because only three projects with relatively small samples sizes were available for review, a per-pile average value of 184 dB was chosen as the recommended SPL proxy value for all piles. This value is below the threshold for the onset of injury in fish (206 dB). Table 2-1 summarizes the values from these projects.

SEL

Two average SEL values of 155 and 159 dB were reported for the two Berkeley marina projects, both with very small sample sets ranging from 147 dB to 163 dB. SEL data were not acquired for the Concord NWS project. The per-pile average value of 159 dB SEL was selected as the most conservative proxy value available for 18-inch concrete piles until additional data are obtained.

2.1.3.6 24-INCH CONCRETE PILE IMPACT DRIVING SOURCE VALUES

Only one value from a single 24-inch concrete pile was available for the Mukilteo Ferry Terminal in Puget Sound. Therefore, we reviewed seven additional marine projects: six in San Francisco Bay, California, and one in Humboldt Bay, California (Attachment 2 in Appendix A). Note that some of the San Francisco Bay projects included data from the same site in two different time periods. Two projects (Humboldt State Floating Dock and Pier 40 Marina) included piles that were driven using a jetting technique, often in combination with a reduced level of fuel to minimize driving energy. Piles driven under these circumstances were not included in the calculation of piles averages. Table 2-1 summarizes unattenuated impact pile driving source data from Attachment 2 and highlights recommended proxy source values.

RMS SPLs

The one pile in Puget Sound reported a maximum RMS value of 170 dB, with average values reported for the California projects ranging from 167 dB RMS to 179 dB RMS. The recommended proxy source value was chosen from the highest average pile value over all projects, 174 dB RMS (Table 2-1). No concrete pile noise levels exceed the RMS injury threshold established for pinnipeds (190 dB RMS), nor the RMS injury threshold for cetaceans (180 dB RMS).

Peak SPLs

Average Peak SPLs reported for projects ranged from approximately 180 dB to 191 dB. The per-pile 90% cumulative probability value of 188 dB was chosen as the recommended proxy peak SPL value. This value is below the peak threshold for the onset of injury in fish (206 dB). Table 2-1 summarizes the values from the two projects.

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SEL

Sound exposure levels were only reported for six of the eight projects reviewed, with per-pile values ranging from 158 dB to 167 dB (Table 2-1). The pile SEL average over all projects of 164 dB was considered representative of a conservative average SEL source value for 24-inch piles.

2.1.4 Vibratory Pile Driving Source Values

NMFS has established non-impulsive injury thresholds (180 dB RMS for cetaceans, 190 dB RMS for pinnipeds) and a disturbance threshold (120 dB RMS) for marine mammals. Vibratory driving is considered a non-impulsive sound source. Attachment 3 in Appendix A contains a list of vibratory projects and derived proxy source values we reviewed in order to calculate how far sound from vibratory driving exceeds the thresholds discussed in Section 1.2.1. Table 2-2 presents the summary of vibratory pile driving data from the projects reviewed. Due to the similarity in levels across multiple projects, 16-inch and 24-inch piles were considered together, and 30-inch and 36-inch piles were considered together.

Table 2-2. Vibratory Pile Driving SPLs.*
Recommended Proxy Source SPLs at 10 m Bolded.

Pile Size and Type	Number of Projects Considered[1]	Range of Average RMS dB re 1µPa @ 10 meters	Reasonable Source Level dB re 1µPa dB @ 10 meters
Timber			
12-inch	1	152-155[2]	**153[2]**
Steel Pipe			
16-inch and 24-inch	4	Bangor 153-162 All projects 159-162	**161**
30-inch and 36-inch	7	Bangor 166 All projects 159-172	**NBK Bangor 166** **Other Puget Sound Locations 167**
Steel Sheet			
24-inch	3	160-163**	**163**

[1]See Attachment 3 for projects reviewed.
[2]Data reported at 16m, converted to equivalent range of 10m using 15Log$_{10}$[16/10] range correction factor.
* Recommended values for 10 meters unless otherwise indicated.
**Highest value for pile; value includes some averages from only top or bottom depth measurements and one from top and bottom averaged.

2.1.4.1 TIMBER PILE VIBRATORY DRIVING SOURCE VALUES

Only one timber pile study is available and only for noise measurements taken during extraction of one 12-inch diameter pile (see Attachment 3 in Appendix A). The highest RMS value was 152 dB measured at 16 meters (Table 2-2), with an average value of 150 dB reported at 16 meters.

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2.1.4.2 24-INCH DIAMETER STEEL PIPE PILE VIBRATORY DRIVING SOURCE VALUES

Two projects in Washington and one in California were reviewed for 24-inch diameter steel pipe piles. The Washington marine projects at the Friday Harbor Terminal and NBK, Bangor waterfront, only measured one pile each, but reported similar sound levels of 162 dB RMS and 159 dB RMS (range 157 dB to 160 dB), respectively (see Attachment 3 in Appendix A). Because only two piles were measured in Washington, the California project was also included in the analysis. The California project was located in a coastal bay and reported a "typical" value of 160 dB RMS with a range 158 to 178 dB RMS for two piles where vibratory levels were measured. Caltrans summarized the project's RMS level as 170 dB RMS (Table I.2-3 in Caltrans 2012), although most levels observed were nominally 160 dB. A fourth project at NBK, Bangor drove 16-inch hollow steel piles, and measured levels similar to those for the 24-inch piles; therefore these data were included in the 24-inch analyses. Although the data set is limited to these four projects, close agreement of the levels (average project values from 159 to 162 dB at 10 meters) indicate similar vibratory conditions at NBK, Bangor. The highest project average of 162 dB was selected as the most reasonable proxy for 24-inch steel pipe piles. This number is higher than the data from the Bangor Test Pile Program and is therefore conservative.

2.1.4.3 30-INCH AND 36-INCH DIAMETER STEEL PIPE PILE VIBRATORY DRIVING SOURCE VALUES

Five projects were reviewed for 30-inch diameter piles and four projects were reviewed for 36-inch diameter piles, with a total sample set of seven projects since some projects used both 30-inch and 36-inch piles. All projects were located in Puget Sound. Because the 30-inch diameter pile average RMS measurements overlap (164 dB, 168 dB, 170 dB, and 171 dB) the measurements reported for 36-inch diameter piles at the Bangor waterfront, the Edmonds and Anacortes ferry terminals range (159 dB, 162.5 dB, 169 dB, respectively), the 30-inch and 36-inch pile data were combined for the review.

We reviewed data from Bangor waterfront projects for 30 and 36-inch piles, which were based on a large sample size relative to other projects (n~68 piles, Attachment 3). RMS vibratory average levels were consistently lower at Bangor than other Puget Sound locations. We recommend using the site-specific data average RMS level for modeling vibratory pile driving at NBK, Bangor, that is, the recommended RMS vibratory installation proxy source value 30-inch to 36-inch diameter piles is 166 dB. Because site specific data is unavailable for all other Navy installations in Puget Sound, we recommend the more conservative proxy value of 167 dB for other Puget Sound Navy sites, which represents the average level for all Puget Sound locations excluding NBK, Bangor for both 30-inch and 36-inch piles.

Table 2-2 summarizes the ranges for the combined size category. Table 2-2 presents reasonable proxy values expected from reviewing values taken from the highest average project SPL for all projects reviewed.

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2.1.4.4 24-INCH STEEL SHEET PILE VIBRATORY DRIVING SOURCE VALUES

Sound levels for vibratory sheet pile driving were reported for three Caltrans projects at the Port of Oakland in San Francisco Bay (see Attachment 3in Appendix A). No data were found for sheet pile driving in Puget Sound. RMS values were only available for one pile at one project and this had an average RMS value of 163 dB. The second project reported 1 sec SEL levels at 10 m for 5 vibratory driven sheet piles. The average per pile SEL ranged from 157 to 160 dB based on the average top and bottom depth measurements. Caltrans also reported 162 dB RMS as the highest average for a single depth for the same project. The third project reported 163 dB RMS (Table I.2-3 in Caltrans 2012). Caltrans reported 160 dB RMS as the typical sheet pile value for all three projects (Table I.2-2 in Caltrans 2012). Based on the levels from the three projects, 163 dB RMS value was used as a conservative proxy value.

2.2 AIRBORNE PILE DRIVING SOURCE VALUES

NMFS has established an in-air noise disturbance threshold of 90 dB RMS re 20µPa (unweighted) for harbor seals, and 100 dB RMS re 20µPa (unweighted) for all other pinnipeds. Attachment 4 and Attachment 5 in Appendix A list the impact and vibratory pile driving projects, respectively, that were reviewed. Most projects report A-weighted levels. For this review, however, only unweighted data were considered. Two airborne noise values are presented for most projects: L_{max} and L_{eq}, The L_{max} is the instantaneous highest sound level measured during a specified period, or maximum noise level. It typically represents a short duration average, usually 35 milliseconds. Because impact pile driving is an impulsive sound with short durations, the signal is most appropriately characterized by the L_{max} value. Proxy values for impact driving are found in Attachment 4.

The L_{eq} is the equivalent steady-state noise level in a stated period of time. It contains the same acoustic energy as the time-varying noise level during the same period. L_{eq} is primarily used for a steadier, non-impulsive noise. The L_{eq}, which averages the source over a period of time, is a better descriptor for non-impulsive sound like vibratory pile driving. These values are listed in Attachment 5 for vibratory pile driving and Table 2-3 summarizes L_{max} and L_{eq} data.

Review of the available literature provided two unweighted L_{max} levels, both from the NBK Bangor Test Pile Program. A maximum level of 112 dB re 20 µPa was measured for 36-inch piles (n=9 piles), at the de facto measurement distance of 50 feet, and was therefore chosen as a conservative proxy value for piles 30 and 36-inches. A maximum level of 110 dB was measured for a single 24-inch pile, and was selected as the most representative value for modeling analysis.

Unweighted RMS L_{eq} values of 88 dB were obtained from vibratory pile driving 18-inch steel pipe piles. A single 30-second measurement was made for 24-inch piles during the Test Pile Program at NBK, Bangor. These data fit the overall trend of smaller and larger pile sizes. The limited data set for 24-inch steel pipe, supports a reasonable representative proxy value of 92 dB.

Limited data were available for 30 and 36-inch piles. One 30-inch pile measured at the Keystone ferry terminal fell within the range of 36-inch piles measured at Bangor., although the

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average value for this was 2 dB above the average value measured at Bangor. Levels measured at Vashon Island ferry terminal were made using A-weighted filters, and adjusted for range and filter type. Even after corrections were made observed levels were significantly lower than other sites, thus these data were not considered for further analysis. We therefore selected 95 dB (unweighted) as the representative L_{eq} average proxy value for 30-inch and 36-inch piles. Based on the limited data available, the RMS L_{eq} value for 18-inch steel pipe piles was chosen as the proxy source value for vibratory installation or removal of piles less than 24-inch regardless of pile type. The RMS L_{eq} value for 24-inch steel pipe piles was chosen as the best estimate for 24-inch sheet piles.

Table 2-3. Summary of Airborne Source Levels. Recommended Proxy Source Values Bolded.[1]

Pile Type	Size (diameter in inches)	Installation Method	
		Impact RMS L_{max} (Unweighted) Impact	Vibratory RMS L_{eq} (Unweighted) Vibratory
Timber	12-inch	---	---
Steel Pipe	18-inch	---	**88**
	24-inch	**110**[2]	**92**[2]
	30-inch	---	**95**
	36-inch	**112**	**95**
Steel Sheet	24-inch	---	---

Notes: All values relative to 20µPa and at 15 m (50 ft) from pile.
[1]See Attachments 4 and 5 in Appendix A for projects reviewed.
[2] Limited data set.

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3.0 EVALUATION OF POTENTIAL BUBBLE CURTAIN SOUND ATTENUATION

To reduce noise produced from impact pile driving, bubble curtains are used around the pile as it is driven and can be confined or unconfined. Confined bubble curtains place a fabric shroud or rigid sleeve around the pile to hold air bubbles near the pile, ensuring they are not washed away by currents or tidal action. They are recommended when water velocities are 0.6 meters (1.6 feet per second) or greater (NMFS 2008).

None of the project locations at Naval Base Kitsap, Naval Magazine Indian Island, Naval Station Everett, Naval Air Station Whidbey Island Seaplane Base, Manchester Fuel Depot are in high current areas; therefore, this discussion focuses on unconfined bubble curtains. Unconfined bubble curtains involve use of pressurized air injected from an air compressor on the pile driving barge through small holes in aluminum or PVC pipe around the driven pile. Noise reduction results from unconfined bubble curtains were reported from several projects. There was a wide range of effectiveness from very little measurable attenuation in some cases to high attenuation in others (Illingworth and Rodkin 2001; WSDOT 2013). Caltrans (2009) summarized the application of unconfined bubble curtain systems in various California projects and reported from 1 to 5 dB of attenuation in high current situations and 5 to 15 dB of attenuation in low current situations. Application of a multiple-ring system in a deep water, strong current setting (Benicia-Martinez Bridge) achieved 15 to more than 30 dB attenuation when driving 8-foot diameter piles. Because some sound pressure waves also propagate from the pile through the substrate and reenter the water column, not all sound pressure waves will be attenuated by a bubble curtain (Reinhall and Dahl 2011). Variability in bubble curtain performance when measured at various distances out from the pile is likely explained by the sound propagation properties of various substrates, the localized bathymetry, as well as variances in embedment depths of piles.

3.1 NOISE ATTENUATION ASSUMPTIONS FOR ACOUSTIC MODELING

The Navy conducted a Test Pile Program at Naval Base Kitsap, Bangor where attenuation of an unconfined bubble curtain was measured when driving 24-inch, 36-inch, and 48-inch steel pipe piles.[5] It should be noted that attenuation measurements were not conducted at EHW-2, and are therefore excluded from calculations herein.[6] Calculations for attenuation were made by calculating the amplitude ratio reduction of the pressure metric with the bubble curtain on compared to the bubble curtain off measurements, and then converting the ratio into a decibel value. Weighted values are computed for each metric based on the number of strikes measured. All measurements were taken from the nominal 10 meter de facto distance from the pile.

[5] Illingworth and Rodkin, 2012
[6] Attenuated measurements from pile installation at EHW-2 in 2012 were similar to nonattenuated measurements from test piles installed in 2011 at the project site, indicating a nonfunctional bubble curtain. Most commonly observed problems reported for non-functional bubble curtains reflect inadequate air-flow or poor seating of the bottom of the curtain at the water-sediment boundary resulting in a non-attenuated sound path.

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The sole 24-inch pile in this project was struck a total of 3 times with the bubble curtain turned on. Therefore, the results are unlikely to be indicative of values that would be obtained on this site with more extensive measurements and are not considered further in this review. Piles for which fewer than 10 strikes were measured were also excluded. It is recommended to acquire a larger 24-inch data set to obtain a better synopsis for these results.

For 36-inch piles the weighted average peak, RMS, and SEL reduction with use of the bubble curtain was 10 dB, where the averages of all bubble-on and bubble-off data were compared (see Table 3-1 below). This data set represents 2 piles, for a total of 165 strikes. For 48-inch piles, the weighted average pressure reduction for RMS, peak, and SEL with use of a bubble curtain was 8 dB, representing 138 strikes. Across all piles (36" and 48") and all metrics (RMS, peak, SEL), the weighted average attenuation was 9 dB.

Table 3-1. Reduction (dB) in Weighted Average Noise Values for Impact Pile Driving of Steel Piles with a Bubble Curtain. Measured at 10 Meters Averaging Mid-Depth and Deep-Depth Data. Measurements Obtained during Bangor Naval Base Test Pile Program.

Pile Size	**Attenuation Level (RMS)**		**Attenuation Level (Peak)**		**Attenuation Level (SEL)**		**Weighted Average (all metrics)**
	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	
36-inch	9	9	11	11	10	10	10
48-inch	7	7	9	9	7	7	8
					Overall weighted average		9
Source: Illingworth & Rodkin 2012							

We also reviewed unconfined bubble curtain attenuation rates from available reports from projects in Washington, California, and Oregon that impact drove steel pipe piles up to 48-inches in diameter. Table 3-2 contains a summary of the attenuation levels reported. Several studies were reviewed, but not included in the summary because they were not considered representative. Excluded studies were:

- Willamette River Bridge Project (Caltrans 2012). Bubble curtain was poorly designed and deployed in a river with a high current. No RMS SPLs reported.
- South Umpqua River (Caltrans 2012). Current conditions resulted in little coverage of piles by bubble curtain. No RMS SPLs reported.
- Ten Mile River Bridge Project (Caltrans 2012). 30-inch piles driven with bubble curtain, but inside of cofferdam.

Of the remaining studies reviewed, significant variability in attenuation occurred; however, an average of at least 8 dB of peak SPL attenuation was achieved on ten of the twelve projects (Table 3-2). Some of the lower attenuation levels reported were attributed to the bottom ring not seated on the substrate, poor airflow, or currents that resulted in an uneven distribution of bubbles (WSDOT 2005a, WSDOT 2005b, Caltrans 2012).

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Table 3-2. Summary of Attenuation Levels Reported with Unconfined Bubble Curtains During Impact Driving of Steel Pipe Piles up to 40-inches Diameter.

Project/Location	Steel Pipe Pile Diameter	Range (dB)	Mean Peak dB re 1µPa @ 10 m	Standard Deviation (dB)
Friday Harbor Ferry Terminal Restoration/ San Juan Island marine waters, WA[1]	24-inch 30-inch	0-5	2	2.2
Bainbridge Island Ferry Terminal Preservation/ Puget Sound marine waters, WA[1]	24-inch	3-14	7	4.7
Cape Disappointment Boat Launch Facility, Wave Barrier Project/ Columbia River, Illwaco, WA[1]	12-inch (n=5*)	6-17	11	4.9
Mukilteo Ferry Terminal Test Pile/Puget Sound marine waters, WA[1]	36-inch (n=2)	7-22	15	10.6
Anacortes Ferry Terminal Dolphin Replacement/Puget Sound marine waters, WA[1]	36-inch (n=7)	3-11	8	3.1
SR 520 Test Pile Project/Lake Washington/Portage Bay (freshwater), WA[1, 2]	24-inch (n=4) 30-inch (n=2)	3-32	20	11.1
Columbia River Crossing Test Pile Program/Columbia River, WA/OR[3]	24-inch (n=1)	---	10	---
Tesoro's Amorco Wharf/San Francisco Bay, Martinez, CA[2]	24-inch (n=8 battered and n=18 vertical)	---	~10 dB (not well seated, stated capable of up to 15 dB and strong currents present at times and poor positioning on some piles)*	---
Deep Water-tongue Point Facility Pier Repairs/Columbia River, Astoria, OR[2]	24-inch (n=10)	5-22	14	---
Portland-Milwaukie Light Rail Project/Willamette River, Portland, OR[2]	24-inch (n=5)	8-27	---	---
Bay Ship and Yacht Dock/San Francisco Bay, Almeda, CA[2]	40-inch (n=2)	---	~10-15 (Not installed at the substrate at start of drive. Performance from part of drive when bubble curtain properly situated).*	---
Richmond-San Rafael Bridge Project/San Francisco Bay, CA[2]	30-inch (n=2)	---	9	---

Sources: [1]WSDOT 2013, Also, see individual report references for WSDOT; [2]Caltrans 2012; [3]CRC 2011.
*As reported by Illingworth and Rodkin in Caltrans 2012.

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In summary, bubble curtain performance is highly variable. Effectiveness depends on the system design and on-site conditions such as water depth, water current velocity, substrate and underlying geology. Installation and how well the curtain is seated on the substrate at the bottom are also important factors. To avoid loss of attenuation from design and implementation errors, our project has specific bubble curtain design specifications, including testing requirements for air pressure and flow prior to initial impact hammer use, and a requirement for placement on the substrate.

While bubble curtain performance is variable, we believe that, based on information from the Bangor Naval Base Test Pile Program, an average peak SPL[7] reduction of 8 dB to 10 dB at 10 meters would be an achievable level of attenuation for steel pipe piles of 36- and 48-inches in diameter. However, to be more conservative for 48 inch piles, use of 7 dB for both RMS and SEL metrics is justified.

[7] For most of the studies reviewed, Peak SPLs were the only metric reported.

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15) WSDOT. 2010. Underwater sound levels associated with driving steel piles for the State Route 520 bridge replacement and HOV project pile installation test program. Prepared by Illingworth and Rodkin, Inc. Available at http://www.wsdot.wa.gov/environment/air/piledrivingreports.htm.

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APPENDIX A

STUDIES REVIEWED FOR EVALUATION OF UNDERWATER PILE DRIVING SOUND

Proxy Source Sound Levels and Bubble Curtain Attenuation
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Appendix A: Studies Reviewed for Evaluation of Underwater Pile Driving Sound

Attachment 1. Impact Pile Driving SPLs from Studies Utilizing Steel Pipe/CISS Piles. Bolded values were considered for proxy source levels.

Project	Location	Number of Piles Measured	Hammer Type	Water Depth (m)	Distance (m)	RMS (dB re 1 µPa)	Peak (dB re 1 µPa)	SEL (dB re 1 µPa²s)
24-inch Steel Pipe								
Bainbridge Island Ferry Terminal[1]	**Bainbridge Island, WA**	**n=5**	**Diesel**	**2.1-3.4**	**10**	**Weighted Ave 195 Ave range 193-198**	**Weighted Ave 206 Ave range 202-209**	**Weighted Ave 181 Ave range 177-184**
Friday Harbor Ferry Terminal[2]	**Friday Harbor, WA**	**n=5**	**Diesel, pneumatic, hydraulic**	**10-14.3*, ****	**10**	**Weighted Ave 189 Ave range 181-193**	**Weighted Ave 207 Ave range 196-213**	**Weighted Ave 181 Ave range 176-185**
Bangor Test Pile Program[3]	Bangor Naval Base, WA	† n=1	Impact	4.6	10	Max 180	Max 193	Ave 167
Conoco/Phillips Dock [4]	Rodeo, San Francisco Bay, CA	n=2	Diesel	>5	10	Range 188-189	203 (unclear if this is average or ave max)	Typical 177 Range 177-178
Tesoro's Amorco Wharf-all values were attenuated-values reported are mostly unattenuated – strong currents present[4]	San Francisco Bay; Martinez, CA	(1st pile with poor attenuation)	Diesel	10-15	10	189	Max 209	174
Deep Water-Tongue Point Facility Pier Repairs[4]	Mouth of Columbia River; Astoria, OR	n=10	Diesel	unknown	10	Ave 182 Ave range 178-189	Ave max 198 Range 193-206 Max 207	Ave 168 Ave range 160-175
30-inch Steel Pipe								
Richmond-San Rafael Bridge, CALTRANS[4]	San Rafael, CA	n=4	Diesel	4-5	10	Typical 190 (max=192)	210 max (typical 205)	---
Eagle Harbor Maintenance Facility[5]	**Bainbridge Island, WA**	**n=3**	**Diesel**	**10**	**10 (n=2) 16 (n=1)**	**Weighted Ave 192 Ave range 192-193**	**Weighted Ave 204 Ave range 203-204**	**---*****
Friday Harbor Ferry Terminal #8[2]	**Friday Harbor, WA**	**n=1**	**Diesel**	**10.4***	**10**	**196**	**211**	**187**
Vashon Ferry Terminal[6,#]	**Vashon Island, WA**	**n=3**	**Diesel**	**11-12**	**10**	**Weighted Ave 195 Ave range 192-196**	**Weighted Ave 215 Ave range 212-217**	**Weighted Ave 186 Ave range 182-187**

Attachment 1. Impact Pile Driving SPLs from Studies Utilizing Steel Pipe/CISS Piles (continued). Bolded values were considered for proxy source levels.

Project	Location	Number of Piles Measured	Hammer Type	Water Depth (m)	Distance (m)	RMS (dB re 1 µPa)	Peak (dB re 1 µPa)	SEL (dB re 1 µPa^{2}s)
36-inch Steel Pipe****								
Humboldt Bay Bridge[4]	Humboldt Bay – Eureka, CA	CISS n=1, restrikes	Diesel	10	10-	193 (max)	210 (max)	183 (max)
Mukilteo Test Piles[7]	**Mukilteo, WA**	**n=2**	**Diesel**	**7.3**	**10**	**Weighted Ave 190 Ave range 187-191**	**Weighted Ave 205 Ave range 202-207**	**Weighted Ave 183 Ave range 180-184**
Anacortes Ferry[8]	**Anacortes, WA**	**n=7**	**Impact**	**12.8**	**10**	**Weighted Ave 192 Ave range 189-193**	**Weighted Ave 209 Ave range 205-211**	**Weighted Ave 185 Ave range 183-186**
Bangor Test Pile Program[3,#]	**Bangor Naval Base, WA**	**n=4**	**Diesel**	**13.7-26.8**	**10**	**Weighted Ave 194 Ave range 185-196**	**---^**	**Weighted Ave 181 Ave range 173-183**

Notes: Ave = Average.
* Substrate was sandy silt/clay.
** Substrate was sandy silt/rock.
*** Single strike SEL not reported.
****EHW-2 project at Bangor waterfront measured 24- and 36-inch piles; however, all piles were attenuated so they are not included in the table. 24-inch (n = 41) averages were: average peak = 199 (s.d. 9.58), average RMS = 179 (s.d. = 24.10), SEL = 170 dB (s.d. = 7.48). 36-inch pile (n = 26): average peak = 205 (s.d. = 4.33), average RMS = 188 (s.d. = 5.01), average SEL = 175 (s.d. = 5.11) (Navy 2013).
† 24-inch piles were not hit very hard, so these are not representative of the levels that may occur in the future or elsewhere.
\# distance to pile ranged above and below 10m. Data normalized to 10m using $15\log_{10}$(range/10m) relationship.
^ Average peak values not reported.

Sources:

[1] WSDOT 2005a
[2] WSDOT 2005b
[3] Navy 2012
[4] Caltrans 2012
[5] JASCO Research. 2005, WSDOT 2008
[6] WSDOT 2010b
[7] WSDOT 2007a
[8] WSDOT 2007b

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Attachment 2. Impact Pile Driving SPLs from Studies Utilizing Concrete Piles.
Bolded values were considered for proxy source levels.

Project	Location	Number of Piles Measured	Hammer Type	Water Depth (m)	Distance (m)	RMS (dB re 1 µPa)	Peak (dB re 1 µPa)	SEL (dB re 1 µPa^{2}s)
16-inch and 18-inch Piles								
Pier 2 Concord NWS[1] (16-inch square)	**Concord, CA**	**n=5**	**Drop Steam Powered**	**7**	**10**	**Ave 171 Ave range 167-173**	**Ave max 183 Ave max range 182-184 Max 184**	**N/A**
Berkeley Marina (2007) [1] (18-inch octagonal)	**Berkeley, CA**	**n=1**	**Diesel**	**2-3**	**10**	**Ave 159 Ave range 155-167**	**Ave max 172 Ave range 172-181 Max 181**	**Ave 155**
Berkeley Marina (2009) [1] (18-inch octagonal)	**Berkeley, CA**	**n=3**	**Diesel**	**2-3**	**10**	**Ave 169 Ave range 165-178**	**Ave max 189 Ave max range 184-192 Max 192**	**Ave 159**
24-inch Piles								
Mukilteo Ferry Terminal[2] (octagonal)	**Mukilteo, WA**	**n=1**	**Diesel**	**7-8**	**10**	**Ave 170 (single pile)**	**Ave max 184 Single pile**	**Ave 159 dB Range 159-170**
Amports Pier 95[1] (octagonal)	**Benicia, CA**	**Not provided**	**Diesel**	**3-7**	**10**	**Ave 170 Range 168-172**	**Ave max 184 Range 180-192 Max 192**	**N/A**
Pier 40 Marina[1] (square)	**San Francisco, CA**	**n=7**	**Diesel**	**3-4**	**10**	**Ave 171 Ave range 167-174**	**Ave max 184 Ave range 180-186 Max 186**	**N/A**
Berth 22 Port of Oakland (December 2004)[1] (octagonal)	**Oakland, CA**	**Several**	**Diesel**	**0-15 (dependent on row)**	**10 (mostly)**	**Ave 176*** Ave range*** 171-179 Max 181**	**Ave max 188*** Ave max range*** 183-191 Max 193**	**Ave 165*** Ave range** 162-167**
Berth 22 Port of Oakland (August 2004)[1] (octagonal)	**Oakland, CA**	**n=4**	**Diesel**	**10-13**	**10**	**Ave 175 Ave range during loudest part of drive 174-176 Max 178**	**Ave max 187 Ave max range during loudest part of drive 186-188 Max 190**	**Ave 165 Ave range during loudest part of drive 164-166 Max 168**

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Attachment 2. Impact Pile Driving SPLs from Studies Utilizing Concrete Piles (continued). Bolded values were considered for proxy source levels.

Project	Location	Number of Piles Measured	Hammer Type	Water Depth (m)	Distance (m)	RMS (dB re 1 µPa)	Peak (dB re 1 µPa)	SEL (dB re 1 $\mu Pa^2 s$)
Berth 32 Port of Oakland (2005)[1] (octagonal)	**Oakland, CA**	**n=2**	**Diesel**	**3-7**	**10**	**Ave 174 Ave range 172-176**	**Ave max 186 Ave max range 185-187 Max 187**	**Ave 163 Ave range 158-165**
Berth 32 Port of Oakland (2004)[1] (octagonal)	**Oakland, CA**	**n=5**	**Diesel**	**>10**	**10**	**Ave 173 Ave range 173-174**	**Ave max 185 Ave max range 184-185 Max 185**	**Ave 162 Ave range 161-163**
Humboldt State University Floating Dock****[1] **(octagonal)**	Humboldt Bay, Eureka, CA	n=3	Diesel	3-4	10	Ave 157 Ave range 156-158	Ave max 179 Ave max range 176-179 Max 179	Ave 148 Ave range 142-151

Notes: Ave = Average.
* For piles with fuel setting on high, no jetting.
**Pile with fuel setting on low, no jetting.
*** Average for row, not pile. Sound levels varied by depth. Only in-water sound levels reported in table (unattenuated values from Row A-D in Table 1.5-4 in Caltrans 2013).
****Piles jetted, so project data is not included in analysis.

Sources:
[1] Caltrans 2012
[2] WSDOT 2007a

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Attachment 3. Vibratory Pile Driving SPLs from Marine Projects.
Bolded values were considered for proxy source levels.

Project	Location	Number of Piles Measured	Water Depth (meters)	Distance (meters)	Mean RMS* dB re 1 μPa
12-inch Timber					
Port Townsend Dolphin Timber Pile Removal[1]	**Port Townsend, WA**	**n=1**	**---**	**16**	**Average 150 Range 149-152**
13-inch Steel Pipe					
Mad River Slough Pipeline Construction[2]	Mad River Slough, Arcata, CA	n=3	4.5-5.5	10	155
16-inch Steel Pipe					
EHW-1[3]	**Bangor, WA**	**n=8**	**9-12**	**10**	**162 Ave range 153-168**
24-inch Steel Pipe					
Friday Harbor[4]	**Friday Harbor, WA**	**n=1**	**2.6**	**10**	**162**
Trinidad Pier Reconstruction[2]	**Trinidad Bay, Humbolt County, CA**	**n=2**	**15.2**	**10**	**Typical 160 range 158-178**
Bangor Test Pile Program[5]	**Bangor Naval Base, WA**	**n=2 (1 pile vibed in and out)**	**4.6**	**10**	**160 Ave range 157-160****
30-inch Steel Pipe					
Edmonds[6]	**Edmonds, WA**	**n=2**	**6.4**	**10**	**165-166**
Keystone Ferry Terminal[7]	**Coupeville, WA**	**n=4**	**~9.4**	**10 11 6 11**	**Per pile values due to different distances (165 176 176 165) Ave 173 Ave range 165-176**
Vashon Ferry Terminal[8]	**Vashon Island, WA**	**n=4**	**<6**	**11-16**	**167 Ave range 160 - 169**
Port Townsend Test Pile Project[9, 10]	**Port Townsend, WA**	**n=1**	**8.8**	**10**	**170 Ave range 164-174**
EHW-1[3]	**Bangor, WA**	**n=35**	**9-12**	**10**	**168 Ave range 155-174**
36-inch Steel Pipe					
Edmonds Ferry Terminal[6]	**Edmonds, WA**	**n=2**	**5.8**	**11**	**Ave range 162-163**
Anacortes Ferry Terminal[11]	**Anacortes, WA**	**n=2**	**12.7**	**11**	**Ave range 168-170**
Port Townsend Test Pile Project[9, 10]	**Port Townsend, WA**	**n=1**	**9.5**	**10**	**172 159-177**
Bangor Test Pile Program[5]	**Bangor Naval Base, WA**	**n=~33**	**13.7-26.8**	**10**	**164 **** **Ave range 154-169**

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Attachment 3. Vibratory Pile Driving SPLs from Marine Projects (continued). Bolded values were considered for proxy source levels.

Project	Location	Number of Piles Measured	Water Depth (meters)	Distance (meters)	Mean RMS* dB re 1 µPa
24-inch AZ25 Steel Sheet					
Berth 23, Port of Oakland[2]	**Oakland, CA**	**n=1**	**~12-14**	**10**	**163*******
Berth 30, Port of Oakland[2]	**Oakland, CA**	**n=5**	**~12**	**10**	1-sec SEL**** = **159** **Ave range 157-160 (162 highest ave from bottom depth)**
Berth 35/37, Port of Oakland[2]	**Oakland, CA**	**---**	**15**	**10**	**163**

Notes: Ave = Average.
*WSDOT typically reports average of 30-second RMS values calculated over the duration of a drive.
** Average of all pile driving events.
***Involved only stabbing. Average reported by Caltrans Table I-1.2-3.
****RMS SPLs were not reported, but would be similar to SEL for 1 second. Average top and bottom depths.

Sources:
[1] WSDOT 2011a
[2]Caltrans 2012
[3]Miner 2012
[4]WSDOT 2010a
[5] Navy 2012
[6] WSDOT 2011b
[7]WSDOT 2010c
[8]WSDOT 2010d
[9] WSDOT 2010e
[10] Laughlin 2010
[11] WSDOT 2012
* Sound attenuation used water jetting and cushion blocks.
** Water jetting data were excluded from analysis data set.
[1] Caltrans 2012

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Attachment 4. Impact Pile Driving Lmax Airborne SPL Studies. Bolded projects were considered for proxy source levels.

Project	Location	Number of Piles Measured	Distance (meters/feet)	L_{max} dB re 20 µPa
12-inch Steel Pipe				
Cape Disappointment Boat Launch Facility, Wave Barrier Project[1]	Columbia River, Astoria, OR	1 at 50 m	50 m/164 ft	89 A-weighted
24-inch Steel Pipe				
Bangor Test Pile Program	**Bangor Naval Base, WA**	**1**	**15.2 m/50 ft** **121.9 m/400 ft**	**110 dB (109 dBA)** **95 dB (93 dBA)**
SR 520 Bridge Replacement Test Pile[2]	Portage Bay, Seattle, WA	2	11-15 m/36-49 ft	95-100 dBA
30-inch Steel Pipe				
Friday Harbor Ferry Terminal Restoration[3]	San Juan Island Area, Friday Harbor, WA	1	49 m/160 ft	---
SR 520 Bridge Replacement Test Pile[2]	Union Bay, Lake Washington, Seattle, WA	4	11-15 m/36-49 ft	103-106 dBA
36-inch Steel Pipe				
Bangor Test Pile Program[4]	**Bangor Naval Base, WA**	**---**	**15 m/50 ft**	**109 dB (s.d.=2.58)** **Range 106-112 dB**

Notes: All values unweighted unless indicated. Only unweighted values were considered for proxy values.

Sources:
[1] WSDOT 2006
[2] WSDOT 2010f
[3] WSDOT 2005b
[4] Navy 2012

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Attachment 5. Vibratory Pile Driving L_{eq} Airborne SPL Studies. Bolded projects were considered for proxy source levels.

Project	Location	Number of Piles Measured	Distance (meters/feet)	Average RMS L_{eq} dB re 20 µPa*	Average RMS L_{eq} dBA re 20 µPa*
18-inch Steel Pipe					
Wahkiakum Ferry Terminal [1]	**Columbia River, WA**	**1**	**15.2 m/50 ft***	**87.5**	
24-inch Steel Pipe					
Bangor Test Pile Program	Bangor Naval Base, WA	1	15.2 m/50 ft 121.9 m/400 ft	92 78 dB	85 72
SR 520 Bridge Replacement Test Pile[2]	Portage Bay, Seattle, WA	1	11 m/36 ft	88 dBA	---
30-inch Steel Pipe					
Keystone Ferry Terminal[1]	**Puget Sound, WA**	**1**	**15.2 m/50 ft***	**95 Range 93-96**	
Vashon Ferry Terminal Test Pile Project[1,3]	Puget Sound, Vashon Island, WA	2	15.2 m/50 ft*	~83-85**	~77-80 dBA*
36-inch Steel Pipe					
Bangor Test Pile Program[4]	**Bangor Naval Base, WA**	**---**	**15 m/50 ft**	**93 (s.d.=3.08) Range 89-102**	

Notes: All values unweighted unless indicated.
* Sound pressure levels standardized to 50 ft range. Measurements made at 11 meters
**Converted to C-weighted from A-weighted measurements to approximate unweighted sound level, reported at a distance of 26 to 36 feet.

Sources:
[1] WSDOT 2010g
[2] WSDOT 2010f
[3] WSDOT 2010d
[4] Navy 2012

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2) Illingworth and Rodkin, Inc. 2001. Noise and Vibration Measurements Associated with the Pile Installation Demonstration Project for the San Francisco-Oakland Bay Bridge East Span, Chapter 4. Prepared by Illingworth and Rodkin, Petaluma, CA. Prepared for the California Department of Transportation, Sacramento, CA.

3) JASCO Research. 2005. Sound pressure and particle velocity measurements from marine pile driving at Eagle Harbor maintenance facility, Bainbridge Island, WA. Prepared for Washington State Department of Transportation. November 2005. http://www.wsdot.wa.gov/NR/rdonlyres/1F219171-FB7D-4754-AE7B-C23D7EAA28F0/0/EagleHarborMaintFacRpt.pdf

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5) Minor, R. 2012. Hydroacoustic Monitoring Production Piles: PP30"X0.50" steel pipe piles, APE 200-6 vibratory driver/extractor; Falsework piles: PP16", APE 200-6 vibratory driver/extractor; Explosives Handling Wharf No. 1, October 7-27, 2011, Naval Base Kitsap, Bangor Washington. Report to Jayme Newbigging, P.E. Manson Construction and Engineering Company from Robert Miner Dynamic Testing, Inc. March 3, 2012.

6) Navy (U.S. Department of the Navy). 2012. Acoustic monitoring report Test Pile Program. Prepared for Naval Base Kitsap at Bangor, WA. Prepared by Illingworth and Rodkin, Inc., April 27, 2012.

7) WSDOT (Washington State Department of Transportation). 2005a. Underwater sound levels associated with pile driving at the Bainbridge Island Ferry Terminal preservation project. November 2005. http://www.wsdot.wa.gov/NR/rdonlyres/8AD90843-1DF0-48B7-A398-2A2BFD851CF8/0/BainbridgeFerryTerminal.pdf

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11) WSDOT 2007b. Underwater sound levels associated with pile driving during the Anacortes Ferry Terminal dolphin replacement project. April 2007. Available at http://www.wsdot.wa.gov/NR/rdonlyres/5AD837F4-0570-4631-979B-AC304DCC5FA0/0/AnacortesFerryTerminal.pdf

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13) WSDOT. 2010a. REVISED Friday Harbor Vibratory Pile Monitoring. Technical Memorandum prepared by Jim Laughlin for John Callahan and Rick Huey. Washington State Department of Transportation, Office of Air Quality and Noise, Seattle, Washington. March 15, 2010.

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15) WSDOT 2010c. Keystone Ferry Terminal – Vibratory pile monitoring. Technical Memorandum prepared by Jim Laughlin for John Callahan. Washington State Department of Transportation, Office of Air Quality and Noise, Seattle, Washington. May 4, 2010. Available at http://www.wsdot.wa.gov/NR/rdonlyres/B42B02E3-713A-44E1-A4A6-B9DDD0C9D28A/0/KeystoneVibratoryPileReport.pdf

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22) WSDOT. 2012. Underwater vibratory sound levels from a steel and plastic on steel pile installation at the Anacortes Ferry Terminal. March 2012.

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APPENDIX B

DATA CHARTS FOR MEASURED DATA AND CUMULATIVE PROBABILITY DISTRIBUTION FUNCTIONS

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Appendix B: Data Charts for Measured Data and Cumulative Probability Distribution Functions

Impact RMS

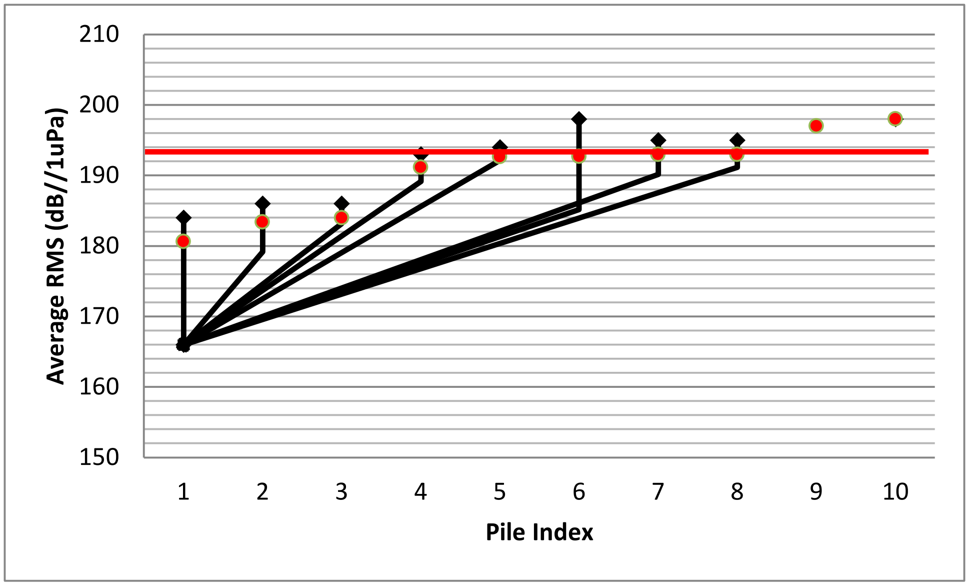

Figure B-1. 24-inch RMS Measurements

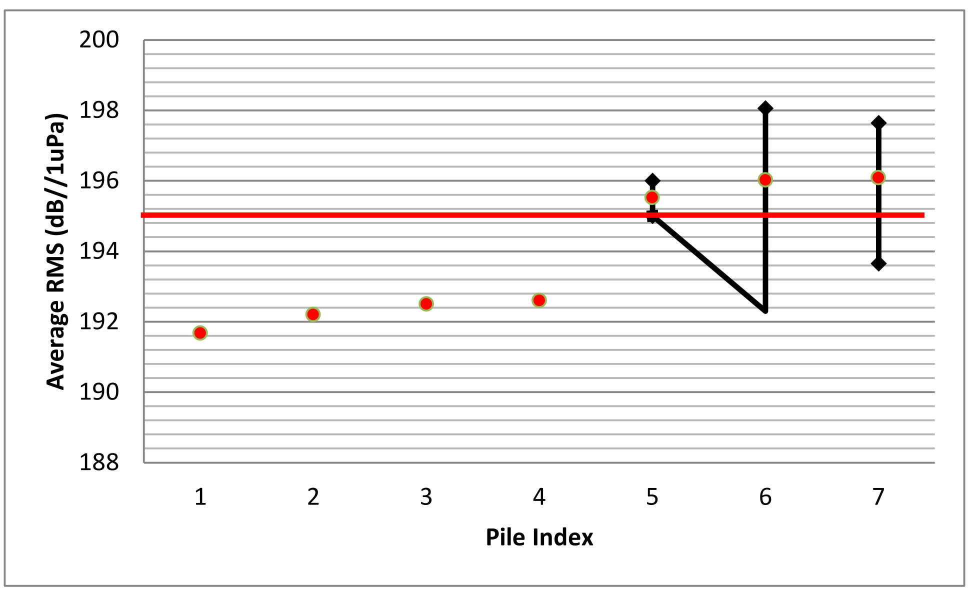

Figure B-2. 30-inch RMS Measurements

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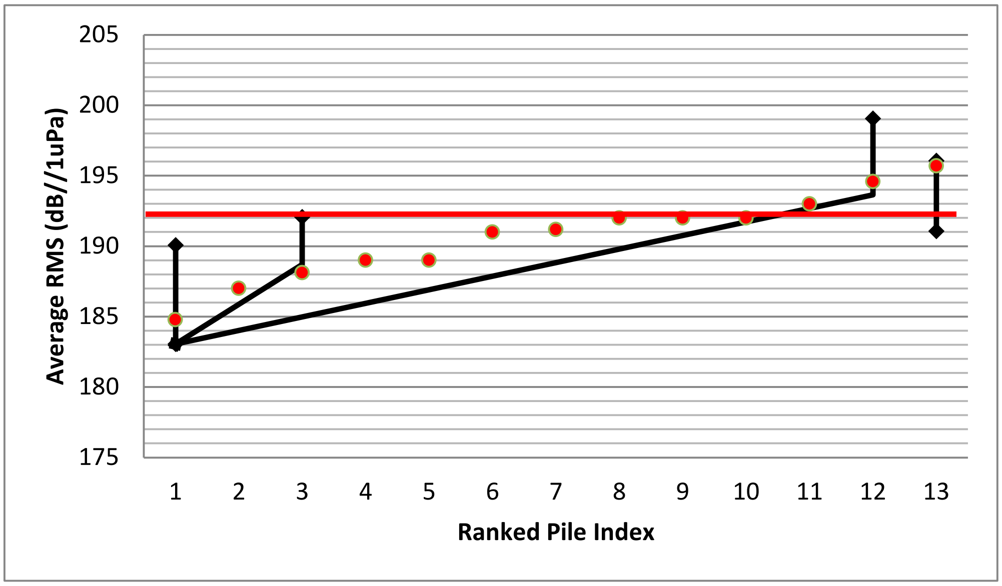

Figure B-3. 36-inch RMS Measurements

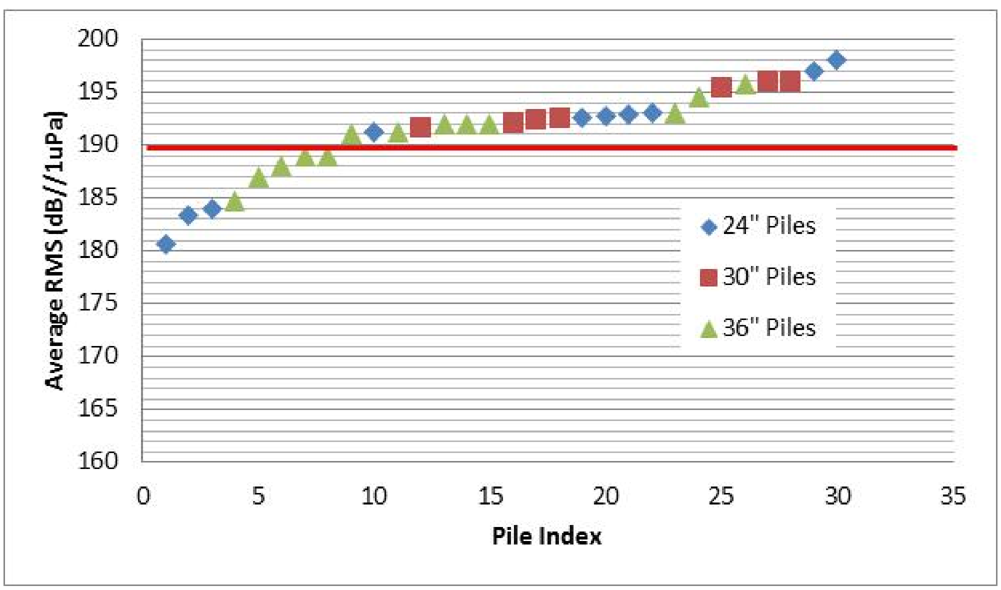

Figure B-4. Combined Analysis: 24, 30, 36-inch RMS Measurements

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Impact Average Peak

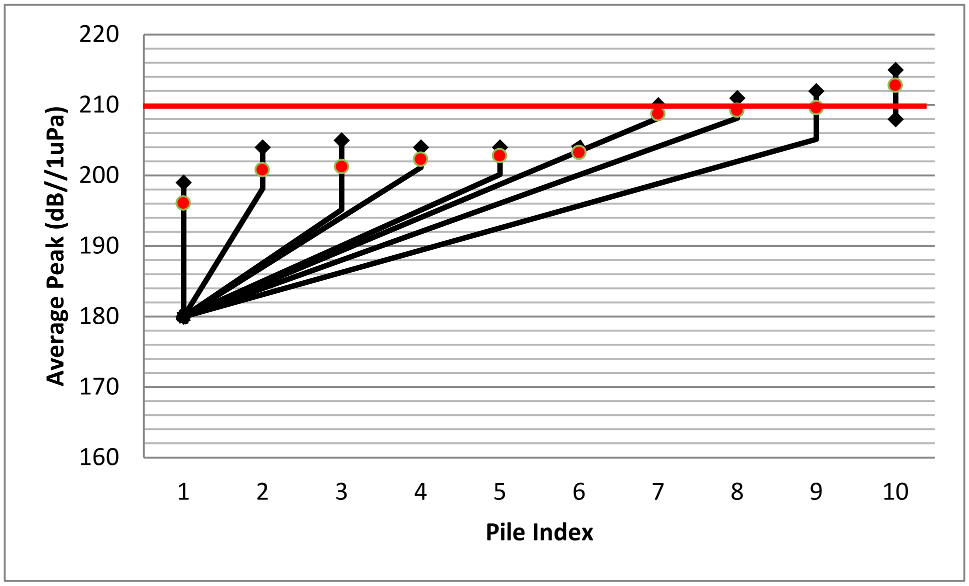

Figure B-5. 24-inch Average Peak Measurements

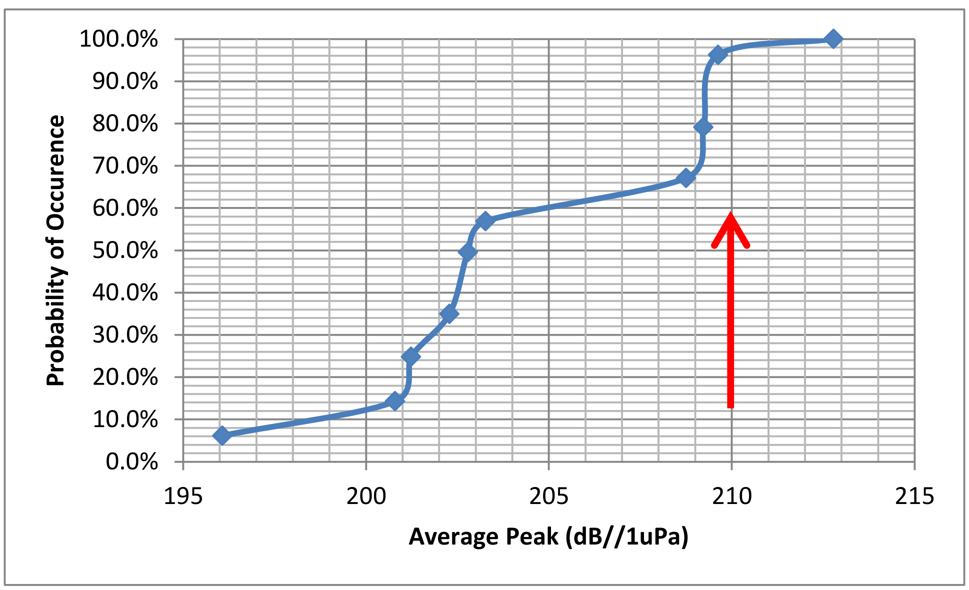

Figure B-6. 24-inch Average Peak Cumulative Distribution Function

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

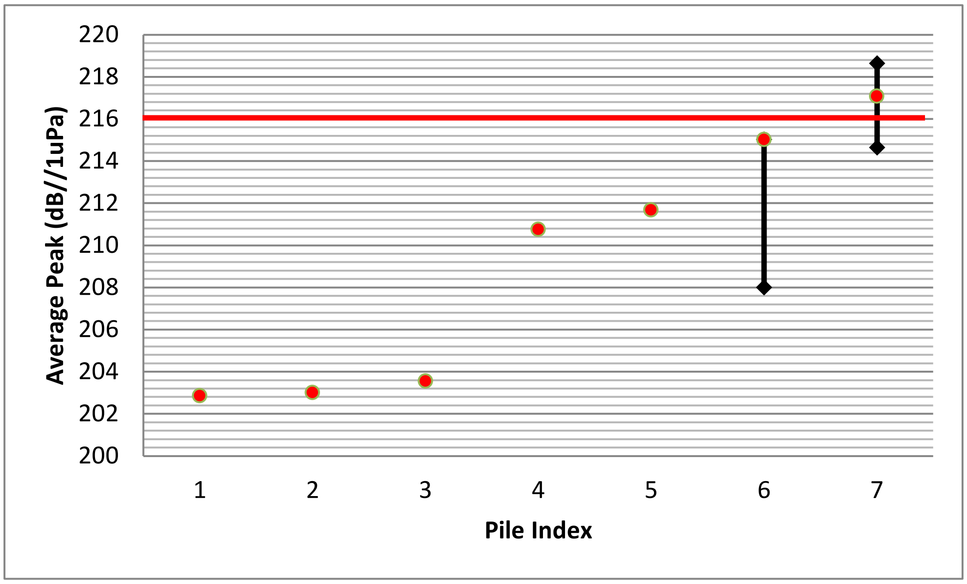

Figure B-7. 30-inch Average Peak Measurements

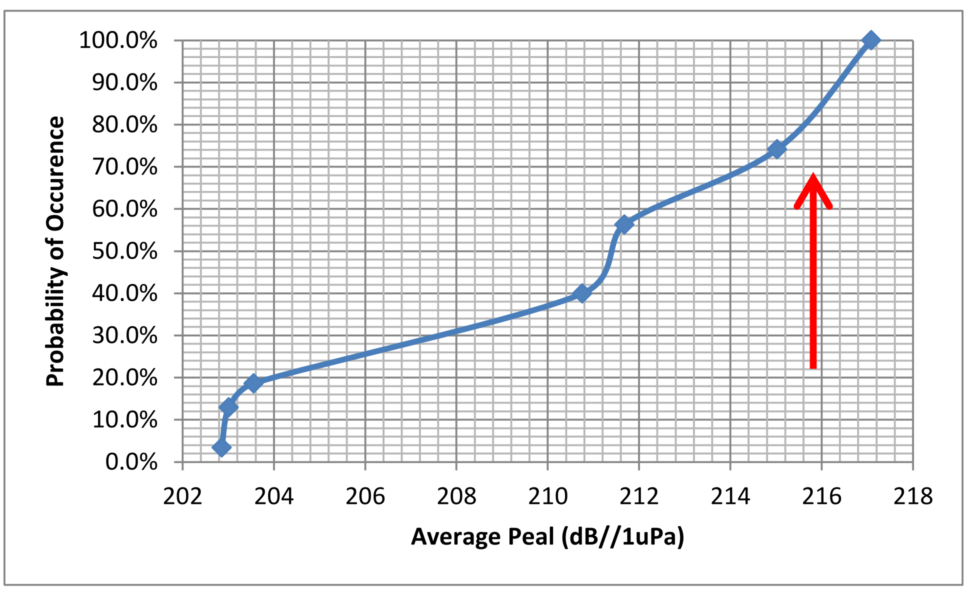

Figure B-8. 30-inch Average Peak Cumulative Distribution Function

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

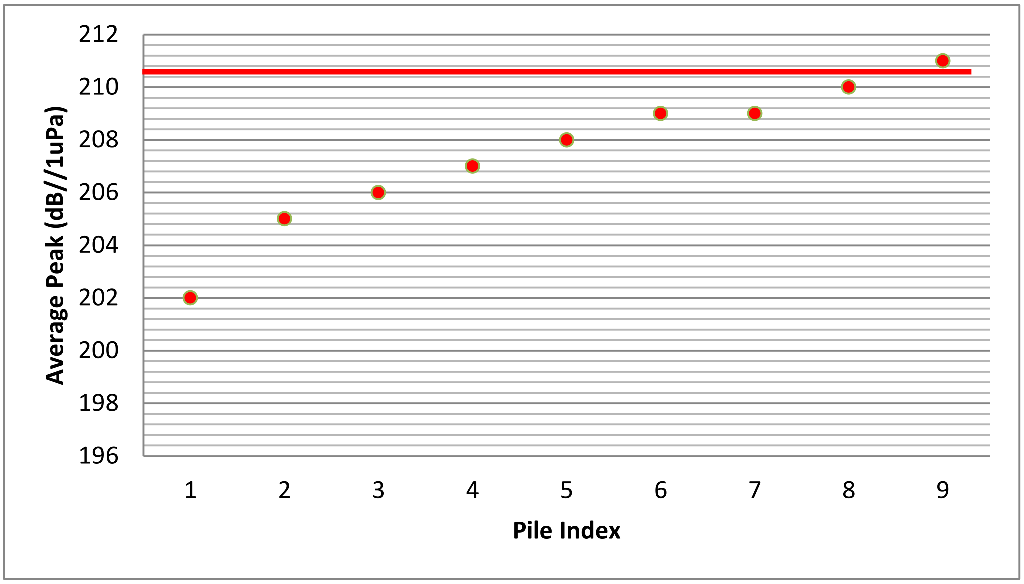

Figure B-9. 36-inch Average Peak Measurements

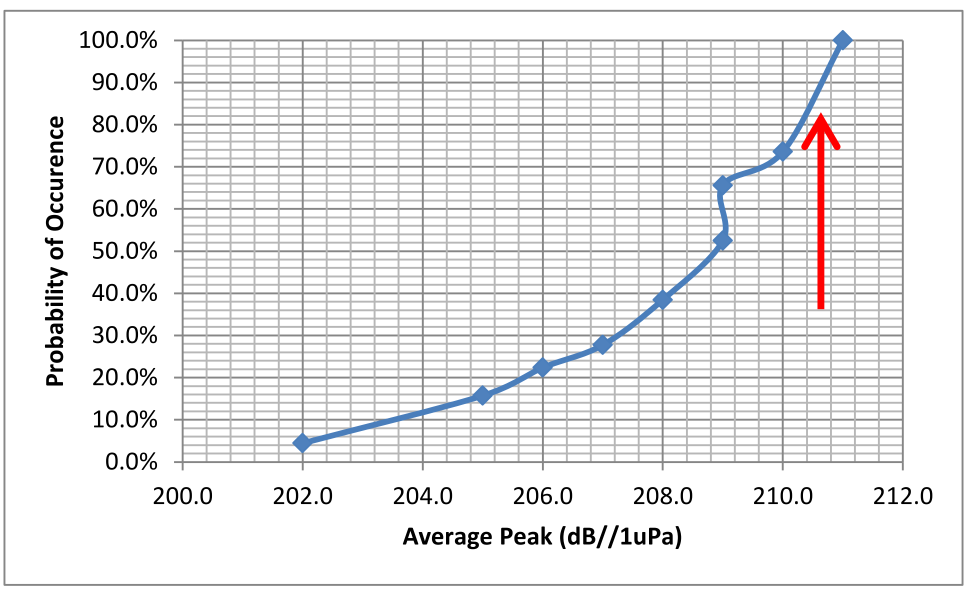

Figure B-10. 36-inch Average Peak Cumulative Distribution Function

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

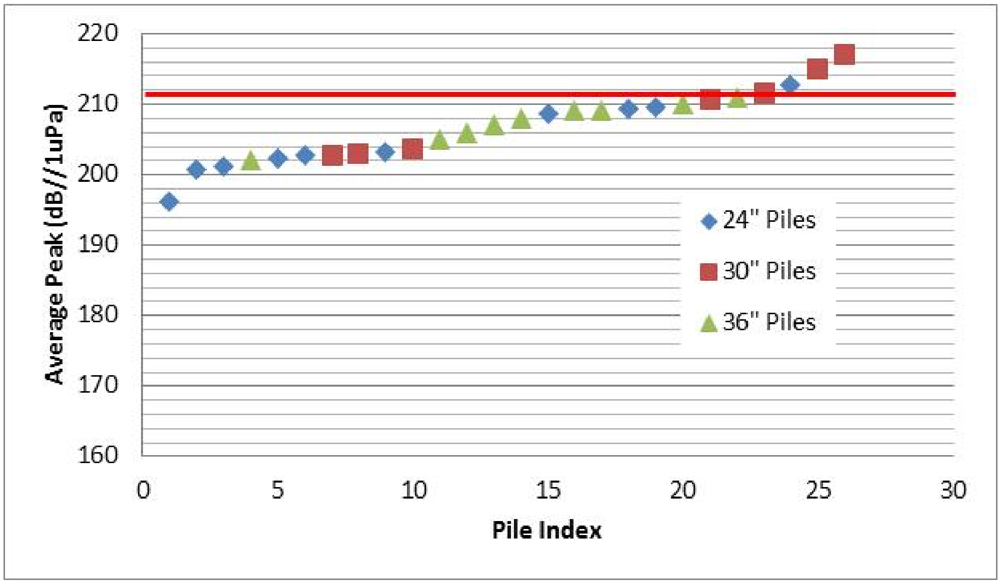

Figure B-11. Combined Analysis: 24, 30, 36-inch Average Peak Measurements

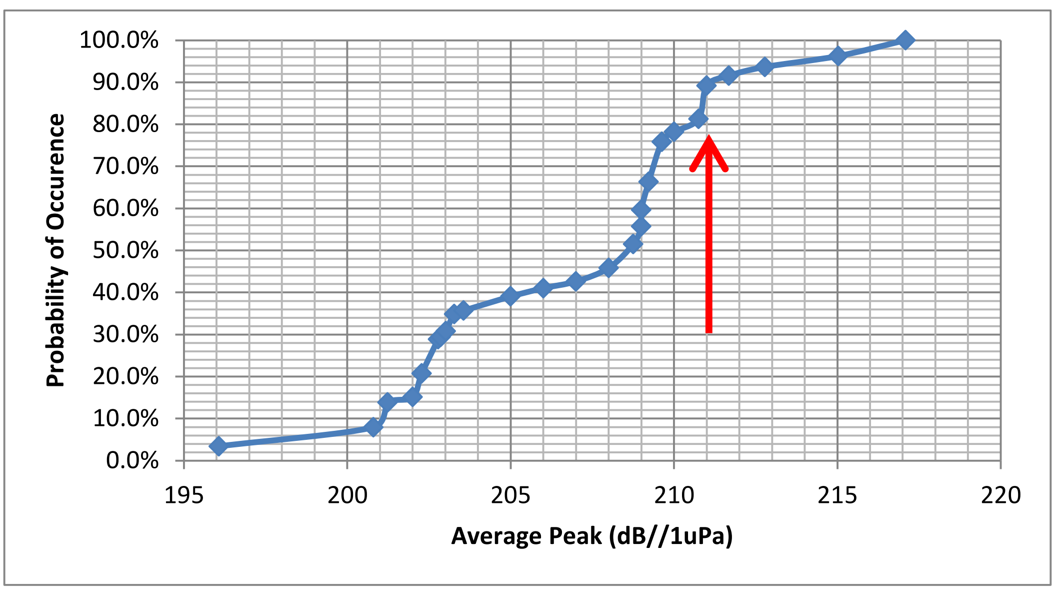

Figure B-12. Combined Analysis: 24, 30, 36-inch Average Peak Cumulative Distribution Function

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

Impact SEL

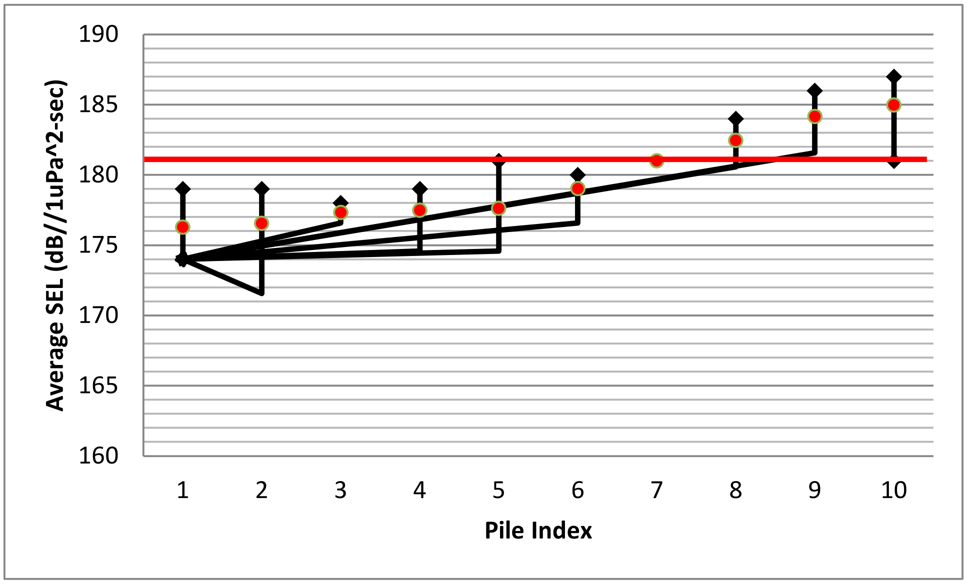

Figure B-13. 24-inch SEL Measurements

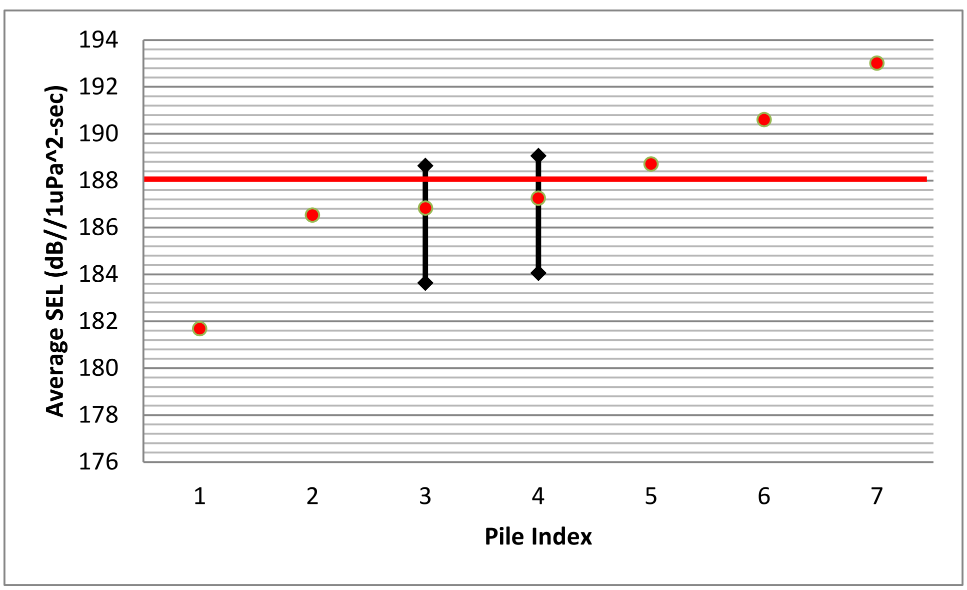

Figure B-14. 30-inch SEL Measurements

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

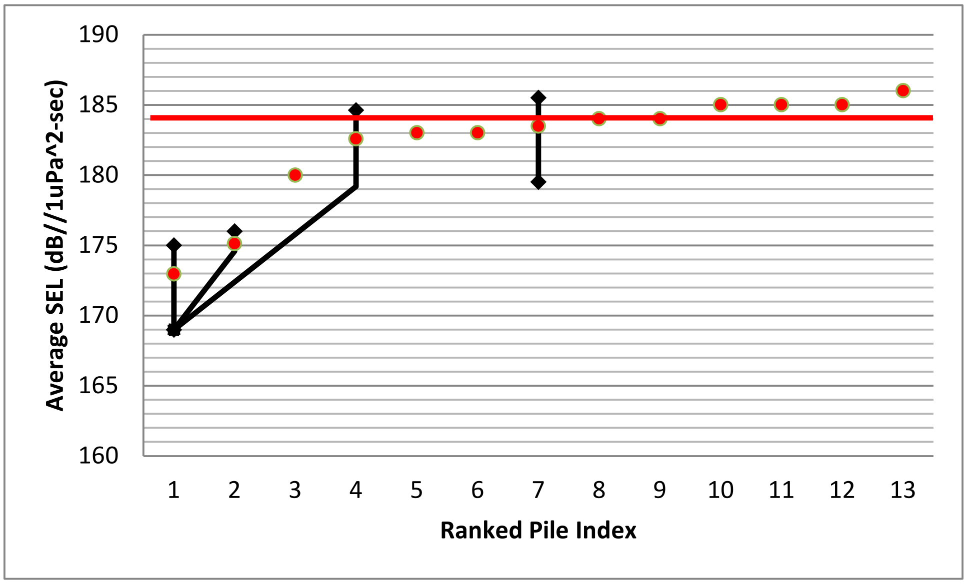

Figure B-15. 36-inch SEL Measurements

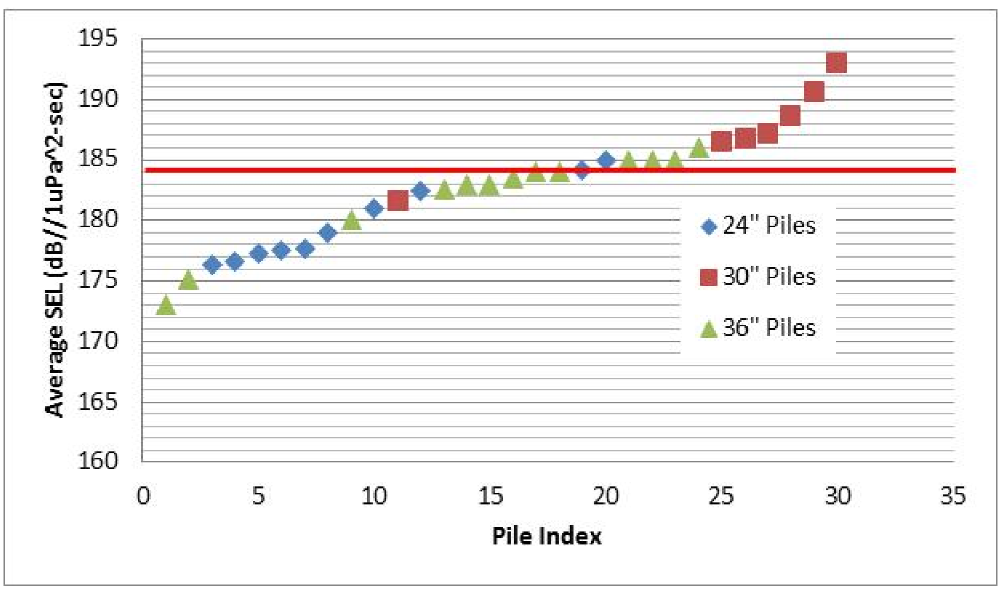

Figure B-16. Combined Analysis: 24, 30, 36-inch SEL Measurements

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

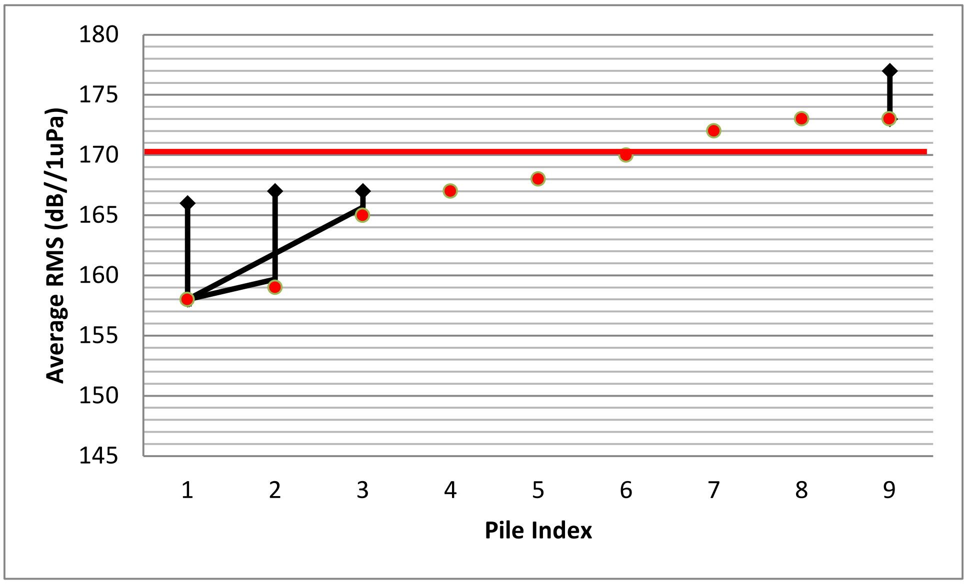

Figure B-17. Concrete 16, 18-inch RMS Measurements

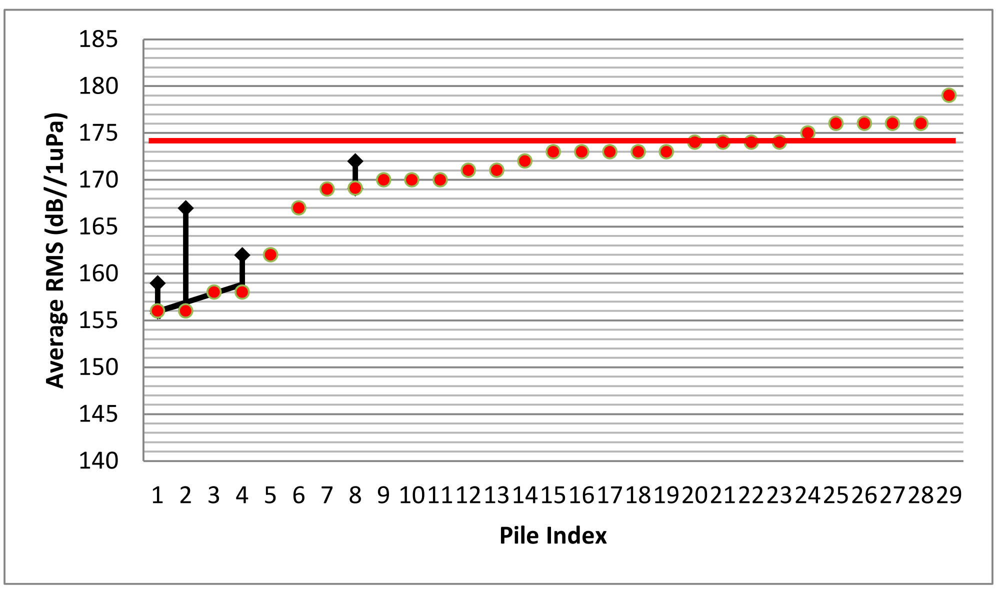

Figure B-18. Concrete 24-inch RMS Measurements

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

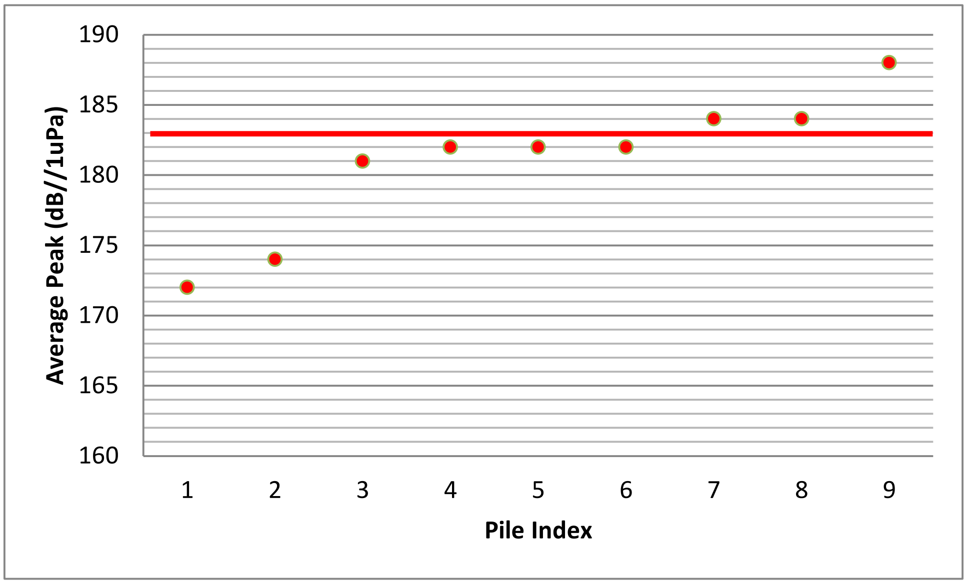

Figure B-19. Concrete 16, 18-inch Average Peak Measurements

Figure B-20. Concrete 24-inch Average Peak Measurements

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

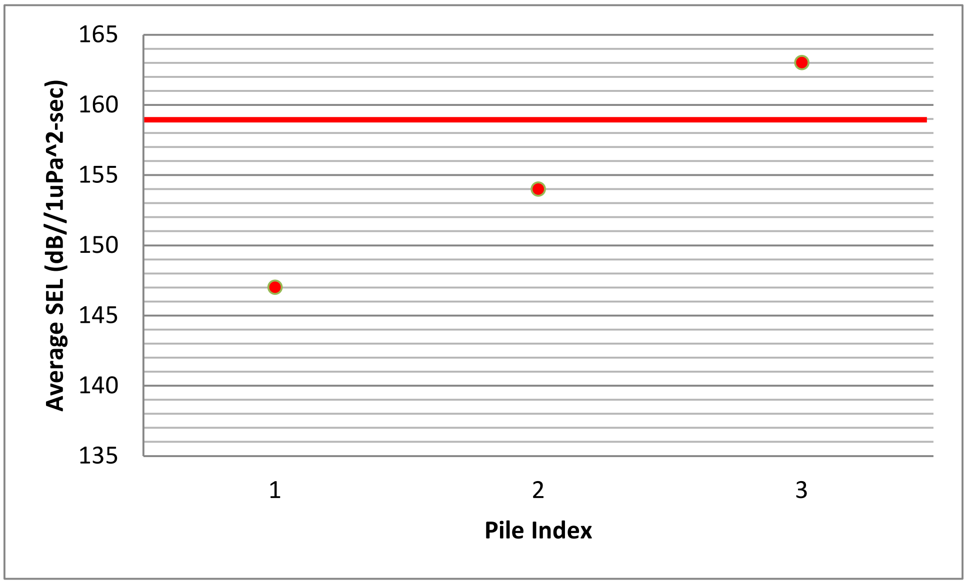

Figure B-21. Concrete 16, 18-inch SEL Measurements

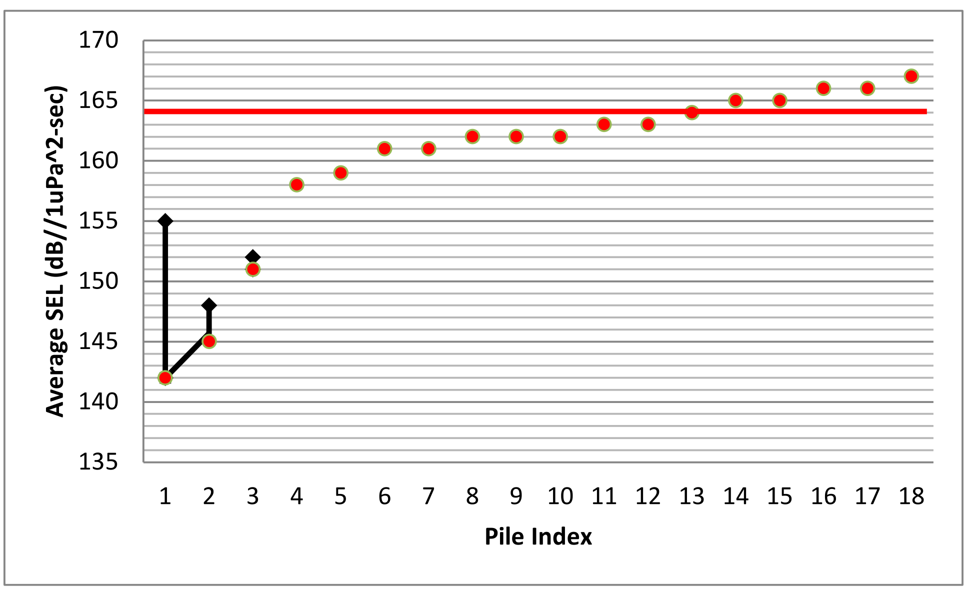

Figure B-22. Concrete 24-inch SEL Measurements

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

Vibratory RMS

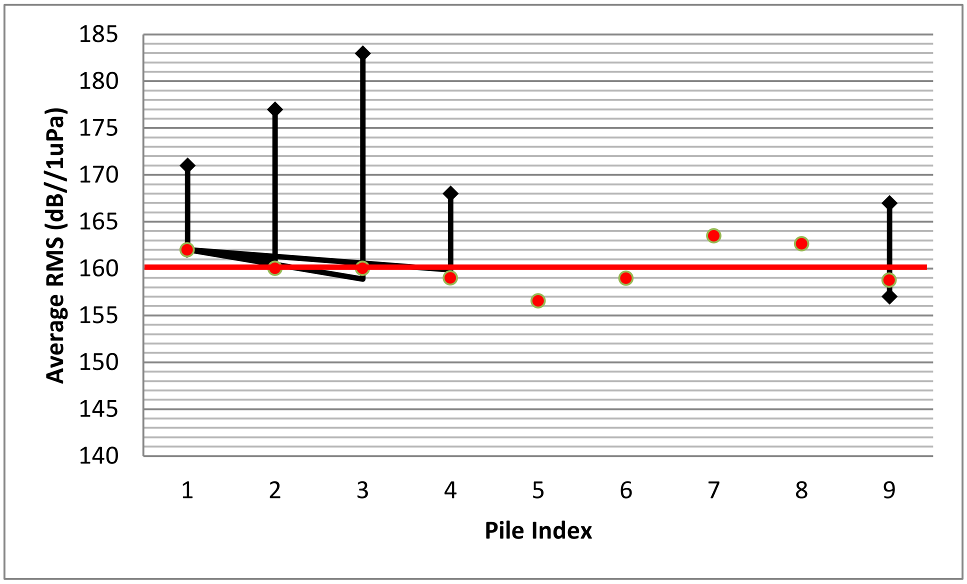

Figure B-23. 24-inch RMS Vibratory Measurements

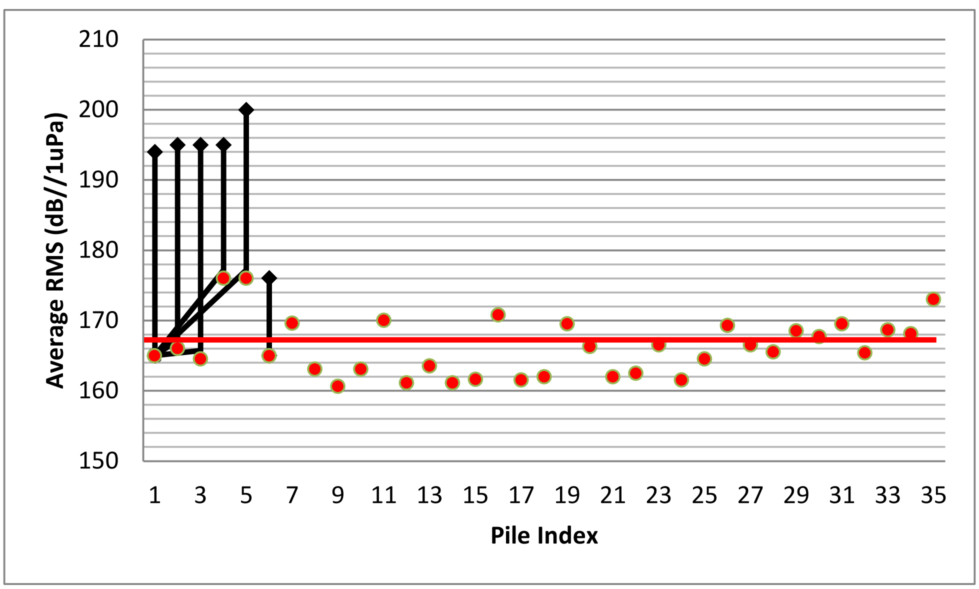

Figure B-24. 30-inch RMS Vibratory Measurements

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

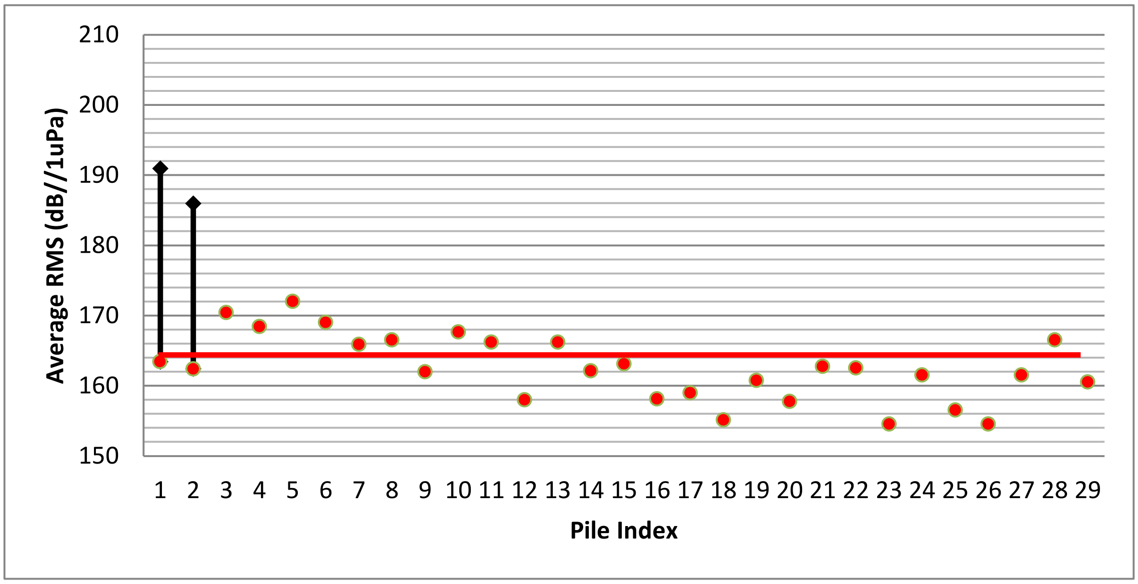

Figure B-25. 36-inch RMS Vibratory Measurement

Proxy Source Sound Levels and Bubble Curtain Attenuation
Revised January 2015

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APPENDIX I

PUBLIC COMMENTS ON THE DRAFT EIS

List of Commenters

Key:

F = Federal Agency
T = Tribe
S = State Agency
P = Private Entity/Individual

Federal Agencies, Tribes, State Agencies, and Private Entities/Individuals

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FEDERAL AGENCY COMMENTS

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F1 – United States Department of the Interior (page 1 of 1)

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
620 SW Main Street, Suite 201
Portland, Oregon 97205-3026

IN REPLY REFER TO:
9043.1
ER15/0094

Electronically Filed

April 13, 2015

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Dear Mr. Dildine:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for the Navy's Land-Water Interface and Service Pier Extension at Naval Base Kitsap Bangor, Kitsap County, Washington. The Department has no comments on the document at this time. 1

We appreciate the opportunity to comment.

Sincerely,

Allison O'Brien

Allison O'Brien
Regional Environmental Officer

Response:

1. Thank you for the comment.

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F2 – United States Environmental Protection Agency, Region 10 (page 1 of 4)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS,
TRIBAL AND PUBLIC
AFFAIRS

April 13, 2015

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Dear Mr. Dildine:

We have reviewed the Navy's February 2015 Draft Environmental Impact Statement for the Land-Water Interface and Service Pier Extension at Naval Base Kitsap Bangor (EPA Region 10 Project Number: 13-008-DOD).

Our review was conducted in accordance with the EPA's responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act. Section 309 specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Our review of the DEIS prepared for the proposed action considers expected environmental impacts and the adequacy of the EIS in meeting procedural and public disclosure requirements of the NEPA.

We are rating the DEIS Environmental Concerns – Adequate (EC-1). A copy of our rating system is enclosed. 1

Project summary
The Navy is proposing and analyzing two separate projects: 1) the construction and operation of Land-Water Interface structures, and 2) the construction and operation of a Service Pier Extension on Naval Base Kitsap Bangor.

The two action alternatives for the Land-Water Interface are the Pile-Supported Pier (Alternative 2) and Port Security Barrier Modifications (Alternative 3). Alternative 3, unlike Alternative 2, does not include in-water pile driving or mesh extending to the seafloor. Alternative 3 is the Navy's Preferred Alternative.

The two action alternatives for the Service Pier Extension are the Short Pier (Alternative 2) and the Long Pier (Alternative 3). Alternative 2 would require 335 piles and extend the existing pier by 44,000 square feet. Alternative 3 would require 660 piles and extend the existing pier by 70,000 square feet. Additional project elements including parking, utilities and road improvements are the same for both action alternatives and would occupy a total of approximately 7 acres. Alternative 2 is the Navy's Preferred Alternative.

Response:

1. Thank you for the comment.

F2 – United States Environmental Protection Agency, Region 10 (page 2 of 4)

Responsiveness to EPA scoping comments

Our March 2013 scoping comments stated that our primary environmental concerns were consistent with the Navy's "Potential Issues of Public Concern." Consistent with your anticipated issues, we recommended the EIS comprehensively analyze:

- potential impacts of underwater sound from pile-driving activities on protected marine species;
- potential impacts of Land-Water Interface and Port Security Barrier placement on movement of marine fish and other species, and longshore sediment transport;
- potential loss and shading of marine habitat, such as eelgrass and other essential fish habitat, and submerged aquatic vegetation; and
- potential impacts on tribal resources.

2 The DEIS does indeed take a hard look into all of these issues. Based on your analysis, we agree that the projects would contribute to cumulative impacts on marine resources, such as shallow-water habitat, including loss of eelgrass, macroalgae, and habitat for juvenile salmon and other fish and invertebrate species. The projects would also result in unavoidable adverse impacts to fish, wildlife and humans from pile driving noise and a loss of upland vegetation and habitats from roads and buildings.

Our March, 2013 scoping comments also included an attachment of information to consider for aquatic resources, air quality, environmental justice, children's health, invasive species, and climate change. The DEIS is responsive to our additional scoping information. For example, we appreciate the DEIS's description of the Navy's broad programs to reduce energy consumption and shift energy demand to renewable and alternative fuels. The Navy is taking a leadership role in contributing to a national effort to mitigate global climate change by, for example, requiring LEED certification for buildings and major renovations, giving awards for energy conservation, researching and implementing new propulsion systems, investigating new hull-cleaning technologies, and testing biofuels to power aircraft.

Environmentally Preferable Alternative

The Council on Environmental Quality encourages the public and other agencies reviewing the DEIS to assist the lead agency in identifying the Environmentally Preferable Alternative.

3 For the Land-Water Interface Project we agree with the DEIS's identification of Alternative 3 – the Port Security Barrier Modifications alternative – as the Environmentally Preferable Alternative. The Port Security Barrier is environmentally preferable because it requires no in-water pile driving – thereby avoiding thousands of behavioral incidental takes on marine mammals. The Port Security Barrier also has a lower potential to affect migration of juvenile salmon and about half of the total impact on aquatic habitat and waters of the U.S. relative to Alternative 2.

For the Service Pier Extension Project we agree with the DEIS's identification of Alternative 2 – the Short Pier alternative – as the Environmentally Preferable Alternative. The short pier is environmentally preferable because it is substantially shorter and the same width as the long pier. The shorter pier meaningfully reduces the behavioral incidental takes on marine mammals due to pile driving noise. It also meaningfully reduces the amount of shading of the benthic community.

In addition to agreeing with the DEIS's identified Environmentally Preferable Alternatives, we applaud the Navy for identifying these alternatives in the DEIS. This goes above and beyond what the implementing regulations for NEPA require. We also applaud the Navy for identifying the

2

Response:

2. Thank you for the comment.

3. Thank you for the comment.

F2 – United States Environmental Protection Agency, Region 10 (page 3 of 4)

Environmentally Preferable Alternatives as the agency preferred alternatives; therefore, we support this decision. 3 cont.

Environmental Concerns
Our Environmental Concerns rating relates to the projects' unavoidable adverse impacts to fish, wildlife and humans from pile driving noise; loss of marine habitat including eelgrass; and loss of upland vegetation for roads and buildings. To address our concerns, we support the Navy's ongoing efforts to complete and implement the Mitigation Action Plan. 4

Temporal Loss
In the FEIS's version of the Mitigation Action Plan (DEIS, Appendix C), we recommend additional information on how compensatory mitigation ratios required by the Hood Canal Coordinating Council's In-lieu Fee program account for risk and uncertainty associated with temporal loss. We believe that additional information on accounting for temporal loss will assist all agencies and entities who are involved in the early implementation of mitigation credit sales for impacts in Hood Canal. 5

We understand that it has been difficult to locate available compensatory mitigation sites to offset the aquatic resource impacts associated with the ongoing Explosives Handling Warf-2 project. Based on this experience, we have concerns that similar over-water structures and aquatic resource impacts will also be difficult to mitigate. 6

Consultation terms and conditions
The FEIS should also include, to the extent possible, permitting and consultation terms and conditions (DEIS, Appendix C, Section 7.0). We believe that including terms and conditions in the FEIS will help enable the public and other agencies reviewing the EIS understand how mitigation is adequate to make the project's contribution to cumulative impacts less than significant. 7

Thank you for this opportunity to comment and if you have any questions please contact me at (206) 553-1601or by electronic mail at reichgott.christine@epa.gov , or you may contact Erik Peterson of my staff at (206) 553-6382 or by electronic mail at peterson.erik@epa.gov.

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosure:
1. EPA Rating System for Draft Environmental Impact Statements

3

Response:

4. Thank you for the comment.

5. The FEIS documents progress on the ILF use plan. Section 6.4.3 of the Mitigation Action Plan (Appendix C) has been updated to add this information.

6. Comment noted.

7. The Mitigation Action Plan (Appendix C, Section 7) of the FEIS has been updated to include permitting and consultation terms.

F2 – United States Environmental Protection Agency, Region 10 (page 4 of 4)

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections
The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns
EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections
EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory
EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

4

Response:

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F3 – Marine Mammal Commission *(page 1 of 4)*

MARINE MAMMAL COMMISSION

23 February 2015

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Dear Mr. Dildine:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the U.S. Navy's (the Navy) Draft Environmental Impact Statement (DEIS) for construction and operation of land-water interface structures (LWI) and a service pier extension (SPE) at Naval Base Kitsap in Bangor, Washington (80 Fed. Reg. 8076). The Commission has commented on activities involving pile driving and removal at Naval Base Kitsap since 2011 (see its most recent 23 June 2014 letter).

Background

The Navy plans to install steel and concrete piles and concrete abutments and remove timber piles and temporary (or false work) piles during construction of the LWI structures and SPE. The LWI structures would connect the existing on-water port security barrier system to the existing on-land waterfront security enclave to complete the perimeter of the waterfront restricted area. SPE activities would include extension of the pier and construction of support facilities to accommodate the transfer of two SEAWOLF Class submarines from the Naval Base Kitsap installation in Bremerton to Bangor. Construction activities could occur for up to two years. It is unclear from the DEIS if the Navy included removal of the temporary piles by vibratory hammer in its take estimations. Inclusion of those activities likely would increase the number of in-water construction days and the total number of takes. Therefore, the Commission recommends that the Navy clarify if removal of the temporary piles using a vibratory hammer was included in its take estimates and if not, re-estimate the total number of takes based on inclusion of temporary pile removal in addition to the takes estimated from pile-driving activities. 1

Harbor seal density estimates

The Commission has been making recommendations since 2011 regarding the manner in which the Navy has estimated its harbor seal densities, which the Commission believes have been underestimated. Specifically, the Commission does not support the Navy reducing the overall density based on the percentage of animals expected to be hauled out at any given instant. That reduction is only valid when models or methods to estimate takes incorporate a time element and animat simulation, similar to the Navy's methods for its environmental impact statements (EISs) for training and testing activities in support of military readiness. However, for construction activities at 2

4340 East-West Highway • Room 700 • Bethesda, MD 20814-4498 • T: 301.504.0087 • F: 301.504.0099
www.mmc.gov

Response:

1. The Navy is not requesting take for the removal of piles as part of the proposed action. Within the EIS, the Navy discussed the vibratory removal of 120 temporary (or false work) piles as part of Alternative 2 of the LWI project. The Navy's preferred Alternative is Alternative 3 which does not include the construction of any temporary piles, so they have not been included within our take analysis.

   The Service Pier Extension (Alternative 2) does include the removal of 36 creosote piles. These piles will be removed by using a clam shell or similar methods and cutting at the mudline if splitting or breakage occurs.

   No changes to the take estimates within the EIS are necessary.

2. The new density value that should be applied is 7.93 animals per sq km.

   The size of the harbor seal population has increased and is much higher than previously determined (3,555 animals vs 1,088). In addition, the correction factor for the amount of time these animals spend in the water vs hauled out has been improved based on Hood Canal specific data, since the behavior of these animals in the Canal is significantly different than haul out behavior in other parts of the inland waters (London *et al*. 2012).

   The Navy utilized Jeffries *et al.* 1999 and London *et al.* 2012 in determining our correction factor. Jeffries et al. 1999 study was used to establish the abundance for the stock in NMFS SARs. In this survey 711 animals were counted (on 21 Sept between the hours of 1500-1600). As a result, an approximate correction factor for this count using the haul out probability from London would calculate the density as follows:

   The approximate probability of animals hauled out during that time frame in those months is 0.20. The inverse of this (1.0/0.20) provides a correction factor of 5.0. When this is applied to the survey count data of 711 harbor seals it yields an updated population estimate of 3,555 animals. Assuming that only 20% of animals are hauled out at one time, then 2,844 (or 80% of the total population) of Hood Canal harbor seals could be available in the water to be taken.

   The researchers indicated that this is the appropriate estimate of the Hood Canal harbor seal population size based upon only published survey data and haul out behavior. It should be noted that the Navy in coordination with
   (continued on next page)

F3 – Marine Mammal Commission *(page 2 of 4)*

Mr. Thomas Dildine
23 February 2015
Page 2

Naval Base Kitsap, the Navy uses a simple area x density method to estimate the number of seals taken on any given day—a method that does not include an instantaneous time element.

For the DEIS, the Navy did update the haul-out correction factor that it had used in previous EISs and incidental harassment authorization applications from 1.53[1] to 5.0[2] based on London et al. (2012). The updated correction factor was used with the Jefferies et al. (2003) survey data[3] from 1999 to yield an abundance of 3,555 harbor seals in Hood Canal. The Commission believes those data are currently the best available and supports the Navy incorporating updated information. But rather than dividing the calculated abundance by the area of Hood Canal[4] to yield 9.92 seals/km^2, the Navy again assumed that only a portion of the seals would be present in the water at any one time—in this instance 80 percent were assumed to be in the water at a given time, which ultimately reduced the density to 7.93 seals/km^2. Based on past monitoring reports, pile driving has occurred for an average of 7 hours per day[5] at any time during the day, including during tidal stages when harbor seals are more likely to be in the water. Given that information, virtually all of the harbor seals in the project area could be in the water at some time when sound-producing activities are being conducted and could be taken on a daily basis. Therefore, the Navy's estimate of the total number of seals that could be taken during the course of a day is a portion of the number of seals that actually could be affected. 2 cont.

For example, by using the lesser density of 7.93 seals/km^2, the Navy estimated that up to 10 percent of the estimated population of harbor seals could be exposed on any given day to pile driving during LMI activities. The Navy believes that percentage is likely a significant overestimate of potential exposures. The Commission does not agree. If the total ensonified area for LMI activities equates to 50.1 km^2 and the total area of Hood Canal based on the Navy's estimate is 358 km^2, then 14 percent of the Canal would be ensonified. The Navy acknowledged that a uniform density spread over Hood Canal is not ideal. Nevertheless, that is the method the Navy chose to use and based on this example[6], the number of seals that have the potential to be taken was clearly underestimated. In addition, the Navy stated that the density would be greater around haul-out sites (e.g., Dabob Bay and farther south in Hood Canal, which are 16 km away from Bangor[7]). The Commission notes that only stratified density estimates and animat modeling would yield more fine-scale estimates and until those data are available and those methods used, the Navy should not be reducing its harbor seal density estimates by the proportion on land at any given instant.

The Navy did note that harbor seals are always present at Bangor. Irrespective of the proximity of dedicated haul-out sites, seals have been observed in large numbers over the years in the project area (Tannenbaum et al. 2009, Tannenbaum et al. 2011, HDR 2012a, HDR 2012b, Department of the Navy 2014), and any seals observed swimming in the area, foraging or not—would be exposed to pile-driving activities. Seals not only haul out on the floating security fence,

[1] Based on Huber et al. (2001).
[2] Haul-out correction factors are based on the reciprocal of the proportion of seals hauled out. 65 and 20 percent of the seals would be hauled out at a given time to yield correction factors of 1.53 and 5.0, respectively.
[3] 711 harbor seals.
[4] The Navy used an area of 358 km^2.
[5] Although activities could have the potential to occur for up to 15 hours per day.
[6] A similar result is evident for the SPE activities as well.
[7] Based on the size of the ensonified areas, those haul-out sites are not far from Bangor and harbor seals are known to forage and swim 10s of kilometers from their haul-out sites.

Response:

NMFS and WDFW have been funding aerial surveys of the inland waters of Washington including the Hood Canal to update the abundance information for this species from the Jefferies study. In coordination with those aerial surveys are tagging efforts to get accurate haul out information for the exact same time periods as the surveys. They only have preliminary data at this time and are not able to provide it for use in permitting but they indicated that population estimates were highly variable across year as were the haul-out correction factors.

Using a uniform density for calculating takes was avoided because the Navy felt it would significantly over estimate impacts in areas that are not located by known haul outs. The closest haulouts to Bangor are just south of Dabob Bay and further south in Hood Canal. Nevertheless, because we do not have any more recent tag data that can be used to assist in generating a stratified density layer to improve take estimates, the Navy is defaulting to a uniform density for the LWI/SPE calculation.

In the future, our approach for density calculations with respect to harbor seals may be different if we are able to obtain more reasonable density estimates based on tag data. Using the percentage of the total population that can be in the water at one time, and the area of Hood Canal, the uniform density value for this stock would be 7.93 animals/sq. km. This is a significant increase from our prior analysis and the Navy feels that this is likely a gross overestimation of our impacts, especially considering that we have no known large scale haul outs and based on the presence of in-water encounters with harbor seals during our other construction actions at the base.

F3 – Marine Mammal Commission *(page 3 of 4)*

Mr. Thomas Dildine
23 February 2015
Page 3

floating booms/floats, wave screen, ladders, overwater structures under the piers, and in workboats within the immediate project area, but they also pup from the northern to southern end of the waterfront—information corroborated by the Navy. For all of these reasons and until such time that the Navy incorporates stratified densities and uses animat modeling, the Commission recommends that the Navy use the relevant ensonfied areas associated with LWI and SPE activities and the unadjusted harbor seal density estimate of 9.92 rather than 7.93 seals/km^2 to estimate the number of seals that could be taken during those activities—that unadjusted harbor seal density estimate should be used to estimate takes for all Navy activities occurring in Bangor. 2 cont.

Overall take estimates

The Commission has commented numerous times about the appropriate treatment of "fractions" of animals when estimating takes for EISs and incidental harassment authorization applications (including non-military activities). The Navy did not round the estimated takes[8] until totaling for each activity. Since NMFS still uses a 24-hour reset time, species-specific takes should be based on the whole number of animals taken in a given day and the number of days those activities would occur—in this instance, the Navy should have rounded before multiplying by the number of days rather than after that multiplication.

By using its approach of rounding after multiplication, the Navy underestimated the number of takes for California sea lions and transient killer whales[9] and overestimated the takes for harbor seals[10] and harbor porpoises for LWI activities. However for SPE activities, the Navy underestimated the number of takes for harbor seals[11], California sea lions, and harbor porpoises and overestimated the takes for transient killer whales[12] only. Based on these issues, the Commission recommends that the Navy re-estimate the numbers of takes for harbor seals, California sea lions, harbor porpoises, and transient killer whales by determining the whole number of animals that could be taken on a given day for both LWI and SPE activities prior to mulitiplying by the number of activity days. 3

[8] Generally, round down if less than 0.50 and round up if greater than or equal to 0.50.
[9] The Navy should have rounded 33.5 up to 34 California sea lions taken per day (as was done in the most recent incidental harassment authorization for Naval Base Kitsap (and prior authorizations); 79 Fed. Reg. 43440) and then multiplied by 80. In addition to rounding after multiplication, the Commission believes the Navy likely miscalculated the daily takes for transient killer whales, since 0.02 whales/km^2 x 28.5 km^2 equates to 0.57 not 0.7 whales taken per day.
[10] The Commission believes the Navy likely miscalculated the daily takes for harbor seals during LWI activities as well, since 7.93 seals/km^2 x 28.5 km^2 equates to 226.005 rather than 226.05 seals taken per day.
[11] The Commission believes the Navy also likely miscalculated the daily takes for harbor seals for SPE activities, since 7.93 seals/km^2 x 50.1 km^2 equates to 397.29 rather than 396.6 seals taken per day during vibratory pile driving of steel piles. For impact pile driving of concrete piles, the Navy overestimated takes based on 7.93 seals/km^2 x 0.007 km^2 equating to 0.05 seals taken per day, which is less than 0.50.
[12] In addition, the Commission believes the Navy likely miscalculated the daily takes for transient killer whales for SPE activities, since 0.02 whales/km^2 x 50.1 km^2 equates to 1.002 not 1.2 whales taken per day.

Response:

3. The Navy agrees with the Commission's recommendations. Changes have been made within the LWI-SPE EIS and IHA to correct the rounding error for our species estimates.

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Mr. Thomas Dildine
23 February 2015
Page 4

The Commission hopes you find its letter useful. Please feel free to contact me should you have questions regarding the Commission's recommendations and comments.

Sincerely,

Rebecca J. Lent

Rebecca J. Lent, Ph.D.
Executive Director

Cc: Jolie Harrison, National Marine Fisheries Service

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Response:

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TRIBE COMMENTS

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TRIBE 1 – POINT NO POINT TREATY COUNCIL

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T1 – Point No Point Treaty Council *(page 1 of 7)*

POINT NO POINT TREATY COUNCIL

Port Gamble S'Klallam * Jamestown S'Klallam

April 13, 2015

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine – LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

RE: Land-Water Interface/ Service Pier Extension Draft Environmental Impact Statement

Dear Mr. Dildine and the LWI/SPE Draft E.I.S. review committee,

Thank you for requesting comments for the Navy's Draft Environmental Impact Statement for the proposed Land-Water Interface and Service Pier Extension. The Point No Point Treaty Council (PNPTC) is concerned about the significant adverse effects on our Tribes' Treaty Rights and the effects on critical natural resources by these two projects. Our tribes (Jamestown S'Klallam and Port Gamble S'Klallam) would like to request government-to-government consultations to resolve some of these major concerns. 1

The PNPTC is a tribal organization that provides fisheries support services to the Jamestown S'Klallam Tribe and Port Gamble S'Klallam Tribe, whom have Usual and Accustomed Fishing Areas (U&A) in Hood Canal, Strait of Juan de Fuca, Admiralty Inlet, the Puget Sound and as far north as the San Juan Islands. The U&A fishing grounds for both tribes are directly included in the proposed areas for the Land-Water Interface (LWI) and the Service Pier Extension (SPE). Our Tribes rely on the healthy habitat conditions that sustain critical finfish and shellfish populations which support fishing activities that are fundamental to the economies and cultures of our tribal communities. 2

As discussed in previous PNPTC comments submitted two years ago to the Navy regarding the LWI-SPE scoping of these two projects, our Tribes have some fundamental concerns that need to be resolved. Without a Government to Government consultation process, and unless there is appropriate significant mitigation achieved, the Tribes will be very challenged to support these projects. We do, however, support the comment letters put forth by the Port Gamble S'Klallam Tribe's Natural Resources Department regarding Treaty Rights and Tribal natural resource concerns. 3

The Treaty of Point No Point

The Treaty of Point No Point reserves perpetual Fishing Rights to the S'Klallam Tribes. The connection to Treaty fishing rights should begin with the history and purpose of the Treaty. In Article I of the Treaty of Point No Point, the S'Klallam people ceded to the United States most of their rights in their land. However, the Treaty reserves the right of the Tribes to take fish "at usual and accustomed grounds and stations." (Treaty of Point No Point, 12 Stat. 933, Article IV) 4

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Response:

1. Thank you for the comment letter. The Commanding Officer of Naval Base Kitsap invited the Port Gamble S'Klallam Tribe, Jamestown S'Klallam Tribe and Lower Elwha Klallam Tribe to consider initiation of government-to-government on the LWI and SPE Proposed Actions in 2008 and 2012, respectively. Since April 2015, the Navy and these Tribes have held many government-to-government and staff consultation meetings to discuss details of the LWI and SPE projects and Tribal concerns.

2. Comment noted.

3. The Navy and the Tribes have held government-to-government consultation and staff level consultation meetings to discuss details of the LWI and SPE projects and tribal concerns. As a result, the Navy has offered treaty mitigations for the potential impacts to treaty rights and resources by the construction and operation of the LWI and SPE projects. These offered treaty mitigations are described in Chapter 9 (Treaty Mitigation) of the Mitigation Action Plan (Appendix C of this FEIS).

4. The Navy appreciates the time taken by the PNPTC to provide the background on the S'Klallam Tribes history, culture and treaty fisheries.

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The right is not created by the Treaty; rather, the Treaty "secures" pre-existing Indian fishing rights.[1] In other words, the Treaty of Point No Point did not grant fishing, hunting, and gathering rights to the Tribes; rather, it reserved to the Tribes its pre-existing rights to engage in those activities. This reservation of rights was intended to permanently secure the full breadth of pre-treaty resource procurement practices.[2] Nothing in the treaty language or negotiations suggested, and neither side anticipated, that non-Indian development would ever hinder Indian fishing or deplete the seemingly inexhaustible abundance of resources.[3]

The Treaty of Point No Point protects three essential components of our Tribes' fisheries: 1) Access to Fishing Places; 2) Access to Sufficient Harvests; 3) Access to necessary, healthy fish habitat. Over one hundred years of federal court decisions have supported and defended each of these components of the Treaty Right. The Jamestown S'Klallam Tribe and Port Gamble S'Klallam Tribe both have Usual and Accustomed Fishing Areas that encompass the marine and nearshore areas where the LWI and SPE are being proposed. The right of the Tribes' to access and fish at these places exists regardless of who owns the land beside or beneath the waterway.[4] The Navy's proposal for the LWI will severely affect natural resources and limit access and possibly severely degrade an important beach (Devil's Hole) that the Tribes have seeded and harvested for many, many years. 4cont

Below, we have briefly described some of the issues with the Draft Environmental Impact Statement (D.E.I.S.) for the LWI-SPE. First of all, we are concerned that the proposed facilities would impact our Tribes ability to access their Usual and Accustomed fishing grounds for shellfish, finfish and other species, which is our Tribes' Treaty Right under the Treaty of Point No Point. Second of all, we have concerns regarding the cumulative environmental impacts in these areas and its disturbances that need more investigation. Finally, the following comments should be considered and addressed as the Navy continues to develop its plans for these projects. Because of the limited time frame to review the impacts for two very large projects, we look forward to the continued consultation with the Navy throughout this process. 5

1. **Impacts to Court-Affirmed Treaty Fishing Rights and Better Analysis Needed**

   The Tribes are concerned that the impacts to Tribal fishing activities and Treaty Rights have not been adequately addressed by this DEIS.

   While PNPTC appreciates the addition section 3.14, American Indian Traditional Resources, this section (3.14) fails to summarize the impacts to tribal fishers in an accurate manner. For example, calculating a $2,208 annual loss for two years on oyster harvest losses may not be accurate (3.14-6). Beyond, the "tribal treaty right" loss that cannot be measured monetarily, it does not include the clams that are also seeded at that same beach. It is unclear how the author derived a 2 year recovery and within "3 years of in-water construction" ceasing (3.14-7) estimate. How these calculations were determined was not made clear in the document and resources and data were not included. This area needs to be better analyzed and brought forth through the government to government consultation process and with the appropriate technical tribal staffs. The area of disturbance (by the pontoon feet and the stairs of the structure), also needs to be adjusted to reflect a higher area of disturbance, since construction and maintenance will occur in a broader circumference around the impacted areas. Again, these areas fall short in assessing if entire beds will be devastated by impacts and 6

[1] *See, e.g., United States v. Winans,* 198 U.S. 371, 381 (1905).

[2] *See Boldt I*, 384 F.Supp.at 381("At the treaty council the United States negotiators promised, and the Indians understood, that the Yakimas would forever be able to continue the same off-reservation food gathering and fishing practices as to time, place, method, species and extent as they had").

[3] *Culverts* Summary Judgment at 10-11. *See also Fishing Vessel*, 443 U.S. at 668.

[4] *Winans, 198* U.S. 371 (right to cross fenced, private upland to reach fishing water); *United States v.Washington* 157 F.3d 630, 644-47 (9th Cir.1998).

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Response:

5. As discussed in government-to-government consultations, there will be no impact to access of the Devil's Hole Beach for shellfishing at NAVBASE Kitsap Bangor in accordance with the 1997 cooperative agreement between the Navy and the Tribes. Further, the Navy has offered the Tribes treaty mitigations projects for the potential impacts to treaty rights and resources by the construction and operation of the LWI and SPE projects which are assessed in this document in Chapter 9 (Treaty Mitigation) of the Mitigation Action Plan (Appendix C).

6. While the Navy does not agree with the Tribes' assertion that the Devil's Hole beach and the shellfish resources will be severely affected by the LWI and SPE projects (see Navy response #13 below) , the Navy has offered to discuss possible actions with the Tribes if significant changes occur at the beach. In addition, the 100-foot construction corridor accounts for the broader disturbance area that could be impacted during construction. However, a coffer dam will be installed during construction of the LWI abutments that will be above the shellfish habitat, reducing the likelihood that shellfish habitat would be impacted by abutment construction. Further, the latest design drawings of the LWI observation posts show these posts will be entirely located above the shellfish habitats. A reference to the appropriate benthic habitat impact discussion in Sections 3.2.2.2.2 and 3.2.2.2.3 (see FEIS pages 3.2-38 through 3.2-40) was added to Section 3.14 in the FEIS. The 2-year period referred to in the FEIS text is the 2-year construction period; that 2-year period would be followed by up to 3 years recovery time. This discussion and analysis has been revised in the FEIS after additional review in response to comments. The recovery time for disturbed shellfish was increased in the FEIS from 3 years to 5 years after construction ceases.

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not just the exact footprint of the physical structure. Shading effects and other deleterious effects could compound the issues environmentally. In addition, tribal access to the beach will be severely affected. The description of the potential impacts to tribal fishers and fisheries is not fully described in this document. The analysis breaks down at reporting the full extent and the ramifications that these project impacts would likely incur, particularly if gaining access through guards is difficult and if transfer between beaches inside and outside the "interface" becomes challenging. This will directly affect how quickly fishers can perform their tasks and will most likely affect their income. S'Klallam fishers actively fish at the locations of the projects. Some activities include fishing for salmon, intertidal clam and oyster gathering (and seeding) and other active fisheries activities. The DEIS does not assess nor does it include the full range of detrimental effects on shellfish habitat and salmonid/finfish habitat. The Navy's Land Water Interface and Service Pier Extension can seriously impede Tribal fishing activities for the reasons described above, and the DEIS does not fully disclose any solutions to these issues. 7

2. Cumulative Effects of the Navy's plans for major construction projects and operational changes including construction and operations of the LWI and SPE

The detrimental effect of the Navy's proposed major projects on Treaty Rights cannot be overstated. Since locating in Puget Sound, the Navy has armored significant shoreline, built massive overwater structures, permanently destroyed acres of seafloor, spilled oil, and greatly increased vessel traffic and vessel exclusion zones. These activities have resulted in degraded habitat, diminished fish production, collisions with and loss of crab pots and other gear, increased fishing effort, temporary or long-term avoidance of traditional fishing areas, and diminished harvest, at a time when the Tribe's fisheries are already greatly diminished and are not providing the Tribe with a moderate living. These injuries to the Treaty Rights will grow if the Navy proceeds with its plans to develop the Land-Water Interface and expand the Service Pier. When combined with the numerous other construction project and submarine reassignment proposals of which the Tribes are aware, these impacts are too great for the Navy to simultaneously meet its Trust responsibilities to the Tribes under the Treaty of Point No Point. 8

In the aggregate, the Navy should include an analysis of the cumulative effects of these actions and developments on **Treaty Rights** and its effect on tribal fisheries. It also should take into account the effects on timing, location, quality and quantity of harvest for tribal members. The final EIS should include an examination of the cumulative effects of all of these projects as it relates to Treaty Rights that the Navy has proposed in last few years.

Below is a sampling of Navy projects that should be included in the Cumulative Impacts Section of the DEIS is included in the Table 1 below:

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Response:

7. This comment raises several distinct issues. Both the LWI and SPE projects are located within an established waterfront Naval Restricted Area (NRA). Currently, the Navy has not authorized tribal, recreational or commercial finfishing within the waterfront NRA. Therefore, there is no impact to other types of tribal fishing in the project sites located within the NRA. Outside the NRA, access to the Tribes' fishing U&A in co-use navigable waterways will not be significantly affected. Tribal access to shellfish at NAVBASE Kitsap Bangor is already provided for at Devil's Hole Beach under the 1997 cooperative agreement. Finally, refer to responses to Point No Point Treaty Council (PNPTC) Comments #6 and #19 (original PGST Comment 4) as well as Port Gamble S'Klallam Tribe (PGST) Comments #13, #21, and #23.

8. The American Indian Traditional Resources cumulative impacts section (4.3.14) has been revised to provide more detail on cumulative impacts of the proposed actions on American Indian traditional resources as well as all aspects of treaty rights. The cumulative impacts of multiple projects at NAVBASE Kitsap Bangor are quantified to the extent possible in Section 4 of the FEIS. Section 4.3.14 assesses impacts to American Indian traditional resources.

   Further, the Navy has offered treaty mitigations projects as a result of government-to-government consultations with the PNPTC member Tribes for the potential impacts to treaty rights and resources by the construction and operation of the LWI and SPE projects which are assessed in this document in Chapter 9 (Treaty Mitigation) of the Mitigation Action Plan (Appendix C).

   Also, refer to PGST Comment #12.

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Table 1: List of Navy Projects and Impacts

Navy Projects	Cumulative Impacts	Tribal Impacts
EHW1	Repair and replacement of 138 piles	Treaty Rights, Habitat Impacts, Fisheries
EHW2	Construction of and operations at a new Explosives Handling Wharf, including 6.3 acres of overwater structure, 1,250 piles, and additional vessel traffic in Hood Canal	Treaty Rights, Habitat Impacts, Fisheries
Barge Mooring Facility	Permanent moorage of a new research barge, which is half an acre in size and five times the size of the existing research barge, and construction of new mooring facilities	Treaty Rights, Habitat Impacts, Fisheries
SPE	Construction of and operations of a Service Pier Extension, adding up to 1.82 acres of overwater structure and up to 700 more pilings to the already massive Service Pier	Treaty Rights, Habitat Impacts, Fisheries
Relocate SEAWOLF to Bangor	Relocation of the SEAWOLF Class submarine SSN-21 (SEAWOLF) submarine from NBK-Bremerton to NBK-Bangor, which will result in even more vessel traffic from the submarines and their security convoys in Hood Canal and destruction of more tribal fishing gear	Treaty Rights, Habitat Impacts, Fisheries
Relocate Connecticut to Bangor	Relocation of the SEAWOLF Class submarine SSN-22 (CONNECTICUT) submarine from NBK-Bremerton to NBK-Bangor, which will result in even more vessel traffic from the submarines and their security convoys in Hood Canal and destruction of more tribal fishing gear.	Treaty Rights, Habitat Impacts, Fisheries
LWI	Construction of the Land-Water Interface, including in-water fill, up to 136 pilings, two large overwater structures, and a terrestrial structure in the middle of the Bangor Beach, where a cooperative agreement with the Navy is in place and tribal shell-fishing activities are ongoing	Treaty Rights, Habitat Impacts, Fisheries
EMMR	Construction and operation of the Electromagnetic Management Range (EMMR), which will interrupt tribal fishing with little to no prior notice to tribal fishermen and permanently destroy a portion of an actively harvested geoduck bed	Treaty Rights, Habitat Impacts, Fisheries
Port Angeles Coast Guard Dock	Construction of a Coast Guard Station dock in Port Angeles Harbor, which will increase vessel activity in the Harbor and permanently destroy important rock fish habitat reef,	Treaty Rights, Habitat Impacts, Fisheries
Indian Island	Indian Island piling replacement, which will impact forage fish spawning habitat	Treaty Rights, Habitat Impacts, Fisheries
NWTT	Testing and training exercises occurring throughout S'Klallam Tribal U&A, which results in closures of U&A, interrupting fisheries, increased vessel traffic, and gear loss, among other impacts	Treaty Rights, Habitat Impacts, Fisheries (finfish & shellfish)

Emerging climate change data should also be included in concert with the cumulative impacts section. New climate data suggests that species (i.e., shellfish, oysters, clams) could be particularly vulnerable to ocean acidity, especially 9

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Response:

9. Section 4.3.16 discusses the effects of climate change, including ocean acidification and effects on calcification. Further, climate change information has been added to Section 4.3.14 as a cumulative stressor for shellfish populations.

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if these populations are already undergoing stress. The increased development in aggregate with all the other on-going and proposed projects further stresses these shellfish populations, along with changing ocean and temperature conditions, which can also cumulatively diminish the survival of these species. 9 cont.

The Tribes appreciate the insertion of Chapter 4, The Cumulative Impacts section, which includes a cumulative impacts Table (4-1). However, it needs to be taken a step further into the analysis section such that the impacts can be quantified (on the environmental resource level); and its direct impacts to Treaty fishers. The author also has included an "American Indian Traditional Resources" section. For the final EIS, however, it would enhance the analysis to have these two sections related to each other in a systematic way. The direct connection between cultural, subsistence and economic impacts by the Navy's large-scale development of these two projects can have a devastating effect on our Tribes. Our Tribes are looking at seven generations out in order to protect their way of life and cultural identity, and also to survive into the future. 10

3. Other Environmental Concerns that need to be addressed

The current Navy proposal is briefly summarized below:

Land-Water Interface (LWI):

The Navy proposes to carry forward to the EIS essentially two action alternatives (with Alternative 1 as a No Action Alternative) for the Land-Water Interface as described from the Notice of Intent for the LWI.

> ***LWI Alternative 2:*** The construction of two pile supported piers (a northern pier which is 280 ft. long, with up to 54 piles (24-inch diameter steel) and a southern pier which is 730 ft. long, with up to 82 piles (24-inch diameter steel)) built from shoreline concrete abutments and connected at the north and south ends to the existing Port Security Barrier (PSB) system. It also includes the installation of a mesh/grate, including sensors, which would extend from the bottom of the pier walkway to the seafloor. This LWI also includes the installation of five 30 ft. tall towers on the piers to support lighting and security devices and the modification and lengthening of the existing PSB system to connect to the seaward ends of the LWI. PSB segments and anchors will be installed.

> ***LWI Alternative 3:*** In this alternative, the Navy would build the LWI using PSBs instead of a pile supported pier. The modification and lengthening of the existing PSB system would extend across the intertidal zone and attach to shoreline concrete abutments. The PSB section in the North would be 280ft long and the PSB section in the south would be 730 ft. long. Installation of three 30ft. tall in-water towers (for lighting and security) would be installed and each in-water tower would be supported by a platform resting on four 24-inch piles. Also, two additional towers would be installed on land. Both Alternatives 2 and 3 involve constructing concrete shoreline abutments.

Service Pier Extension (SPE)

Two action alternatives (Alternative 1 is a no action alternative) are also being proposed by the Navy for the SPE which include two configurations - a short pier or a long pier.

> ***SPE Alternative 2:*** This Short Pier Configuration involves a side-by-side mooring configuration for submarines, 600 lineal ft. pier extension to the existing Service Pier and approximately 320 steel piles.

> ***SPE Alternative 3:*** This Long Pier Configuration involves an in-line berth mooring configuration for submarines, 1,200 lineal ft. pier extension, and approximately 700 steel piles. Both SPE action alternatives 2 and 3 include a 3,100 sq. ft. Pier Services and Compressor building, one pier crane, a shore side emergency

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Response:

10. Please see the response to PNPTC Comment #8 and PGST Comment #4.

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diesel generator facility, a 50,000 sq. ft. shoreline Maintenance Support Facility (MSF) built within an existing parking lot, and a six acre new parking lot and area near the proposed MSF.

Additional Comments and Concerns:

1) We applaud the Navy for including a cumulative impacts section in the DEIS. The Navy should also include an analysis of the cumulative effects of these two projects on Treaty Rights and its effect on tribal fisheries (both finfish and shellfish) in a separate table. All these proposed actions, should include the combined past, present and reasonably foreseeable future actions that could impact Tribal resources due to changes in access to traditional fishing and foraging areas and loss of geoduck (and a more restricted beach access), and other shell-fishing and fishing activities. 11

2) The proposed land water interface and service pier extension is concerning because the project site is located in the Treaty Tribes' U&A, including tribal fishing and harvesting areas throughout Hood Canal where project vessels will travel. The cumulative impacts of these Project Actions and other projects in the Hood Canal will likely have a significant effect on tribal fishing and harvesting from vessel activity, construction, maintenance and operational activities. The cumulative effects section would be enhanced by including maps and tables containing vessel/boat traffic increases on the water- which covers a larger swath of area than depicted in the point map of project locations. This should also include the area that limits the tribal fishers because of coast guard vessels that will interfere with tribal fishers from their traditional grounds. 12

3) The Port Gamble S'Klallam Tribe provided a sediment transport study entitled, "Bangor Beach Littoral Drift Assessment, Kitsap County" on 10/8/14 that was professionally and scientifically prepared to analyze nearshore drift and sediment transport in the vicinity of these two projects. (See Attachment 1) In addition, Coast Geologic Services provided a memorandum (10/10/2014) that summarizes the findings. (See Attachment 2) This study identifies a long drift cell that runs from south to north. This study seems to contradict the study that was used in the Draft EIS, but is a more current study that demonstrates impacts that were not identified. The new littoral drift cell study should be reviewed and incorporated into the Final EIS for the LWI-SPE. 13

4) The Final EIS should better address impacts to shellfish and important shellfish beaches to the Tribes. In Chapter 3 (Marine Vegetation and Invertebrates), this chapter lightly touches the issues associated with benthic communities. The Navy should more specifically address project impacts to the known shellfish tracts (both tribal commercial and subsistence) that exist in the aquatic zone adjacent to the naval base. Tribal members harvest clams and oysters at Devil's Hole Beach, and harvest geoduck and other shellfish in the Hood Canal adjacent to the waterfront restriction area. A more comprehensive analysis of shellfish and benthic communities is needed to more fully assess the proposed project impacts to Treaty Rights. 14 On page 3.2-36, the Draft EIS references piles as "creating habitat to support new algae." Piles are not an acceptable type of natural habitat and should not be used for mitigation. Should this be factored into the environmental component of mitigation, it should be made clear that piles cannot be promoted as habitat forming structures, when the overall area and species composition will be forever changed. For example, large vessels carrying exotic species that can also attach to pile supported piers. This should also be addressed in the FEIS. 15

6) The FEIS should address the direct adverse effects of construction, maintenance and repair activities throughout lifespan of the project, especially as it pertains to natural resources and treaty rights. The DEIS suggests that it only takes 2-3 years for certain shellfish habitats to go back to its original state. The Tribes request more data and information on this subject area. It should include a table that addresses indirect impacts of the proposed project on aquatic habitat, including habitat fragmentation, sediment disturbance, artificial lighting, and other impacts. It should also include a table on impacts to marine and nearshore species habitats, which could include salmon, forage fish, rockfish, shellfish (such as geoduck, crab and shrimp). While the Draft EIS discusses ESA listed species, it remains 16

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Response:

11. Tables of cumulative impacts are included for resources for which impacts can be quantified; text discussions of multiple numbers can be confusing. The proposed table would not add information not included in Table 4-1 and revised Section 4.3.14 (American Indian Traditional Resources cumulative impacts), which address the impacts included in this comment.

12. The potential impacts of project construction vessels and SEAWOLF, LOS ANGELES, and VIRGINIA Class submarine transits on tribal fishing vessels have been added to Section 3.14.2 (American Indian Traditional Resources) of the FEIS.

13. The DEIS analysis was based on modeling by cbec (2013). The Tribes' CGS study based its conclusions on literature review and field visits but did not do any modeling. The FEIS incorporates field observations noted in the CGS report. EPA reviewed and found the DEIS took a hard look at the sediment transport issue and found the DEIS adequate. Additionally, while the Navy does not agree with the Tribes' assertion that the Devil's Hole Beach will be severely affected by the LWI and SPE projects, the Navy has offered to discuss possible actions with the Tribes if significant changes occur at the beach. Also, refer to PGST Tribe Comment #13.

14. The LWI and SPE projects would not have impacts to shellfish resources outside of the immediate construction areas; impacts would not extend to the properties beyond the base. As described in the FEIS, the only benthic areas anticipated to be impacted during construction are those in the immediate areas of the pile driving where sediment disruption would occur, and where anchors are placed.

15. Section 3.2 of the FEIS has been revised to clarify that the habitat provided by the new piles is not viewed as mitigation for habitat loss.

16. Section 3.17 of the FEIS includes tables summarizing all the impacts of the Proposed Actions as requested by this comment. Chapter 4 describes the cumulative impacts of the proposed actions, and the Executive Summary includes a summary of cumulative impacts. Regarding shellfish recovery time, please see the response to PGST Comment #25.

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critical that functioning/ healthy species remain intact. These potential effects may extend beyond the project boundaries and impact species and habitats throughout the Hood Canal watershed. The final EIS should also include summary tables to indicate potential long-term, direct, indirect, and cumulative impacts of project components associated with each of the action alternatives. 16 cont.

7) The FEIS should also provide an analysis of alternatives to the shoreline abutments (LWI) that would avoid and minimize impacts to riparian vegetation and sediment delivery, transport, and deposition. Studies show that armoring the shoreline has dramatic negative effects on the shoreline. The Navy should look at known feeder bluffs that are undergoing protection in the current Kitsap County SMP and that play an important role in protecting sediment delivery and habitat function in Hood Canal. 17

8) The Final EIS should address alternatives to the currently designed six acre parking lot for the SPE that could avoid and minimize impacts to upland habitat including forest, wetland, riparian, and stream habitats. The Final EIS should also address the storm water system that will be developed and designed to handle run-off into the Hood Canal from the proposed parking lots, new structures and other cleared vegetated areas. 18

9) The Final EIS should provide an analysis of the increase in vessel activity from the current conditions (including an analysis of activity during construction times). 19

10) The FEIS should provide alternatives to the two observation towers that lie directly on the beaches on the North and South sides of the Land Water Interface. The abutment and stairwells to these towers can have significant effects to the beaches, which lie directly on shellfish beds. It would be appropriate to suggest alternatives in the FEIS. 20

We request that the Navy notify us directly and with ample time to comment on documents related to this project and other upcoming projects. This process is on-going and our Tribes need ample time to consider the cultural, historical, environmental, and economic effects of these projects to both of the Point No Point Treaty Council Tribes. 21

Thank you for the opportunity to comment on the Draft Environmental Impact Statement for the Land Water Interface and Service Pier Extension. The Navy has a Treaty Trust responsibility that should include selecting good final alternatives and appropriate mitigation that does not already add to the collective impact to the Jamestown S'Klallam Tribe and Port Gamble S'Klallam Tribe's Usual and Accustomed fishing area. Our Tribes request government to government consultation regarding these projects. Please do not hesitate to contact me at crossi@pnptc.org or at 360-297-6534 with any questions or to provide additional information regarding the LWI and SPE projects.

Sincerely,

Cynthia A Rossi

Cynthia A. Rossi

Lead Habitat Program Biologist
Point No Point Treaty Council
19472 Powder Hill Place NE, Suite 210
Poulsbo, WA 98370
Ph. 360-297-6534

Response:

17. The abutments have been designed and located to minimize environmental impacts while meeting the required security function (Section 2.3.1).

18. Comment Noted. Please refer to PGST Comment #New 17.

19. The potential impacts of project construction vessels and SEAWOLF, LOS ANGELES, and VIRGINIA Class submarine transits on co-use waterways of the Hood Canal and Admiralty Inlet on tribal fishing vessels have been added to Section 3.14.2 of the FEIS.

20. The observation posts will be located in the high intertidal zone, above the shellfish habitats, as will the stairs from the bluffs down to the beach. Further, installation of a coffer dam above the shellfish beds during abutment construction will reduce the potential of construction impacts to this resource.

21. The Navy remains committed to fulfilling its government-to-government consultation responsibilities in accordance with Navy polices. The Navy routinely provides notifications to the Tribes of project developments as early as practical in order to provide adequate time for the Tribes to review documents.

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T1 – Point No Point Treaty Council — ATTACHMENT 1 *(attachment page)*

Attachment 1: Bangor Beach Littoral Drift Assessment

RE: Land-Water Interface/ Service Pier Extension Draft Environmental Impact Statement
Point No Point Treaty Council Comments 4/13/2015

Responses have been provided to the main comment document, which references the attachments. There are no responses to the attachments here and below.

T1 – Point No Point Treaty Council — ATTACHMENT 1 *(page 1 of 15)*

Bangor Beach Littoral Drift Assessment
Kitsap County, WA

Prepared for: Port Gamble, S'Klallam Tribe

Prepared By: Coastal Geologic Services

Preparers: Andrea MacLennan, MS,

Jim Johannessen, Licensed Engineering Geologist, MS

October 8, 2014

COASTAL GEOLOGIC SERVICES, INC.

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Introduction and Purpose

The objective of this memo is to summarize the potential effects on coastal geomorphic processes resulting from a proposed project at the Naval Base Kitsap – Bangor (NBK Bangor) beaches on behalf of the Port Gamble S'Klallam Tribe. The proposed project would entail several new structures in the intertidal area, including in-water fencing, two watch towers with associated footings and retaining walls, and a major expansion to the Service Pier located just north of Carlson Spit. Our understanding of the proposed new structures is based on preliminary design information provided by the Navy contained in the file "Navy_LWI_012314.pdf", apparently created January 23, 2014. This file included a site plan map and 6 conceptual design schematics, which are attached in Appendix A for reference. Originally, conceptual design information provided by the Navy in a PowerPoint show titled *Notice of Intent to Prepare an Environmental Impact Statement For Land-Water Interface and Service Pier Extension, Naval Base Kitsap Bangor, W,A Brief for Mr. Donald Schregardus, DASN(E,) dated* January 16, 2013 was reviewed, however much of this information was updated by the information in Appendix A.

Observations from a field visit on February 21, 2014, examination of long-term shore change within the NBK Bangor shore areas, and results and recommendations are summarized below. The field visit was carried out by Jim Johannessen, MS, Licensed Engineering Geologist, and Andrea MacLennan, MS, of Coastal Geologic Services Inc. Roma Call of the Port Gamble S'Klallam Tribe and Rowan Thompson and Greg Leicht from the US Navy were also present during the field visit. CGS and other field visit participants were not allowed to take any photographs during the site visit, so no photos were available for later examination or inclusion in this report. This report was delayed for some months in waiting for updated designs from the Navy, which we were later informed would not be coming at this time. Therefore consideration of the proposed structures in this report is based on the analysis described below using the above mentioned design information only.

This report contains an overview of site conditions including net shore-drift and geology/geomorphology, historical shore change, a brief summary of model results (described in detail in associated memo by ESA, and Conclusions. The report generally discusses the site from south to north, in the direction of net shore-drift. Changes which appear to be due to overwater and in-water structures already in place are discussed to both document existing conditions and also to provide insight into the potential impacts of the installation of additional structures.

Site Conditions

The NBK Bangor is located along the northwest shore of the Kitsap Peninsula in northern Hood Canal (Figure 1). The base encompasses approximately 5 miles of shore directly east of the Toandos Peninsula, starting 7 miles south of the Hood Canal Bridge. For the purpose of this assessment, the Bangor study area was delineated into 5 distinct shore reaches, each of which was assessed during the field visit (Figure 2). The 5 reaches were numbered from south to north in the direction of net shore-drift and were generally visited in that same order. Field observations were assessed along with observed and mapped geologic and geomorphic information to both assure data quality and provide a baseline for pre-project conditions. In many cases the existing NBK Bangor's waterfront infrastructure has already altered natural conditions. The areas in which historical conditions have been altered by extensive shoreline developments were identified and will be discussed below.

Net Shore-drift

Net shore-drift is the long-term, net effect of littoral (beach and nearshore sediment) transport along a coast. Daily or seasonal littoral drift may occur in either direction along our coasts, typically driven by wind-generated waves in the sheltered Puget Sound region (Johannessen and MacLennan 2007). However net shore-drift is the net effect over many years of these short term processes (Schwartz and Jacobsen 1981).

Original net shore-drift mapping shows that the Bangor study area is located in the middle of one long drift cell (named KS-5-1 in Washington Department of Ecology (WDOE) digital coastal atlas). KS-5-1 extends from just north of Anderson Creek to the entrance to Port Gamble Bay (Figure 3), with continuous northward net shore-drift throughout this 16.5 mile shore reach. This drift cell was originally mapped by Taggart as KS-2-1 (1984), and mapping was later compiled and published in Schwartz et al. (1991), published by the Washington Department of Ecology. This mapping replaced earlier coastal drift mapping in the *Coastal Zone Atlas of Washington* (WDOE 1979), which is now understood to be incorrect. Net short-drift mapping was most recently verified and updated by MacLennan et al. (2013). No changes to previous mapping were made to this area. However, field observations suggest that the cell may now be functioning as several smaller cells due to the abundance of shoreline modifications.

The maximum fetch which the southern portion of the study area is exposed to is 5.8 miles, from the south-southwest. These shores have similar exposure to the north (5.5 miles). Predominant (strongest) winds are from the south (southerlies), resulting in a net northward transport of sediment. Portions of the central study area are exposed to lesser fetch from the southwest, particularly as subtle changes in shore alignment orient some of the shore more to the north, making these areas less exposed to the predominant southerly winds . Areas that are not located in the lee of sheltering shore features are exposed to up to 9.5 miles of fetch from northerly winds. This generally classifies these shores as moderately high wave energy in the Puget Sound-Hood Canal context.

Geology and Geomorphology

Surficial geology was mapped at a 1:24,000 scale by the Washington Department of Environment and Geologic Resources (Polenz et al. 2013, Contreras et al. 2013). Field observations concurred with the mapped geology. The geology of the bluffs differed considerably from south to north (Figure 4). At the south end of the Bangor study area, the bluffs were primarily comprised of Pre-Vashon alluvium (Qc) and Vashon ice-contact deposits (Table 1 includes additional description of these strata). Vashon ice-contact deposits (Qgic) and Vashon recessional outwash (Qgo) were more commonly found in the central and northern bluffs. The northernmost bluffs were comprised of Vashon esker deposits (Qge; Table 1). Intermittent artificial fill associated with naval infrastructure and beach deposits were observed along low elevation shores.

Shoretypes, observations of littoral drift patterns, beach substrate composition, and impacts to geomorphic processes were observed during the field assessment of the Bangor study area. Reach conditions are described below, from south to north, with additional detail in Table 2. The geomorphology of the coastal area was dominated by erosional bluffs, all containing intertidal beaches. The bluffs are locally known as bluff-backed beaches (Shipman 2008, Simenstad et al. 2010) and range in height from 30 to 55 ft. Typical bluff slopes were on the order of 35 to 50 degrees from horizontal.

Table 1. Surficial geology units found within the study area.

Unit	Description
Qc	Pre-Vashon alluvium: sand, silt, pebble, gravel, clay, and organic sediment; gray to tan, locally brown, with silt and clay facies ranging to bluish-gray; compact; moderately sorted, bedded.
Qgic	Vashon ice-contact deposits: Cobbles and pebble gravel, sand, ablation till, flow till, lodgement till, lacustrine mud, and rare boulders; tan to gray; loose to compact; variously sorted; massive to well stratified; includes sub-ice flow and collapse features.
Qgo	Vashon recessional outwash: Sand, pebble, and cobble-gravel, some silt and clay, moderately fresh; clasts subrounded; moderately sorted and stratified.
Qge	Vashon esker: Pebble to cobble-gravel and sand; tan to brown; loose; clasts moderately to well rounded; mostly well sorted; mostly basaltic; forms sinuous hills.

Table 2. Reach characteristics (see Figure 2), including location, shoretypes, and sediment composition. N/A is not applicable to that reach; ND is no data.

Reach number	Location	Shoretypes	Backshore sediment	Upper beach sediment	Mid beach sediment
1	South of Carlson Spit	Feeder bluffs, accretion shoreform	N/A	Coarse sand with pebble and minor granules	Coarse sand with pebble and minor cobble
2	Carlson Spit to Keyport Bangor Docks spit	Feeder bluffs	Sand with granules	Pebble with sand	Sand with pebble and minor cobble
3	Keyport Bangor Docks spit to Delta Pier, including Port Gamble shellfish beach	Feeder bluffs and transport zones	Sand with shell hash	Coarse sand with granule and minor pebble	ND
4	Delta Pier to EHW #1	Feeder bluffs	ND	ND	ND
5	North of EHW #1	Transport zones	Sand with shell hash	Coarse sand with granules and pebble	Sand with pebble and minor cobble

Feeder bluffs are coastal bluffs with active erosion and/or mass wasting that periodically supplies moderate volumes of sediment to the nearshore, thereby "feeding" the beach with sediment. Feeder bluffs are the primary source of beach and littoral sediment in the Puget Sound-Hood Canal area (Keuler 1988, Johannessen and MacLennan 2007). The bluff face typically has vegetation indicative of disturbance, with evidence of landslides and toe erosion (MacLennan et al. 2013). Feeder bluffs account for approximately 40% of the KS-5-1 drift cell. Modified shores, which represent approximately one-third of the entire drift cell, include all forms of shore armor from riprap, rockeries, seawalls and sheet pile, and similar structures. Figure 2 displays the spatial extent of modified shores in the study area.

Feeder bluffs represent approximately 22% of the study area (Figure 2). Forty-six percent of the area of interest on the NBK Bangor waterfront is armored. Sediment for the beaches within the study area is supplied from bluffs both in the Bangor areas of interest as well as further up-drift, to the south. South of Carlson Spit, 1.8 miles of feeder bluff have been mapped, with an additional 0.6 miles of historical feeder bluffs. Historical feeder bluffs have been armored such that they no longer supply sediment to the down-drift shore. Therefore sediment supply and transport are currently altered within the Bangor study area.

Three large sand and gravel spits are located within the study area. These shoreforms develop as the result of long-term deposition of littoral sediment and are mapped as accretion shoreforms in Figure 2.

Although sediment deposition is the process responsible for the evolution of these coastal landforms, many are no longer accreting and in some cases are eroding.

The southernmost accretion shoreform is Carlson Spit, which has the form of a cusped foreland. The Carderock Pier is located on the south shore of Carlson Spit and the Service Pier is located immediately north of the Carlson Spit (Figure 2). Indicators of northward drift were observed south of Carlson Spit, such as sediment accumulation on the south side of fallen trees. Sediment transport appeared unobstructed beneath the Carderock Pier. There were also areas in which dense glacial deposits were exposed, indicating that there was limited sediment in this system. Sediment transport appeared unobstructed beneath the pier.

Signs of erosion were observed along the north shore of Carlson Spit in Reach 3, although the eroded material was likely fill. Considerable sediment is continually transported over the boat launch located along the north shore of Carlson Spit. This confirms northward sediment transport at the site. A deeply incised channel with a 24-inch culvert and concrete rubble and may partially impede continuous sediment transport beneath the Service Pier trestle further north. Intermittent armor was observed along the toe of bluffs east of the Service Pier. Several small boats and moderately sized tug boats were moored in this area, and no signs of net erosion were observed.

Sediment transport dramatically declines north of the boat ramp, as the shore becomes increasingly sheltered from southwest wind waves by the Service Pier and vessels moored at the pier to also from the north by the Keyport Bangor Docks (also referred to as the K/B Docks). The existing Service Pier facility entails several docks, a trestle, a boat launch and extensive boat moorage. Dense pile spacing likely dampens wave energy and sediment transport in the lee of the pier and docks. The lack of sediment transport was evident by upper beach sediment with fine-grained sediment, dense barnacle growth on sediment in the middle of the high-tide beach, and old landslide colluvium on the backshore and upper beach (age indicated maturity of vegetation). The large majority of gravel contained barnacles in growth position, which refers to them growing upwards on the top of gravel clasts with no growth on the bottom. These combined characteristics suggest that the sediment has not moved or been buried recently. In addition, indicators of southward drift were observed on the leeward side of K/B Docks, suggesting this area is at least partially removed from the larger net shore-drift cell that has northward transport.

Devil's Hole barrier estuary is located near the center of the study area, in Reach 3. This estuary has a filled causeway with the coastal road atop it, which serves to enclose the estuary at an artificially high water level. There is no free tidal exchange in or out of Devil's Hole estuary. There is a tide gate with questionable fish passage located on the landward side of the road at Devil's Hole estuary. The channel contains a relatively high velocity and steep exit channel, which was apparently intended to provide some amount of fish passage. Velocities observed indicate that flow may be too rapid for salmon to gain access to the estuary. Beaver are known to utilize the habitat. Historically, this area encompassed the mouth of a barrier estuary with two narrow and low-elevation converging spits (Figure 5).

The beach at Devil's Hole is the Port Gamble S'Klallam Tribe's shellfish beach. The constrained tidal flushing affects sediment transport patterns from the old open barrier estuary to the beach and alters nearshore processes. Sediment supply and transport have been impacted within this reach; however, indicators of northward net shore-drift were still evident. Sediment supply has been degraded due to armored bluffs that would otherwise supply sediment to the nearshore. Dense glacial deposits were exposed on the beach in several locations, which may be a result of diminished sediment supply. The beach is now considerably sheltered from the north by Delta Pier. Wave dampening would impact sediment transport, which would further alter nearshore conditions.

A third spit is located in Reach 4, south of the Explosive Handling Wharf 1 (EHW #1) and north of the Delta Pier. This spit was extensively developed and armored and now encompassed by the Marginal Wharf. This area was not directly observed in the field as access was not available. North of the EHW #1, in Reach 5 (where the new EHW #2 will be constructed), the shore was comprised of a transport zone and bluff-backed beaches (Figure 2). Some landslides and toe erosion were observed in this area. The existing EHW #1 has dense pile spacing that likely dampens northward sediment transport in this reach. Although sediment transport may be dampened, indicators of northward transport were observed.

Historical Shore Change

Methods

A set of shore change maps were produced using maps covering the longest data period available. These maps were produced in ArcGIS using 2 data sets. Topographic or T-sheet mapping was available from the year 1878, produced by the US Coast and Geodetic Survey (USCGS 1878). This mapping was produced at a scale of 1:20,000. Previously georeferenced T-sheets data were downloaded from the University of Washington's Puget Sound River History Project website (http://riverhistory.ess.washington.edu/). The mean high water (MHW) line was used from all data sets. The 1962 position of the MHW line was mapped by NOAA compiled from charts 6445 and 6446. More recent mapping, from the year 2000, was available from the Puget Sound LiDAR consortium. The local elevation of MHW was delineated by CGS using this elevation data. The published elevation of MHW at the Bangor tidal benchmark (NOAA Station ID: 9445133) is +10.2 ft above mean lower low water (MLLW).

History of Overwater Structures at NBK Bangor

The history of construction of major overwater structures at the base was investigated using all available aerial photos and maps. This was conducted in order to understand when and where these structures may have begun affecting coastal processes.

The first pier in the study area was constructed prior to 1951 and most of the Naval structures were built several decades ago. Several structures have been reconfigured or expanded in recent years. The overall order of construction of the six major overwater structures was as follows: Marginal Wharf, K/B Docks, EHW-1, Delta Pier, Service Pier, and finally Carderock Pier (Figure 2). The history of construction of these large overwater structures is important for qualitative consideration of processes as well as potential iterative examination of modeled quantitative change to processes over time (which has not been completed to date to our knowledge. The details of installation of these structures are outlined below:

- Carderock Pier (Reach 1, Figure 2), located south of Carlson Spit, was constructed in the summer of 2007. The pier was visible in Landsat imagery at that time.
- The Service Pier (Reach 2) with its multiple docks was constructed in 1981 or 1982. This structure does not appear in the topographic map photorevised in 1981 but does appear on a 1982 T-sheet.
- The Keyport Bangor Docks (K/B Docks; Reach 2), west of Devil's Hole Lagoon, was constructed between 1951 and 1953. The pier and docks do not appear in 1951 air photo but appear on a topographic map from 1953.
- Marginal Wharf (Reach 4), which wraps around a smaller point, was constructed prior to 1951. This facility appears in the August 1951 air photo.
- Delta Pier (Reach 3-4 break), the largest of the overwater structures, was constructed in 1977. Delta pier appears under construction in a 1977 air photo.
- Explosive Handling Wharf (EHW1, Reach 4-5 break), was constructed between 1973 and 1977. The wharf does not appear on topographic map "photorevised" 1973 but does appear in the oblique air photo from 1977.

Shore Change Results

Examination of Figures 6-S and 6-N show several clear trends. Each of the 3 spits described above appear to have eroded and shifted northeastward. This is most pronounced at Carlson Spit where the historical location of the tip of the spit appears to have migrated northeastward by approximately 185 ft between 1878 and 2000. The northern migration of spits in the Salish Sea is caused by long-term prevailing and predominant southerly winds and waves, which typically result in northward sediment transport, the long-term effects of which is the gradual northward migration of depositional features. This phenomenon has been documented previously in several other studies (Johannessen 1992, Finlayson 2006, Johannessen and MacLennan 2007, MacLennan and Johannessen 2010). Some of the measured change may be due to inaccuracies in the historical mapping. Additional northward migration, approximately 10 to 13 ft, appears to have occurred between 2000 and 2013 (Figure 6-N and 6-S).

Another trend that is apparent from the shore change work is that the shorelines in most feeder bluff have receded landward significantly. Most of the bluff recession appears to have occurred prior to 1962 and was generally in 3 locations: between the Service Pier and the K/B Docks (Reach 2), at the bluffs west of Devil's Hole barrier estuary (Reach 3), and just north of the Marginal Wharf (Reach 4). Shoreline recession was not exclusive to bluff shoretypes and was also observed along much of the shore, excluding the tide flats on the shore south of Devil's Hole barrier estuary, which have changed very little since 1962.

The position of the mean lower low water (MLLW) line was compared using the 1878 T-Sheet with NOA charts from 1970 to 1989. A greater amount of error is associated with the 1878 position of MLLW as compared to MHW, as MHW was a priority of the mapping in the earlier era. Additionally, T-sheet mapping from the late 1800s generally tended to map the position of MLLW as further waterward than it actually occurred (based on experience on other projects). Considerable apparent recession of the MLLW (ranging from 90 to 150 ft) was mapped throughout much of the southern portion of the study area. The point north of the Keyport Bangor Docks exhibited the least recession. The shore waterward of the mouth of Devil's Hole barrier estuary was one of the few areas that prograded. Northeast of Devil's

Hole barrier estuary near the Delta Pier, recession of MLLW again persisted. This is not surprising, as the shore is not sheltered from waves by large structures. However, north of the EHW-1, southerly waves are again dampened by overwater structures and high pile density and the MLLW shoreline did not recede adjacent to and north of the EHW-1.

Review of Model Results

ESA reviewed the cbec modeling reports focused on the proposed new structures on the NBK Bangor waterfront (cbec 2012a, cbec 2012b, and cbec 2013). The review was limited in scope and only considered the effects of the proposed project on hydrodynamics and sediment transport. ESA prepared a memo (ESA 2014) for this study, which should be read in full as it contains much additional information. The following key pieces of information were excerpted from the ESA memo, which are particularly relevant and should be integrated with the other observations in this study.

- The model does not accurately represent wave-driven alongshore sediment transport in the Puget Sound region, as indicated by the model's prediction of deposition on the north side of structures, counter to the littoral transport observed at the site. ESA hypothesized that this prediction of sediment transport in opposition to observations may be due to tidal currents dominating model results, as opposed to wave-driven transport, which is the predominant driver of sediment transport in the Puget Sound region.
- Model results reported bed elevations changes ranged up to 2 meters over the course of a single year, which is a large range of change for the region.
- cbec's assumed recurrence-interval for a change-event was 2-years and they also considered a 50 year event; 2 years is considerably more frequent than typical change events in the region, which are typically on the order of 10-15 years.
- Local pile scour and pile density were one of the greatest potential impacts to sediment transport.

Conclusions

Current Conditions Relative to Overwater Structures

Based on the changes documented in the shore change analysis, it is concluded that accretion shoreforms are not currently prograding or accreting, but are instead shifting northeastward due to the predominant southerly winds and waves. Extensive shore modifications have likely impacted sediment transport and deposition, particularly along the lower beach, which appears to have resulted in considerable lower beach erosion throughout the study area; however, as stated above, error in MLLW mapping is greater than MHW mapping. The lower beach consists of several valuable habitat types; including eelgrass and shellfish beds. Bluffs have receded throughout the study area.

The combined recession of the lower (MLLW) and upper beach (as indicated by the MHW line) could represent the landward shift of the entire beach profile, which is a natural response at very gradual rates in this type of semi-sheltered Puget Sound shore and also attributable to a very small degree to the long-term effects of rising sea level. A small amount of erosion and recession of the beach is likely to continue into the coming decades due to natural erosion and also as sea levels rise is projected to accelerate. Intertidal to backshore (where present) beach area loss can be expected to occur along all

modified (armored) shores, as armor precludes translation of the upper beach profile. There remains only one depositional shore within the reach and that is the Devil's Hole beach, where the Tribe maintains shellfish beds.

Based on the field visit and supported by shore change work and examination of aerial photos, several alterations of littoral sediment transport were observed. Overwater structures at NBK Bangor appear to have caused several fundamental and ongoing changes to beaches within the base. These conclusions relate to existing conditions in early 2014, which are important to understand and document prior to assessing potential changes in the geomorphology of beaches and other coastal features in the study area which may be caused by new structures. Observations revealed an active beach system south of Carlson Spit, including clear evidence of northward sand and gravel transport, dynamic beach adjustment, intermittent bluff toe erosion and landslides from mapped feeder bluffs, and a variety of beach habitats. Habitat types span the intertidal from sand flats at the lower beach, potential forage fish spawning areas on the mid-beach, backshore habitats in supratidal areas, and dune-upland transitional habitats moving further upland. Erosion occurring on the south limb of Carlson Spit is counterbalanced with significant deposition on the north limb, in agreement with historical shore change work (discussed above). Armor along these depositional shores will impact these processes, as this naturally-driven morphological process requires ample room for beaches to translate landward and for sediment erosion and deposition.

Northward net shore-drift appeared to continue around the tip of Carlson Spit from the south. The character of the beach sediment and degree of morphological change of the beach changed east and northeast of the Service Pier. The associated piers, docks, and moored vessels cause dampening of wave energy, thus reducing sediment mobility, sorting, and transport, as documented above. Here the majority of intertidal beach sediment did not appear to be subject to active littoral transport. This was evidenced by a decrease in sediment size and mobility with additional fine gravel and coarse sand, as compared to southern and more northern beaches (Table 2).

Similar to landward of the Service Pier, the Keyport Bangor Dock area also had a substantially finer-grained beach than away from the pier. This included substantial quantities of sand in an accreted area which bulges waterward towards the pier. The Keyport Bangor Dock also had significant structures including large floats with numerous barges and vessels tied up in deep water. Together, these structures appear to diminish littoral drift volume and potentially locally reverse the direction of littoral transport for considerable time periods. This process also occurred landward of the other overwater structures, which has resulted in long-term changes to the intertidal beach in the areas landward of the overwater structures.

Consideration of Proposed New Overwater and In-water Structures

The wave dampening due to existing overwater structures appears to reduce the total volume of littoral sediment transported in the drift cell as it runs northward through the site, as discussed immediately above. Proposed overwater structures and in-water structures are illustrated in materials in Appendix A, attached. Overall, structures proposed for up-drift and south of the Tribal shellfish beach are more likely to impact sediment transport to the beach, potentially reducing the volume and quantity of fine sediment along the down-drift Tribal beaches. The proposed Service Pier extension is the one proposed change up-drift of the Tribal shellfish beach. The proposed Service Pier extension information was provided in 2 alternatives; one had a shorter pier (44,025 square ft) with 2 submarines berthed adjacent to each other, and the other had a longer pier (90,000 square ft) with 2 submarines berthed end to end (Appendix A). Based upon an e-mail received from the tribe on January 30, 2014, we understand that the shorter and smaller overwater footprint pier extension is the preferred alternative.

The impacts associated with these structures are cumulative. Both alternatives for the Service Pier extension would likely have minor additional wave dampening compared to existing conditions, and would therefore constitute a small impact to littoral transport and beach habitats and conditions. The pier extension would affect both waves from the southwest and also for the northwest. The number and size of piles, sizes of submarines, alterations to the existing Service Pier, and if other vessels would also be docked here are not known at this time. After these sort of design details are provided, the degree of wave dampening and subsequent alteration of wave propagation and sediment transport in the nearshore would be best evaluated using a sediment transport model which has been shown to reproduce observed northward sediment transport trend.

The existing and proposed new structures are summarized, along with anticipated impacts to coastal processes in Table 3. The beach at Devil's Hole Barrier estuary, which we understand is a very productive beach and is the primary shellfish beach of concern to the Tribe within the base, appears to have a moderately large volume of sediment at present. It is likely that some littoral sediment, although a reduced volume since historical conditions, reaches this beach from the southwest and also possibly from the northeast. However the extensive scale of the naval infrastructure has at a minimum partially fragmented this net shore-drift cell, reducing the volume of sediment in transport and available sediment to maintain the Tribal shellfish beach. The proposed extension of the Service Pier would likely lead to some amount of additional reduction in sediment transport volume from the south. The magnitude of change would be very difficult to quantify, however a refined modeling approach may provide insight into this and other proposed changes.

The southern Land Water Interface (LWI; Appendix A) as we understand it would be constructed approximately 350 ft northeast of the Devil's Hole outlet and approximately 1,000 ft southwest of the southern portion of Delta Pier. We understand that this southern extent of the LWI would cross the nearshore northeast of the existing Tribal shellfish beds, and would therefore not have a direct burial impact on these intertidal resources. The current preferred alternative (formerly Alternative 3) for the LWI shows a floating barrier with vertical piles and fencing atop what appears to be cylindrical floats of unknown size. This approach appears to be an installation of an additional piece of the floating barrier, in place since prior to 2004, with the significantly large connection to the beach and bluff face. We understand that no mesh or fencing would extend to the subtidal bottom with this alternative. The existing floating barrier was observed in aerial photos to wave a dampening effect on waves, and the new installation would likely slightly increase this effect.

This preferred alternative for in water portion of the LWI however is clearly preferable to the earlier alternatives which included mesh-like grates extending from the bottom to a narrow, floating pier above the water surface, as there would be less dampening of waves and tidal currents in the absence of underwater elements.

Table 3. Summary of existing and proposed structures (based on preliminary designs) and corresponding altered coastal processes. Reach 4 was not included since no structures are proposed in this reach and the proposed projects are not likely to have an impact on this reach.

Reach number	Existing structures	Currently altered processes	Proposed structure description	Proposed structures potential effect on processes
1	Pier, dolphins, large overwater structures	Minor wave dampening from the south	None	Additional wave dampening from the north
2	Trestle, 2 piers, dense pile spacing, boat storage. Shore armor.	Moderate wave dampening from the north and south. Reduced sediment transport	560 ft extension of Service Pier with associated piles and submarine berthing (2 alternatives)	Further wave depending and reduced northward sediment transport. Local scour at base of piles.
3	Shore armor, tide gate between Devil's Hole estuary and marine environment	Tidal flushing, sediment input, water quality and fish passage from Devil's Hole barrier estuary, road and creosoted wood bulkhead. Wave dampening from the north due to Delta Pier	Land-water interface observation platform and footings	Further wave dampening from the north. Local scour at base of piles.
5	EHW-1 large overwater structure, with dense pile spacing	EHW-1 dampens wave energy to from the south	Land-water interface observation platform and footings	Potential wave dampening from the north. This could isolate sediment transport processes within the reach. Local scour at base of piles.

The LWI design in the current preferred alternative also includes an approximately 70 ft long retaining wall on the upper beach (in this setting also known as a bulkhead or shore armor) at both the south and north ends. Although design details were not provided, we understand from the conceptual graphics provided (Appendix A) that the retaining wall would be vertical (likely concrete) walls along with concrete short return walls extending up the face of the bank. Both ends of the LWI would also have new observation towers constructed on piles over the upper beach and bank face. These retaining wall structures and vertical piles would constitute moderate sized areas of sediment impoundment with associated impacts to existing minor sediment input. The sediment impoundment would not be large as these areas are in mapped transport zones and not in mapped feeder bluffs (MacLennan et al. 2013), however transport zones do provide limited sediment input to local beaches. The retaining walls and associated structures would necessitate disturbance of existing marine riparian vegetation. The observation platforms, the southern of which would extend approximately 35 ft waterward of MHW, would also constitute small, new overwater structures with associated small shading footprints.

Overall the proposed shore modifications at NBK Bangor would likely have the impacts to littoral sediment transport and intertidal habitats outlined in this report and would likely result in a decrease in intertidal habitat quality and area at the Tribal shellfish beach in the long-term. Within the context of sea level rise, a further reduction in sediment supply and transport and in the presence of an armored (bulkheaded) upper beach at the shellfish area, the intertidal shellfish habitats have little natural adaptive capacity to sustain habitats in the face of the accelerated sea level rise projected for the coming decades.

Limitations of This Report

This report was prepared for the specific conditions present at the subject property to meet the needs of specific individuals. No one other than the client and the client's direct project partners should apply this report for any purposes other than that originally contemplated without first conferring with the geologist who prepared this report. The findings and recommendations presented in this report were reached based on brief field visits. The report does not reflect detailed examination of sub-surface conditions present at the site. It is based on examination of surface features, bank exposures, soils characteristics, beach features, and geologic processes. In addition, conditions may change at the site due to human influences, floods, earthquakes, groundwater regime changes, or other factors. This report may not be all that is required by a construction contractor to carry out recommended actions. Great care must be exercised when working on unstable slopes or close to foundations. Thank you for engaging the professional services of Coastal Geologic Services, Inc. If we can be of any additional assistance please contact our office at (360) 647-1845.

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Coastal Geologic Services Inc.

Jim Johannessen	Andrea MacLennan
Licensed Engineering Geologist, MS	Coastal Geomorphologist, MS

Attachments

Figure 1. The location of Naval Base Kitsap Bangor.
Figure 2. Reach locations and geomorphic shoretypes within the NBK Bangor study area.
Figure 3. Net shore-drift cell and geomorphic shoretypes in the NBK Bangor study area.
Figure 4. 1:24,000 surface geology mapping of the NBK Bangor study area.
Figure 5. Historical condition of the Devil's Hole barrier estuary.
Figure 6-N and 6-S. Long-term shore change of mean high water (MHW) at NBK Bangor area, northern and southern sections.
Figure 7-N and 7-S. Long-term shore change of mean lower low water (MLLW) at NBK Bangor area, northern and southern sections.
Appendix A. Site plan map and 6 conceptual design schematics contained in the file "Navy_LWI_012314.pdf", apparently created January 23, 2013.

Figure 1. The location of Naval Base Kitsap Bangor.
Bangor Beach Littoral Drift Assessment

COASTAL GEOLOGIC SERVICES

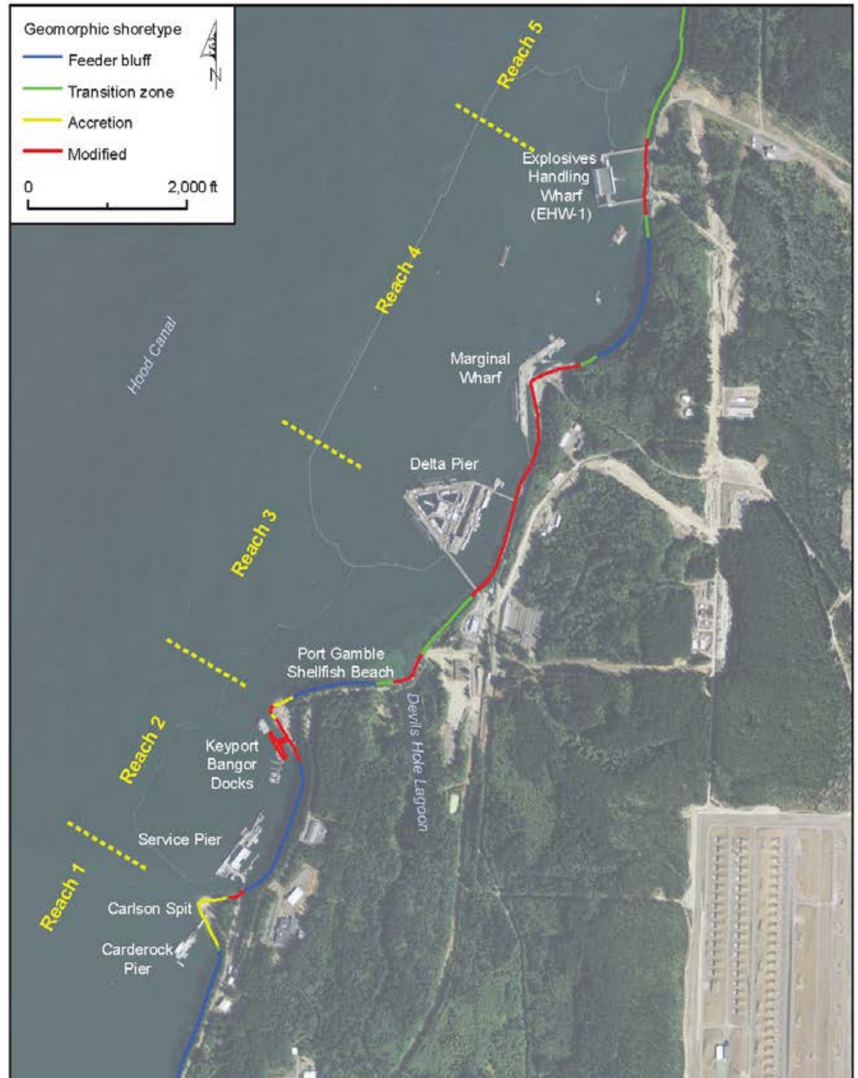

Figure 2. Reach locations and geomorphic shoretypes within the NBK Bangor study area (MacLennan et al. 2013).
Bangor Beach Littoral Drift Assessment

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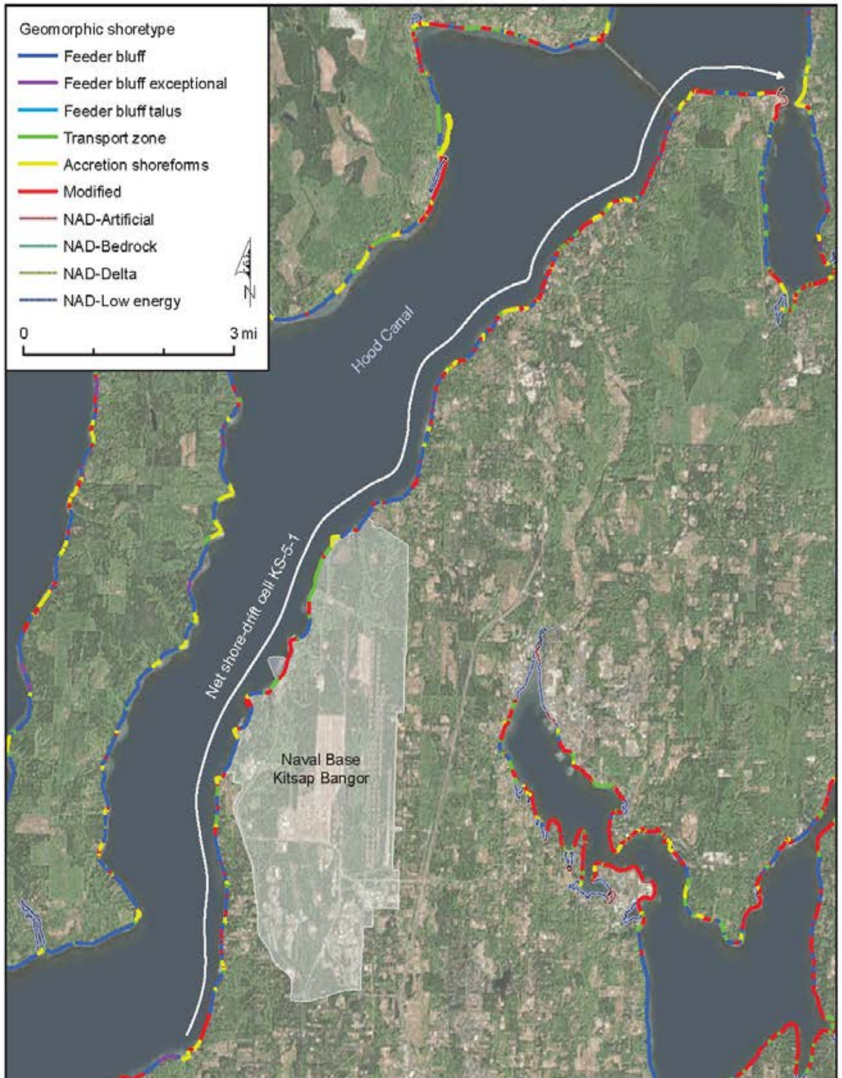

Figure 3. Net shore-drift cell and geomorphic shoretypes in the NBK Bangor study area (MacLennan et al. 2013).
Bangor Beach Littoral Drift Assessment

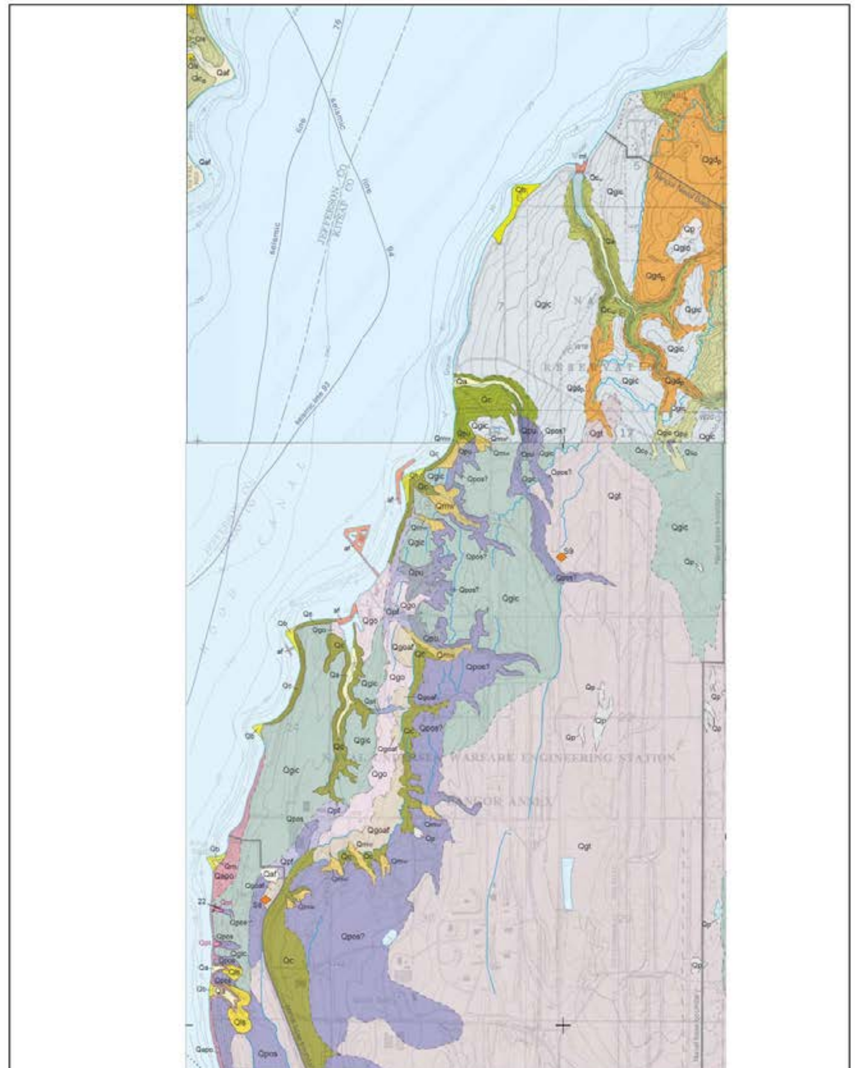

Figure 4. 1:24,000 surface geology mapping of the NBK Bangor study area (Polenz et al. 2013, Contreras et al. 2013; geology units described in Table 1).
Bangor Beach Littoral Drift Assessment

T1 – Point No Point Treaty Council — ATTACHMENT 1 *(page 10 of 15)*

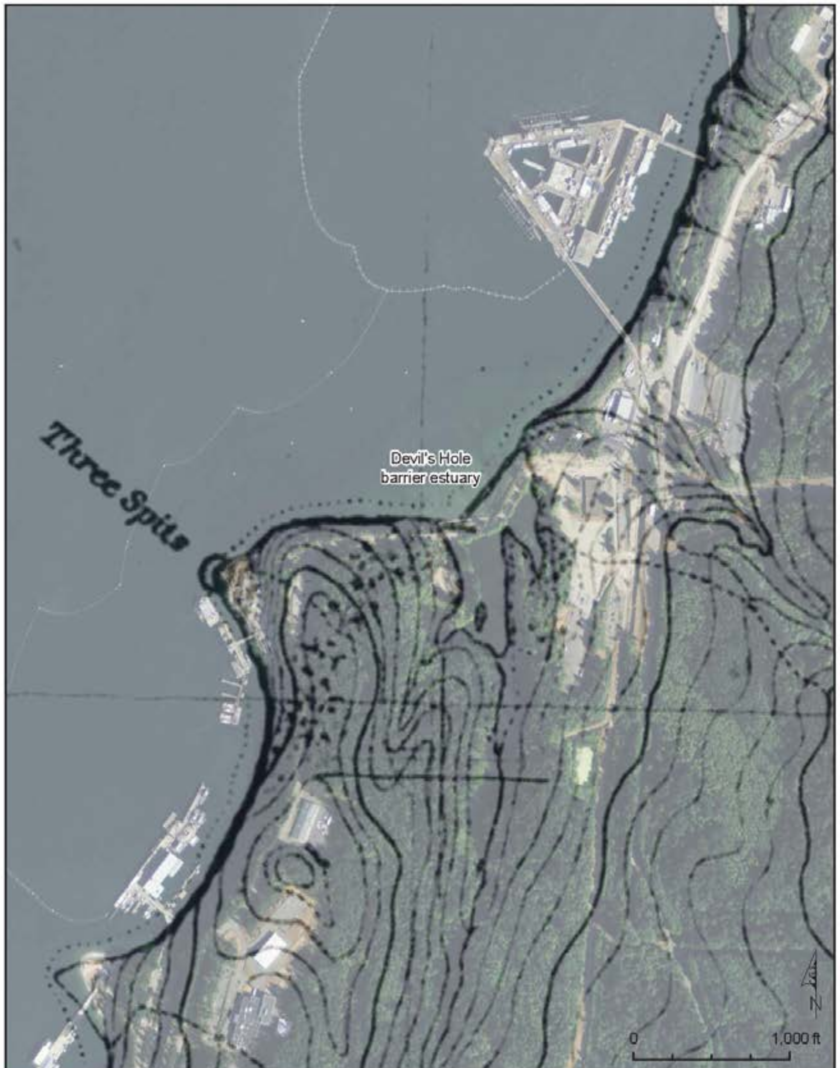

Figure 5. Historical condition of Devil's Hole barrier estuary (T-Sheet 1556, from 1878).
Bangor Beach Littoral Drift Assessment

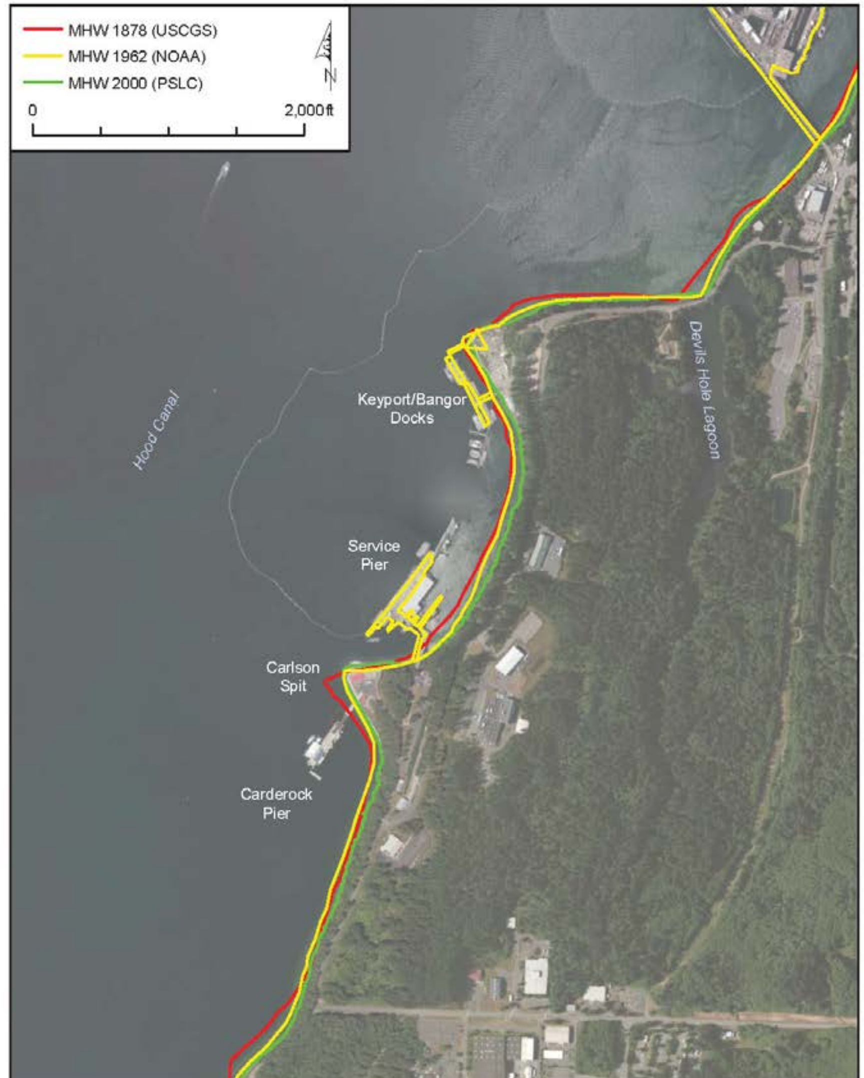

Figure 6-S. Long-term shore change of mean high water (MHW) at NBK Bangor area, southern section.
Bangor Beach Littoral Drift Assessment; air photo from ESRI 2014

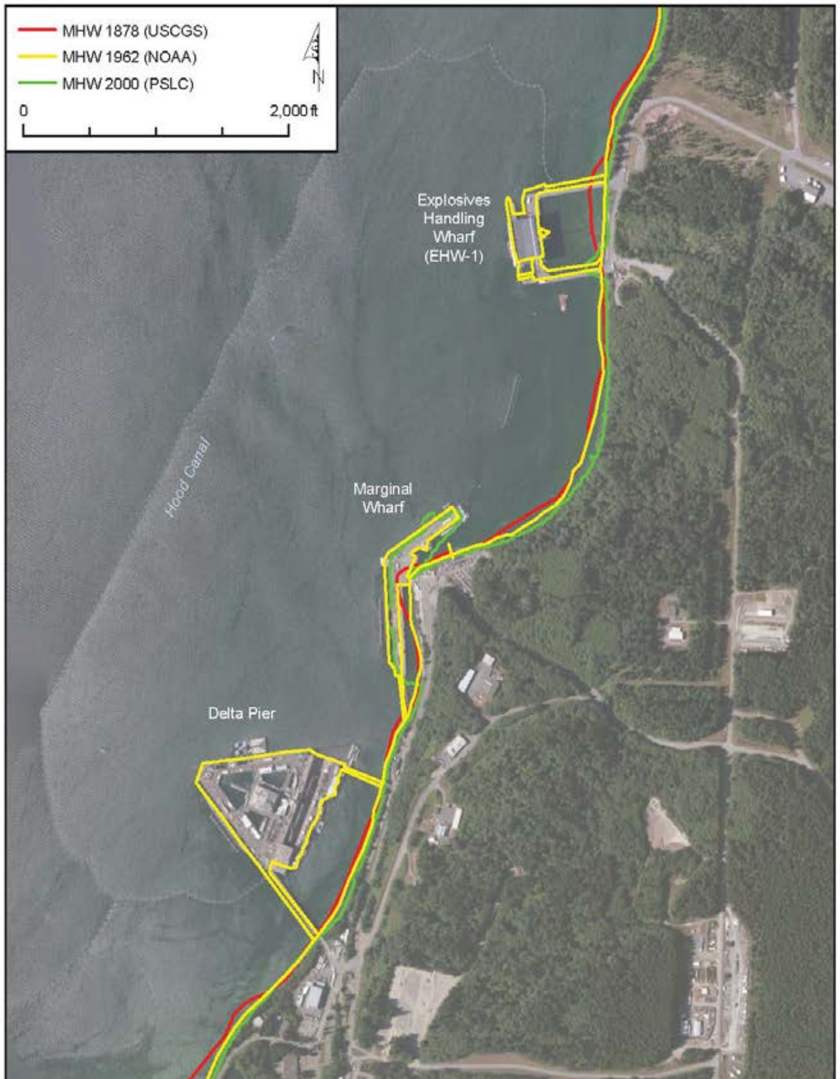

Figure 6-N. Long-term shore change of mean high water (MHW) at NBK Bangor area, northern section.
Bangor Beach Littoral Drift Assessment; air photo from ESRI 2014

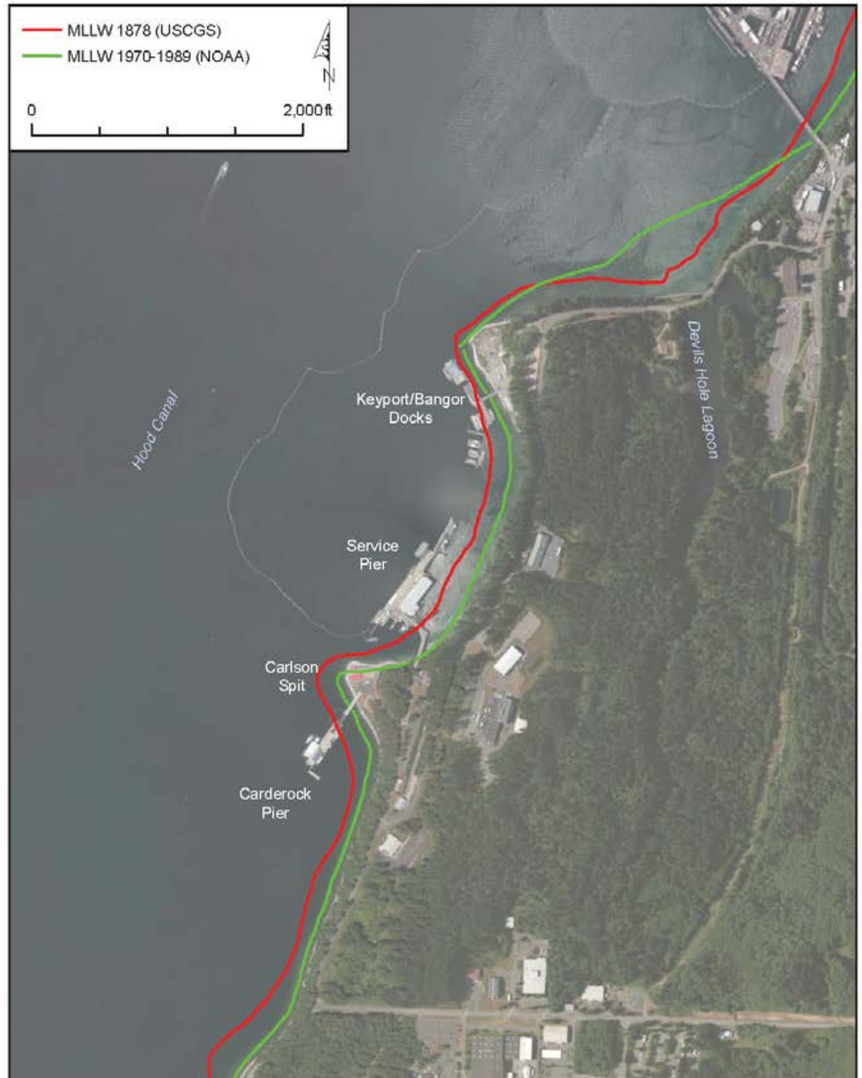

Figure 7-S. Long-term shore change of mean lower low water (MLLW) at NBK Bangor area, southern section.
Bangor Beach Littoral Drift Assessment; air photo from ESRI 2014

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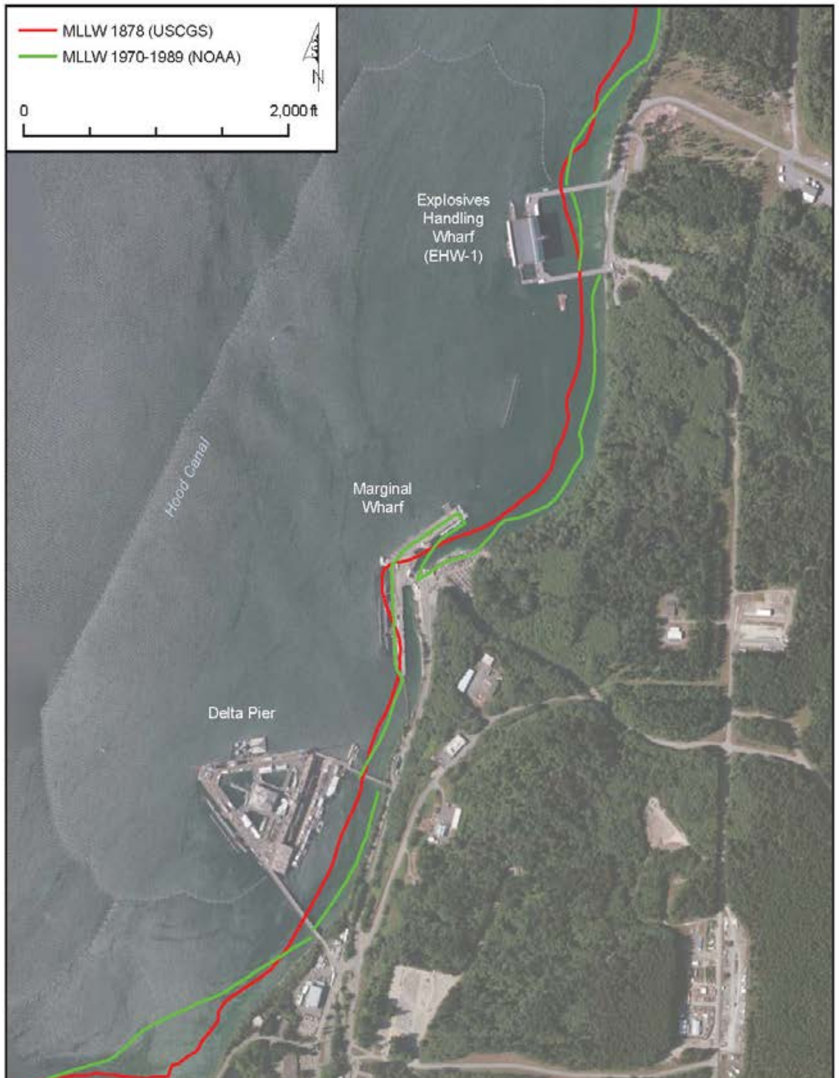

Figure 7-N. Long-term shore change of mean lower low water (MLLW) at NBK Bangor area, northern section.
Bangor Beach Littoral Drift Assessment; air photo from ESRI 2014

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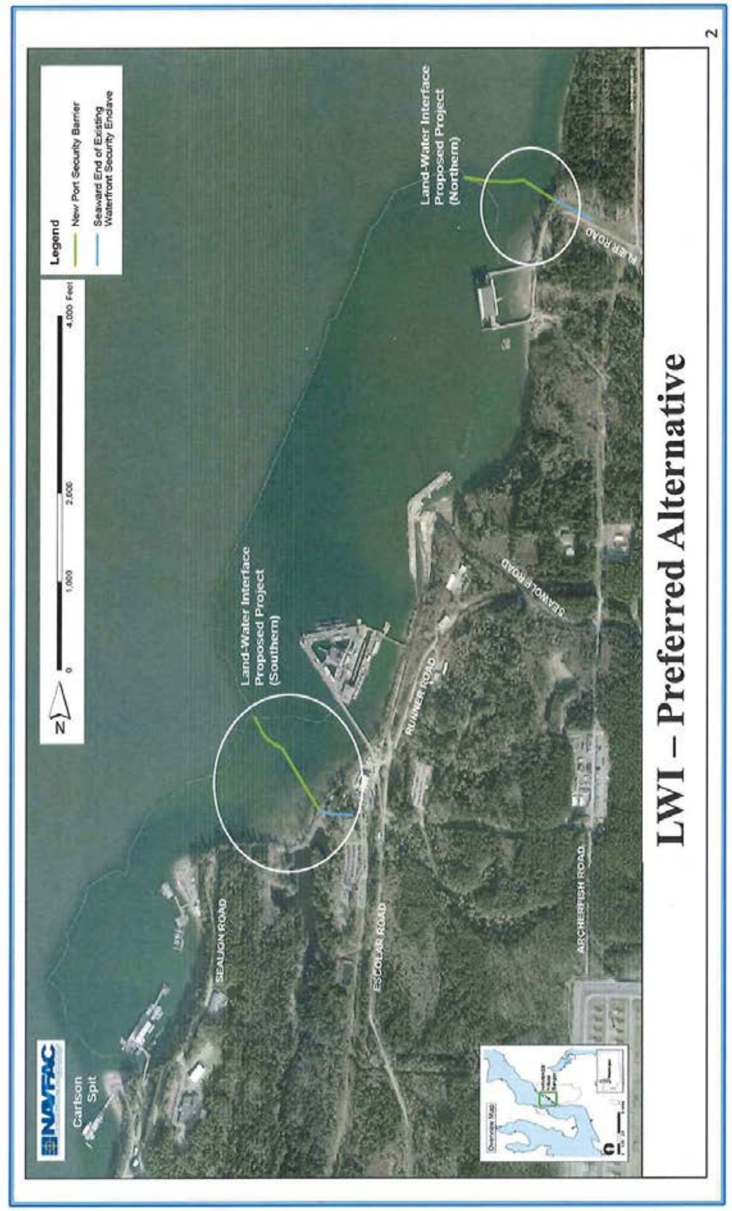
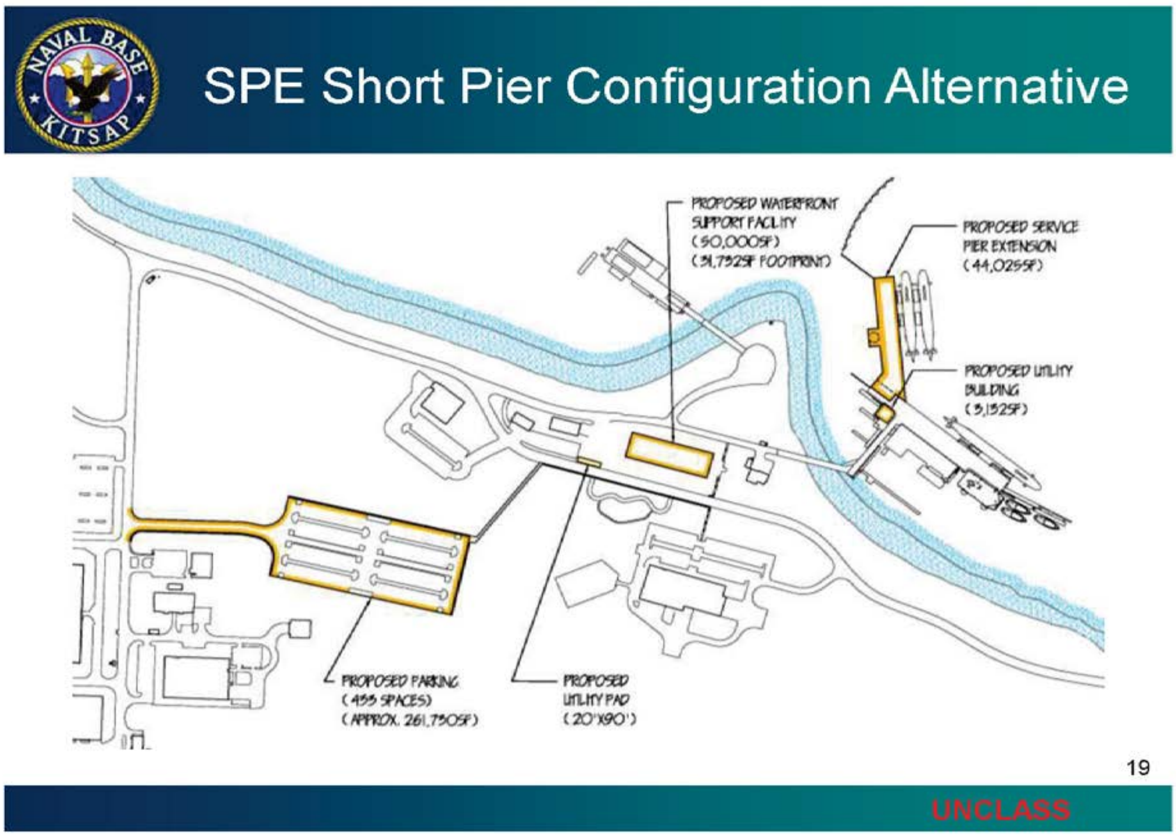
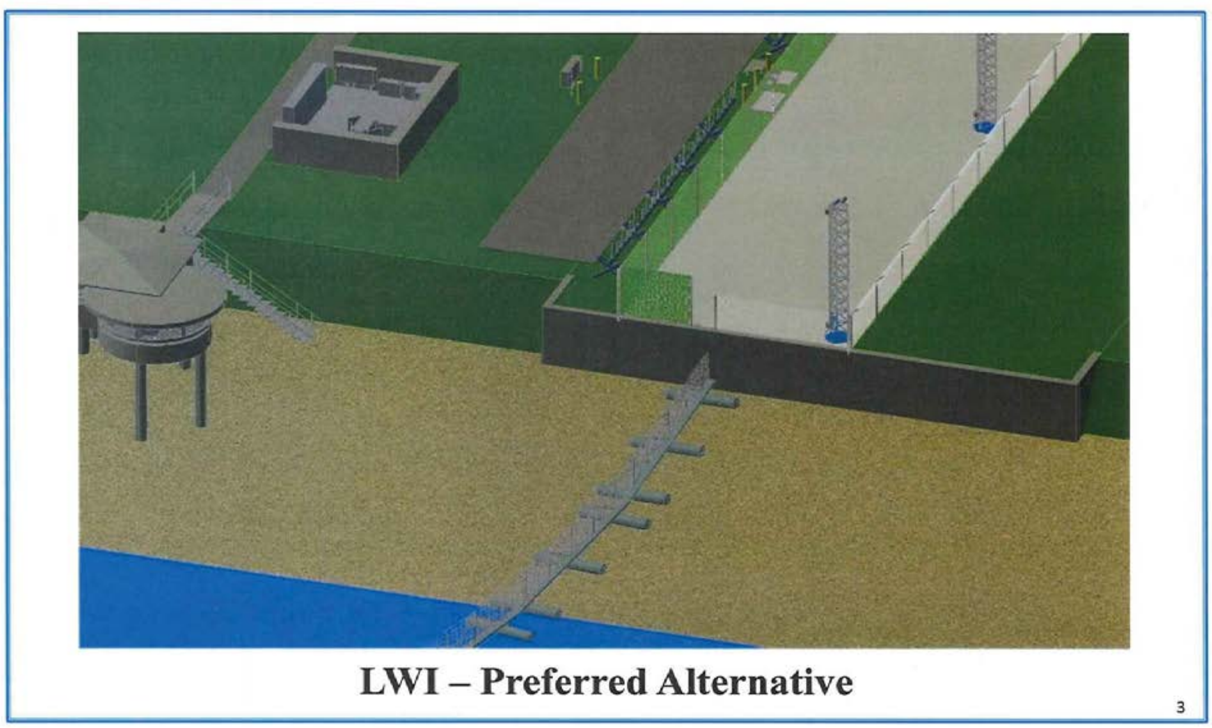


T1 – Point No Point Treaty Council — ATTACHMENT 1 *(page 13 of 15)*





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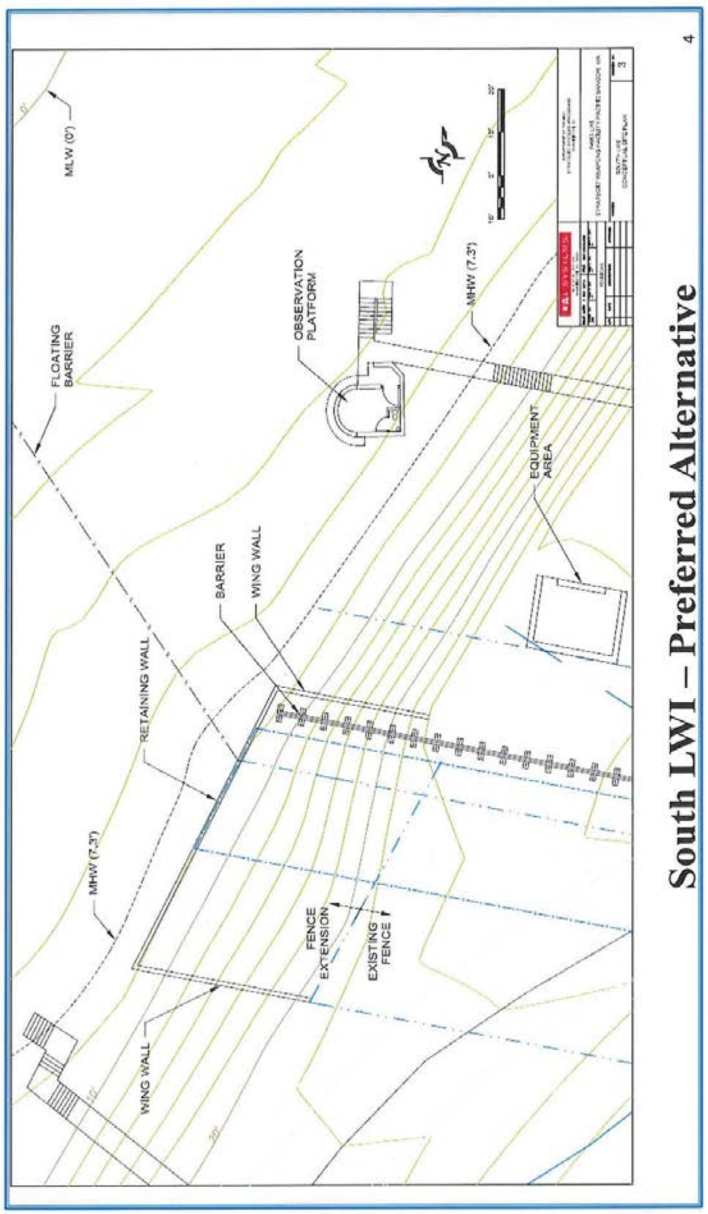
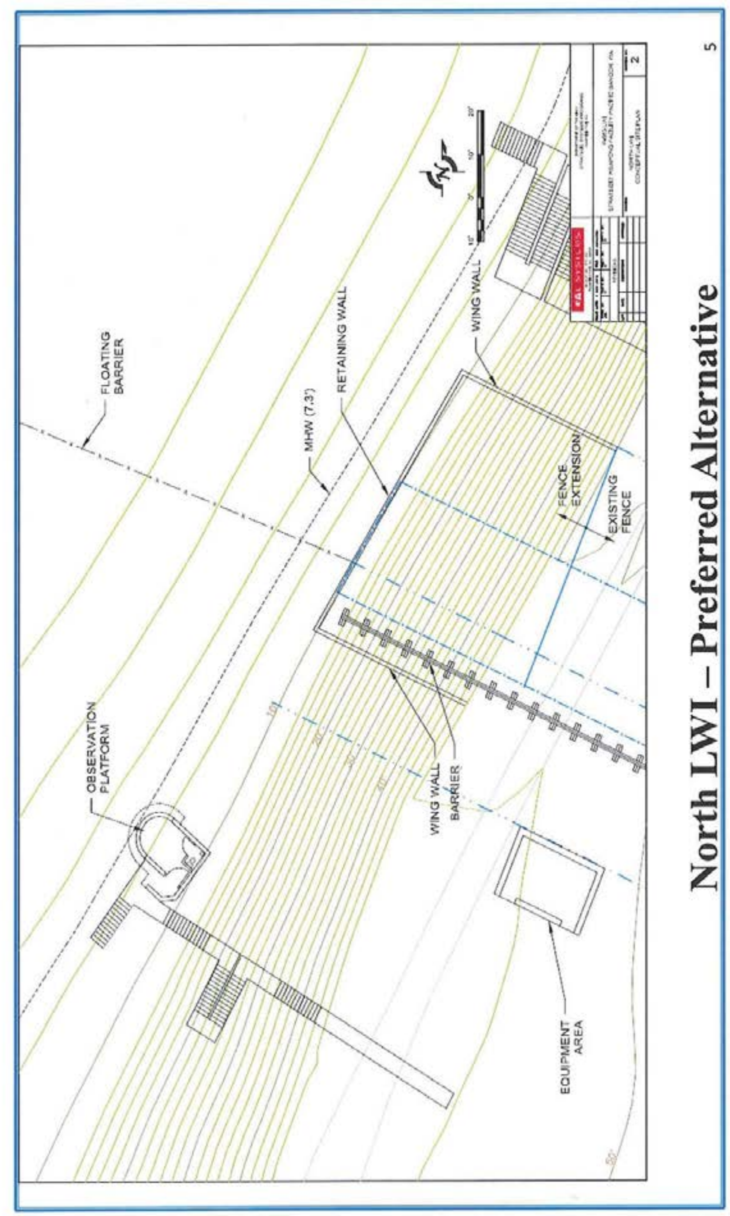
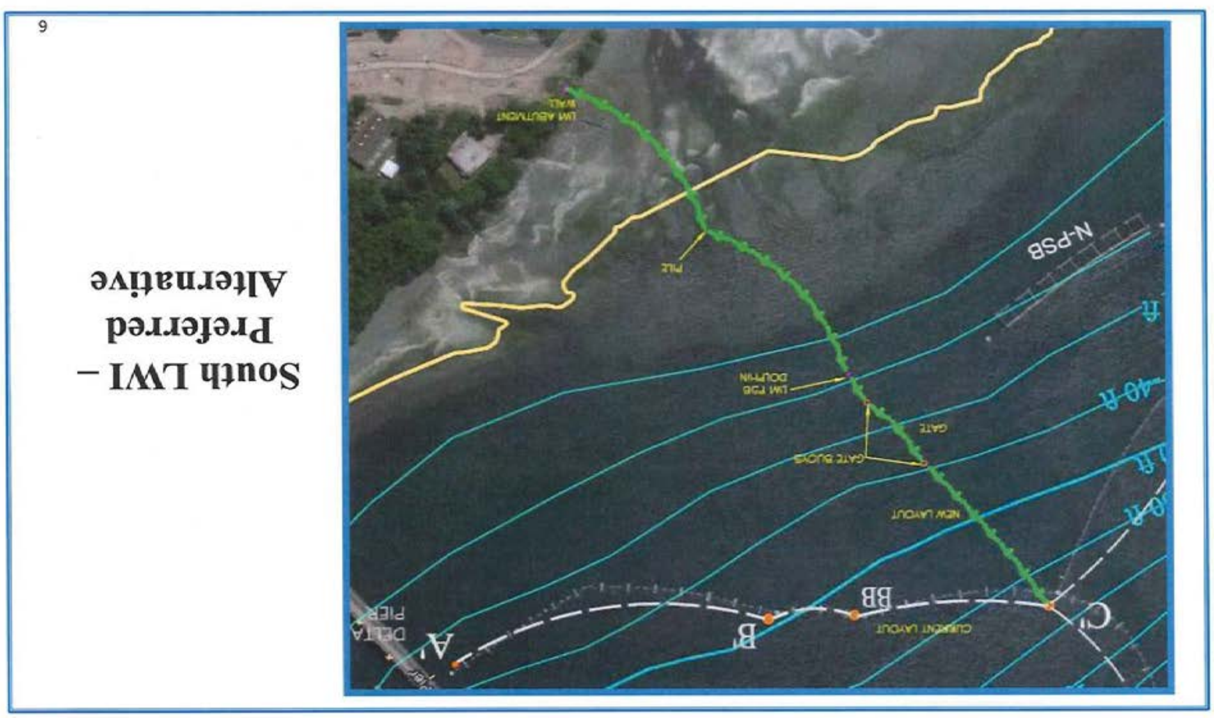
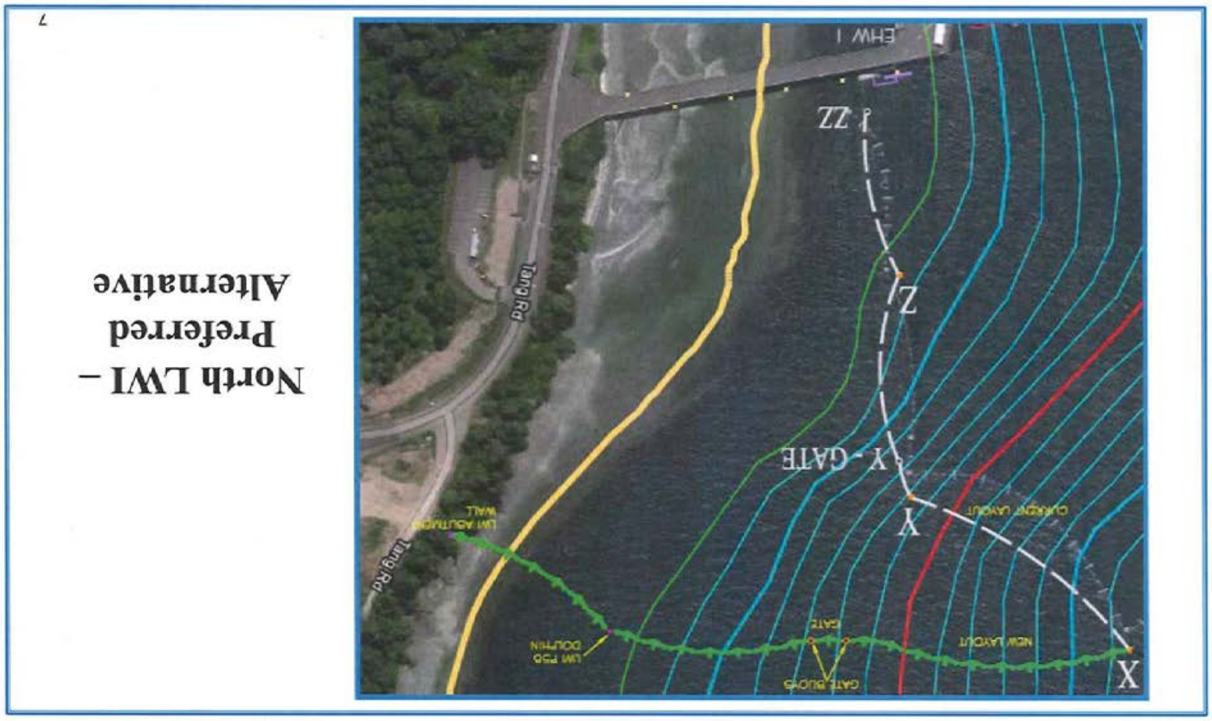





6
South LWI – Preferred Alternative
A'
DELTA PIER
B'
BB
C'
CURRENT LAYOUT
NEW LAYOUT
GATE BUOYS
GATE
LWI P58 DOLPHIN
PILE
LWI ABUTMENT WALL
N-PSB
40 ft


7
North LWI – Preferred Alternative
Tang Rd
LWI ABUTMENT WALL
LWI P58 DOLPHIN
GATE BUOYS
GATE
NEW LAYOUT
CURRENT LAYOUT
X
X'
Y - GATE
Z
ZZ
EHW I

T1 – Point No Point Treaty Council — ATTACHMENT 2 *(attachment page)*

Attachment 2: Bangor Beach Littoral Drift Assessment; Summary of Findings

RE: Land-Water Interface/ Service Pier Extension Draft Environmental Impact Statement
Point No Point Treaty Council Comments 4/13/2015

T1 – Point No Point Treaty Council — ATTACHMENT 2 *(page 1 of 3)*

ESA PWA

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memorandum

date October 10, 2014

to Jim Johannessen, Andrea MacLennan (Coastal Geologic Services, Inc.)

from Matt Brennan, PhD, PE, and Bob Battalio, PE

subject Review of '*Hydrodynamic and Sediment Transport Modeling of the NBK Bangor Waterfront – Draft Technical Report*'

Introduction

The Naval Base Kitsap (NBK) has proposed the construction and operation of two new in-water projects at the Bangor waterfront. The first proposed project, the Land Water Interface (LWI), completes the base's security perimeter by extending a pile-supported security fence from the shore into the water. The second proposed project, the Service Pier Extension, consists of a pile-supported structure added to an existing pier.

The Port Gamble S'Klallam Tribe is concerned about possible short term and long term effects of the proposed projects on habitat and geomorphology, particularly with regard to shellfish beds used by the Tribe. To assess the proposed project's potential effects on beach geomorphology, the Tribe retained the services of a consultant team led by Coastal Geologic Services (CGS) and including ESA. ESA has been tasked with reviewing the report '*Hydrodynamic and Sediment Transport Modeling of the NBK Bangor Waterfront – Draft Technical Report*' (cbec, 2013). This report documents cbec's modeling comparison of existing conditions and project alternatives.

This memo documents ESA's review of the cbec report. We considered the model's representation of physical processes, the model's representation of the proposed projects, and what the predicted differences between modeled existing conditions and proposed project conditions suggest about potential impacts on the flow and sediment transport. After summarizing our findings, we present a more detailed model review, followed by a discussion of our model review as it relates to the CGS site assessment.

Summary of Findings

In developing and applying the Delft3D model to the Bangor waterfront, cbec has efficiently leveraged its previous modeling effort to predict the potential for impact from two proposed in-water projects. By using nested grids, cbec established a modeling approach that captures Puget Sound dynamics, achieves practical run times, and provides high grid resolution in the project area. Use of a two-dimensional depth-averaged model is consistent with the minor role freshwater inflows play in the Hood Canal and the shallow nearshore sediment transport region.

Based on our review of the cbec modeling report, we found the following:

- The model predicts that regional effects of pile-supported structures will be limited.
- However, piles are likely to cause local scour holes in the immediate vicinity of their footings. If piles are grouped close together, these scour holes can interact to alter flow and bed morphology at a larger scale.
- If the security fence and pontoons (during low tide in intertidal areas) touch the bed, they may also cause some local impacts to the bed. The degree and types of impacts depend on the fence configuration and fence's interaction with currents and wind waves.
- The model does not appear to capture the dominant processes which affect shoreline sediment transport and geomorphology, most notably, the south-to-north alongshore sediment transport. The model predicts that structures along the NBK Bangor waterfront accumulate sediment on the downdrift (north side), which contradicts the regional sediment transport direction, typical groin blocking of alongshore transport, and site observations (CGS, 2014).
- In some areas, the model predictions of bed change switch sign abruptly and with considerable magnitude. These conditions are not likely to be representative of the natural system.

Overall, the modeling does not accurately represent waves and wave-induced sediment transport. Since this is a key physical process affecting shore resources and could be affected by the proposed project, we conclude that the modeling is not adequate to assess project effects. Also, the analysis did not include a geomorphic assessment, which further compounds, and perhaps caused the omission of this key process.

ESA's review of the modeling report and readily available supporting documentation was limited to the allocated budget for this review. We do not have sufficient information to fully understand what modeling was done, and our comments are therefore provisional pending additional information. To gain greater confidence in the model predictions, it may be useful to explore the model development and application further by initiating a discussion between ESA and cbec. Since ESA only reviewed the modeling report, and did not develop any portion of the model or review the modeling input and output files, ESA is not responsible for any findings or lack of findings based on the modeling. In addition, ESA's assessment is limited to the model predictions and do not include an assessment of whether the predicted impacts are significant.

Model Review

The focus of this review was the 2013 cbec report focused on the Bangor Waterfront has been provided for ESA's review. The model used in this 2013 report is based on modeling previously completed by cbec for NBK. Rather than repeat the details of model development and calibration, the 2013 report only contains a brief summary of these steps and refers the reader to prior 2012 reports (cbec, 2012a; cbec, 2012b). ESA conducted a cursory review of these 2012 reports. These reports provide some additional details about the model, but not specific information about the NBK Bangor waterfront model. In particular, the cbec (2013) report provides little or no details about the hydrodynamic calibration, about wind-induced processes (such as waves), and about the sediment transport setup and calibration for the NBK Bangor waterfront.

Our review only considered the effects of the proposed project on hydrodynamics and sediment transport. These structures can have other impacts on habitat. For example, the deck of a pier can shade the water column below, altering the habitat's light qualities. Also, the security net does not appear to be included in the model. It may have local impacts to flow velocity and ecosystem that were not evaluated as part of this review.

In the sections below, which correspond to similarly titled sections of the cbec report, we present our detailed comments on the modeling which informed our findings presented above.

T1 – Point No Point Treaty Council — ATTACHMENT 2 *(page 2 of 3)*

Modeling approach

Although cbec's 2013 report discusses the wind boundary conditions, the report does not specify which wind-related processes are included in the modeling. The 2013 report makes reference to prior studies (cbec 2012a; cbec 2012b), but does not clarify which aspects of the earlier work was also included in the NBK Bangor waterfront model. For instance, the 2013 report does not mention the SWAN wave model, nor are there any predictions of the wave field provided in the report. Without this information, ESA cannot determine if waves were included in the NBK Bangor waterfront model and if waves were predicted, assess these predictions and their implications for sediment transport.

The prior reports (cbec 2012a; cbec 2012b) provide some additional detail on the methodology used at other sites, but, on cursory inspection, do not provide information about the following questions for the NBK Bangor waterfront: Was the wind boundary condition used to generate shear stress on the water surface that created flows within the water column? To predict wind-waves? Was the bed shear stress induced by either or both of these processes included in the sediment transport model? Were alongshore currents and transport generated by breaking waves modeled? Was any wave modeling conducted and were wave-induced, surf zone sediment transport computations made ?

Were contributions of flow and cross-shore sediment from Devil's Hole Creek included in the model? The deltaic formation at the mouth of this creek suggests that the pre-tidegate Creek flow in the intertidal zone led to cross-shore sediment transport across the shellfish beach. It now appears that there the Creek is connected to the Canal by a hydraulic structure with limited peak flows and therefore limited hydraulic and sediment conveyance. Does this structure alter sediment transport and grain sizes at the shellfish beach?

Wharf waterfront model development

Wind

Although the average wind direction at Duckabush was from the south, the hilly topography and alignment of Hood Canal at the project site suggests that dominant wind direction during specific events is likely to be from the southwest, along the main axis of the Canal. Using a south wind direction may underestimate wind forcing at the project site since the fetch is not aligned with the main axis of the Canal.

Since long-term wind records are available near the project site, it is not clear why an average wind speed was used, rather than actual wind data for a representative period. Using the average wind eliminates much of the dynamics of wind forcing. A representative time period of wind data could have been selected much in the same way that representative tides were selected. Because of local differences in direction (see point above), it may be appropriate to transform the wind record to project site conditions.

Sediment

How were the D50 grain sizes selected for the two sediment size classes? What is the relationship between the grain sizes used in the model and the grain sizes at the project site shoreline?

What parameterization of erosion and deposition were used for the sediment transport predictions?

In the areas with mixed size classes, does the model consider armoring whereby the large size class limits the erosion of the small size class?

Simulation Time Periods

During Weeks 2-6, it appears that a constant wind speed, representative of an average over a month or longer, were used. Because the averaging interval is so long, the magnitude of the wind speed is relatively small, e.g. less than 2 m/s (5 mph). Since sediment transport only occurs when bed shear stress exceeds a critical value, use of this constant average wind speed underestimates sediment transport for a large portion of the simulated period (Weeks 2-6) and an even larger portion of the morphologic year (Weeks 2-52).

Eddy Viscosity

Although the model grid cell size is relatively small, the lateral distribution of the velocity field behind the spits may be sensitive to the model's horizontal eddy viscosity. The selected value for the horizontal eddy viscosity is not mentioned and we assume the model was not evaluated for sensitivity to this parameter.

Project Conditions

The documents cited in cbec (2013) as informing the representation of the proposed project conditions were not provided to ESA. Therefore, we cannot evaluate how well the model replicates these conditions, just the results based on the manner in which cbec chose to represent the proposed conditions. For example, we do not know the spacing of the piles in the proposed project, nor do we know the spacing of the dry cells used to represent the piles in the model.

An updated version of NBK's preferred alternative for the LWI was provided to CGS and ESA on January 30th. While similar to the pile-supported LWI project alternative that was modeled, this alternative appears to differ from the proposed modeled alternatives in a few ways. The updated preferred alternative extends further out into the Canal than what is described in the modeling report. The updated alternative also includes observation towers, mounted on piles in the intertidal zone that do not appear to be represented in the model. In addition, the LWI abutments in the updated alternative are approximately 50 ft wide, not 30 ft wide, as in the pile-supported version that was modeled.

Model Results

Bed level changes off of Carson Spit, and, to a lesser degree off Three Spits and landward of the Explosive Handling Wharves, switch sign abruptly without clear connection to expected physical processes. These changes can be as much as at least one meter of erosion adjacent to at least one meter of deposition, a net change of more than two meters. Additionally, at the western edge of the change region off of Carson Spit, the changes appear to go from +/- 1m to zero almost immediately (e.g. Figure 4-3, Figure 4-4). A significant fraction of these bed level changes also occur in water that is more than 25 ft deep (Figure 2-3). It is not clear what forcing mechanism would create large enough bed shear stress at these depths to cause so much erosion.

The model predicts increased deposition on the downdrift (north) side of the rock-fill bridge and minimal deposition adjacent to the updrift (south) side (cbec 2013 p. 9 and Figure 4-22). This is counter to the expected impacts of groins, both in Puget Sound (Shipman, 2010) and elsewhere (USACE, 2002), as well as site observations (CGS, 2014). Groins typically interrupt the alongshore transport of sediment, which is south to north in this area (WDOE, 2002, as shown in Figure 2-2), such that sediment deposits on the updrift side and erodes from the downdrift side. This suggests that the model is not accurately representing the dominant, wave-driven alongshore transport and may be over-emphasizing changes that the proposed alternatives make on the currents. This might explain why the model predicts that the rock fill North LWI actually eliminates nearly all bed change in the vicinity of the groin (Figure 4-14). This is counter to our experience with groins, which typically cause local erosion and deposition, not halt sediment transport altogether. Therefore, it appears that wave-driven littoral sediment transport was not modeled, which indicates that the modeling is not adequate to address project effects.

Text describing Figure 4-22 says that changes are 'approximately 4mm' (p. 9). It appears this is referring to the orange colored areas, which the legend says are 0.01 to 0.1 m of bed change. Should this be 4 cm instead?

The model shows little change for what is configured as a year of morphologic change and includes a nominal 2-year wind event. Model predictions of bed level change (Figures 4-17 through 4-20) show no or very little (less than 1 cm) change for most of the shoreline (except for the regions offshore from the spits). Is this amount of change representative of just the 2-year event (i.e. Week 1 of the simulations)? Observations at other locations in Puget Sound (Finlayson, 2006), suggest that events of this magnitude cause detectable changes in the shoreline, on the order of 10-20- cm. Are the changes predicted during the Week 1 storm event then offset by opposing bed changes predicted for the remainder of the simulation (Weeks 2-6)?

The model results presented are somewhat brief, with limited information about the analysis and interpretation. This limits a more extensive review of the model predictions. Examples of areas in which the analysis and interpretation could be extended include:

- The results metrics are limited to a single snapshot of the velocity field and integrated bed level changes, but there is little explanation of what processes link these two timescales.
- There is no discussion of the relative contributions to sediment flux and bed level change for the different periods of the model scenarios. For example, are there significant differences between storm conditions (first week of model run), typical winter conditions, and summer conditions?
- No information is provided to place the ebb velocity pattern figures in context relative to the hydrodynamics during the remainder of the simulation – when in time did this velocity field occur and how did the tides and wind compare to the rest of the simulation?
- The color scale for bed level change makes difficult to differentiate between 0.01-0.001 and 0.1-0.01 bins since they similar shades of green (for erosion) and yellow/orange (for deposition). Since these bed changes are most prevalent and differ by order of magnitude, a color scale that better differentiates between these bins would be helpful.
- The scales of the figures, which include the entire shoreline in a single figure, make it difficult to evaluate predicted changes in the vicinity of each of the proposed structures. Additionally, the scale varies from one figure to the next (e.g. 1 cm=215 m; 1 cm=219 m; 1cm= 275 m), making direct comparisons between figures more difficult.

Discussion of the CGS Site Assessment

After our initial model review, ESA recommended several factors for CGS consider when they conducted their site visit. These observations, reported to via phone calls, email and their memo (CGS, 2014) provide useful context for evaluate the cbec modeling and the geomorphic context of the project area. Below are several observations and discussion points related to CGS's findings:

- CGS found that the south-to-north regional sediment transport was evident throughout the NBK Bangor study area, although some portions of the shore were more sheltered by overwater structures and/or protruding land.
- CGS noted that a substantial fraction of the waterfront's feeder bluffs have been armored, reducing the overall sediment supply to the littoral (net shore-drift) cell and altering the ambient conditions.
- CGS found evidence that the existing overwater and other shore structures are likely to have altered and continue to alter the natural sediment transport regime.
- The cbec model did not show clear evidence of replicating the dominant south-to-north sediment transport regime. Nor did the model predict the expected response to the proposed structures, most notably the rock fill groin. Given the lack of these two key observed processes being replicated by the model, we recommend further model refinements before relying wholly on the modeling findings to assess potential project impacts.

- The model does capture some of the characteristics observed by CGS, such as the reduced sediment transport in the protected area just north of the Service Pier. It is not clear if the predicted reduction is due to the model's representation of currents, waves, or both.
- The model's assumption of mixed sand and gravel along the waterfront beaches is consistent with the visual observations by CGS. If model improvements are planned, some representative grain size samples would be informative.
- We concur with CGS's judgment that the preferred LWI alternative's alignment north of the shellfish beds and the limited vertical extent of the floating barrier will help reduce the project's impact on the hydraulic and sediment transport environment relative to earlier LWI alternatives..
- CGS found that the hydraulic structure between Devil's Hole Creek and the Hood Canal probably limits hydraulic and sediment conveyance between the Creek/lagoon and the Canal. They also found from a comparison of mapped MLLW between the late 19th century and the late 20th century that the Creek's delta may be prograding. A more detailed study of this Reach may be warranted to better characterize the local sediment transport on this stretch of the shoreline containing the shellfish beach.

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TRIBE 2 – PORT GAMBLE S'KLALLAM TRIBE

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PORT GAMBLE S'KLALLAM TRIBE
NATURAL RESOURCES DEPARTMENT
31912 Little Boston Rd. NE – Kingston, WA 98346

April 13, 2015

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine
LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Dear Mr. Dildine,

Thank you for the opportunity to comment on the U.S. Navy's Land-Water Interface (LWI) and Service Pier Extension (SPE) Draft Environmental Impact Statement (DEIS). The Port Gamble S'Klallam Tribe has concerns regarding the potentially significant adverse effects of these proposed projects on treaty rights and the environment.

I. Port Gamble S'Klallam Tribe Has Significant Concerns that Proposed Actions Will Severely Interfere with Treaty Rights.

As stated in our Land Water Interface (LWI) and Service Pier Extension (SPE) Scoping comments (March 17, 2013) the Port Gamble S'Klallam Tribe opposes both of the proposed projects because they would severely infringe the Tribe's treaty rights. These massive new structures, along with the construction, operation, and maintenance of these facilities, would physically eliminate the Tribe's access to a portion of its usual and accustomed (U&A) fishing areas, preclude the Tribe's access to additional portions of its fishing area due to submarine and construction vessel traffic, and further degrade marine and nearshore habitat. Given the multitude of existing and proposed in-water structures, construction activities, and additional naval operational uses in the Tribe's U&A, the Tribe opposes these projects unless appropriate and meaningful mitigation to restore both treaty right and environmental impacts can be achieved. 1

The Tribe appreciates and supports the need for greater security for the Navy's nuclear submarine fleet. However, the Navy's proposed LWI project would have disastrous impacts on treaty rights. The DEIS does not go far enough to evaluate the full extent of these impacts. Four Tribes (Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam and Skokomish) and the Navy entered a cooperative agreement in 1997 in which the Tribes agreed not to harvest the entire beach along NBK-Bangor (which is their right) in exchange for the right to harvest the Devil's Hole Beach ("tribal shellfish beach") to the exclusion of non-Indian harvesters. Now, the Navy wants to build a large security structure in the middle of that beach, as well as a concrete structure on the beach bluff and at the base of the bluff. As described in the DEIS, 2

Response:

1 Thank you for the comment letter. The Commanding Officer of Naval Base Kitsap invited the Port Gamble S'Klallam Tribe S'Klallam Tribe, as well as the Jamestown S'Klallam Tribe and Lower Elwha Klallam Tribe, to consider initiation of government-to-government for the LWI and SPE projects in letters of August 22, 2008 and 2012, respectfully. Since April 2015, the Navy and the Tribes have held many government-to-government and staff consultation meetings to discuss details of the LWI and SPE projects and Tribal concerns. Although formal agreement was not reached, as a result of consultations, the Navy has offered treaty mitigations for the potential significant impacts to treaty rights and resources by the construction and operation of the LWI and SPE projects. These offered treaty mitigations are described in Chapter 9 (Treaty Mitigation) in Appendix C (Mitigation Action Plan) of this FEIS.

As discussed in government-to-government consultation meetings, the Tribes will continue to have access of the Devil's Hole Beach for shellfishing at NAVBASE Kitsap Bangor in accordance with the 1997 cooperative agreement between the Navy and the Tribes. The Navy is committed to continued communication and coordination with the Tribes for continued access to the shellfish resources at this beach in accordance with Navy security requirements during both construction and operation of the LWI project. Currently the Tribes, including the Skokomish Indian Tribe, access this beach approximately 4 times a year for shellfish harvest.

In addition, as noted throughout the EIS, the Navy plans to provide compensatory mitigation for impacts to aquatic resources through the established Hood Canal In-Lieu Fee (ILF) Program, for which the Hood Canal Coordinating Council (HCCC) is the sponsor. The aquatic compensatory mitigation actions will be identified and developed by the ILF program and its inter-agency review team which includes Tribal representatives.

2. The Navy appreciates the Tribe's support of the Navy's mission and the need for protection of vital national security assets at NAVBASE Kitsap Bangor. As this comment raises several distinct issues, please refer to responses to Port Gamble S'Klallam Tribe (PGST) Comments #1, #13, #15, #25, and #27, as well as Point No Point Treaty Council (PNPTC) Comments #6 and #14.

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these structures would severely disrupt tribal access and destroy tribal resources. A PGST-sponsored assessment of coastal processes by Coastal Geologic Services, Inc. described in these comments, reported that the Navy's proposed shore modifications would likely result in a decrease in intertidal habitat quality and area at Devil's Hole Beach in the long-term. The DEIS does not go far enough to assess the potential impacts of this project on geomorphological processes, shellfish habitat, and forage fish habitat. The Tribe vigorously opposes any alternative that would either physically or practically (e.g., through security protocols) limit tribal access to any portion of the Devil's Hole Beach, any alternative where the footprint of terrestrial and aquatic infrastructure would physically destroy intertidal habitat quality and disturb shellfish beds, and any alternative that does not include the most environmentally protective design without appropriate mitigation. 2 cont.

As described in the DEIS, the Preferred Alternative for the proposed SPE project would involve the construction of a 44,000 square foot over-water structure and a 7-acre permanent upland footprint. As described in these comments, this project would detrimentally impact benthic species, the migration of salmonids, and water quality in Hood Canal. The SPE would also 3 allow for reassignment of two additional submarines (SEAWOLF and CONNECTICUT) to the Service Pier. In addition to increased overwater shading from the moorage of two new submarines at the pier and from the pier extension itself, reassignment to Hood Canal would result in more submarine and security details in the canal and vehicle traffic, and, in turn, even greater risk of equipment damage and fishing disruption to tribal fishers. The DEIS falls short of evaluating the full extent of these significant effects on the Tribe's treaty rights, including impacts to access, habitat and harvest. 4

A. Background on the Tribe's Treaty Fisheries

The Port Gamble S'Klallam Tribe is the successor in interest to Indian bands and tribes signatory to the 1855 Treaty of Point No Point, 12 Stat. 933.[1] According to S'Klallam oral traditions, the ancestral Port Gamble people lived in the area of the level, sandy spit on the west shore of the mouth of Port Gamble Bay. Like other Washington treaty tribes, the S'Klallam people relied on their fisheries for much of their food supply, pre-dating the signing of the treaty by thousands of years.[2] The tribes used all available species of fish, including all six species of salmon, herring and other smaller fish, and shellfish.[3] Tribal customs and traditions reflected the importance of 5

[1] *United States v. Washington*, 459 F. Supp. 1020, 1039 (W.D. Wash. 1978) (hereinafter *Boldt II*).
[2] *See United States v. Washington*, 384 F. Supp. 312, 350-53 (W.D. Wash. 1974), *aff'd* 520 F.2d 676 (9th Cir. 1975), *subst'y aff'd sub nom. Washington v. Wash. Commercial Passenger Fishing Vessel Ass'n*, 443 U.S. 658 (1979) (hereinafter *Boldt I*).
[3] *Id.*

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Response:

3. This comment addresses several distinct issues. Please see responses to PGST Comments #17, #18, and #21, as well as PNPTC Comments #1, #14, and #16.

4. The American Indian Traditional Resources section (3.14.2) has been revised to provide more detail on the potential impacts of the Proposed Actions on American Indian traditional resources including off reservation treaty rights for access to harvest shellfish under the 1997 cooperative agreement between the Navy and the Tribes. Please also see the responses to PNPTC Comments #8 and #12, and PGST Comment # 26.

5. The Navy appreciates the time taken by the Port Gamble S'Klallam Tribe to provide the background on the Tribe's history, culture and Treaty fisheries.

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the fisheries by proscribing waste, regulating distribution of the catch, and discouraging water pollution.[4] An annual First Salmon ceremony expressed the people's appreciation for their harvest.[5] Trade in fish was a major element of the tribal economy, and the tribes developed a vibrant cultural life based on the wealth of their fisheries.[6]

In addition to rich fisheries, the waters surrounding the area offered the Tribe an easy means of travel. Each summer the S'Klallam dispersed by canoe to camps where they fished and met family and friends.[7] The Treaty reserved to the S'Klallam the right to take fish at all these "usual and accustomed grounds and stations" (U&A)—an area roughly centered on Port Gamble Bay that includes all of the bay, most of the Hood Canal watersheds, and extends west along the Strait of Juan de Fuca to the Sekiu River, north to the San Juan Islands, east to Whidbey Island, and south through Hood Canal.[8] Within these areas the Port Gamble S'Klallam and other tribes that share the U&A are entitled to take half the harvestable fish and shellfish, and retain the right to access private property to fish and to shellfish.[9] 5cont

Today, over 150 years after signing the Treaty of Point No Point, the Tribe retains deep cultural and economic ties to the surrounding waters and to their fisheries. More than ninety tribal members earn all or a portion of their livelihood working as commercial salmon fishermen (PGST 2005-2009 survey). In addition, the Tribe conducts fisheries in its U&A to obtain fish for ceremonial use. Subsistence harvests from the Tribe's U&A are a key element of the diet of many tribal members. For example, Region 10 of the United States Environmental Protection Agency (EPA) found that the consumption rate for tribal members was approximately 147 pounds of salmon per year, 68 pounds of other fish per year, and 400 pounds of shellfish per year. *See* Framework for Selecting and Using Tribal Fish and Shellfish Consumption Rates for Risk-Based Decision Making at CERCLA and RCRA Cleanup Sites in Puget Sound and the Strait of Georgia, EPA Region 10, Appendix B, Table B-2 (consumption rates based upon data from the Suquamish Tribe, a neighboring Tribe); *see also* Fish Consumption Survey of the Suquamish Indian Tribe of the Port Madison Indian Reservation, Puget Sound Region.

[4] *Id.* at 351, 357.
[5] *Id.* at 351.
[6] *United States v. Washington*, 626 F. Supp. 1405, 1433 (W.D. Wash. 1985); *Boldt I*, 384 F. Supp. at 350.
[7] *United States v. Washington*, 626 F. Supp. at 1442; *Boldt I*, 384 F. Supp. at 350-51.
[8] *See United States v. Washington*, 626 F. Supp. at 1442; *Boldt II*, 459 F. Supp. at 1041.
[9] *See, e.g., United States v. Washington,* 873 F. Supp. 1422, 1444-45 (W.D. Wash. 1994) (hereinafter *Shellfish I*).

Response:

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B. The Treaty of Point No Point Reserves Perpetual Fishing Rights to the Tribe, Which the Navy Cannot Infringe.

A proper conception of treaty fishing rights must begin with the history and purpose of the Treaty. In Article I of the Treaty of Point No Point, the S'Klallam people ceded to the United States most of their rights in their land. However, the Treaty reserves the right of the Tribe to take fish "at usual and accustomed grounds and stations." Treaty of Point No Point, 12 Stat. 933, Article IV. "[W]hatever land concessions they made, the Indians viewed a guarantee of permanent fishing rights as an absolute predicate to entering into a treaty."[10] Federal negotiators, led by Territorial Governor Isaac Stevens, obliged. "I want," Stevens said, "that you shall not have simply food and drink now but that you may have them forever."[11] Gov. Stevens' promise regarding the Tribes' continued access to traditionally-utilized resources is memorialized in Article IV of the Treaty:

> The right of taking fish at usual and accustomed grounds and stations is further secured to said Indians, in common with all citizens of the United States; and of erecting temporary houses for the purpose of curing; together with the privilege of hunting and gathering roots and berries on open and unclaimed lands.[12]

5cont

The right is not created by the Treaty; rather, the Treaty "secures" pre-existing Indian fishing rights.[13] In other words, the Treaty of Point No Point did not grant fishing, hunting, and gathering rights to the Tribe; rather, it reserved to the Tribe its pre-existing rights to engage in those activities.[14] This reservation of rights was intended to permanently secure the full breadth of pre-treaty resource procurement practices.[15] Nothing in the treaty language or negotiations suggested, and neither side anticipated, that non-Indian development would ever hinder Indian fishing or deplete the seemingly inexhaustible abundance of resources.[16]

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[10] *Shellfish I*, 873 F.Supp. at 1437.
[11] *United States v. Washington, Subproceeding 01-1*, No. C70-9213, 2007 WL 2437166, at *11 (W.D. Wash., 2007) (hereinafter *Culverts* Summary Judgment); *see also Washington v. Wash. Commercial Passenger Fishing Vessel Ass'n* (*Fishing Vessel*), 443 U.S. 658, 667 n.11 (quoting Stevens: "This paper secures your fish").
[12] Treaty of Point No Point, Art. IV.
[13] *See, e.g.*, *United States v. Winans,* 198 U.S. 371, 381 (1905).
[14] *Id.*
[15] *See Boldt I*, 384 F.Supp.at 381("At the treaty council the United States negotiators promised, and the Indians understood, that the Yakimas would forever be able to continue the same off-reservation food gathering and fishing practices as to time, place, method, species and extent as they had").
[16] *Culverts* Summary Judgment at 10-11. *See also Fishing Vessel*, 443 U.S. at 668.

Response:

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The rights that the Tribe reserved in the Treaty are property rights, and like any private property cannot be taken for government use except upon payment of just compensation.[17] Because the treaties are approved by Congress, only Congress can take or diminish tribal treaty rights – no regulation or decision of an executive department or agency may do so.[18]

Implicit in the treaty bargain and the tribes' surrender of lands to the United States was a promise of federal protection, referred to now as "the trust relationship."[19] The trust relationship imposes upon the United States and all its agencies the obligation to follow "the most exacting fiduciary standards" in dealing with the tribes, as well as to protect tribal rights and property.[20] Consistent with this relationship of trust, federal courts require that ambiguities in federal laws regarding tribes must be construed in the tribes' favor.[21] No statute will diminish treaty rights unless that is the clear intent of the Congress.[22] The Navy's policies acknowledge the trust responsibility and obligate the Navy to consult with tribes when its actions affect tribal treaty rights or resources.[23] 5cont

C. The Treaty of Point No Point Protects Three Essential Components of the Tribe's Fishery: Access to Fishing Places, Sufficient Harvests, and Necessary Fish Habitat. Both the Service Pier Extension and the Land-Water Interface Threaten to Infringe on Each of These Aspects of the Treaty Right.

More than a century of federal court decisions have fleshed out the components of the treaty right, including the right of access to places, the right to a share of harvest to meet tribal moderate living needs, and the right to protection of fish habitat. The Navy's projects would adversely affect each of these components. 6

The treaty fishing right applies to every "usual and accustomed" area (U&A).[24] Tribal U&A

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[17] *Menominee Tribe v. United States*, 391 U.S. 404, 413 (1968).
[18] *See, e.g., Confederated Tribes of Umatilla Indian Reservation v. Alexander,* 440 F.Supp. 553 (D. Or. 1977) (U.S. Army cannot build dam and flood tribal fishing places, where Congressional authorization does not expressly provide for taking of treaty fishing rights). Federal agencies may, however, regulate treaty fishing where necessary for conservation. *See N. Arapahoe Tribe v. Hodel,* 808 F.2d 741, 749-50 (10th Cir. 1987); *United States v. Eberhardt,* 789 F.2d 1354, 1359-60 (9th Cir. 1986).
[19] *United States v. Kagama*, 118 U.S. 375, 384 (1886).
[20] *Seminole Nation v. United States*, 316 U.S. 286, 296-97 (1942); *Parravano v. Babbitt,* 70 F.3d 539, 546 (9th Cir. 1995) (federal agencies have trust obligation to protect tribal treaty fishing rights).
[21] *Parravano,* 70 F.3d at 544.
[22] *Menominee,* 391 U.S. at 412-13.
[23] Department of the Navy Policy for Consultation With Federally-Recognized Indian Tribes, SECNAV Instruction 11010.14A, ¶ 6.a. (Oct. 11, 2005).
[24] *Muckleshoot Tribe v. Hall*, 698 F. Supp. 1504, 1511 (W.D. Wash. 1988) [hereinafter *Muckleshoot*] (citing *Washington v. Wash. St. Commercial Passenger Fishing Vessel Ass'n*, 443 U.S. 658, 674 (1979)

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Response:

6. The Navy generally agrees with the statements regarding the existence and extent of off reservation fishing tribal treaty rights. With respect to the issue of habitat protection, the Navy acknowledges the decision of the federal district court in the sub-proceedings in the United States v. Washington regarding culverts. However, the Navy notes that the court's decision is on appeal and the existence and parameters of a right of habitat protection (also referred to as habitat degradation) are subject to interpretation and evolving court decisions. Additionally, the Navy notes that a *de minimus* interference with treaty right is not necessarily a treaty violation (See Lummi v. Cunningham, No. C92-1023, Western District of WA unpublished decision 1992).

   Further, both the LWI and SPE projects are located within an established waterfront Naval Restricted Area (NRA) (see 33 CFR Part 334). Currently no tribal, recreational or commercial finfishing is allowed within the waterfront NRA which encompasses the LWI and SPE project sites. Outside the NRA, access to the Tribe's fishing U&A in co-use navigable waterways will not be significantly affected. Continued Tribal access to shellfish at NAVBASE Kitsap Bangor Devil's Hole Beach is provided for under the 1997 cooperative agreement between the Navy and the Tribes.

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have been defined broadly by reference to entire water bodies.[25] This practice is consistent with the treaty language, which speaks not only of specific fishing "stations," but of general fishing "grounds."[26] The broad treatment of U&A is also consistent with the nature of the treaty fishing right—a reservation of preexisting rights. The Port Gamble S'Klallam Tribe's U&A encompass the marine and nearshore areas of Naval Base Kitsap – Bangor and surrounding marine and nearshore areas. The right of the Tribe to access and fish at these places exists regardless of who owns the land beside or beneath the waterway.[27] The ability to access all potential fishing places has been and remains crucial for the tribe to maintain harvest stability in the face of unpredictable local variations in the supply of fish.[28] Maintaining access to the entire terrestrial and marine landscape that was used by tribal ancestors is also of critical cultural importance, and helps to define the Tribe's identity. 6cont

Exclusion of treaty fishers from any of their U&A fishing places is a violation of tribal treaty fishing rights and subject to injunction.[29] The vehicle for the exclusion is immaterial. It may be fences that block the path to an onshore fishing site, or non-Indian fishing gear that monopolizes a stretch of water.[30] It may be a dam that drowns fishing places under fathoms of water.[31] It may be a marina that physically occupies the water.[32] It may be State regulations restricting the area to be fished, even if the regulations would increase a tribe's harvest.[33] It may be a nearly two-acre overwater pier extension, significantly increasing existing overwater coverage and facilitating increased vessel traffic in Hood Canal. It may be a security structure that physically destroys shellfish habitat and inhibits a harvester's access to a shellfish bed. The Navy may not choose to go forward with a plan that would prevent tribal access to usual and accustomed fishing places.[34] 7

[hereinafter *Fishing Vessel*] and *Boldt I*, 384 F. Supp. at 332).
[25] *Boldt I*, 384 F. Supp. at 402; *see, e.g.*, *United States v. Washington*, 626 F. Supp. at 1442.
[26] *See Boldt I*, 384 F. Supp. at 332 (distinguishing "grounds" from "stations").
[27] *Winans*, 198 U.S. 371 (right to cross fenced, private upland to reach fishing water); *United States v. Washington* 157 F.3d 630, 644-47 (9th Cir. 1998) (tribes have right to take shellfish on private and State-owned lands).
[28] *See BoldtI*, 384 F.Supp. at 351-52 (local fish supplies varied, so tribes traditionally shifted fishery locations in response to relative abundance).
[29] *See, e.g.*, *United States v. Oregon*, 718 F.2d 299, 303-04 & n.6 (9th Cir. 1983) (citing *Fishing Vessel*, 443 U.S. at 667, 675).
[30] *Winans*, 198 U.S. at 381-82.
[31] *Umatilla Tribes v. Alexander*, 440 F. Supp. 553, 555 (D. Or. 1977).
[32] *Muckleshoot*, 698 F. Supp. at 1511.
[33] *United States v. Oregon*, 718 F.2d at 304-05.
[34] *Nw. Sea Farms v. U.S. Army Corps of Eng'rs*, 931 F. Supp. 1515 (W.D. Wash. 1996).

Response:

7. Comment noted. Please also refer to Section 3.14 for discussion on establishment of the 1997 cooperative agreement for shellfish at Devil's Hole Beach and the 1993 Special legislation for DoD purchase of tidelands.

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It does not matter that the area taken may be a relatively small portion of the U&A.[35] "No case has been presented to this Court holding that it is permissible to take a small portion of a tribal usual and accustomed fishing ground, as opposed to a large portion, without an act of Congress, or to permit limitation of access to a tribal fishing place for a purpose other than conservation."[36] Nor does it matter if there has been no recent fishing at a particular location. In *Muckleshoot*, for example, fishing had been curtailed in the area proposed for the marina for several years but the marina was enjoined nonetheless as interfering with the Tribes' ability to access that area in the future.[37] 7cont

The right of access to fishing places furthers the underlying right to take fish. The treaty right is more than the right merely to go fishing; it is the right to actually harvest fish.[38] The purpose of the fishing rights provision is to ensure the tribes sufficient harvest to sustain their livelihood, that is to say, a moderate living.[39] Because the tribes must share the fishery "in common" with non-Indians, however, tribal harvest is capped at 50% of the harvestable fish in each run or watershed.[40] Non-Indians may not deprive the tribes of their share of the harvest by monopolizing the catch themselves.[41] Neither may they drive tribal harvest down by placing obstructions in tribal fishing places that increase the effort required to take the tribal share.[42] The Tribe's access right and harvest rights are independent.[43] Thus, an in-water structure that precludes tribal fishing at a site may violate the treaties, even if the tribes remain able to harvest their full share of the runs.[44]

The final component of the Tribe's treaty fishing rights that is relevant here is the right to protection of the habitat without which there will be no fish to take. As discussed above, the

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35 *Muckleshoot*, 698 F. Supp. at 1515.
36 *Id.*
37 *Id.* at 1522.
38 *Fishing Vessel,* 443 U.S. at 678.
39 *Id.* at 686 (treaty "secures so much as, but no more than, is necessary to provide the Indians with a livelihood-that is to say, a moderate living").
40 *Hoh Tribe v. Baldrige*, 522 F.Supp. 683, 690 (W.D.Wash. 1981).
41 *Winans,* 198 U.S. 371 (non-Indians may not take all harvestable fish with fish wheels); *Wash. Dept. of Game v Puyallup Tribe,* 414 U.S. 44 (1973) (non-Indian sport fishery may not monopolize harvest).
42 *Muckleshoot v. Hall*, 698 F. Supp. 1504, 1509 n.5, 1515 (W.D. Wash. 1988) (proposed marina would occupy U&A and increase the effort necessary to harvest tribal share)
43 *United States v. Oregon*, 718 F.2d 299, 304 n.6 (9th Cir. 1983) (multistate fish management plan may not dictate which parts of U&A tribes can fish, even if plan would increase tribal harvest).
44 *Nw. Sea Farms, Inc. v. U.S. Army Corps of Engineers,* 931 F.Supp. 1515, 1522 (W.D. Wash. 1996) (Army Corps properly denied permit for overwater structure that would occupy part of tribe's U&A, although project would not substantially affect number of fish available for harvest); *Muckleshoot Tribe v. Hall,* 698 F. Supp. 1504.

Response:

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Treaty of Point No Point promised the Tribe the ability to support itself through fishing as it has since time immemorial. Implicit in that promise is a commitment that non-Indians will not degrade the habitat and thereby diminish fish production, leaving the Tribe unable to catch fish sufficient to its moderate living needs.[45] For more than three decades, the United States has joined tribes in litigation successfully asserting the treaty right to habitat protection.[46] Having asserted for so long that the treaties impose habitat protection duties on others, there is little doubt that the United States – and the Navy – are subject to such duties themselves. 7cont

The Tribe is concerned that the Navy does not fully understand or accept the full scope and importance of the Tribe's treaty rights. Thus, the Navy should engage the Tribe as a cooperating agency to help analyze impacts to treaty rights and tribal resources for this DEIS, as well as NEPA documents associated with other projects described later in these comments. Further, as the Tribe has told the Navy on many occasions, only the Tribe is in the position to access the value of its treaty right, to the extent any such valuation may actually be desirable. In any negotiations to settle upon mitigation projects that would offset impacts from these projects, the Navy must respect and accept this fact. 8

II. The Navy's plans for numerous construction projects and operational changes at NBK-Bangor, including the Service Pier Extension and Land Water Interface, infringe on the treaty fishing right.

The detrimental effect of the Navy's projects on treaty rights and tribal resources when examined in the aggregate cannot be overstated. The Bangor waterfront currently includes seven major structures and supports significant naval vessel operations. In the past three years, the Navy has proposed—and, in some cases, has begun to implement—at least nine additional major construction projects or operational shifts within the Port Gamble S'Klallam Tribe's U&A. These projects include: 9

- Repair and replacement of 138 piles at the first Explosives Handling Wharf;
- Construction of and operations at a second Explosives Handling Wharf (EHW-2),

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[45] *Culverts* Summary Judgment at 11; *see United States v. Adair*, 723 F.2d 1394, 1410 (9th Cir. 1983) (reserved treaty right to fish impliedly reserves sufficient water in river to support fishery).
[46] *Culverts* case, United States response to Washington's Summary Judgment Motion, at 4 (Dkt. No. 313, Sept. 27, 2006)*; United States v. Washington,* 506 F. Supp. 187, 190 (W.D. Wash. 1980) (*"Phase II"); see also Adair, supra.* When *Phase II* was appealed, the Ninth Circuit disagreed with the District Court over the scope of the implied right to habitat protection, but not over its existence. *United States v. Washington,* 694 F.2d 1374, 1389 (9th Cir. 1982) (treaties impose duty upon signatories to take reasonable measures to preserve fishery when their projects threaten existing harvests). This initial Ninth Circuit decision was later vacated on procedural grounds. *United States v. Washington, 759* F.2d 1353 (9th Cir. 1985).

Response:

8. Comment noted. The Navy acknowledges and respects the reserved treaty rights of the Port Gamble S'Klallam Tribe and other treaty tribes and remains committed to fulfilling its government-to-government consultation responsibilities in accordance with Navy policies. While the Navy and the Port Gamble S'Klallam Tribe could not reach formal agreement for treaty mitigations as a result of government-to-government consultations, the Navy has offered treaty mitigations to for potential significant impacts to treaty rights and resources by the construction and operation of the LWI and SPE projects. These offered treaty mitigations are described in Chapter 9 (Treaty Mitigation) of the Mitigation Action Plan (Appendix C of this FEIS).

9. The Navy acknowledges the Tribe's concerns with the potential effects of various Navy projects on treaty fishing and the environment. NAVBASE Kitsap Bangor has a vital security mission that supports the Nation's strategic deterrence program, as such, the operations at Bangor waterfront are complex and require on-going planning and coordination. NAVBASE Kitsap Bangor also supports various classes of non-ballistic submarines.

   The Navy has invited and conducts government-to-government consultation with the PGST and other potentially affected tribes on these projects that have the potential to significantly affect the tribes in accordance with EO 13175 and Navy policy. Where impacts are significant, the Navy has reached formal agreement for appropriate treaty mitigations relative to potential impacts of the Proposed Actions with PGST (e.g., EHW-2 project in 2012).

   The Navy also complies with other laws and permit requirements for these projects including providing compensatory mitigation under the U.S. Army Corps of Engineers/USEPA *Compensatory Mitigation Rule for Loss of Aquatic Resources* that also mitigates for impacts to some of the same treaty protected intertidal and marine aquatic resources.

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including 6.3 acres of overwater structure, 1,250 piles, and additional vessel traffic in Hood Canal;

- Permanent moorage of a new research barge, which is half an acre in size and five times the size of the existing research barge, and construction of new mooring facilities;
- Construction of and operations at the proposed Service Pier Extension, adding up to 1.82 acres of overwater structure and up to 700 more pilings to the already massive Service Pier;
- Relocation of the SEAWOLF Class submarine SSN-21 (SEAWOLF) submarine from NBK-Bremerton to NBK-Bangor, which will result in even more vessel traffic from the submarines and their security entourages in Hood Canal and destruction of more tribal fishing gear; 9cont
- Relocation of the SEAWOLF Class submarine SSN-22 (CONNECTICUT) submarine from NBK-Bremerton to NBK-Bangor, which will result in even more vessel traffic from the submarines and their security entourages in Hood Canal and destruction of more tribal fishing gear;
- Construction of the Land-Water Interface, including in-water fill, up to 136 pilings, two large overwater structures, and a terrestrial structure in the middle of the Devil's Hole Beach, where a cooperative agreement with the Navy is in place and tribal shell-fishing activities are ongoing;
- Construction and operation of the Electromagnetic Management Range (EMMR), which will interrupt tribal fishing with little to no prior notice to tribal fishermen;
- Implementation of increasing numbers and magnitude of training and testing activities at Bangor, throughout the Hood Canal and beyond;
- Modification of the Magnetic Silencing Facility to provide berthing for U.S. Coast Guard Blocking Vessels, including the installation of a steel support structure and two mooring camels;
- Construction and operation of a pier and facilities for U.S. Coast Guard at Port Angeles Harbor, including piling installation and overwater structures.

All of these projects occur within the Port Gamble S'Klallam Tribe's usual and accustomed fishing areas, and all of the projects affect the Tribe's treaty rights in one way or another. Most of the projects have obvious detrimental effects on tribal resources and treaty rights, and these effects are likely to last for decades into the future. For example, the proposed EMMR threatens to displace tribal fishermen from frequently used fishing grounds with little to no prior notice before a submarine and its safety detail enter the course. The proposed Service Pier Extension threatens to destroy even more nearshore habitat, harming juvenile and adult salmonid migration and benthic species. The proposed Land Water Interface threatens to destroy or make inaccessible shellfish beds currently harvested by tribal members. This is just a sampling of

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Response:

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long-term impacts to tribal resources and treaty rights, which must be fully disclosed and examined in the Navy's cumulative effects analysis.

In addition to these long-term impacts, impacts from infrastructure construction—such as in-water noise, sediment transfer, and increased construction vessel traffic—are likely to be acute over the next few years. The Navy must fully analyze and disclose the possible impacts that will result from concentrating so much construction and vessel activity within just four work windows (July-February) between now and 2017. The Navy must reevaluate its proposed in-water construction window in light of new analyses by NOAA Fisheries and the Washington Department of Fish and Wildlife. The Navy must also fully analyze the possible effects on the environment and on treaty rights from further industrializing Hood Canal and concentrating so much in-water infrastructure in nearshore habitat along NBK-Bangor. The Tribe looks forward to a detailed analysis of these issues in the draft EIS.

Standing alone, each of these construction projects and operational shifts has a significant effect on treaty rights and natural resources. The impacts are amplified when examined collectively. Over the past few decades, Hood Canal has become increasingly industrialized, its shoreline increasingly hardened and shaded, and its waters increasingly congested. The Navy's infrastructure and operations contribute greatly to these trends. Tribal fishers feel these impacts when there are not enough salmon to harvest, when fishing is disrupted or gear lost as a result of naval vessel traffic, and when shellfish beds are closed due to security measures or contamination. For purposes of NEPA, the Navy must accurately analyze and disclose these and other cumulative effects.

The Tribe is extremely concerned that the Navy's past, present, and proposed activities in Hood Canal incrementally threaten the Tribe's treaty right with death by a thousand cuts. As the Tribe's trustee, the Navy cannot allow that to happen. This is particularly true when projects are not strictly necessary or could be reconfigured to minimize or avoid impacts to treaty rights and tribal resources. For example, the EMMR project is not strictly necessary because the Navy has successfully used the EMMR facility at Pearl Harbor for many years and a new EMMR facility will soon be available at half that distance at San Diego. Similarly, the Service Pier Extension project has been proposed, in large part, because of inconvenience to submarine movements resulting from tidal conditions at Rich Passage. Yet the Navy has successfully operated the SEAWOLF Division from Bremerton for many years. To put it simply, inconvenience alone does not make a project necessary, and it certainly does not justify avoidable infringement of the treaty right. On the other hand, where a project is necessary, it should be configured to avoid infringement of the treaty right, if at all possible. 10

To summarize, the treaty fishing rights of the Port Gamble S'Klallam are a "sacred entitlement"

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Response:

10. The need for the SPE Proposed Action is based on the Navy's operational readiness mission, not merely due to inconvenience as suggested by the Tribe. The purpose of the Proposed Action is to provide additional berthing capacity and improve associated support facilities for existing homeported and visiting submarines at NAVBASE Kitsap Bangor (see FEIS Section 1.2.2). The SPE project is needed to:

    - Provide alternative opportunities for berthing to mitigate restrictions at NAVBASE Kitsap Bremerton on navigating SEAWOLF Class submarines through Rich Passage under certain tidal conditions;
    - Improve long-term operational effectiveness for the three SEAWOLF Class submarines on NAVBASE Kitsap;
    - Provide berthing and logistical support for SEAWOLF, LOS ANGELES, and VIRGINIA submarine classes at the Navy's SSN research, development, test and evaluation hub, which is currently located on NAVBASE Kitsap Bangor; and
    - Improve submarine crew training and readiness through co-location of command functions at NAVBASE Kitsap Bangor submarine training center.

    The SPE and supporting facilities would address a number of infrastructure deficiencies on NAVBASE Kitsap (both NAVBASE Kitsap Bangor and NAVBASE Kitsap Bremerton) to ensure its capability to support the SEAWOLF fleet. These deficiencies include inadequate support services facilities, parking, and berthing space at the existing NAVBASE Kitsap Bangor Service Pier.

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promised to them in exchange for their part of the vast territory that is now Washington State.[47] Having promised to secure the Tribes their fisheries, the United States, including the Navy, has a fiduciary duty to fulfill that promise and protect the Tribe's treaty rights.[1] Exercising that trust responsibility requires the Navy to analyze and select action alternatives that do not add to the already great collective impact of the Navy's actions on the Port Gamble S'Klallam Tribe's treaty rights. The Tribe believes that requires analyzing different configurations for the LWI and alternative operations or locations to achieve the goals of the SPE project. To remediate those impacts to treaty rights and tribal resources that are unavoidable, it also requires the Navy to develop *with* the Tribe a serious mitigation package. We look forward to engaging in government-to-government consultation with the Navy in order to further discuss these matters. 11

III. The Navy's DEIS for the Proposed Land Water Interface and Service Pier Extension does not adequately evaluate the significant adverse effects on tribal fisheries.

The Navy's DEIS (February 2015) compares the environmental impacts of two alternatives and a no action alternative for each of the proposed projects. The Tribe finds that the DEIS does not go nearly far enough to evaluate the full range of potentially significant adverse effects on treaty rights and traditional resources. The proposed projects will likely impact all aspects of the Tribe's treaty rights, including access, habitat and harvest. 12

The proposed LWI project includes the construction of two facilities, one north of the EHW-2 and one directly in the subtidal, intertidal and riparian areas of Devil's Hole Beach, to enclose the Navy Waterfront Restricted Area. The proposed action includes at each location constructing security barriers in the intertidal zone, installing fill and abutments on the shoreline, constructing observation and stairwell structures on the beach and modifying the existing floating Port Security Barrier system (PSBs). Construction is anticipated to take two years with a three-year post-construction recovery period and would involve multiple components, including the relocation of PSB units and anchors using a barge-mounted crane, as well as the construction of concrete abutments, observation posts and stairs on the shore.

For the north LWI, four existing buoys and associated anchors would be relocated. For the south LWI, 200 feet of new PSB would be added, three existing buoys and associated anchors would be relocated, and one new buoy would be installed with two mooring legs. Each unit would be supported on three pontoons, two that are 6 feet and one that is 18 feet long. The north abutment

[47] *Shellfish I*, 873 F. Supp. at 1435.

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Response:

11. Executive Order (EO) 13175 *Consultation and Coordination with Indian Tribal Governments* affirms the trust responsibility of the United States and directs agencies to consult with American Indian tribes and respect tribal sovereignty when taking actions affecting such rights. The Navy complies with this federal trust responsibility by complying with laws and regulations such as the National Environmental Policy Act (NEPA).

    Regarding the analysis of different LWI configurations or alternative operations or locations to achieve the goals of the Service Pier Extension, the Navy identified its Environmentally Preferred Alternatives in the DEIS which are also the Navy's preferred alternatives.

    For LWI the Port Security Barrier Modifications alternative is environmentally preferable because it requires no in-water pile driving thereby avoiding thousands of behavioral incidental take on marine mammals. This alternative also has a lower potential to affect migration of juvenile salmon and about half of the total impact on aquatic habitat and waters of the U.S. relative to the Pile Supported Pier alternative. Further, this alternative would have fewer impacts to marine vegetation and shellfish.

    For SPE the short pier alternative is environmentally preferable because it is substantially shorter and the same width as the long pier. The shorter pier meaningfully reduces the behavioral incidental takes on marine mammals due to pile driving noise.

12. Comment noted. Refer to the responses to PGST Comments #1, #4 and #26, and PNPTC Comments #8 and #12.

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would be ~ 38 feet high and 75 feet long, and the south abutment would be ~ 12 feet high by 85 feet long. Both abutments would be located directly on the shoreline bluff. For each abutment, ten 24-inch piles would be driven on land. The abutments include a stairway from the top of the abutment to the LWI deck and base of the bluff. Riprap would be placed about MHHW to stabilize the bluff slopes disturbed by construction, with ~ 200 cubic yards covering 1,125 square feet on the north and 235 cubic yards covering 1,275 feet on the south. On the other end of the abutment observation posts and stairs would be installed adjacent to the abutments at the base of the bluff, directly on the beach. Each observation post would be ~ 35 by 45 feet, supported on seven 24-inch diameter steel piles, and include a second stairway to the base of the bluff. A potable water line and a wastewater line connecting to the base sanitary sewer system would be provided to the observation posts (DEIS Chapter 2).

The proposed SPE project includes the construction of a large over-water extension to the existing Service Pier. PSB fencing would be relocated to attach to the end of the new extension. A Waterfront Ship Support Building and Emergency Generator Facility would be constructed on the shoreline and a Pier Services and Compressor Building would be constructed on the Pier. Additionally, a parking lot for 421 additional spaces would be constructed on the shoreline. The purpose of the project is to relocate the SEAWOLF Class submarines SSN-21 and SSN-22 from NAVBASE Kitsap Bremerton to join SSN-23 at NAVBASE Kitsap Bangor. Operational changes would include berthing and maintenance of the two additional SEAWOLF Class submarines at Service Pier, including transfer of 322 employees from Bremerton to Bangor (DEIS Chapter 2).

For the proposed SPE Preferred Alternative the pier extension would be approximately 540 feet long and 68 feet wide and would have a surface area of approximately 44,000 square feet. The total number of 36-inch diameter steel support piles would be approximately 230. The total number of 24-inch diameter piles would be approximately 50 and there would be approximately 105 18-inch square concrete fender piles. Driving of the steel piles would require up to 125 days and driving of the concrete piles would require up to 36 additional days. Proposed new facilities would include a pier crane on a 28-by 60-foot foundation, a 2,100 square foot Pier Services and Compressor Building located on the Service Pier, and upland 500,000-square foot Waterfront Ship Support Building, an 1,800-square foot shore side emergency generator facility and roadway and utility improvements. The area permanently occupied by new project elements would be approximately 7 acres.

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a) Significant Impacts of Navy's Proposed Projects on Access to Fishing Places in Usual and Accustomed Areas

The ability to access all potential fishing places has been and remains crucial for the tribe to maintain harvest stability in the face of unpredictable local variations in the supply of fish.[48] Maintaining access to the entire terrestrial and marine landscape that was used by tribal ancestors is also of critical cultural importance, and helps to define the Tribe's identity.[49]

Impacts of Proposed Facilities on Access

In recognition of rights of the tribes under the Treaty of Point No Point, January 26, 1855, and in recognition of the mission and responsibilities of the Department of the Navy, the four applicable tribes and the Navy signed a Cooperative Agreement[50] in 1997 to establish a plan for the conservation, harvest and enhancement of shellfish resources contained within the boundaries of SUBASE Bangor. In 2000, the Navy agreed to nighttime harvesting by the tribes of the Point No Point Treaty Council. The Port Gamble S'Klallam Tribe continues to harvest at the Devil's Hole Beach under these cooperative agreements today.

Because the proposed LWI project is located directly on Devil's Hole Beach, centrally located across the Tribe's oyster and clam beds, as well as on the bluff and upper beach areas around the beds, impacts to the Tribe's access will be significant. The Navy's DEIS describes the impacts to Tribal access as follows:

> *For the south LWI project site, access at the north end of a tribal shellfishing beach at the mouth of Devil's Hole would be restricted from the immediate construction zone. During construction of the south LWI, there would be temporary loss of access to an estimated 0.64 acres (0.26 hectare) of shellfish beds due to the presence of equipment and construction activities for up to 2 years. As with Alternative 2, access to shellfish beds in the immediate construction zone would be restricted during construction, for safety purposes (DEIS 3.14-7).*

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[48] *See* Boldt Decision, 384 F.Supp. at 351-52 (local fish supplies varied; tribes traditionally shifted fishery locations in response to relative abundance).

[49] *See, e.g.*, DEIS at 4-3 (acknowledging the link between cultural injury and loss of access to traditional use areas).

[50] Cooperative Agreement for the Conservation, Management and Harvest of Shellfish at the Naval Submarine Base, Bangor, WA, 1997.

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Following construction, after up to 2 years, tribes would again have access to the shellfish beds, but with the permanent loss of an estimated 0.043 acre (0.017 hectare) due to displacement of existing shellfish beds by LWI structures (the area disturbed by the PSB pontoon feet and the area lost to access under the observation post stairs). Recovery of harvestable shellfish in the temporarily disturbed areas is expected within 3 years after in-water construction activities have ceased. Tribal access to these beds would continue during recovery, although subject to increased security checks (DEIS 3.14-7).

The Navy's evaluation of American Indian Traditional Resources (DEIS, Chapter 3.14) as in the statements above, acknowledges the restriction of tribal access for at least 5 years (2 years of construction and 3 years post-construction for habitat recovery). However, the DEIS inappropriately underestimates and minimizes impacts to the Tribe's access to harvesting areas over the long term. By constructing and operating a permanent new facility and security operation directly on and around the Tribe's harvesting areas at Devil's Hole Beach, the Navy's proposed project violates its 1997 Cooperative Agreement with the tribes to conserve, harvest and enhance shellfish resources.

Due to the new PSB fence, Tribal members will not be able to walk across the full length of the beach and will be forced to leave the beach and go through an additional security checkpoint and reenter the beach in order to access the northern section of the harvest. Limited access and increased security checks have a direct impact on the amount of shellfish that tribal members can harvest during a scheduled visit. This impact is likely to be significant on tribal fisheries. In addition, the tribes' access to Devil's Hole Beach for periodic oyster and clam seeding is important for ensuring sufficient tribal harvest into the future. Given the high security measures with the LWI project, it is unclear at this time whether or not the tribes would be able to continue accessing the intertidal area inside the security fence for such seeding activity, particularly for seeding by barge. This restriction of access would have a significant adverse effect on available harvest into the future. Also, it is not clear how the new security fence will impact access for the nighttime harvest by Port Gamble S'Klallam Tribal members. 13

Vessel Traffic Impacts on Access

The proposed in-water construction activities for the LWI would require use of marine-based construction equipment (pile-driving rigs, support barges, tugboats and work skiffs) that would be present within the project area for two in—water work seasons (July 16, 2016, to January 15, 2017 and July 16, 2017, to January 15, 2018). A total of approximately 16 barge round trips through Hood Canal per year would be required to support construction activities (DEIS 3.15-12). Any increase in marine vessels through the Hood Canal, within the Tribe's U&A, will have a potentially significant adverse effect on access to tribal fisheries. Cumulative effects of 14

Response:

13. The Navy respectfully disagrees that construction of the LWI project violates the 1997 cooperative agreement between the Navy and the Tribes. The Tribes will continue to have access to the shellfish resources at the Devil's Hole Beach. Section 3.14.2.2 of the DEIS acknowledged that a portion of shellfish beds at Devil's Hole Beach would be temporarily restricted during construction of the LWI. Access would be restored after construction, with the exception that the LWI structures (floating Port Security Barriers) would occupy a small relative portion of the shellfish beds. In addition, tribal shellfishers would have to pass through an additional security checkpoint to gain access to the northern 1/3 of the shellfish beds (access to the southern 2/3 would not change from current practices). The Navy has indicated that it is committed to coordinating with the Tribes to make this additional security measure as seamless as possible while still following Navy security procedures for the approximate four times a year that the Tribes harvest. Neither construction nor operation of the SPE would directly affect these shellfish beds or access to those beds as there are no shellfish harvest sites at this project location; however, the loss of geoduck and other clam standing stocks under the SPE piles for seeding future generations in adjacent areas of Hood Canal has been clarified in the FEIS.

14. The impacts of LWI and SPE construction vessels and SEAWOLF, LOS ANGELES, and VIRGINIA Class submarine transits on tribal fishing vessels have been added to Section 3.14.2 of the FEIS. Both the LWI and SPE projects are located within the established waterfront Naval Restricted Area (NRA) at Bangor. Currently no tribal, recreational or commercial finfishing is allowed within the waterfront NRA. Therefore, there is no impact tribal fishing in the project sites located within the NRA. Outside the NRA, construction vessel traffic and Navy submarine traffic is in the co-use navigable waterways of the Hood Canal and Admiralty Inlet.

    The Navy currently coordinates with the Post Gamble S'Klallam Tribe and the three other Tribes whose adjudicated treaty fishing area includes the co-use navigable waters of the Hood Canal. The Navy provides text messaging to Tribal fisheries enforcement staff to inform them of submarine escort movements as soon as allowed to minimize or eliminate any potential to interfere with tribal fisheries.

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increased vessel traffic limit tribal fisheries and increase the risk of vessel conflicts and loss of fishing gear. In combination with all of the other increased construction and operation vessels proposed by the Navy for Hood Canal cumulative effects on tribal fisheries is likely be significant. While the Navy proposes to build the LWI fence and massive structures on and around the Tribe's shellfish harvest beach, and to increase vessel traffic in Hood Canal for two seasons for construction, the DEIS minimizes the extent of these impacts on the Tribe's access to its traditional places.

The DEIS states that the proposed SPE project would have a "substantial increase in openings of Hood Canal Bridge; barge trips schedule to avoid commuting hours to maximum extent possible" (DEIS 3-17-19). Homeporting the two additional SEAWOLF Class submarines at the Service Pier would result in "two additional one-way transits of these submarines per month, resulting in two additional openings of Hood Canal Bridge" (DEIS 3.15-20). During SPE construction marine-based equipment would be present within the project area for two in-water work seasons. A total of approximately six barge round trips per month would be required to support construction activities during this period (DEIS 3.15-17). As stated earlier, the cumulative effects of increased vessel activity from the SPE and LWI projects in combination with the increase in construction and operation vessel activity from all of the other proposed Navy projects over the next five years will be significant for tribal fisheries. 14 cont.

The DEIS does not identify any impact to American Indian Traditional Resources from increased marine vessel traffic during construction and operation of the proposed SPE project. The DEIS does not acknowledge that vessel traffic associated with project construction and operation would usurp or significantly limit tribal access to fishing places. The DEIS does not acknowledge that these effects would increase the fishing effort required in tribal fisheries, nor does it disclose that the Tribe's ability to increase its fishing effort is constrained by a host of factors including limited fishing seasons (openings), other fisheries regulations, and the availability of fishers and gear. Navy actions that increase required fishing effort may interfere with the Tribe's ability to obtain its harvest share and thus infringe on the access component of the Tribe's treaty right.

b) Significant Impacts of Proposed Projects on Habitat for Critical Species in Tribe's Usual and Accustomed Areas

The Navy's DEIS identifies environmental impacts of the proposed projects, but falls short of describing the potentially significant effects on treaty rights, including impacts to habitat. The DEIS describes some environmental impacts to marine water resources and marine vegetation and invertebrates from the LWI Preferred Alternative. The DEIS states that 2,570 sq. ft. of intertidal habitat will be permanently lost by the LWI project and 2,000 sq. ft. of shading will

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occur from over-water area of the project (DEIS Table 3.17-1). A total of 12.7 acres of bottom sediment will be disturbed during construction. The DEIS also describes some of the environmental effects of the proposed SPE project. It identifies just under 2,000 sq. ft. of benthic habitat permanent loss and 3.9 acres of impact to marine vegetation and invertebrates from the SPE Preferred Alternative structures. The DEIS states that SPE project would construct 44,000 sq. ft. of overwater structure, approximately 385 piles, and 7 acres of new impervious surface on the shoreline. (DEIS Table 3.17-3).

Impacts on Coastal Processes

Although the environmental effects described in the DEIS are significant, the evaluation does not go far enough to identify all potential impacts of the proposed projects on habitats of concern to the Tribe and fails to use appropriate data. The DEIS does not adequately assess the long-term effects of the proposed projects on coastal processes along the Bangor shoreline, including those at Devil's Hole Beach. Coastal Geologic Services, Inc. (CGS) reported on their assessment of littoral drift at Bangor and potential effects of the proposed LWI and SPE projects on coastal geomorphic processes.[51] CGS reported the following:

> *Original net shore-drift mapping shows that the Bangor study area is located in the middle of one long drift cell (named KS-5-1 in Washington Department of Ecology (WDOE) digital coastal atlas. KS-5-1 extends from just north of Anderson Creek to the entrance to Port Gamble Bay, with continuous northward net shore-drift throughout the 16.5 mile shore reach. This drift cell was originally mapped by Taggart as KS-2-1 (1984), and mapping was later compiled and published in Schwartz et al. (1991), published by the Washington Department of Ecology. This mapping replaced earlier coastal drift mapping in the Coastal Zone Atlas of Washington (WDOE 1979), which is now understood to be incorrect. Net shore-drift mapping was more recently verified and updated by MacLennan et al. (2013).* 15

Contrary to the information above, the Navy's DEIS states that the north and south LWI and SPE project sites are within three drift cells, Drift Cells 18, 19 and 20, respectively (DEIS 3.1-13) based on a 2010 assessment. Although subarea drift cells may exist in the area, the description of the Bangor drift cells as described seems to contradict the most recent mapping and verification of sediment transport processes in the Bangor nearshore. A comprehensive assessment of shoreline processes using the most up-to-date science is important to the Tribe for evaluating impacts to habitat, particularly impacts to Devil's Hole Beach.

[51] Johannessen, J. and MacLennan, A, Coastal Geologic Services, Inc., Bangor Beach Littoral Drift Assessment, Kitsap County, WA, Prepared for Port Gamble S'Klallam Tribe, October 8, 2014.

Response:

15. The DEIS analysis was based on modeling by cbec (2013). The Tribes' CGS study based its conclusions on literature review and field visits but did not do any modeling. The FEIS incorporates field observations noted in the CGS report. EPA reviewed and found the DEIS took a hard look at the sediment transport issue and found the DEIS adequate. Additionally, while the Navy does not agree with the Tribes' assertion that the Devil's Hole Beach will be severely affected by the LWI and SPE projects, the Navy has offered to discuss possible actions with the Tribes if significant changes occur at the beach.

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A memorandum prepared by ESA Associates (October 10, 2014) summarizes findings from a review of the Navy's "Hydrodynamic and Sediment Transport Modeling of the NBK Bangor Waterfront – Draft Technical Report," upon which the Navy based its DEIS assessment of impacts to sediment and hydrology. ESA summarizes the following:

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- *The model predicts that regional effects of pile-supported structures will be limited. However, piles are likely to cause local scour holes in the immediate vicinity of their footings. If piles are grouped close together, these scour holes can interact to alter flow and bed morphology at a larger scale.*
- *The model does not appear to capture the dominant processes, which affect shoreline sediment transport and geomorphology, most notably, the south-to-north alongshore sediment transport. The model predicts that structures along the NBK Bangor waterfront accumulate sediment on the downdrift (north side), which contradicts the regional sediment transport direction, typical groin blocking of alongshore transport, and site observations (CGS, 2014).*
- *In some areas, the model predictions of bed change switch sign abruptly and with considerable magnitude. These conditions are not likely to be representative of the natural system.*
- *Overall, the modeling does not accurately represent waves and wave-induced sediment transport. Since this is a key physical process affecting shore resources and could be affected by the proposed project, we conclude that the modeling is not adequate to assess project effects. Also, the analysis did not include a geomorphic assessment, which further compounds, and perhaps caused the omission of the key process.*

A more appropriate modeling analysis should be applied in the Navy's environmental assessment. Potentially significant impacts of the proposed projects on erosion or depositional changes to Devil's Hole Beach over the long term are particularly important to the Tribe. In addition, the DEIS should evaluate alternatives to the abutments and observation towers. The DEIS compares alternatives for the fencing and piling design, and should also include alternate designs for the on shore facilities.

The Navy's DEIS states, "... relatively little shoreline change has occurred over the last two decades and only moderate change has occurred since 1876, indicating that the shoreline in the region is fairly stable as a result of the relatively sheltered environment and low net erosion and long shore transport rates" (DEIS 3.1-14). This statement contradicts the CGS assessment report, which states the following:

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Extensive shore modifications have likely impacted sediment transport and deposition, particularly along the lower beach, which appears to have resulted in considerable lower beach erosion throughout the study area.

Intertidal to backshore (where present) beach area loss can be expected to occur along all modified (armored) shores, as armor precludes translation of the upper beach profile. There remains only one depositional shore within the reach and that is the Devil's Hole beach, where the Tribe maintains shellfish beds.

Overwater structures at NBK Bangor appear to have caused several fundamental and ongoing changes to beaches within the base. These conclusions relate to existing conditions in early 2014, which are important to understand and document prior to assessing potential changes in the geomorphology of beaches and other coastal features in the study area, which may be caused by new structures. Observations revealed an active beach system south of Carlson Spit, including clear evidence of northward sand and gravel transport, dynamic beach adjustment, intermittent bluff toe erosion and landslides from mapped feeder bluffs, and a variety of beach habitats. Habitat types span the intertidal from sand flats at the lower beach, potential forage fish spawning areas on the mid-beach, backshore habitats in supratidal areas, and dune-upland transitional habitats moving further upland. Erosion occurring on the south limb of Carlson Spit is counterbalanced with significant deposition on the north limb, in agreement with historical shore change work. 15 cont.

Although the DEIS admits to some permanent disturbance of shoreline geology and soils from the proposed LWI project at the abutments and temporary disturbance from the proposed SPE project construction, it does not go far enough to evaluate coastal processes that would effect the long term health and stability of the Tribe's harvest beach at Devil's Hole and the entire Bangor shoreline. According to the CGS assessment,

Armor along these depositional shores will impact these processes, as this naturally-driven morphological process requires ample room for beaches to translate landward and for sediment erosion and deposition. The Navy's proposed shore modifications would likely result in a decrease in intertidal habitat quality and area at Devil's Hole Beach in the long-term. Within the context of sea level rise, a further reduction in sediment supply and transport and in the presence of an armored upper beach at the shellfish area, the intertidal

Response:

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shellfish habitats have little natural adaptive capacity to sustain habitats in the face of accelerated sea level rise projected for the coming decades.[52]

These impacts will have a significant adverse effect on the Bangor shoreline and the Tribe's harvest beach over the long term and were not adequately addressed in the DEIS. In addition to the impacts to coastal processes, we are concerned about other effects on critical habitat, such as impacts to water quality, marine vegetation and visual impacts. 15 cont.

Impacts on Water Quality

The DEIS states that the LWI observation posts would be provided with a potable water line and with a wastewater line connecting to the base sanitary sewer system. These lines would be attached to the walkways/trestles leading to the observation posts (DEIS 2-9). The purpose of these lines for the observation posts is unclear and the DEIS does not provide any design information to indicate whether or not the wastewater line system would be protective of water quality at the Tribe's harvest beach. We are concerned that leakages and breaks to the system could impact water quality and potentially cause a closure of the shellfish beach. We request that the final EIS include a complete description of these lines and their purpose with detailed design information that describes measures for protecting the Tribe's harvest beach and other shoreline areas. 16

The DEIS indicates that a new parking lot would be constructed as part of the proposed SPE project. The new lot would contain 421 spaces to replace the existing 107 parking spaces and to accommodate 322 personnel from Bremerton (DEIS 2-20). This additional impervious surface and potentially up to 322 additional cars at the site daily, the effects of stormwater runoff are a major concern. The DEIS fails to identify the exact size and acreage of the new parking lot, but does state that the total of impervious surface would be approximately 7 acres including the new lot and upland buildings. The DEIS also describes road improvements to accommodate changes in traffic patterns but does not provide any detail on these changes. 17

We are concerned that this enormous amount of new impervious surface would likely increase stormwater runoff over the long term. In combination with the pollution from an additional 322 vehicles and large amount of in-water construction proposed at Bangor over the next 5+ years, the project would have a significant adverse effect on water quality in Hood Canal. The DEIS states that "WDOE stormwater standards would be maintained" (DEIS 3.1-86) during operation

[52] Johannessen, J. and MacLennan, A, Coastal Geologic Services, Inc., Bangor Beach Littoral Drift Assessment, Kitsap County, WA, Prepared for Port Gamble S'Klallam Tribe, October 8, 2014, p. 10.

19

Response:

16. The wastewater lines from the north and south LWI observation posts would be double-piped to ensure no contamination of beach areas. This has been added to Section 3.1.2.2.3 of the FEIS. No water lines are planned for the replacement observation post on Marginal Wharf.

17. FEIS Section 2.2.1.3.2 was updated to state that the size of the proposed parking lot is 6 acres and there would be an additional one acre of impervious surface for other structures. Section 2.2.1.3.2 of the FEIS explains why the parking lot is needed. This parking lot has been designed to minimize clearing of vegetation and creation of impervious surface, while providing the needed parking spaces. Section 3.7.2.3.2 (pages 3.7-27 to 3.7-28) of the FEIS explains in detail how stormwater would be managed during both construction and operation of the SPE. These measures are considered adequate to protect water quality, including the water quality of Hood Canal. These measures are components of project design.

    The Navy has considered alternatives to the onshore facilities and has revised the preferred alternative appropriately. For example, an earlier concept included an industrial facility located on a larger pier extension. Also, parking needs have been carefully reviewed to ensure they are accurate. Finally, due to functionality requirements, the upland structure needs to be adjacent to the pier where the submarines will be berthed, and the parking needs to be adjacent to the upland structure where people will be working.

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of the SPE and that the projects "will meet the requirements of the USEPA general permit for stormwater discharges from construction sites" (DEIS C-16), and indicates that drainage water at the SPE would be collected in a trench drain and treated using an in-line canister system and then discharged to Hood Canal (DEIS C-25).

However, the DEIS Mitigation Action Plan does not go far enough to mitigate for the impacts of stormwater runoff. For example, designs for bioswales, vegetated buffers, permeable pavement or other measures to infiltrate stormwater rather than discharge it into Hood Canal, would improve water quality and potentially provide appropriate mitigation for the likely significant impacts of an additional 7 acres of new impervious surface. Implementing rideshare and other types of programs to decrease the number of automobiles at the waterfront would help to reduce stormwater pollution. In addition, the DEIS should consider alternatives to the onshore facilities and parking lot for consideration. Considering the cumulative effects of all proposed Navy projects and increasing activities in Hood Canal, improvement to water quality should be the goal rather than merely maintaining or degrading current levels. 17 cont.

Impacts on Marine Vegetation

Eelgrass and other types of aquatic vegetation are important habitats for herring, salmon and shellfish. The LWI Preferred Alternative, although having less impact on marine vegetation than the Alternative 2, does traverse the eelgrass beds and areas with other types aquatic vegetation on both the north and south locations. The DEIS states that an estimated 0.46 acre and 0.5 acres of eelgrass would be potentially impacted within the 100-foot wide construction corridors of the north and south LWI respectively from the Preferred Alternative (DEIS 3.2-44). The DEIS Mitigation Plan identifies steps for avoiding and minimizing impacts to eelgrass during LWI construction and the DEIS states that "seagrass recoveries in natural systems following clearing or declines due to turbidity plumes found full recoveries ranging from 2 to 6 years" (DEIS 3.2-33). Regardless, there will clearly be permanent impacts to eelgrass and other aquatic vegetation from the project footprint. The DEIS does not identify options for mitigating eelgrass loss, such as removing eelgrass from the area during construction and/or replanting eelgrass after construction. The Mitigation Plan for the LWI should go further to identify all options for replacing eelgrass and other types of aquatic vegetation.

The DEIS identifies 1.0 acre of shading impact from the proposed SPE project and states that the shading would occur in areas that do not support marine vegetation as of a 2007 survey (DEIS 3.2-37) and 3.9 acres of disturbed habitat from SPE construction. For a project of this size we recommend that the Navy conduct a new marine vegetation survey in order to assess potential impacts using more recent data. Variations in temperature and sediment and water quality may cause changes in the distribution and abundance of marine vegetation over time. In other words, 18

Response:

18. Removing eelgrass from a healthy eelgrass bed ahead of construction could be damaging to the existing bed areas that would not be disturbed by anchors/buoys, and would not be beneficial if no suitable transplant area can be identified. Eelgrass occurs in a nearly continuous line along the Bangor shoreline and generally should currently occupy any areas with suitable habitat. As noted throughout the FEIS, the Navy plans to provide compensatory mitigation for impacts to marine vegetation, including eelgrass, through the established Hood Canal ILF Program. The mitigation actions will be identified and developed by the ILF program and its inter-agency review team which includes Tribal representatives

    The 2007 survey was wide ranging and covered the entire Bangor shoreline. Macroalgae density and species diversity tended to increase with decreasing depth, as red and brown algae became more abundant at water depths between 10 to 25 feet below MLLW. Most forms of macroalgae were documented in the shallow subtidal zone between 0 and 10 feet below MLLW, often growing in the direct presence of eelgrass. Below -30 feet, macroalgae occurrence was generally sparse along the entire ~5 miles of survey area. The majority of the new pier extension would be located in depths greater than -35 feet (FEIS Figure 2-10). The new submarines would be moored at depths of -55 to -85 feet (FEIS Figure 2-10). Therefore, a new vegetation survey is not warranted. Unavoidable impacts to eelgrass and other aquatic vegetation will be mitigated through the Navy's proposed compensatory mitigation action.

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a 2007 survey may not represent current conditions. In order to ensure that SPE structures would not impact these critical marine habitats, the Navy should provide a new survey and more accurate and current data upon which to base their assessment of marine vegetation impacts. In addition to the shading effects of the SPE structure, the assessment of impacts should include the shading effects of two new submarines stationed at the Service Pier. 18 cont.

In addition, the Navy has not provided information on the removal of overwater structures and facilities at Bremerton, once the SEAWOLF Class submarines are located to Bangor. This would be an important consideration for the Mitigation Action Plan. We are concerned that by using outdated and incomplete information, the environmental assessment of these large structures and increased activity will omit potentially significant impacts to marine vegetation. 19

Visual Impacts

The DEIS also identifies "possible visual impacts" to American Traditional Indian Resources with the construction of the LWI. This does not adequately describe the significant effects of the proposed project on a traditional cultural harvest site at Devil's Hole Beach, which is all that remains of tribal access along the Bangor shoreline. The LWI will construct a fence across the beach, a concrete observation tower and stairwell at the base of the bluff, and a concrete abutment wall on the bluff. The SPE will bring additional vessel traffic to Hood Canal and construct massive structures in water and on the shoreline. The visual impact of these facilities, in combination with the cumulative impacts of other Navy structures on the Bangor shoreline, will have an obvious adverse effect on the integrity of this cultural site, which would be permanently lost. These impacts cannot be identified by the size of the structures in square feet. Impacts to the integrity of a cultural site and the loss to future generations go beyond any quantitative measurement for the tribe. The description of possible visual impacts described in the DEIS does not do justice to the actual effects of these proposed actions on treaty rights and cultural resources. 20

c) Significant Impacts of Navy's Proposed Projects on Sufficient Tribal Harvest in Usual and Accustomed Areas

With regard to harvest, the DEIS states that the LWI Preferred Alternative would involve temporary and intermittent construction impacts including increased turbidity and minor reduction in benthic habitats. Minimal barrier effects on nearshore-occurring juvenile and adult migratory fish were identified. Under LWI impacts to American Indian Traditional Resources, the DEIS sites a long-term loss of approximately 1,880 sq. ft. of shellfish beds and no population-level impacts on salmon stocks harvested by tribes. The DEIS identifies potential long-term impacts to American Indian Traditional Resources from the operation of the LWI as follows:

Response:

19. The USS SEAWOLF and USS CONNECTICUT are moored at NAVBASE Kitsap Bremerton Pier D, which is also the homeport pier for the aircraft carrier USS Nimitz. There are no overwater structures in Bremerton that are unused and available for removal or demolition.

20. Comment noted. Refer to Section 3.13 for the Navy impact analyses for cultural resources.

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> *Following construction, after up to 2 years, tribes would again have access to shellfish beds, but with the permanent loss of an estimated 0.043 acre due to displacement of existing shellfish beds by LWI structures (the area disturbed by the PSB pontoon feet and the area lost to access under the observation post stairs). Recovery of harvestable shellfish in the temporarily disturbed areas is expected within 3 years after in-water construction activities have ceased.*

The DEIS identifies SPE impacts to fish from pile driving noise that may exceed current thresholds and guidelines and from 24 months of in-water construction work. The DEIS also states that 44,000 sq. ft. offshore overwater structure with approximately 385 support piles and fender piles and artificial lighting would have an impact on fish (DEIS 3.3-76) and adjacent nearshore sand lance spawning habitat (DEIS 3.3-82).

Impacts to Fish

The DEIS summarizes SPE Preferred Alternative impacts on American Indian Resources as follows (DEIS Table 3.14-2).

> *Construction: Minimal impact on salmon with no impact on tribal salmon harvest. No impact on tribal shellfish harvest.*
> *Operations: No impact on tribal salmon or shellfish harvest*

The DEIS assertion that SPE construction and operations would have no or minimal impact on tribal harvest, while the assessment does identify impacts to fish and forage fish species and their habitats, is not consistent. The DEIS claims that impacts on tribal harvest would be minimal because the impacts on the overall population of available adult salmon and steelhead in Hood Canal would be minimal. However, any impacts to juvenile or adult fish and shellfish have a direct effect on the survival and abundance of species over time and tribal harvest over the long term. 21
Additionally, the DEIS fails to consider the impacts of increased vessel traffic on treaty fisheries and it does not consider impacts of the SPE structure on reserve geoduck areas. 22

Impacts on Forage Fish

The DEIS states that "operation of LWI Alternative 3 is not anticipated to impact surf smelt or Pacific herring spawning habitats or their reproductive success, because surf smelt or Pacific herring spawning grounds have not been documented along the 4.3-mile (7 kilometer) long Bangor waterfront. However, Pacific sand lance spawning occurs adjacent to both the south and north LWI locations." This analysis assumes that impacts would not occur due to lack of 23

Response:

21. As discussed in Section 3.3.2.3 of the DEIS, the potential impacts of SPE construction on salmonids will be temporary and minimized through observation of the salmonid in-water work window. In the long term, the SPE structure will lie in water depths greater than 30 feet, which will minimize interference with juvenile salmon migration, which occurs primarily in shallower water. The depth of the SPE will also minimize impacts to marine vegetation and other habitats used by juvenile salmon for foraging and refuge. Therefore, the SPE project is not likely to affect salmonid populations to the extent that tribal harvest is affected. Cumulative Impacts are addressed in Sections 4.3.3 and 4.3.14. The Navy's proposed compensatory mitigation action (Appendix C, Mitigation Action Plan, Chapter 6) will offset the potential contribution of the Proposed Actions to cumulative impacts, through habitat enhancement elsewhere in Hood Canal, such that there is no net loss in marine habitat, or marine life survival and abundance as a result of the LWI and SPE projects.

22. Section 3.14.2 has been revised to acknowledge that the naval vessel protection zone (33 CFR Part 165.2030) around Navy vessels may have the potential to impact access by tribal fishing vessels while fishing in their respective treaty fish area in the co-use waterways of Hood Canal (outside the Naval Restricted Areas). The FEIS has clarified discussion of SPE impacts to address impacts to seed shellfish under the piles.

23. Since 2013, NAVBASE Kitsap Bangor has conducted forage fish spawning surveys using WDFW protocols. The Navy has revised the EIS with available updated findings.

    The term "forage fish" was added to Appendix C, Mitigation Action Plan, Chapters 5 and 6, instead of implied as a sensitive species. These sections include descriptions of how BMPs will help avoid or minimize potential impacts to sensitive habitats.

    Within the FEIS, the Navy provides additional description of potential impacts from the abutment and tower construction on forage fish habitats.

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documented surveys for surf smelt and Pacific herring spawning. While DEIS Appendix B identifies varying percentages of surf smelt and Pacific herring captured in samples over different years, it does seem to indicate the presence of surf smelt habitat at the project location. A more conservative approach to protecting this important habitat and more comprehensive survey work over a long-term period is needed. According to Navy staff at the February 13 Pre-public Scoping Meeting, the Navy intends to develop a forage fish spawning sampling plan for Hood Canal. The Tribe has an interest in participating in the development of that plan if possible and coordinating with the Navy on the Tribe's own forage fish survey work now underway in Hood Canal. 23 cont.

Appendix B states that Pacific sand lance were documented along an estimated 1,000-foot shoreline at the north LWI project site extending from the proposed abutment location southward. At the south LWI project site, Pacific sand lance spawning habitat has been documented along the shoreline approximately 500 feet north of the proposed abutment location, extending approximately 1,600 feet north. However, the Mitigation Action Plan (DEIS Appendix C) does not include measures to avoid or minimize disturbance in these areas. In addition, the DEIS does not evaluate the potential environmental effects of the abutment and observation tower construction on these habitats. Pacific herring, surf smelt and Pacific sand lance are important species for tribal fisheries, as they are critical forage species for salmon and other fish.

Impacts to Geoduck

The DEIS states that the decrease in soft-bottom habitat and increase in hard substrate habitat would result in a localized change in species composition, but would not result in substantial loss of biological productivity in the area of the SPE project (DEIS 3.2-59). However, geoduck species were not considered in this assessment. The DEIS states that "there are no recent geoduck survey data for the SPE project site" (DEIS 3.2-17). According to the Washington State Department of Fish and Wildlife Geoduck Atlas[53], surveys have shown that geoduck tracts exist within the US Naval Trident submarine base, over 116 acres and containing an estimated 651,000 pounds of geoduck. Reserve Geoducks found in waters deeper and shallower than the commercial harvest depths are part of the standing stock, and contribute to the reproductive potential of the population. This is an open system and various parts contribute to the population health. Biological and ecological values have a direct impact on the entire geoduck stock and other nearshore species.[54] The Navy should complete a survey of subtidal geoduck in the project areas and complete a comprehensive assessment of all benthic species being impacted. 24

[53] Sizemore, Bob, and Ulrich, Michael, WDFW 2002 Geoduck Atlas, Atlas of Major Geoduck Tracts of Puget Sound, p. 51.
[54] Personal correspondence with Bob Sizemore, WDFW Research Scientist, March 12, 2013.

Response:

24. Section 3.2.2.3 of the DEIS describes the impacts of the SPE on benthic communities and shellfish, including geoducks, based on available information. As discussed in the response to WDNR Comment #2, the Navy and WDNR will determine mitigation for impacts to geoducks, based on available information. Impacts to the benthic community in general will be mitigated through compensatory mitigation (ILF program) and any additional mitigation agreed upon by the Navy and affected Tribes through government-to government consultation (Section 3.14.1.2 and Appendix C, Mitigation Action Plan, Chapters 6 and 9).

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Recovery of Shellfish

25 The DEIS does not provide supporting information to validate the claim that recovery of shellfish in temporarily disturbed areas would only take up to three years. The location, size and type of construction activity has not been identified in the DEIS, making it difficult to understand the full level of impact to oyster and clam beds. In addition, it is not evident that recovery would actually occur once shellfish have been lost from construction activities unless construction is followed by seeding and restoration actions. As an example, a local oyster bed has not yet recovered five years later from construction impacts that occurred in 2010[55]. The DEIS does not identify any plans for seeding the beach or restoring disturbed areas after construction and this should be part of the Mitigation Action Plan if recovery is expected within three years.

Vessel Traffic Impacts on Harvest

26 Procedures to accommodate the transit of the Navy's two SEAWOLF Class submarines in addition to the existing Navy vessel traffic in Hood Canal will have a direct impact on tribal fishing and harvesting opportunities. Fishing vessels are required to stop or adjust the timing and location of their activities under the U.S. Coast Guard procedures.[56] Tribal harvesting and fishing openings are limited to specific days and times according to fisheries management regulations. Accommodation of additional Navy vessel traffic will further limit harvesting and fishing during these scheduled openings, by requiring that fishing boats leave or stay away from particular areas of the Hood Canal during specific periods to provide safety zones for military traffic.[57] As stated above, two additional one-way transits of the SEAWOLF Class submarines per month to and from the SPE over the 50-year life of the project will have a significant effect on tribal harvest and the DEIS fails to recognize these impacts.

Calculating Impacts to Tribal Harvest

The DEIS summarizes the impacts to tribal harvest from long-term permanent loss of shellfish beds as "up to $2,208 per year." This is based on the Navy's calculation of oysters per square foot and price per dozen oysters. The DEIS states that:

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[55] Conversation with Tamara Gage, Shellfish Program Manager, Port Gamble S'Klallam Tribe Natural Resources Department, April 8, 2015.

[56] U.S. Navy Boat Owners Information Notice.

[57] Port Gamble S'Klallam Tribe, Point No Point Treaty Council, U.S. Navy Email Correspondence, Sept. 2011.

Response:

25. The DEIS provides citations for the information referenced regarding shellfish recovery in the benthic impact sections. This discussion and analysis has been revised in the FEIS after additional review in response to comments. Because the SPE will be built in deep waters, no impacts to shellfish (clams & oysters) are expected from construction of the SPE project. Additionally, most of the work associated with construction of the LWI will be above the shellfish (clams & oyster) beds where the abutments and observation posts proposed to be built. The DEIS described, in Section 2.1.1.3.3 on page 2-10, how the LWI's PSB anchors/buoys would be placed (with barge/crane) to avoid beach and shellfish impacts. In addition, installation of a coffer dam above the shellfish beds during abutment construction will reduce the potential of construction impacts to this resource (this has been incorporated into the project and the description added to Chapter 2 of the FEIS). For LWI, construction impacts to other benthic organisms would be due to crushing (e.g., when piles and anchors are placed) or smothering from turbidity caused by pile driving and other in-water activities. Approximately 420 square feet of the Devil's Hole Beach oyster bed would be impacted in the long term due to coverage expected. Both of these impacts would be localized to immediate areas in the construction zone, as acknowledged in the DEIS and FEIS.

26. The potential impacts of the LWI and SPE project construction vessels and SEAWOLF, LOS ANGELES, and VIRGINIA Class submarine transits on tribal fishing in the co-use waterways of Hood Canal have been added to Section 3.14.2 of the FEIS.

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There would be an estimated 1,880 square feet of oyster beds to which the tribes would permanently no longer have access. Oyster density at the south LWI location is approximately 2.3 oysters per square foot. If all these oysters were harvested for commercial purposes, the socioeconomic impact could be up to $2,208 per year, approximately 30,000 dozen oysters per year at NAVBASE Kitsap Bangor, with an estimated commercial value of $180,000. Therefore the $2,208 annual loss would represent approximately 1.2 percent of annual tribal income from this source.

We disagree with this calculation for several reasons. First, it is not clear where the values in the Navy's calculation were derived. A 2009 survey of oyster beds at Devil's Hole Beach found 7.27 oysters per square foot and 118,344 dozen oysters on the beach. Last year a survey found that the oyster band on Devil's Hole Beach is 77,862 square feet. This indicates that the annual loss to tribes for oyster harvest would be closer to $17,041.53. However, the calculation is based on a permanent loss of 1,880 square feet of oyster beds, which is likely to be an underestimate of the actual area of shellfish loss. The additional shellfish area that will be lost due to changes in sediment movement outside of the immediate area of the pontoon feet in the intertidal zone has not yet been determined. Likewise, the area that will be lost due to the decrease in quality of intertidal shellfish habitat over time from shoreline armoring has not yet been determined. Also, the DEIS does not consider any impacts to tribal harvest of clams that are also located on Devil's Hole Beach. According to the DEIS, a 2013 shellfish survey indicated that bent nose clams were the most abundant clams in the intertidal region of the north LWI site, followed by Manila clams and native little necks. At the south LWI project site, a 2013 subtidal survey included samples of geoduck, false geoduck, horse clam and cockle. 27

Even with these corrections, the DEIS calculation would not be suitable for describing the impacts of these proposed projects on treaty rights. Only the tribes can determine what their treaty rights are worth. Impacts to treaty rights cannot be quantified with the calculation of a project footprint or market price per pound. Treaty right impacts go beyond commercial harvest to subsistence and ceremonial harvest that cannot be defined in monetary terms. Likewise, the impacts to tribal access and loss of the integrity of traditional areas cannot be measured. 28

IV. Other Considerations for Discussion through Government-to-Government Consultation.

In general, the Port Gamble S'Klallam Tribe has serious concerns over the manner in which the Navy is attempting to force through numerous construction projects and operational changes in the Tribe's U&A that, either individually or collectively, will disrupt Tribal members' exercise of the treaty fishing right. Providing the Tribe very limited time to review and comment upon two major project proposals in one lengthy DEIS document, and ignoring the Tribe's 29

Response:

27. Oyster harvest data was used to estimate shellfish impacts because no clam harvest data was available for the analysis. The $17,041.53 amount noted in the comment appears to be for the entire oyster band at the Devil's Hole delta. The Navy's method for calculating physical disturbance by the LWI PSBs is described in detail in Sections 2.1.1.3.3 (page 2-16) and 3.2.2.3 (page 3.2-50) of the DEIS. The 1,880 square foot estimate is the entire disturbance footprint of the PSB feet on the intertidal zone, not just in the Devil's Hole delta oyster beds (420 sq ft); so while the Navy's dollar estimate ($2,208) was based on oyster values (available data), the overall area impacted included both clam and oyster habitat. Sediment is frequently moving across the shellfish beach (on incoming and outgoing tides, during and after storms, etc.); therefore, sediment movement due to pontoon feet (equivalent downward pressure of a human footprint on the surface) should not be more than what oysters typically experience.

28. The Navy acknowledges the Tribe's position that monetary impacts do not fully describe the potential of the Proposed Actions to impact to the Tribes' treaty rights. Based on court decisions, treaty rights are identified as access to fishing grounds and the fisheries resources themselves. The monetary impacts were determined as part of the socioeconomic impact analysis and included as part of the analysis of impacts to traditional resources.

29. The Navy invited the Port Gamble S'Klallam Tribe, the Jamestown S'Klallam Tribe and the Lower Elwha Klallam Tribe to consider government-to-government consultation for LWI in August 2008 and for SPE in July of 2012 due to the potential for the LWI and SPE projects to potentially impact American Indian traditional resources. As a result, the Navy has consulted with the Port Gamble S'Klallam Tribe, the Jamestown S'Klallam Tribe and the Lower Elwha Klallam Tribe (Tribes) and other tribes with adjudicated treaty fishing in Hood Canal on the details of the LWI and SPE Proposed Actions. The Navy and the Tribes have met eleven times to discuss the LWI project, seven times since June of 2015. The Navy has carefully considered the Tribe's concerns and the project designs were revised to address these issues where possible. As an example, the Navy's original preferred alternative for the LWI project had been to construct two piers; however, as a result of our government-to-government consultations, the preferred alternative is now the floating LWI barrier.

    Under Navy policy, the Navy is required to consider tribal comments and concerns prior to making a final Navy decision on Proposed Actions. However, reaching formal agreement with a tribe or obtaining tribal approval prior to a Navy final decision is not required.

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explanations of treaty rights impacts and the aggregate effect of the Navy's presence in Hood Canal on the exercise of treaty rights also gives us cause for concern. 29 cont.

As stated previously in these comments, the Tribe opposes the two proposed projects unless appropriate and meaningful mitigation for impacts to treaty rights and the environment can be achieved. This cannot be accomplished unless the Navy considers the full extent of impacts its proposed new projects and activities, as well as cumulative impacts of past and future projects and activities, are likely to impose on treaty rights and traditional resources in the Tribe's U&A. The Tribe welcomes further discussion through the government-to-government consultation process. 30

Sincerely,

Jeromy Sullivan
Chair, Port Gamble S'Klallam Tribe

26

Response:

29cont

Although formal agreement was not reached as a result of government-to-government consultation with the Port Gamble S'Klallam Tribe, the Jamestown S'Klallam Tribe and the Lower Elwha Klallam Tribe, the Navy has offered treaty mitigations for the potential significant impacts to treaty rights and resources by the construction and operation of the LWI and SPE projects. These offered treaty mitigations are described in Chapter 9 (Treaty Mitigation) of Appendix C (Mitigation Action Plan) of this FEIS.

30. The Navy appreciates the time the Port Gamble S'Klallam Tribal Leadership and staffs have committed to government-to-government consultation meetings and discussions with the Navy on the LWI and SPE Proposed Actions at NAVBASE Kitsap Bangor.

TRIBE 3 – SUQUAMISH TRIBE

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THE SUQUAMISH TRIBE
PO Box 498 Suquamish, WA

April 13, 2015

Naval Facilities Engineering Command, Northwest
1101 Tautog Circle
Silverdale, WA 98315-1101
ATTN: Thomas Dildine, LWI/SPE EIS Project Manager

Subject: Draft EIS Comments for proposed Land-Water Interface and Service Pier Extension projects, Naval Base Kitsap-Bangor

Dear Mr. Dildine:

This letter transmits the Suquamish Tribe's ("Suquamish") comments on the Draft Environmental Impact Statement (DEIS) for the Land-Water Interface (LWI) and Service Pier Extension (SPE) projects proposed by the Navy at Naval Base Kitsap - Bangor. Suquamish is a signatory to the 1855 Treaty of Point Elliott and the proposed LWI and SPE projects are located within Suquamish's usual and accustomed fishing grounds and stations ("U&A"). Based on information received during previous communication with the Navy, participation in a multi-agency meeting pre-public scoping meeting on February 13, 2013, and review of the DEIS, the proposed LWI and SPE projects will likely result in significant and cumulative impacts to natural resources, shoreline, marine, and upland habitats, as well as impacts to tribal fisheries. 1

Suquamish submitted Scoping comments on the LWI-SPE project on March 15, 2013 (see attached letter). Our review of the DEIS and comments in this letter focus primarily on the extent to which the Navy has addressed those scoping comments. On April 9, Suquamish requested a 10 day extension for review of the DEIS, but was denied this extension.

A. PURPOSE AND NEED

As stated in the DEIS, the Purpose and Need of the LWI is to "comply with Dept. of Defense directives to protect Navy OHIO Class Ballistic Missile submarines (TRIDENT submarines) from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets" by enhancing security within the Navy's Waterfront Restricted Area (WRA). The Purpose and Need of the SPE is to "eliminate deployment constraints and improve maintenance of SEAWOLF Class submarines" by "removing restrictions on navigating submarines through Rich Passage under certain tidal conditions; providing berthing and logistical support at the Navy's submarine research, development, test and evaluation (RDT&E) hub, which is located at NAVBASE Kitsap Bangor; and by improving submarine crew training and readiness through co-

Response:

1. Thank you for the comment letter. The Navy understands the Suquamish Tribe is signatory to the 1833 Treaty of Point Elliot and that its adjudicated usual and accustomed fishing grounds and stations include the waters of Hood Canal. However, the Skokomish Indian Tribe's primary fishing rights in the waters of Hood Canal over those of other tribes granted rights under this treaty, particularly the Suquamish, was affirmed in a 1985 ruling by the Ninth Circuit Court of Appeals (*United States v. Skokomish Indian Tribe*, 764 F.2d 670 [9th Cir. 1985]). Since the 1985 court decision, the Suquamish Tribe must receive permission from the Skokomish Tribe to fish south of the Hood Canal Bridge; this permission has not been granted.

   The Commanding Officer of Naval Base Kitsap (CO NBK) invited the Suquamish Tribe to consider initiation of government-to-government for the LWI and SPE projects in letters of August 22, 2008 and July 23, 2012, respectively. The CO NBK provided information for the Proposed Actions to the Tribe in consultation meetings.

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Thomas Dildine
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Page 2

location of the submarines and crew with command functions at NAVBASE Kitsap Bangor submarine training center".

B. ACTION ALTERNATIVES

The Navy proposes to combine two separate and independent marine-nearshore projects into a single EIS because the projects would be constructed in close proximity to each other along the Hood Canal Bangor shoreline, they would likely have similar impacts, and construction of the projects would overlap or occur sequentially.

Land-Water Interface (LWI)

The Navy proposes two action alternatives (Alternative 1 is No Action) for the Land-Water Interface as described in the DEIS. Alternative 2 (Pile Supported Pier) involves (1) the construction of two pile supported piers (northern pier - 280 ft. long, up to 54, 24-inch diam. steel piles; southern pier – 730 ft. long, up to 82, 24-inch diam. steel piles); (2) construction of shoreline concrete abutments that would connect to the north and south piers and to the existing Port Security Barrier (PSB) system on land; (3) installation of a mesh/grate (and sensors) that would extend from the bottom of the pier walkways to the seafloor; (4) installation of twenty 40 ft. tall towers on the piers to support lighting and security devices; (5) relocation of the existing PSB system to connect to seaward ends of the LWI; and (6) relocation of PSB anchors. 2

LWI Alternative 3 (Navy's preference) involves (1) the modification and lengthening of the existing PSB system to extend across the intertidal zone and attach to shoreline concrete abutments (therefore, the PSBs would occur at the same north and south locations as the pile supported piers in Alternative 2; 280 ft. long PSB section at northern location and 730 ft. long PSB section at southern location; (2) installation of two 30 ft. observation towers (one at north end and another at south end) along the shoreline at the newly constructed abutments. Both action alternatives would involve the construction of concrete shoreline abutments.

Service Pier Extension (SPE)

Two action alternatives (Alternative 1 is no action) for the SPE are described in the DEIS– a short pier configuration and a long pier configuration. SPE Alternative 2 (Short Pier Configuration) is the Navy's preferred alternative, and involves a side-by-side mooring configuration for submarines; 540 ft long by 68 ft wide pier extension to the existing Service Pier, supported by 385 steel or concrete piles. SPE Alternative 3 (Long Pier Configuration) involves an in-line berth mooring configuration for submarines; 975 ft long by 68 ft wide pier extension, supported by 710 steel or concrete piles.

Both SPE action alternatives involve: (1) a 2,100 sf Pier Services and Compressor building; (2) one pier crane; (3) 1,800 sf shore side emergency generator facility; (4) 50,000 sf Waterfront Support Building; (5) 421 space parking lot; and (6) 7 acres of permanently occupied upland area for new structures.

Response:

2. Comment noted. Please see Chapter 2 for modifications made to the Action Alternatives in this FEIS.

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April 13, 2015
Page 3

C. **SUQUAMISH COMMENTS**

Land Water Interface

Port Security Barriers

The LWI project Alternative 3 (Navy's preferred) would include extending the existing Port Security Barrier (PSB) to connect to the land-based security enclave. Extending the PSBs at Bangor increases the area that is excluded from treaty fishing without established fishing access agreements between the Navy and tribes and without mitigation. 3

In its 2013 Scoping comments, Suquamish requested that the EIS include an assessment of PSBs (specifically the pontoons that support the PSB) serving as an "attractive nuisance" for marine mammals that are known to haul out on the PSBs. The DEIS looks at impacts from the perspective of the marine mammal species and concludes that there may be benefits of adding PSBs for certain marine mammal species (e.g., harbor seals, California sea lions), (e.g., From Table 3.4-3: "Manmade structures at and near the LWI project sites represent unique haul-out habitat for California sea lions, which are not known to haul out in groups elsewhere in Hood Canal"). However, the Navy has done no analysis of potential concentrations of marine mammal species and resulting impacts to local salmonid species. There also does not appear to be any analysis of potential impacts to tribal fishing from having large concentrations of marine mammals hauled out on PSBs or other artificial structures. Suquamish also requested in Scoping comments that the EIS provide an analysis of alternative PSB designs that would avoid and minimize this attractive nuisance effect. 4

Shoreline Abutments

In Scoping comments (from 2013) Suquamish requested an analysis of alternatives to the shoreline abutments that support the north and south LWI overwater structures that would avoid and minimize ecological impacts. These abutments and associated onshore observation posts (or towers) will result in removal of riparian vegetation and associated functions, reduction of sediment delivery (an essential ecological function along these shorelines) from shoreline bluffs, and coverage of shallow upper intertidal habitat. There is no evidence in the DEIS that the alternatives analysis included different options in the design of the abutments or the potential to use alternative means of meeting the purpose of the abutments. 5

Service Pier Extension

The purpose and need of the SPE is to accommodate the transfer of two submarines from Bremerton to Bangor. The Navy needs to consider ways to eliminate and minimize impacts to the marine/nearshore environment by constructing temporary structures that can be removed when the purpose has been met and removing overwater structures that are no longer needed. Suquamish requests that the SPE project be dismantled once this purpose and need has been met. 6

Response:

3. The PSB extensions would occur within the established Bangor waterfront Naval Restricted Area (33 CFR Part 334). Also the project sites are located within the existing PSBs where neither the Suquamish Tribe or nor any other tribe is authorized to fish due to Navy operations and security requirements. In 1997, the Navy and the Tribes with adjudicated shellfish harvest rights at Bangor established a cooperative agreement for shellfish harvest and management at Bangor. Therefore, no new area is created that would be excluded from tribal fishing. The Navy has consulted with the Tribes that have adjudicated fishing rights at the project sites (see Section 3.14).

4. Comment noted. The Navy recognizes that the Suquamish Tribe is concerned with PSBs serving as an "attractive nuisance" for marine mammals at NAVBASE Kitsap Bangor, however, the Navy's historic information indicate that the majority of sea lions haul out on exposed submarine hulls rather than PSB pontoons. Those sea lions that have been detected on PSB pontoons have been in close proximity to Delta Pier. Most pontoons have never been used for hauling out by sea lions. Sea lions have not been detected hauling out elsewhere on the Bangor shoreline. The numbers of California and Steller sea lions hauling out on submarines at Delta Pier and pontoons of the adjacent PSB have increased since marine mammal surveys commenced at Bangor Naval Base in 2008 without the addition of any new haulout sites. It is possible that sea lions could use the additional pontoons that would be installed under LWI Alternative 3, but these would be in intertidal waters; as noted, sea lions do not currently haul out on the shoreline and appear to prefer to be in close proximity to the submarines at Delta Pier. In addition, sea lions can readily access nearshore areas from Delta Pier if so desired. Therefore, the presence of the LWI pontoons is unlikely to increase the presence of sea lions at NAVBASE Kitsap Bangor or the prevalence of sea lions in very nearshore waters of the base. Predation by sea lions on salmon, including juvenile salmon, is unlikely to increase due to the presence of the LWI pontoons. Section 3.3 of this FEIS has been revised to evaluate this potential impact on fish.

5. The abutments have been designed and located to minimize environmental impacts while meeting the required security function (Section 2.3.1).

6. As stated in FEIS Section 1.2.2, the purpose of the SPE Proposed Action is to provide additional berthing capacity and improve associated support facilities for existing homeported and visiting submarines at NAVBASE Kitsap Bangor. The SPE project is needed to:

T3 –Suquamish Tribe *(page 4 of 5)*

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Page 4

Similarly, are there overwater structures that can be removed at NAVBASE Bremerton because demands will be transferred to Bangor? 6 cont.

Cumulative Impacts

The DEIS states at 4-15: "Potential cumulative impacts include (sic) that construction and operation of the LWI and SPE would contribute to regional cumulative impacts on marine resources such as shallow-water habitat, including loss of eelgrass, macroalgae, and habitat for juvenile salmon and other fish and invertebrate species. However, through the implementation of proposed compensatory aquatic mitigation actions in the Mitigation Action Plan (Appendix C), the project's contribution to cumulative impacts would not be significant."

Suquamish is concerned that the cumulative impacts resulting from the proposed LWI and SPE projects, in combination with the many other past, present, and reasonably foreseeable future federal and non-federal actions in the Hood Canal area are not only significant, but at risk of not being adequately mitigated. In particular, there are several current (e.g., EHW2) and proposed (e.g., Transit Protection System Pier) Navy construction actions occurring along the Bangor shoreline during the next several years that involve pile driving, construction of overwater structures, shoreline abutments or armoring, and other actions. 7

Consultation with Services

In 2013 Scoping comments, Suquamish requested that the DEIS include an analysis of impacts from proposed in-water work windows on ESA-listed and non-listed species, including but not limited to summer chum, Chinook, and forage fish species. The proposed in-water work window is July 16-Jan. 15. The Navy needs to describe the basis for determining that ending the window on January 15 would be protective enough for juvenile summer chum out-migrating in Hood Canal. Suquamish repeats its recommendation to apply an in-water work window that is least impacting to these species, and concentrating the most impacting in-water construction during periods when these species are least likely to be present in the area. 8

Suquamish requests information from the Navy on the current status of consultation with the Services (NOAA and USFWS). 9

Compensatory Mitigation

From Appendix C, 6.1, C-51: "The proposed actions will result in the loss and shading of eelgrass habitat, impacts on sensitive species, including movement of salmonids, and other long-term impacts on marine habitats and species."

The Navy's preference for offsetting unavoidable environmental impacts associated with the LWI and SPE projects is to purchase credits from the Hood Canal In Lieu Fee (ILF) Mitigation Program. The adequacy of this mitigation will depend in part on specific impacts identified and described in the Final Mitigation Action Plan (Appendix C of the DEIS), and the ability to 10

Response:

6cont:

- Provide alternative opportunities for berthing to mitigate restrictions at NAVBASE Kitsap Bremerton on navigating SEAWOLF Class submarines through Rich Passage under certain tidal conditions;
- Improve long-term operational effectiveness for the three SEAWOLF Class submarines on NAVBASE Kitsap;
- Provide berthing and logistical support for SEAWOLF, LOS ANGELES, and VIRGINIA submarine classes at the Navy's SSN research, development, test and evaluation hub, which is currently located on NAVBASE Kitsap Bangor; and
- Improve submarine crew training and readiness through co-location of command functions at NAVBASE Kitsap Bangor submarine training center.

The SPE and supporting facilities would address a number of infrastructure deficiencies on NAVBASE Kitsap (both NAVBASE Kitsap Bangor and NAVBASE Kitsap Bremerton) to ensure its capability to support the SEAWOLF fleet. As stated in Section 2.2 of the FEIS, the design life of the SPE Proposed Action is 50 years, but the purpose and need will continue as long as the mission requires. There are no overwater structures at NAVBASE Kitsap Bremerton that are unused and available for demolition.

7. Sections 3.14.2.2 and 4.3.14 of the EIS state that appropriate mitigation for potential impacts of the Proposed Actions, including contributions to cumulative impacts, tribal traditional resources, and treaty rights will be developed through consultation between the Navy and affected tribes. Please also see the response to Suquamish Comment #10.

8. In-water work windows dates in the DEIS were determined by closely working with NMFS to identify when juvenile summer chum out-migration in Hood Canal is active. The Navy proposed the shorter window (closing January 15) based on best available science, including SAIC 2006; Bhuthimethee et al. 2009. WDFW (see WDFW Comment #3) describe their use of best available science documenting the presence of juvenile chum in upper Hood Canal and concurred that this shortened window will help protect juvenile chum salmon during periods of in-water work. WDFW Comment #3 on the DEIS supports the January 15 closing date. The updated Hydraulic Code (WAC 220-660) established the Authorized Work Times in Saltwater Areas for Hood Canal (at WAC 220-660-330) as July 15 to January 15, effective July 1, 2015. The new window has been incorporated throughout the FEIS.

T3 –Suquamish Tribe *(page 5 of 5)*

Thomas Dildine
April 13, 2015
Page 5

identify appropriate sites for mitigating these various environmental impacts through the ILF Program. 10cont.

Suquamish requests continued consultation with the Navy as developments on the LWI and SPE projects progress, including throughout the NEPA, biological consultation with the services (NOAA Fisheries and USFWS), and Corps permit processes. Please provide the Suquamish Tribe with opportunities to attend and participate in any multi-agency meetings and site visits associated with the LWI/SPE projects. For issues concerning cultural resources, including Section 106 consultation, please contact Dennis Lewarch, the Suquamish Tribal Historic Preservation Officer at 360-394-8529. If you have other questions, please contact me at 360-394-8667. 1

Sincerely,

Steve Todd
Ecologist

e-cc:
Roma Call, Port Gamble S'Klallam Tribe
Randy Lumper, Skokomish Tribe
Scott Chitwood, Jamestown S'Klallam Tribe
Doug Morrill, Lower Elwha Klallam Tribe
Cynthia Rossi, Point No Point Treaty Council
Kathlene Barnhart, Kitsap County
Stacy Hoskins, Jefferson County
Karen Urelius, USACE
Sheila Hosner, Governor's Office of Regulatory Assistance
Linda Storm, USEPA
Erik Peterson, USEPA
Tami Black, NOAA-Fisheries
Nancy Brennen-Dubbs, USFWS
Rebekah Padgett, Washington Dept. of Ecology
Chris Waldbillig, Washington Dept. of Fish and Wildlife
Cyrilla Cook, Washington Dept. of Natural Resources
Matt Goehring, Washington Dept. of Natural Resources
Timothy Westcott, US Coast Guard

Response:

9. The Navy submitted the Biological Assessment (BA) for both projects to NMFS and USFWS, who requested more information and a revised BA was submitted. NMFS concurred with the Navy's effect determinations for LWI; ESA consultation with NMFS is ongoing for SPE. The USFWS determined for both projects that effects were insignificant for bull trout and discountable for the marbled murrelet. The Navy submitted an IHA for SPE to NMFS in November 2014 and a revised IHA in June 2015. MMPA consultation with NMFS for SPE is ongoing. The Navy did not submit an IHA for LWI because the preferred alternative would not result in takes of marine mammals. The Navy will provide updates as consultation for both projects progresses. Suquamish Tribe representatives attended the second inter-agency meeting, held on May 4, 2015.

10. As noted throughout the FEIS, the Navy plans to provide compensatory mitigation through the established Hood Canal In-Lieu Fee (ILF) Program, of which the Hood Canal Coordinating Council (HCCC) is the sponsor. The mitigation actions will be identified and developed by the ILF program and its inter-agency review team which includes Tribal representatives.

11. Please see response to Suquamish Tribe Comment #9. The Navy appreciates the contact for the Suquamish Tribal Historic Preservation Officer. The Navy's impact assessment to cultural resources is found in Section 3.13 of this FEIS.

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T3 –Suquamish Tribe – ATTACHMENT *(attachment page)*	
Attachment: EIS Scoping Comments RE: Land-Water Interface and Service Pier Extension Projects, Naval Base Kitsap-Bangor Suquamish Tribe Comments 3/15/2013	Responses have been provided to the main comment document, which references the attachment. There are no responses to the attachment.

T3 –Suquamish Tribe – ATTACHMENT *(page 1 of 3)*

PHONE (360) 598-3311
Fax (360) 598-6295
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THE SUQUAMISH TRIBE
PO Box 498 Suquamish, WA 98392-0498

March 15, 2013

Naval Facilities Engineering Command, Northwest
1101 Tautog Circle
Silverdale, WA 98315-1101
ATTN: Thomas Dildine, LWI/SPE EIS Project Manager

Subject: EIS Scoping Comments for proposed Land-Water Interface and Service Pier Extension projects, Naval Base Kitsap-Bangor

Dear Mr. Dildine:

This letter transmits the Suquamish Tribe's ("Suquamish") comments on scoping for the Environmental Impact Statement (EIS) for the Land-Water Interface (LWI) and Service Pier Extension (SPE) projects proposed by the Navy at Naval Base Kitsap - Bangor. Suquamish is a signatory to the 1855 Treaty of Point Elliott and the proposed LWI and SPE projects are located within Suquamish's usual and accustomed fishing grounds and stations ("U&A"). Based on information received during previous communication with the Navy, a review of the Notice of Intent (NOI) to prepare an EIS for these projects, and participation in a multi-agency meeting pre-public scoping meeting on February 13, 2013, the proposed LWI and SPE projects will likely result in significant impacts to natural resources, shoreline, marine, and upland habitats, as well as tribal fisheries. Suquamish requests pre-decisional government-to-government consultation to minimize and avoid these impacts.

A. PURPOSE AND NEED

As stated in the NOI, the Purpose and Need of the LWI is to "comply with Dept. of Defense directives to protect Navy OHIO Class Ballistic Missile submarines (TRIDENT submarines) from increased and evolving threats and to prevent the seizure, damage, or destruction of military assets" by enhancing security within the Navy's Waterfront Restricted Area (WRA). The Purpose and Need of the SPE is to "eliminate deployment constraints and improve maintenance of SEAWOLF Class submarines" by "removing restrictions on navigating submarines through Rich Passage under certain tidal conditions; providing berthing and logistical support at the Navy's submarine research, development, test and evaluation (RDT&E) hub, which is located at NAVBASE Kitsap Bangor; and by improving submarine crew training and

readiness through co-location of the submarines and crew with command functions at NAVBASE Kitsap Bangor submarine training center".

B. ACTION ALTERNATIVES

The Navy proposes to combine two separate and independent largely marine-nearshore projects into a single EIS because both projects would be constructed along the Hood Canal Bangor shoreline, and they would likely have similar impacts.

<u>Land-Water Interface (LWI)</u>

The Navy proposes to carry forward to the EIS two action alternatives (Alternative 1 is No Action) for the Land-Water Interface as described from the Notice of Intent to prepare EIS LWI. Alternative 2 involves (1) the construction of two pile supported piers (northern pier - 280 ft. long, up to 54, 24-inch diam. steel piles; southern pier – 730 ft. long, up to 82, 24-inch diam. steel piles) built from shoreline concrete abutments and connected at north and south ends to the existing Port Security Barrier (PSB) system; (2) installation of a mesh/grate (and sensors) that would extend from the bottom of the pier walkway to the seafloor; (3) installation of five 30 ft. tall towers on the piers to support lighting and security devices; and modification and lengthening of the existing PSB system to connect to seaward ends of the LWI;(4)installation of new PSB segments; and (5) construction of PSB anchors.

LWI Alternative 3 involves (1) the modification and lengthening of the existing PSB system to extend across the intertidal zone and attach to shoreline concrete abutments (therefore, the PSBs would occur at the same north and south locations as the pile supported piers in Alternative 2); 280 ft. long PSB section at northern location; (2) 730 ft. long PSB section at southern location; (3) installation of three 30 ft. tall in-water towers to support lighting and security devices; (4) each in-water tower would be supported by a platform resting on four 24-inch piles; and (5) two additional towers would be installed on land. Both action alternatives would involve the construction of concrete shoreline abutments.

<u>Service Pier Extension (SPE)</u>

Two action alternatives (Alternative 1 is no action) are also being carried forward by the Navy for the SPE – a short pier configuration and a long pier configuration. SPE Alternative 2 (Short Pier Configuration) involves a side-by-side mooring configuration for submarines; 600 lineal ft. pier extension to the existing Service Pier; and approximately 320 steel piles. SPE Alternative 3 (Long Pier Configuration) involves an in-line berth mooring configuration for submarines; 1,200 lineal ft. pier extension; and approximately 700 steel piles. Both SPE action alternatives involve: (1) a 3,100 sf Pier Services and Compressor building; (2) one pier crane; (3) shore side emergency diesel generator facility; (4) 50,000 sf shoreline Maintenance Support Facility (MSF) built within an existing parking lot; and (5) 6 ac. new parking lot and lay down area near the proposed MSF.

T3 –Suquamish Tribe – ATTACHMENT *(page 2 of 3)*

Thomas Dildine
March 15, 2013
Page 3

C. **SUQUAMISH COMMENTS**

Suquamish reiterates comments made at the February 13, 2013 multi-agency meeting, and offers the following additional comments:

- Include summary tables to indicate the potential temporary, long-term, direct, indirect, and cumulative impacts (absolute and relative) of project components associated with the action alternatives.

- Include summary tables showing the footprint dimensions (area, length, width, etc.) covered by piles, abutments, anchors, overwater structures, fill, and other structures.

- The EIS should address construction, operation, and maintenance-related impacts to marine habitat, including but not be limited to effects on nearshore and deep water habitat for salmonids, forage fish, rock fish and other marine fish species, as well as shellfish species including bivalves such as geoduck and crustaceans such as crab and shrimp.

- In addition to assessing impacts to habitat, and species injury and death from proposed actions, the EIS should assess construction, operation, and maintenance-related impacts on the behavior of marine/nearshore species.

- Assess potential impacts of the proposed mesh grate (LWI Alternative 2) and use of concertina wire suspended in the water column (LWI Alternative 1).

- Assess potential temporary, long-term, direct, indirect, and cumulative impacts to nearshore ecological processes including but not limited to alterations in shoreline and beach sediment delivery, transport, and deposition associated with the proposed overwater structures, Port Security Barrier (PSB) system, and shoreline abutments.

- Provide details on the dimensions and position relative to the ordinary high water mark (OHWM) of the proposed shoreline abutments associated with the LWI project.

- Provide an analysis of alternatives to the shoreline abutments (LWI) that would avoid and minimize impacts to riparian vegetation and sediment delivery, transport, and deposition.

- Provide an assessment of impacts to cultural resources associated with upland and shoreline project construction, operation, and maintenance activities.

- In addition to the "Cultural Resources" section that would include issues related to Section 106 of the NHPA, the EIS should include another section entitled "American Indian Treaty Rights and Resources". This recommended section should address potential impacts to treaty-reserved fishing rights from both construction and

Thomas Dildine
March 15, 2013
Page 4

operation/maintenance of the proposed LWI and SPE projects. These impacts would include but not be limited to impacts on geoduck beds and on the treaty-protected harvest of geoduck. Much of the proposed project infrastructure for both LWI and SPE projects would occur at depths where geoducks grow and harvesting occurs.

- Assess impacts to water quality from any proposed pile driving, dredging, and other construction, operation, and maintenance-related activities. These impacts need to be assessed in the context of other overlapping and sequential projects proposed by the Navy and other entities in the Hood Canal area (see Cumulative Impacts comment below).

- Assess the biological impacts from the generation of underwater and in-air noise associated with pile driving and other construction and operation/maintenance activities. These impacts need to be assessed in the context of other overlapping and sequential projects proposed by the Navy and other entities in the Hood Canal area (see Cumulative Impacts comment below).

- Assess alternatives to the proposed 6 acre parking lot (SPE) that could avoid and minimize impacts to upland habitat including forest, wetland, riparian, and stream habitats. Suquamish recommends the use of low impact development methods, including retaining and restoring as much native vegetation and soil as possible, and employing pervious surfaces when at all possible to reduce runoff and minimize water quality impacts.

- Describe the stormwater systems designed to handle runoff from proposed parking, buildings, and other cleared upland areas associated with the LWI and SPE projects.

- Include an assessment of Port Security Barriers (PSBs) that function as an "attractive nuisance" for marine mammals that are known to haul out on the PSBs. Include as part of the EIS an analysis of alternative PSB designs that would avoid and minimize this attractive nuisance effect.

- Assess Cumulative Impacts associated with the proposed LWI and SPE projects, in combination with the many other past, present, and reasonably foreseeable future federal and non-federal actions in the Hood Canal area. There are several current and proposed Navy actions along the Bangor shoreline during the next several years that involve pile driving, construction of overwater structures, shoreline abutments, and other actions that need to be considered in the cumulative impact analysis for this project. To aid in effectively illustrating the temporal and spatial extent of cumulative impacts, we recommend displaying the geographical location of current and foreseeable future projects (both Navy and other entities) on a map of the Hood Canal area, including project highlights for each project (e.g., overwater coverage area, number of piles, length of armoring, and year(s) of construction).

T3 –Suquamish Tribe – ATTACHMENT *(page 3 of 3)*

Thomas Dildine
March 15, 2013
Page 5

- The EIS include an analysis of impacts to ESA-listed and non-listed species, including but not limited to summer chum, Chinook, and forage fish species of in-water work windows. Suquamish strongly recommends applying an in-water work window that is least impacting to these species, and concentrating the most impacting in-water construction during periods when these species are least likely to be present in the area.

We look forward to continued consultation with the Navy as developments on the LWI and SPE projects progress, including throughout the NEPA and biological consultation processes with the services (NOAA Fisheries and USFWS). For issues concerning cultural resources, including Section 106 consultation, please contact Dennis Lewarch, the Suquamish Tribal Historic Preservation Officer at 360-394-8529. If you have other questions, please contact me at 360-394-8667.

Sincerely,

Steve Todd

Steve Todd
Ecologist

e-cc:
Roma Call, Port Gamble S'Klallam Tribe
Randy Lumper, Skokomish Tribe
Scott Chitwood, Jamestown S'Klallam Tribe
Doug Morrill, Lower Elwha Klallam Tribe
Cynthia Rossi, Point No Point Treaty Council
Kathlene Barnhart, Kitsap County
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Rebekah Padgett, Washington Dept. of Ecology
Chris Waldbillig, Washington Dept. of Fish and Wildlife
Cyrilla Cook, Washington Dept. of Natural Resources
Matt Goehring, Washington Dept. of Natural Resources
Timothy Westcott, US Coast Guard

STATE AGENCY COMMENTS

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S1 – State of Washington Department of Ecology *(page 1 of 6)*

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

April 13, 2015

Naval Facilities Engineering Command Northwest
Attention: Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

RE: Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Project, Draft Environmental Impact Statement (DEIS)

Dear Mr. Dildine:

Thank you for the opportunity to comment on the DEIS for the Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor projects.

The DEIS identifies the preferred alternative for the Land-Water Interface as the Port Security Barrier Modifications Alterative, which would extend the existing Port Security Barrier system and attach it to new concrete abutments at either end of the interface. For the Service Pier Extension, the DEIS identifies the preferred alternative as the Short Pier Alternative, which would extend the existing pier by 540 feet in length, reconfigure the Port Security Barrier, and add new facilities and infrastructure on the pier and upland.

The Department of Ecology (Ecology) reviewed the DEIS and prepared the attached comments for inclusion in the record. Note that the comments are made by separate programs in our agency, so please contact the person appropriate for that subject area if you have questions.

We look forward to meeting with the Navy, along with other regulatory agencies and tribes, as a follow-up to our February 13, 2013 meeting.

Sincerely,

Rebekah R. Padgett
Federal Permit Manager
Shorelands and Environmental Assistance Program

e-cc: Danielle DeVoe, Ecology
Susannah Edwards, Ecology

Response:

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S1 – State of Washington Department of Ecology *(page 2 of 6)*

Laura Inouye, Ecology
Hugh Shipman, Ecology
Chad Fisher, Ecology
Susan Dier, Ecology
Joe Burcar, Ecology
Patrick McGraner, Ecology
Loree' Randall, Ecology
Karen Urelius, U.S. Army Corps of Engineers — Karen.M.Urelius@usace.army.mil
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Linda Storm, U.S. Environmental Protection Agency — storm.linda@epa.gov
Steve Todd, Suquamish Tribe — stodd@suquamish.nsn.us
Paul McCollum, Port Gamble S'Klallam Tribe — paulm@pgst.nsn.us
Roma Call, Port Gamble, S'Klallam Tribe — romac@pgst.nsn.us
Cynthia Rossi, Point No Point Treaty Council — crossi@pnptc.org
Doug Morrill, Lower Elwha Klallam Tribe — doug.morrill@elwha.nsn.us

Response:

Response side of this page intentionally left blank.

S1 – State of Washington Department of Ecology *(page 3 of 6)*

Attachment

Detailed Ecology Comments on the Land-Water Interface and Service Pier Extension at Naval Base Kitsap Bangor Draft Environmental Impact Statement

SHORELANDS AND ENVIRONMENTAL ASSISTANCE PROGRAM

401/CZM: Rebekah Padgett, (425) 649-7129

As noted in the DEIS, it is anticipated that both the Land-Water Interface and Service Pier Extension projects will require the U.S. Navy, Naval Base Kitsap-Bangor, to obtain an individual Section 401 water quality certification (WQC) and/or Coastal Zone Management (CZM) Consistency Determination from Ecology.

We would also like to let you know that relative to the ordinary high water mark (OHWM), the DEIS only mentions mean higher high water (MHHW). When it comes time to submit permit applications to Ecology, including site plans, you should be aware that the OHWM will need to be based on field indicators. In the central Puget Sound, MHHW is typically about 1.5 feet lower in elevation than OHWM. Ecology staff would be happy to field-verify your OHWM determination prior to submitting the application package. 1

Here are some specific comments on the DEIS:

- Section 3.1.1.2.1 Regulatory Compliance, Water Quality: There is a statement that "The proponent submits the JARPA to USACE who coordinates the overall approval process" and continues with a discussion of other permits and authorizations. This implies that the U.S. Army Corps of Engineers (Corps) would send the JARPA on to Ecology and coordinate the WQC review. This should be clarified. 2

  For your reference, applications for WQC/CZM and supporting documents should be submitted directly to Ecology at the same time as the Corps by email to ecyrefedpermits@ecy.wa.gov, or mail 401/CZM Federal Permit Coordinator, Shorelands and Environmental Assistance Program, Washington State Department of Ecology, PO Box 47600, Lacey, WA 98504.
- Section 3.6.1.1.1 Vegetation and Habitats: It appears that the project will avoid impacting all of the wetlands, including the isolated Orchard Wetland. Please note that if this isolated wetland is impacted, while not regulated by the Corps, those impacts would need to be mitigated and would require an Isolated Wetland Administrative Order from Ecology. 3
- Section 3.6.1.2.3 Requirements and Practices Related to Wetlands: This section should include reference to Ecology's regulation of waters of the state, including wetlands, under Section 401 of the Clean Water Act, as well as RCW 90.48. 4
- Section 3.6.2.3.2 Service Pier Extension Alternative 2: Short Pier (Preferred), Wetlands: This paragraph states that "[t]he Service Pier Extension project would impact the orchard 5

Response:

1. The USACE's policy for the marine waters of Washington State is that the OHWM is MHHW.
2. Comment has been incorporated.
3. Comment noted.
4. Comment has been incorporated.
5. The proposed project will not affect the wetland near the orchard; this typo has been fixed in the FEIS.

S1 – State of Washington Department of Ecology *(page 4 of 6)*

wetland because it is excluded from the proposed construction area…" Please clarify whether the wetland would be impacted. 5 cont.

- Appendix C—Mitigation Action Plan: Ecology anticipates addressing mitigation for aquatic resources in its review, which would include an evaluation as to whether impacts have been avoided and minimized to the maximum extent practicable prior to review of the proposed use of the Hood Canal Coordinating Council In-Lieu Fee (HCCC ILF) Program to address any mitigation needs. The mitigation plan should include other mitigation approaches considered both on site and in the vicinity of the project areas. If use of the HCCC ILF is approved by Ecology, the HCCC ILF Interagency Review Team would also need to be consulted regarding use of the Program. 6

SHORELINES: Joe Burcar, (425) 649-7145

For CZM, as noted in the DEIS, the Navy will need to submit an analysis for each of these projects demonstrating how the enforceable policies of Washington State's CZM Program are being met. One of the enforceable policies of this Program is the Shoreline Management Act. The proposed project is located in Kitsap County and each of the CZM Consistency Determinations should provide an analysis of how the proposed project is consistent with applicable provisions from the Kitsap County Shoreline Master Program, including the location and determination of the OHWM. Kitsap County recently completed an update to their Shoreline Master Program, which has been approved by Ecology and should serve as the basis for the Navy's consistency analysis. 7

HAZARDOUS WASTE AND TOXICS REDUCTION PROGRAM

Chad Fisher, (425) 649-7281

I have reviewed the Draft Environmental Impact Statement for the Land-Water Interface and Service Pier Extension, Naval Base Kitsap Bangor (https://www.nbkeis.com/lwi/), and have the following comments and suggestions regarding hazardous waste generation and management:

Cover - Ch. 2 (17 MB)

- Executive Summary (page *xxiii*) – Regulatory Compliance: Add "Resource Conservation and Recovery Act (RCRA)" to the list. 8
- Chapter 1.4. – Regulatory Considerations: Add "Resource Conservation and Recovery Act (RCRA)" to the list. 9

Ch. 3 - Section 3.2 (38 MB)

- Chapter 3.1.1.2.3. – Best Management Practices and Current Practices: Include that the applicant must designate all waste generated from operations at this site as per the Dangerous Waste Regulations, Chapter 173-303 WAC. As detailed in our original comments, the following items should be addressed: 10
  - Issues of hazardous waste designation, accumulation, management and proper disposal will be addressed.

Response:

6. Due to the Navy's current and future use of the Bangor waterfront, onsite mitigation options are limited.

7. The Navy's Coastal Consistency Determination, submitted to Ecology on May 25, 2016, considered the most recent Kitsap Shoreline Master Program.

8. Comment has been incorporated.

9. Comment has been incorporated.

10. Comment has been incorporated.

S1 – State of Washington Department of Ecology *(page 5 of 6)*

- Proper steps to prevent spills and leaks and mitigate soil contamination and/or cleanup of contaminated soils excavated during the proposed construction activities.
- Appropriate management of hazardous waste generated through the use, maintenance, or repair of any construction equipment, vehicles, earth working equipment, paving equipment, etc., are also subject to the dangerous waste regulatory requirements. 10 cont.
- Any contractor demolishing or constructing buildings or other structures, foundations, etc. must comply with the state regulatory requirements of designation and appropriate management of any hazardous waste generated as a result of such work. Assess building demolition materials for asbestos, lead, mercury, etc.

Ch. 4 - 6 (3 MB)

- Chapter 5.1.6. – Regulatory Compliance: Add "Resource Conservation and Recovery Act (RCRA)" and "Washington State Dangerous Waste Regulations, Chapter 173-303 WAC" to Table 5-1. Responsible agencies are USEPA and WA State Department of Ecology, respectively. 11
- Chapter 5.2.6. – Regulatory Compliance: Add "Resource Conservation and Recovery Act (RCRA)" and "Washington State Dangerous Waste Regulations, Chapter 173-303 WAC" to Table 5-2. Responsible agencies are USEPA and WA State Department of Ecology, respectively. 12

TOXICS CLEANUP PROGRAM

SEDIMENTS: Susannah Edwards, (360) 407-6798

The area of the proposed service pier extension and land-water interface structures is within the boundaries of the Naval Base Kitsap-Bangor Superfund Cleanup Site. The area where construction is proposed includes sediments that are within Operable Unit 7, Area 26 (Hood Canal Sediments) of the cleanup Site. In the Second Five-Year Review of this Site the Navy and U.S. Environmental Protection Agency (EPA) concluded that "no unacceptable human health risks were identified for Site 26 (based upon recreational exposure to sediments and ingestion of clams)." Since the time of that determination, the Washington State Sediment Management Standards have been updated (September 2013) and include new criteria for evaluating risk to human health and upper trophic level species. These criteria constitute new Applicable or Relevant and Appropriate Requirements (ARARs) which need to be met at the Site.

Sediment samples collected in vicinity of the proposed project construction areas, and reported in the DEIS represent the top 0-10cm of sediment. Reported concentrations are protective of benthic invertebrates. However, during and post project construction, sediment deeper than 10cm may be disturbed and released into the surrounding aquatic environment, potentially significantly exacerbating the Site conditions identified during the most recent five-year review period. The chemical concentrations of these deeper sediments must be characterized and evaluated against the updated Sediment Management Standards in order to comply with State ARARs. 13

Response:

11. Comment has been incorporated.

12. Comment has been incorporated.

13. This comment's statement that sediments at NAVBASE Kitsap Bangor must be evaluated against the new SMS is not accurate. The applicable ARARs are those in effect at the time of the site ROD, which include the 1995 SMS. These ARARs will continue to be valid for Five-Year Reviews for the site. The site is not contaminated. As stated in the comment, past Five-Year Reviews found that site sediments do not pose a risk to human health or the environment; contaminant levels in site sediments have not increased over time. In addition, driving piles is not expected to result in significant releases of materials from depth to the surface environment. Therefore, no additional action related to sediment contamination is required for implementation of the two proposed actions.

S1 – State of Washington Department of Ecology *(page 6 of 6)*

Because contamination is known to be present at the Site, testing of the potentially contaminated media must be conducted. If contamination of soil, groundwater, or sediment is revealed by testing, the Department of Ecology must be notified; contact the Environmental Report Tracking System Coordinator at the Northwest Regional Office at (425) 649-7229. For assistance and information about subsequent cleanup and to identify the type of testing that will be required, contact Susannah Edwards with the Toxics Cleanup Program at Ecology Headquarters at (360) 407-6798. 13 cont.

Please note that prior to conducting any sampling the Navy should coordinate with both Ecology's Toxics Cleanup Program and the Dredged Material Management Program (DMMP). Ecology's representative on the DMMP is Laura Inouye, 360-407-6165 or Laura.Inouye@ecy.wa.gov.

Response:

Response side of this page intentionally left blank.

S2 –Washington State Department of Fish and Wildlife *(page 1 of 2)*

State of Washington
DEPARTMENT OF FISH AND WILDLIFE
Mailing Address: 600 Capitol Way N · Olympia, WA 98501-1091 · (360) 902-2200, TTY (800) 833-6388
Main Office Location: Natural Resources Building · 1111 Washington Street SE · Olympia, WA

April 13, 2015

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 2 03
Silverdale, WA 98315-1101

RE: Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Project, Draft Environmental Impact Statement (DEIS)

Dear Mr. Dildine:

The Washington Department of Fish and Wildlife (WDFW) submit this comment letter in response to the above-referenced document. Thank you for the opportunity to comment on the DEIS for the Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor projects.

The DEIS identifies the preferred alternative for the Land-Water Interface as the Port Security Barrier Modifications Alterative, which would extend the existing Port Security Barrier system and attach it to new concrete abutments at either end of the interface. For the Service Pier Extension, the DEIS identifies the preferred alternative as the Short Pier Alternative, which would extend the existing pier by 540 feet in length, reconfigure the Port Security Barrier, and add new facilities and infrastructure on the pier and upland.

WDFW appreciates the opportunity to comment on this DEIS. We look forward to meeting with the Navy, along with other regulatory agencies and tribes on May 4 2015, as a follow-up to our February 13, 2013 meeting. We may have additional comments after review of these background materials for consideration in the final EIS.

Our comments on the DEIS follow:

The projects will have impacts to nearshore, intertidal, shallow subtidal and subtidal areas.

Mitigation- WDFW supports the In-Lieu-Fee (ILF) Program, in concept, to provide more successful mitigation options within the Hood Canal watershed. WDFW supports this program as the preferred option for mitigation and continues to work with Hood Canal Coordinating Council to continue develop and management of the program as quickly as possible. 1

Response:

1. Thank you for the comment. The Hood Canal ILF Program is also the Navy's preferred option for compensatory mitigation.

S2 –Washington State Department of Fish and Wildlife *(page 2 of 2)*

WDFW is concerned about impacts to the marine ecosystem, e.g. not just how the eelgrass bed will be disturbed, but also other kelp and macroalgae and the fish and wildlife that use these communities for shelter, food and reproduction. For example, the role of drift algae in recruitment of juvenile lingcod and juvenile rockfish is an important function not listed in the DEIS impact table. 2

Inwater work window- WDFW uses in-water work window closures for the protection of fish life. For the last five years WDFW has used the best available science that documents the presence of juvenile chum in upper Hood Canal, presumed to be Hood Canal summer chum salmon (ESA listed), rearing in marine waters as early as late December and early January. Some of this work was conducted at Bangor in the marine waters adjacent to EHW-1 and both north and south of the pier. WDFW recommends that in-water work closures be expanded to include protection for juvenile chum salmon beginning January 15. WDFW understands the constraints a seven month in-water work closure (January 15-July 16) would place on the Navy and may be able to work with the applicants and contractors on construction sequencing to identify specific work offshore in waters greater than +20 MLLW, that will not cause direct harm to juvenile chum migration corridors along the shallow marine shoreline during January 15 – February 14. After this time, additional salmonids are present and migration is less confined to the shallow shoreline. 3

WDFW may comment at a later date on operational impacts, such as increase likelihood of spills, vessel traffic disturbance, as well as impacts to fisheries (e.g. damage assessments for geoduck and other resources).

We look forward to working with the Navy on this project and the mitigation options. Just as construction of these two projects is of critical importance to the Navy, the protection of fish life and appropriate mitigation selection is crucial to WDFW for our constituents. Once again, we request to be informed of any action taken relative to the mitigation planning for the LWI/SPE projects. If there are any questions or additional information is needed, please do not hesitate to contact Chris Waldbillig, Marine Area Habitat Biologist for Kitsap County at (360) 874-7258.

Sincerely,

Chris Waldbillig

Chris Waldbillig
Region 6 Assistant Habitat Program Manager

Response:

2. Drift algae impacts have been added to Section 3.2 of the Final EIS.

3. The Navy will adhere to the July 15 to January 15 in-water work window for the proposed actions.

S3 –Washington State Department of Natural Resources *(page 1 of 2)*

WASHINGTON STATE DEPARTMENT OF
Natural Resources
Peter Goldmark - Commissioner of Public Lands

Caring for
your natural resources
... now and forever

April 13, 2015

Thomas Dildine, Project Manager
Naval Facilities Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315-1101

Dear Mr. Dildine:

Thank you for the opportunity to submit comments on the Draft Environmental Impact Statement for the Land-Water Interface and Service Pier Extension at Naval Base Kitsap Bangor. The Washington Department of Natural Resources (DNR) is the proprietary manager of state-owned aquatic, which include the bedlands and tidelands located within or adjacent to the proposed project area. DNR also manages the resources embedded or attached to state-owned aquatic lands, including aquatic vegetation, geoducks, and valuable materials and minerals.

The Navy proposes two separate actions at NAVBASE Kitsap Bangor waterfront: the Land-water interface and the Service Pier Extension. The Land-Water Interface proposal includes alternatives that would result in construction and operation of barrier structures, including two pile-supported piers at both the north and south ends of the waterfront restricted area, a walkway, fence, and towers for lights and equipment. One of the alternatives proposes installation of metal mesh that would extend from the bottom of the piers to the seafloor, anchored to heavy steel plates, placed on the seafloor using a barge-mounted crane. Other improvements would include a floating dock for small boat access, a gangway deck and up to 136 permanent piles, and various anchoring structures.

The Service Pier Extension (SPE) proposed action is the extension and operation of the existing Service Pier, and construction and operation of support facilities to accommodate the transfer of two SEAWOLF Class submarines from NAVBASE Kitsap Bremerton to NAVBASE Kitsap Bangor. Depending on the alternative, the service pier could be extended by up to 975 feet. Two of the alternatives would include construction of a 2,100-square foot Pier Services and Compressor Building on the Service Pier and relocation of the existing system to attach to the end of the pier extension.

Shellfish, Eelgrass, and Benthic Community Impacts
DNR has an interest in ensuring that resources located on state-owned aquatic lands where DNR has a reversionary interest will be fully mitigated by projects that provide substantial habitat benefits to state-owned aquatic lands. DNR supports the proposed use of the Hood Canal Coordinating Council (HCCC) in-lieu fee mitigation program to mitigate unavoidable impacts to aquatic vegetation and other benthic community habitats. Under this program, the HCCC uses fees paid into the program to enhance, restore, create, and preserve habitat in Hood Canal. 1

AQUATIC RESOURCES DIVISION ▮ 1111 WASHINGTON ST SE ▮ MS 47027 ▮ OLYMPIA, WA 98504-7027
TEL (360) 902-1100 ▮ FAX (360) 902-1786 ▮ TTY (360) 902-1125 ▮ TRS 711 ▮ WWW.DNR.WA.GOV
EQUAL OPPORTUNITY EMPLOYER

Response:

1. Thank you for the comment.

S3 –Washington State Department of Natural Resources *(page 2 of 2)*

Thomas Dildine, Project Manager
Naval Facilities Engineering Command Northwest
April 13, 2015
Page 2 of 2

However, the in-lieu fee program cannot be used to compensate for the taking of shellfish from public lands.

The placement of pilings, abutments, anchor systems, mesh barriers, and other construction that impacts the substrate have the potential to permanently harm the wild geoduck stock located on state-owned aquatic lands. The people of Washington own the wild geoducks located on public aquatic lands, and the clams are sold by the state as valuable materials. Under Chapter 79.135 Revised Code of Washington, the people of Washington must be compensated for the taking of geoducks, and damages must be deposited in state of Washington accounts. 2

DNR requests the Navy reimburse the state for the lost commercial value of geoducks located on state-owned aquatic lands that will be harmed by construction activity under our proprietary authority granted under Chapter 79, Revised Code of Washington. DNR also requests that the Final EIS identify potential, adverse impacts on shellfish, including geoducks, from sediment disturbance, crushing, or smothering due to pile driving, anchor and dolphin placement, and increases in turbidity. The Mitigation Plan in Appendix C should be revised, as it does not adequately address the specific impacts to geoduck and shellfish in intertidal and subtidal areas within the proposed project area.

Should you have any questions, please do not hesitate to contact Cyrilla Cook, Policy Unit Supervisor, at (360) 902-1080.

Sincerely,

Kristin Swenddal, Manager
Aquatic Resources Division

c: Cyrilla Cook, Policy Unit Supervisor

Response:

2. The ILF is for compensatory mitigation. The Navy and WDNR will determine the fee resulting from impacts to geoducks, which the Navy will pay to WDNR.

   Section 3.2.2 of the DEIS addresses the impacts of the proposed actions on geoducks.

   Sections 2.1 and 5.1 of the MAP (Appendix C) describe measures to minimize impacts to marine habitat, which includes shellfish. Mitigation for impacts to geoducks is addressed earlier in this response.

PRIVATE ENTITY/INDIVIDUAL COMMENTS

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Public Meeting Comment Form

Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Environmental Impact Statement

Location: Poulsbo **Date:** 3-4-15

Thank you for your comments on the Land-Water Interface and Service Pier Extension Draft Environmental Impact Statement

Please use this form to record your comments on the Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Draft Environmental Impact Statement (EIS). Comments must be postmarked or received electronically by **April 13, 2015**, to ensure they become part of the official record. All comments will be responded to in the Final EIS.

Please provide your comments on the adequacy and accuracy of the environmental analysis.

Please Print

* Please include LENGTH of riprap around abutments, not just area & volume 1

* Pleased to see issues addressed that were brought up during scoping process 2

Name: Kathlene Barnhart

Organization/Affiliation: Kitsap County, DCD

Address:* 914 Division Street ML-36

City, State, Zip Code: Port Orchard, WA 98366

Please give this completed form to one of the project team representatives, or mail, email or submit online by **April 13, 2015**, to:

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101
Email: nwnepa@navy.mil
Website: www.nbkeis.com/lwi

*Provide your mailing address to receive future notices about the Land-Water Interface and Service Pier Extension EIS.

Visit **www.nbkeis.com/lwi** for project information.

Response:

1. The requested information has been added in the FEIS.

2. Thank you for the comment.

P2 – Beam, Alan (page 1 of 1)

Public Meeting Comment Form

Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Environmental Impact Statement

Location: Poulsbo Date: 4 Mar 15

Thank you for your comments on the Land-Water Interface and Service Pier Extension Draft Environmental Impact Statement

Please use this form to record your comments on the Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Draft Environmental Impact Statement (EIS). Comments must be postmarked or received electronically by **April 13, 2015**, to ensure they become part of the official record. All comments will be responded to in the Final EIS.

Please provide your comments on the adequacy and accuracy of the environmental analysis.

Please Print

1 I recommend that you consider Alternate III for the pier extension, This will allow pierside berthing for both submarines, rather than Breasting out. Invaribly it is the inboard boat that needs to get out.
The extra pier space will also allow for future growth and berthing space for visiting submarines.

2 What plans are there to upgrade Marginal Wharf

Name: Alan Beam

Organization/Affiliation: Bremerton Navy League

Address:* [redacted] Tracyton WA 98393

City, State, Zip Code: [redacted]

Please give this completed form to one of the project team representatives, or mail, email or submit online by **April 13, 2015**, to:

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101
Email: nwnepa@navy.mil
Website: www.nbkeis.com/lwi

*Provide your mailing address to receive future notices about the Land-Water Interface and Service Pier Extension EIS.
Visit **www.nbkeis.com/lwi** for project information.

Response:

1. Although the long pier may offer operational advantages, the Navy has identified the short pier as the Preferred Alternative because it would have fewer environmental impacts and lower cost.

2. Upgrades to Marginal Wharf are not within the scope of the LWI/SPE EIS.

P3 – Bruns, Michele (page 1 of 1)

Michele Bruns

Subject: FW: Naval Base Kitsap Bangor EIS comment

-----Original Message-----
From: michele bruns [redacted]
Sent: Sunday, April 12, 2015 4:48 PM
To: Michele Bruns; NAVFAC NW NEPA
Subject: Naval Base Kitsap Bangor EIS

Your draft EIS states that there would be, during the months-long construction project, a large number of construction barges passing through Hood Canal and apparently requiring the closure of Hood Canal Bridge. Moreover, it states that one-way transits through this spot with Seawolf Class submarines would increase, I assume not temporarily, from .5 times per month to 2 times per month, a fourfold increase in bridge closures for that purpose alone.

The EIS MUST address the fact that the Hood Canal Bridge is a lifeline for thousands and every closure affects people trying to get to medical appointments, jobs, airline and train connections, events for which expensive tickets have been purchased, and often emergency medical care. 1

The Navy is not the only entity which causes bridge closures, but it has been the cause of many (sometimes up to 2 hours according to Navy statements!), and now you wish to burden the public with even more closures. The EIS needs to address, with an INDEPENDENT study, just what these additional closures will mean for the safety and physical welfare of citizens, as well as the economic impact. There is no reasonable alternative route for people to take.

The Navy needs to explain why it needs to increase this burden on law-abiding, tax-paying citizens, who have the right to travel freely on public roads paid for and maintained by their taxes. In August of 2013, I was traveling home from Seattle on this route. We (my brother who had leukemia, a Japanese family whom we had gone down to pick up after their long flight, and myself) were stuck for 2 1/2 hours in stopped traffic. It was a Friday afternoon, a time with a great deal of traffic headed to the Peninsula, and VERY hot. All those people. No water. No bathrooms for miles. I can't imagine how awful this was for the elderly, people with babies, pregnant women, etc. The word went down the line of cars that the long ordeal was caused by a Navy sub with escort. The response was anger because of the suffering and inconvenience. The public does NOT feel that the Navy is there to protect us when this is what we have to endure. Quite the opposite.

Respectfully, Michele T. Bruns
[redacted]

Port Townsend, WA 98368

1

Response:

1. The Navy regrets that openings of the Hood Canal Bridge would be unavoidable to allow passage of construction vessels and transits of SEAWOLF, LOS ANGELES, and VIRGINIA Class submarines. As stated in the EIS, the number of required openings would be minimized and timed to avoid peak commuting hours, 6:00 a.m. to 8:30 a.m. and 3:30 p.m. to 6:00 p.m. For the LWI preferred alternative, an average of 0.5 openings per month would be required, resulting in average delays of 30 minutes per month during one in-water construction season (July 15, 2016 through January 15, 2017). This is considered a minimal impact. For the SPE preferred alternative, an average of 12 bridge openings per month would be required, resulting in average delays of 6 hours per month during two in-water work seasons (July 15 through January 15 [construction years not yet known]). This would represent an increase of approximately one-third from the current number of openings and traffic delays; currently there are approximately 400-450 openings per year, or about 35 per month on average. This would be an unavoidable adverse impact that the Navy would minimize as described above. During operation, SEAWOLF, LOS ANGELES, and VIRGINIA Class submarines would be transiently moored at the SPE at NAVBASE Kitsap Bangor for maintenance and logistic support. Transits of these submarines, which do not require the same large escort group as the OHIO Class submarines, would result in approximately two additional openings of the Hood Canal Bridge per month, producing two additional traffic delays of about 30 minutes each. This would be an increase of approximately 5 percent over current conditions.

P4 – May, Stephen *(page 1 of 1)*

COMMENTS REPORTS LOGOUT

Reviewing Comment 30... Close/Cancel and Return to Comments

Approved ◉ N/A ○ No ○ Yes

Approved Date N/A

Reviewer N/A

Update Cancel

Submit Date 3/15/2015

Comment The most important things I see that need to be adressed with this new pier based upon my experance is as follows. 1. Subdet5 needs to keep its hands off any addtions to the pier. I worked at Service a number of time for PSNS on the Jimmy Carter since it first arrived in 2005. Because DET5 owned 2/3 of the buiding the offices for the Shipyard and OE mangement team was stuffed into a very small space. Downstairs you had to put all the shops into a space that in most cases is smaller then the size of a single shop back at PSNS in Bremerton.
The engineers had to be located up across from bldg. 7000 area because of the small space PSNS had on service pier. The other problem is parking PSNS built a parking lot north of the main DET5 buliding at their cost but right from the start DET 5 tried to clam the lot as their own. By 2006 everytime PSNS had an upkeep on the JIMMY CARTER starting in 2006 shop personnel had to park up the hill across from bldg 7000 and ride busses paid for by PSNS at a rate of $70-90 per hour for one bus and one driver per shift of 2 shifts. Finally the services were lacking auch as having to lease abackup generator for shore power, proper heavy crane service (had to use one of PSNS's floating cranes. just to name a few problems. hopefully all these problem will be adressed. By the way I am a retired Submarine A-Ganger who was first on service pier on active duty in 1992 on the USS BREMERTON SSN698 when the pier was only have as wide as it is now. I retierd later thet same year on 9/30/92 1

E-mail [redacted]

Name May, Stephen

Address [redacted]

City Port Orchard

State WA

Zip Code 98366

Top of Page

Response:

1. Thank you for the comment.

P5 – McCluskey, Kathy *(page 1 of 1)*

McCluskey, Kathy

From: Dildine, Thomas E CIV NAVFAC NW, OPSP [redacted]
Sent: Monday, March 09, 2015 8:52 AM
To: Turk, Ted R.; Wallin, Jennifer M.
Subject: FW: Pier EIS comment
Signed By: [redacted]

Hi,

Comment from NWNEPA email address.

Thanks

Tom

-----Original Message-----
From: Kathy McCluskey [redacted]
Sent: Saturday, March 07, 2015 8:33 PM
To: NAVFAC NW NEPA
Subject: Pier EIS

I'm writing to express my concern regarding the impact of additional openings of the hood canal bridge during construction of the pier and after addition of two subs. Bridge closures are intolerable already. This will only be worse. How does the navy plan to mitigate this impact. There are serious economic impacts to bridge delays as well as general inconvenience, highway backups and lost production. 1

Sent from my iPad

1

Response:

1. Please see response to Bruns Comment #1.

P6 – McLemore, Janice *(page 1 of 1)*

McLemore, Janice

From: Janice McLemore [redacted]
Sent: Sunday, March 01, 2015 12:39 PM
To: NAVFAC NW NEPA
Subject: Extension of Service Pier on Naval Base Kitsap Bangor

Naval Facilities Engineering Command Northwest
Attention: Mr Thomas Dildine

Dear Mr Dildine and Naval Facilities Engineering Command NW:

Thank you for the opportunity to respond to the environmental impact on Hood Canal because of proposed construction and operation of the extension of the service pier at Bangor.

Hood Canal and in fact the entire Puget Sound is stressed environmentally. With the effect of increased climate temperatures the stresses are increasing. Sea stars, as an indicator of the health of the Canal are diseased and dying. Increasing the naval activity on the Canal is not good for the health of the environment. Please figure out how to use what you already have without increasing the negative impact you make. 1

Furthermore, our country is spending more on military expenses than the combined budgets of most countries on the earth. We need to be focusing on caring for our earth, the people and animals on it, not blowing it up. 2

Please stop further construction of the new pier at Bangor.
Sincerely,
Janice McLemore

1

Response:

1. The Navy is dedicated to environmental stewardship while fulfilling its mission. On NAVBASE Kitsap Bangor this includes protecting the Hood Canal environment. As described in the EIS, the proposed LWI and SPE projects have been designed to minimize impacts to Hood Canal, and incorporate many mitigation measures, including compensatory habitat mitigation within Hood Canal (see Appendix C, Mitigation Action Plan, Section 6.0) to balance unavoidable impacts of the project. Although the project would contribute to cumulative impacts to the Hood Canal environment, the Navy's proposed mitigation measures and actions would ensure that the project's net contribution would not be significant.

2. The Navy recognizes that individuals may have different views on the most appropriate approach to the defense of the United States, and on priorities for spending taxpayers' money in the current financial climate. However, current U.S. government policy is that the TRIDENT submarine program remains a vital part of the nation's sea-based strategic deterrence mission. Per the April 2010 Nuclear Posture Review Report, "as long as nuclear weapons exist, the United States will sustain safe, secure, and effective nuclear forces. These nuclear forces will continue to play an essential role in deterring potential adversaries and reassuring allies and partners around the world." The LWI project is important to the security of the TRIDENT program submarines, facilities and personnel at NAVBASE Kitsap Bangor. The SPE is a critical project required to improve posture and surge capability in the Pacific area of responsibility (AOR) per the USFF/PACFLT. Every effort has been and will be made to minimize costs during the planning, design, construction, and operation of the LWI and SPE projects.

P7 – Sanford, Carolyn *(page 1 of 1)*

COMMENTS REPORTS LOGOUT

Reviewing Comment 29... Close/Cancel and Return to Comments

Approved (•) N/A ( ) No ( ) Yes

Approved Date N/A

Reviewer N/A

Update Cancel

Submit Date 2/27/2015

Comment Re: Bangor, WA I want the Navy to get approval for the plan they prefer. I believe in their ability and expertise. We crab, fish and use the waterways affected. 1

E-mail [redacted]

Name sanford, carolyn

Address [redacted]

City Brinnon

State WA

Zip Code

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Response:

1. Thank you for the comment.

P8 – Strycharski, Jim *(page 1 of 1)*

Public Meeting Comment Form

Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Environmental Impact Statement

Location: Poulsbo Date: 3-4-15

Thank you for your comments on the Land-Water Interface and Service Pier Extension Draft Environmental Impact Statement

Please use this form to record your comments on the Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Draft Environmental Impact Statement (EIS). Comments must be postmarked or received electronically by April 13, 2015, to ensure they become part of the official record. All comments will be responded to in the Final EIS.

Please provide your comments on the adequacy and accuracy of the environmental analysis.
Please Print

My concerns:
Bridge openings, Incresed
Even if it is only 5%, 1/2 mile From my
house is enough. To upset me. 1

~~Salmon~~ Salmon Transit 2

Perfered method Floating security
barrier, service Pier Short pier 3

Name: Jim Strycharski
Organization/Affiliation: Retired USN
Address:* [redacted]
City, State, Zip Code: Poulsbo, WA 98370

Please give this completed form to one of the project team representatives, or mail, email or submit online by **April 13, 2015**, to:

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101
Email: nwnepa@navy.mil
Website: www.nbkeis.com/lwi

*Provide your mailing address to receive future notices about the Land-Water Interface and Service Pier Extension EIS.
Visit **www.nbkeis.com/lwi** for project information.

Response:

1. Please see response to Bruns Comment #1.
2. Both the LWI and SPE projects have been designed to minimize impacts to salmon migration.
3. Thank you for the comment.

P9 – Sullivan, Julianna *(page 1 of 1)*

Public Meeting Comment Form

Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Environmental Impact Statement

Location: NKHS- Poulsbo **Date:** March 4, 2015

Thank you for your comments on the Land-Water Interface and Service Pier Extension Draft Environmental Impact Statement

Please use this form to record your comments on the Land-Water Interface and Service Pier Extension on Naval Base Kitsap Bangor Draft Environmental Impact Statement (EIS). Comments must be postmarked or received electronically by **April 13, 2015**, to ensure they become part of the official record. All comments will be responded to in the Final EIS.

Please provide your comments on the adequacy and accuracy of the environmental analysis.

Please Print

AS a tribal member, with family members that depend on commercial harvesting and Subsistence living of natural resources, I hope the Navy acknowledges that the obstruction to habitat increases the fishing/ harvesting efforts. I recommend that the Navy employ a Tribal Liason with their projects, Someone who understands Indian Law and understands the impact to tribal members when treaty rights are violated, overviewing the Projects. 1

Name: Julianna Sullivan

Organization/Affiliation: PGST

Address:* [redacted]

City, State, Zip Code: Kingston WA 98346

Please give this completed form to one of the project team representatives, or mail, email or submit online by **April 13, 2015**, to:

Naval Facilities Engineering Command Northwest
Attention: Mr. Thomas Dildine, LWI/SPE EIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101
Email: nwnepa@navy.mil
Website: www.nbkeis.com/lwi

*Provide your mailing address to receive future notices about the Land-Water Interface and Service Pier Extension EIS.

Visit **www.nbkeis.com/lwi** for project information.

Response:

1. The Navy maintains both a tribal liaison officer and a Cultural Resources staff who are knowledgeable of tribal treaty rights, review all proposed Navy projects, and engage in government-to-government consultation with the tribes. Please also see the responses to Port Gamble S'Klallam Tribe Comments #5, #8, #9, and #10.

P10 – Waters, Steven *(page 1 of 1)*

COMMENTS REPORTS LOGOUT

Reviewing Comment 31... Close/Cancel and Return to Comments

Approved ◉ N/A ○ No ○ Yes

Approved Date N/A

Reviewer N/A

Update Cancel

Submit Date 3/20/2015

Comment With the additional personnel being assigned onboard NBK Bangor, is there going to be additional traffic lanes opened for access onto the base and operational area to relieve some of the traffic backlogs that occur? The last modification to base entry requirements has already caused significant increases in traffic back-ups when accessing the base in the mornings, additional personnel assigned to the base could result in those back-ups extending out onto the highways, posing serious safety issues for personnel. 1 The amounts of automobile exhaust discharged while idling in line to access the base/operational areas should be factored in this as well. 2

E-mail [redacted]

Name Waters, Steven

Address [redacted]

City Seabeck

State WA

Zip Code 98380

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Response:

1. The proposed actions are not expected to result in back-ups of traffic onto highways near the base. Construction of the two projects would not overlap. A maximum of 100 construction workers is expected for the LWI, and 225 workers for the SPE. Ongoing construction of the second Explosives Handling Wharf (EHW-2) has required a maximum of 260 workers and has not resulted in traffic back-ups onto nearby highways.

2. Emissions from vehicles waiting to enter the base will be localized and temporary and would not have a significant effect on air quality in the region.