
4 Cumulative Impacts

**Gulf of Alaska Navy Training Activities
Draft Supplemental Environmental Impact Statement/
Overseas Environmental Impact Statement**

TABLE OF CONTENTS

4	CUMULATIVE IMPACTS	4-1
4.1	Definition of Cumulative Impacts	4-1
4.2	Scope of Cumulative Analysis	4-1
4.3	Past, Present, and Reasonably Foreseeable Actions.....	4-2
4.4	Resource-Specific Cumulative Impacts.....	4-23
4.4.1	Fishes	4-23
4.4.2	Sea Turtles.....	4-24
4.4.3	Marine Mammals.....	4-24
4.4.4	Birds	4-25
4.4.5	Socioeconomic Resources and Environmental Justice	4-26
4.5	Summary of Cumulative Impacts	4-28

List of Tables

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis.....	4-3
---	-----

List of Figures

There are no figures in this chapter.

This page intentionally left blank.

4 Cumulative Impacts

This chapter (1) defines cumulative impacts; (2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts; (3) analyzes the incremental interaction the Proposed Action may have with other actions with coincidental effects; and (4) evaluates cumulative impacts potentially resulting from these interactions of the coincidental effects on the same environmental resource. For this Supplemental Environmental Impact Statement (SEIS)/Overseas Environmental Impact Statement (OEIS), the approach to analysis of cumulative impacts has changed since the 2011 Gulf of Alaska (GOA) United States (U.S.) Department of the Navy (Navy) Training Activities Final Environmental Impact Statement (EIS)/OEIS and the 2016 GOA Navy Training Activities Final SEIS/OEIS. An explanation of the updated analysis is provided below.

4.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives outlined in the Office of the Chief of Naval Operations's *Environmental Readiness Program Manual* section 10-5.17.c. This section states that "Cumulative impacts (NEPA) result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (U.S. Department of the Navy, 2019). This analysis does not incorporate by reference the 2011 GOA Final EIS/OEIS (U.S. Department of the Navy, 2011) nor the 2016 GOA Final SEIS/OEIS (U.S. Department of the Navy, 2016), but rather builds upon it for an updated look at cumulative impact potential.

4.2 Scope of Cumulative Analysis

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the temporal (relating to time) extent in which the coincidental effects could be expected to occur.

The geographic boundaries for the cumulative impacts analysis included the entire GOA Navy Training Activities SEIS/OEIS Temporary Maritime Activities Area (TMAA). In general, the TMAA includes those areas previously identified in Chapter 3 (Affected Environment and Environmental Consequences) and is the same TMAA as described in the 2011 GOA Final EIS/OEIS and in the 2016 GOA Final SEIS/OEIS. The geographic boundaries for cumulative impacts analysis for marine mammals were expanded to include activities outside the GOA SEIS/OEIS TMAA that might impact migratory marine mammals. Primary considerations from outside the TMAA include impacts associated with maritime traffic (e.g., vessel strikes and underwater noise) and commercial fishing (e.g., bycatch and entanglement).

The time frame for cumulative impacts centers on the timing of the Proposed Action (see Chapter 2, Description of Proposed Action and Alternatives). The Proposed Action would occur over a maximum time period of up to 21 consecutive days during the months of April–October annually. While Navy training requirements change over time in response to global events, geopolitical events, or other factors, the general types of activities addressed by this SEIS/OEIS are expected to continue into the reasonably foreseeable future, along with the associated impacts. Likewise, some non-military activities addressed in this cumulative impacts analysis (e.g., oil and gas production, maritime traffic, commercial fishing) are expected to continue into the reasonably foreseeable future. Therefore, the cumulative impacts analysis is not bounded by a specific future timeframe. For past actions, the cumulative impacts analysis only considers those actions or activities that have ongoing impacts.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. In addition to identifying the geographic scope and time frame for the previously completed and currently ongoing actions, the analysis also includes the identification of “reasonably foreseeable” actions (i.e., anticipated future actions). For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for EISs and Environmental Assessments, management plans, land use plans, and other planning related studies. Finally, local websites for local news outlets were searched for articles pertaining to ongoing and future actions that would need to be included in this analysis.

4.3 Past, Present, and Reasonably Foreseeable Actions

This section focuses on past, present, and reasonably foreseeable future actions that occur within or potentially impact resources analyzed in the TMAA. Using the first fundamental question included in Section 4.1 (Definition of Cumulative Impacts), in determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding each past, present, or reasonably foreseeable action as to whether a relationship exists such that the affected resource areas of the Proposed Action (included in this SEIS/OEIS) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the action was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance these actions considered but excluded from further cumulative effects analysis are not catalogued here because the intent is to focus the analysis on the meaningful actions relevant to inform decision making (Council on Environmental Quality, 2005). Actions included in this cumulative impacts analysis were determined to affect resource areas that the Proposed Action would also cumulatively affect and are listed and briefly described in Table 4.3-1.

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Offshore Power Generation						
Marine Hydrokinetic Projects	Kvichak River, Alaska	The Federal Energy Regulatory Commission issues permits for marine and hydrokinetic projects. There is currently one licensed hydrokinetic project in Alaska on the Kvichak River. While this river is not a part of the GOA watershed, this project may have cumulative impacts on sediments and water quality, marine habitats, fishes, and socioeconomic resources and environmental justice (Federal Energy Regulatory Commission, 2019).		O	O	O
Yakutat Alaska Wave Energy Project	Yakutat, Alaska	This project has undergone a feasibility study and is currently being looked at by students at the University of Alaska Fairbanks. There are no confirmed plans to begin construction, but if feasible the city of Yakutat would like to proceed with this alternate power source (Grassi, 2019). This project could have cumulative effects on air quality, sediments and water quality, fishes, marine mammals, and socioeconomic resources and environmental justice.	If this project is implemented it would reduce the amount of diesel used by the city to generate electricity.		X	X

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> C=Construction O=Operation X=Other		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Hilcorp's Liberty Project - First Oil Production Facility in Federal Waters Offshore Alaska	Beaufort Sea	The Bureau of Ocean Management released an EIS in 2018 following the U.S. Secretary of the Interior's announcement that oil and gas production in federal waters offshore the state of Alaska would be granted. The EIS examined the potential environmental impacts of Hilcorp's proposal, and looked at a range of alternatives (U.S. Department of the Interior, 2018). The implementation of the proposed action in this EIS, including construction and operational procedures, could have cumulative effects on air quality, sediments and water quality, fishes, marine mammals, and socioeconomic resources and environmental justice.		X	X	C/O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Restoration, Research, and Conservation Projects and Programs						
Alaska Groundfish Harvest Specifications EIS	Bering Sea, Aleutian Islands, and Gulf of Alaska groundfish fisheries	This EIS provides information on the harvesting strategies of the groundfish fisheries in the GOA, which is a federally managed fishery (National Marine Fisheries Service, 2007). Operations carried out under this EIS could have cumulative effects on sediments and water quality, fishes, and socioeconomic resources and environmental justice.	This document defines where and how groundfish fisheries can be cultivated, thus reducing overfishing.	O	O	O
Alaska Groundfish Fisheries Programmatic SEIS	Bering Sea, Aleutian Islands, and Gulf of Alaska groundfish fisheries	This Programmatic SEIS assesses the past, present, and future environmental impacts of the Alaska groundfish fishery management practices (National Marine Fisheries Service, 2015). Operations carried out under this Programmatic SEIS could have cumulative effects on sediments and water quality, fishes, and socioeconomic resources and environmental justice.		O	O	O
Cook Inlet Beluga Whale Subsistence Harvest – Final SEIS	Cook Inlet, Alaska	This SEIS is intended to specify Beluga whale harvest limits “to recover the Cook Inlet beluga stock and to fulfill the Federal Government’s trust responsibility to recognize Alaska Native traditional cultural and nutritional needs for subsistence harvest” (National Marine Fisheries Service, 2015). Operations carried out under this SEIS could have cumulative effects on sediments and water quality, marine mammals, and socioeconomic resources and environmental justice.	This document defines the number of Belugas that may be harvested by local tribes, setting a limit that National Marine Fisheries Service (NMFS) determines will not pose a long-term threat to the species.	O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> C=Construction O=Operation X=Other		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Final EIS for Essential Fish Habitat Identification and Conservation in Alaska	Entire TMAA	This EIS provides information about describing and identifying Essential Fish Habitat (EFH) and habitats of Particular Concern in Alaska to aid in expanding necessary closures of EFH (National Marine Fisheries Service, 2005). Operations carried out under this EIS could have cumulative effects on sediments and water quality, fishes, and socioeconomic resources and environmental justice.	This document outlines procedures for identifying EFH, which can allow for further closures and protection of EFH from fishing.	O	O	O
Gulf Watch Alaska Monitoring Plan	Prince William Sound, lower Cook Inlet, outer Kenai Peninsula coast	This project is a long-term monitoring program looking at the effects of the Exxon Valdez oil spill and the GOA, which will help the Navy detect change in the TMAA on resources affected by the oil spill (Batchelder, 2019). This project could have cumulative effects on sediments and water quality, fishes, birds, marine mammals, and public health and safety.	Knowledge of long-term effects of the Exxon Valdez oil spill will aid the Navy and other entities operating in the GOA to reduce further impacts on environmental resources.	O	O	O
Alaska Aerospace Corporation Kodiak Launch Complex	Kodiak, Alaska	The Alaska Aerospace Corporation Kodiak Launch Complex is to be issued regulations from NMFS to take species of marine mammals that may be impacted by space vehicle and missile launch. The period of regulation from NMFS is 2017–2022 and will include issuance of Letters of Authorization (82 Federal Register 14996). This may have cumulative impacts on air quality, marine mammals, birds, and socioeconomic resources and environmental justice.	The NMFS permitting process will allow for a certain amount of incidental marine mammal takes and has the ability to stop further actions taken by the Alaska Aerospace Corporation Kodiak Launch Complex should the limit be reached.	O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> C=Construction O=Operation X=Other		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Bureau of Safety and Environmental Enforcement, Alaska Region promotion of safety, protection of the environment, and conservation of resources through vigorous regulatory oversight and enforcement	Arctic Ocean, Bering Sea, and the northern Pacific Ocean	The Bureau of Safety and Environmental Enforcement, Alaska Region, has regulatory oversight and enforcement responsibility for more than one billion acres on the Outer Continental Shelf and more than 6,000 miles of the Alaskan coastline. Currently there is an active lease in the Beaufort Sea. This may have cumulative effects on sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, marine mammals, and birds.		O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> <i>C=Construction</i> <i>O=Operation</i> <i>X=Other</i>		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Oceanographic Research	All of TMAA and open ocean areas	There are currently scientific research permits and General Authorizations for research issued by NMFS for cetacean work in the North Pacific. Scientific research permits allow for tagging, biopsy, vessel and aerial surveys, and photo-identification; General Authorizations allow commercial photography of non-listed marine mammals. As of November 2019, the Bureau of Ocean Energy Management has no active survey permits in the Alaskan region. Their last permit was completed on October 31, 2019 and was for a 3D Marine Seismic Survey (Bureau of Ocean Energy Management, 2013). This research could have cumulative impacts on sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, and marine mammals.	Given the analysis and scrutiny given to permit applications, it is assumed that any adverse effects are largely transitory. Data to assess population-level effects from research are not currently available, and it is uncertain that research effects could be separately identified from other adverse effects on populations in the TMAA.	O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Academic Research	All of the TMAA and open ocean areas	The University of Alaska Anchorage devotes sponsored programs and research to special concerns and opportunities associated with northern populations. Research areas include public decision making, ecosystem studies and conservation biology, earth and climate processes, human ecology and coupled human-environment interactions, health research, behavioral and physical health, biomedical programs, and rural health issues. The continuation of academic research in the Gulf of Alaska, open oceans, and on land could have cumulative effects on marine vegetation, marine invertebrates, fishes, marine mammals, and birds.	Given the analysis and scrutiny given to permit applications, it is assumed that any adverse effects are largely transitory. Data to assess population-level effects from research are not currently available, and it is uncertain that research effects could be separately identified from other adverse effects on populations in the TMAA.	O	O	O
Exon Valdez Oil Spill Trustee Council	Gulf of Alaska	The Trustee Council was formed to oversee restoration of the injured ecosystem through the use of the \$900 million civil settlement (Exxon Valdez Oil Spill Trustee Council, n.d.). Actions of the Exxon Valdez Oil Spill Trustee Council could have cumulative effects on sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, marine mammals, birds, and public health and safety.	In fiscal year (FY) 2019 alone there were 27 active monitoring, research, general restoration, and public information, science management, and administration projects dedicated to aiding in gathering information and remedying long-term effects of the Exxon Valdez oil spill (Exxon Valdez Oil Spill Trustee Council, 2019).	O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Alaska Marine Conservation Council	North East Pacific	This council has 8 active conservation projects dedicated to maintaining Alaska’s fisheries. The projects enacted by this council could have cumulative effects on sediments and water quality, fishes, and socioeconomic resources and environmental justice (Alaska Marine Council, n.d.).	The projects enacted by this council help to collect data, pass litigation, and promote healthy fishing practices in the Northeast Pacific.	O	O	O
Ocean Acidification Program (OAP) – Gulf of Alaska	Gulf of Alaska and Bering Sea	National Oceanic and Atmospheric Administration’s (NOAA’s) OAP projects in the GOA and Bering Sea focus on the effects of ocean acidification and its effects on marine life. There are currently 6 active projects (National Ocean and Atmospheric Administration, 2018). The active projects enacted by the OAP could have cumulative effects on sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, and marine mammals.		O	O	O
North Pacific Research Board	Gulf of Alaska	The North Pacific Research Board has four research and monitoring programs centered around producing peer-reviewed research on the Gulf of Alaska, Bering Sea/Aleutian Islands, and the Arctic Ocean ecosystems. The projects enacted by the North Pacific Research Board could have cumulative effects on sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, and marine mammals.	Research from the North Pacific Research Board has been used to help guide fishery management, ultimately aiding in sustaining fisheries.	O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Other Military Activities						
Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar Draft SEIS/OEIS	Western and Central North Pacific and Eastern Indian Oceans	The Navy released a Draft SEIS/OEIS for SURTASS LFA Sonar in 2018 to continue to train with low-frequency sonar with its four surveillance ships. The training occurs outside of the TMAA (U.S. Department of the Navy, 2018). This project could have cumulative effects on fishes and marine mammals.	Under the Navy’s preferred alternative, the number of hours the Navy could train SURTASS LFA would decrease from 1,020 to 496 hours per year. However, for the foreseeable future the Navy would increase training by approximately 100 hours every 5 years.	O	O	O
EIS for the Modernization and Enhancement of Ranges, Airspace, and Training Areas in the Joint Pacific Alaska Range Complex (JPARC) in Alaska	JPARC	This EIS proposed to modernize and enhance the JPARC to enable realistic joint training for the Army, Navy, Marine Corps, and Air Force. The proposed modernization could have cumulative effects on all resource categories.		O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> C=Construction O=Operation X=Other		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Naval Special Warfare Maritime Training Activities – 2014 Programmatic Environmental Assessment (EA)	Kodiak Island	A thorough description of Naval Special Warfare Maritime Training Activities can be found in the 2011 GOA Final EIS/OEIS. The 2014 Programmatic EA was finalized with a Finding of No Significant Impact (FONSI) in 2015 (U.S. Department of Homeland Security & United States Coast Guard, 2014). Based on the analysis in this document and the FONSI, it is unlikely any significant effects would arise from the actions of the Naval Special Warfare Maritime Training. However, the actions described in this programmatic EA could contribute to cumulative effects on public health and safety.		O	O	O
<i>United States Coast Guard</i>						
North Pacific Regional Fisheries Training Center	Kodiak, Alaska	The United States Coast Guard (USCG) training center located in Kodiak, Alaska, instructs 13 different courses to 750–1,000 students per year. Instruction includes fisheries-related topics, both international and domestic. This training center’s operation could have cumulative effects on fishes and socioeconomic resources and environmental justice.		O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Draft Programmatic EA Arctic Operations and Training Exercises Alaska	Above the Arctic Circle – Proposed Forward Operating Locations are Barrow, Nome, Kotzebue, and Port Clarence, Alaska	The Proposed Action is to conduct increased operations and training exercises in the Arctic to meet USCG mission responsibilities due to the increase of national and international activities in the area. This would provide a shore, air, and sea Coast Guard presence to meet the seasonal surge mission requirements, typically mid-March through mid-November. The Preferred Alternative consists of five main elements, including shore operations, air operations, sea operations, training operations, and building partnerships (U.S. Department of Homeland Security & United States Coast Guard, 2014). The actions taken by the USCG could have cumulative effects on public health and safety.		O	O	O
Environmental Regulations and Planning						
A Climate Science Regional Action Plan for the Gulf of Alaska	Gulf of Alaska	This NOAA Technical Memorandum aims to meet the demand for scientific information to prepare for and respond to climate impacts on the Nation’s living marine resources and resource-dependent communities (Dorn et al., 2018). The contents of this document could have cumulative effects on all environmental resources analyzed in this SEIS/SOEIS except for cultural resources.	This document addresses some of the biggest factors contributing to and dangers of climate change. The purpose of this document is to aid federal and non-federal entities to take actions to reduce their contribution to climate change.	X	X	X

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> C=Construction O=Operation X=Other		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
<i>Other Environmental Considerations</i>						
Commercial and Recreational Fishing	All of the TMAA and open ocean areas	Commercial and recreational fishing constitutes an important and widespread use of the ocean resources throughout the TMAA. Potential impacts of fishing include overfishing of targeted species, bycatch, entanglement, and habitat destruction, all of which negatively affect fish stocks and other marine resources. Fisheries bycatch has been identified as a primary driver of population declines in several marine species, including sharks, mammals, seabirds, and sea turtles (Simkins, 2019). The continuation of commercial and recreational fishing throughout the TMAA and open ocean could have cumulative effects on sediments and water quality, marine invertebrates, fishes, marine mammals, birds, and socioeconomic resources and environmental justice.		O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> C=Construction O=Operation X=Other		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Maritime Traffic	All of the TMAA and open ocean areas	In 2020, cruise ship passengers are expected to follow an upward trend of the past 5 years and grow by an additional 6% (The Associated Press, 2019). Ferries, passenger vessels with overnight accommodations, and cruise ships comprise 68% of the vessel activity, although cruise ships only operate during a 5-month period from May through September. Dry freight cargo barges, tank barges, and freight ships comprise the other 32% of the vessel activity (Alaska Department of Environmental Conservation, 2012). The Alaska Marine Highway is a ferry service operated by the State of Alaska, headquartered in Ketchikan, Alaska. Primary concerns for this cumulative impact analysis include vessel strikes on marine mammals, introduction of non-native species through hull fouling and ballast water, and underwater sound from ships and other vessels. The continued maritime traffic in and around the GOA could result in cumulative effects on air quality, sediments and water quality, fishes, marine mammals, and socioeconomic resources and environmental justice.		O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> C=Construction O=Operation X=Other		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Knik Arm Crossing	Cook Inlet Knik Army	This project is currently dormant, with many opposing it. The project was scheduled to originally begin in 2013 but was postponed indefinitely due to funding issues. If this project resumes it could have a cumulative effect on fishes, marine mammals, and public health and safety during construction, along with a cumulative effect on socioeconomic resources and environmental justice after its completion and during its operation (KnikBridgeFacts.org, 2019).				C/X
Port MacKenzie Development	Cook Inlet along the Knik Arm	According to the 2016 update of the 2011 Port MacKenzie Master Plan, the mission of the port’s owner, Matanuska-Susitna Borough, is to “develop a premier deep-water port capable of safely and efficiently transporting bulk commodities and project cargoes into and out of Southcentral Alaska” (Matanuska-Susitna Borough, 2016). This project could potentially have cumulative effects on sediments and water quality, fishes, marine mammals, socioeconomic resources and environmental justice, and public health and safety.		C/O	C/O	C/O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Port of Alaska (formerly the Port of Anchorage) Expansion	Port of Alaska	The Port of Alaska is currently looking to begin infrastructure improvements again after a failed first attempt ended in 2010. The project is estimated to cost \$2 Billion (Brehmer, 2019). This project could potentially have cumulative effects on sediments and water quality, fishes, marine mammals, socioeconomic resources and environmental justice, and public health and safety.				X
Shoreline Development	Northern coastline of Gulf of Alaska	Shoreline development adjacent to the TMAA is prompted for commercial, industrial, transportation and circulation, and residential purposes. The TMAA also includes coastal tourism development and the infrastructure supporting coastal development; however, the TMAA is greater than 12 nautical miles off the coast of Alaska. Shoreline development could have a cumulative impact on air quality, sediments and water quality, birds, socioeconomic resources and environmental justice, and public health and safety.		C/O	C/O	C/O
ShoreZone – NOAA’s 5-Year Plan for the Alaska Shore Zone Program	Beaufort Sea, Chukchi Sea	This document is used to guide ShoreZone’s strategic planning for FY 2017-2021 including, but not limited to, expansion of ShoreZone data (ShoreZone, 2019). The actions taken by ShoreZone could have cumulative effects on birds and socioeconomic resources and environmental justice.	Expansion of ShoreZone data will help aid federal and non-federal entities in reducing impacts on environmental resources from actions carried out in Alaska’s marine and nearshore environment.	O	O	O

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> C=Construction O=Operation X=Other		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Ocean Noise	All of TMAA and open ocean areas	Anthropogenic sources of noise that are most likely to contribute to increases in ocean noise are vessel noise from commercial shipping and general vessel traffic, oceanographic research, oil and gas exploration, underwater construction, and naval and other use of sound navigation and ranging (sonar). Appendix B (Acoustic and Explosive Concepts) provides additional information about sources of anthropogenic sound in the ocean and other background information about underwater noise. Ocean noise from non-Navy anthropogenic sources could have an effect on fishes, marine mammals, and birds.	Navy vessels during a Carrier Strike Group exercise are a small, infrequent, and short duration component of overall vessel noise in Gulf of Alaska. In addition, Navy combatant vessels have been designed to generate minimal noise and use ship quieting technology to elude detection by enemy passive acoustic devices (Mintz & Filadelfo, 2011; Southall et al., 2005).	X	X	X

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

<i>Project</i>	<i>Location</i>	<i>Project Description</i>	<i>Summary of Impact Minimization and Mitigation Measures</i>	<i>Project Timeframe</i> <i>C=Construction</i> <i>O=Operation</i> <i>X=Other</i>		
				<i>Past</i>	<i>Present</i>	<i>Future</i>
Ocean Pollution, Tsunami Debris, and Other Marine Debris in Alaska	All of the TMAA and open ocean areas	Ocean pollution has and will continue to have serious impacts on marine ecosystems. The government of Japan estimates that 5 million tons of debris was swept into the Pacific Ocean after the March 2011 earthquake and tsunami that struck Japan. Some of this debris has reached the Alaskan coast. Plastic marine debris is a major concern because it degrades slowly, is consumed by fish, and many plastics float, allowing the debris to be transported by currents throughout the oceans. Sunken debris contributes to marine habitat degradation and are also a concern for ingestion and entanglement. This issue could have cumulative effects on sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, marine mammals, birds, and public health and safety.	The National Oceanic and Atmospheric Administration works closely with state agencies and local authorities to systematically survey Alaska’s coast. NOAA models predict an increase in debris in the next several years; however, very little is anticipated to be hazardous.	X	X	X

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Non-Point Sources, Point Sources, and Atmospheric Deposition	All of the TMAA and open ocean areas	Storm water runoff, wastewater, and nonpoint source pollution, are considered major causes of impairment of ocean waters. Hypoxia (low dissolved oxygen concentration) occurs when waters become overloaded with nutrients. Too many nutrients can ultimately cause dissolved oxygen in the water to decline to the point where marine life that depends on oxygen can no longer survive (Boesch et al., 1997). According to <i>Our Nation's Air</i> , published by the U.S. Environmental Protection Agency (2019), criteria air pollutants (refer to Section 3.1, Air Quality, of the 2011 GOA Final EIS/OEIS for a list of criteria air pollutants) have been steadily decreasing since 1990. Non-Point Sources, Point Sources, and Atmospheric Deposition could have a cumulative effect on air quality, sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, marine mammals, birds, and public health and safety.	The trend in decreasing criteria pollutant emissions is predicted to continue with the help of the Environmental Protection Agency's regulations.	X	X	X

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Marine Tourism	All of the TMAA and open ocean areas	The coast and some major rivers are the center of Alaska’s tourism. The Alaska Railroad Corporation, fish and game licenses/tags, and commercial passenger vessels (cruise ships) made up the 3 largest sources of state revenue in Alaska, according to the Alaska Department of Commerce (Alaska Department of Commerce, 2018). From 2008 to 2017 there was an increase of 20%, 32%, and 32% to the amount of jobs, labor income, and economic output of Alaska’s visitor industry, respectively (Alaska Department of Commerce, 2018). Marine tourism is essential to Alaska’s growing economy and could have cumulative effects on sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, marine mammals, birds, cultural resources, and socioeconomic resources and environmental justice.		O/X	O/X	O/X
Port on Nome Modification	Bering Sea	In May 2019 a Draft Integrated Feasibility Report and EA and Draft FONSI was released that presented several alternatives to facilitate the modification of the Port of Nome to better handle commerce, national security, and recreational usage (U.S. Army Corps of Engineers, 2019). Modification of the Port of Nome could have cumulative impacts on air quality, sediments and water quality, fishes, marine mammals, socioeconomic resources and environmental justice, and public health and safety.		X	X	C

Table 4.3-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Project	Location	Project Description	Summary of Impact Minimization and Mitigation Measures	Project Timeframe C=Construction O=Operation X=Other		
				Past	Present	Future
Alaska Deep-Draft Arctic Port System Study	Bering Sea and Gulf of Alaska	This project looks at optimizing several ports in Northern Alaska to prepare for more resource extraction and shipping in the Arctic as the open sea season expands. As of 2015 there has been a Draft Integrated Feasibility Report, Draft EA, and Draft FONSI released by the U.S. Army Corps of Engineers, with a final soon to be released (Battelle, 2015). If this project moves forward it could have a cumulative effect on air quality, sediments and water quality, fishes, marine mammals, socioeconomic resources and environmental justice, and public health and safety.		X	X	C/X
The Pebble Project	Iliamna, Iliamna Lake, and Cook Inlet	The U.S. Army Corps of Engineers released a Draft EIS in 2019 regarding Pebble Limited Partnership's proposal to develop the Pebble copper-gold-molybdenum porphyry deposit (Pebble Deposit) as an open-pit mine, with associated infrastructure, in southwest Alaska. The proposed action would include ferrying resources extracted from the mine through Iliamna lake and the Cook Inlet (The Pebble Partnership, 2018). This project could have cumulative effects on air quality, sediments and water quality, and socioeconomic resources and environmental justice.		X	X	C/O

Notes: EIS = Environmental Impact Statement, OEIS = Overseas Environmental Impact Statement, SEIS = Supplemental Environmental Impact Statement, GOA = Gulf of Alaska, U.S. = United States, Navy = U.S. Department of the Navy, TMAA = Temporary Maritime Activities Area.

4.4 Resource-Specific Cumulative Impacts

In accordance with CEQ Guidance (Council on Environmental Quality, 1997), the following cumulative impacts analysis focuses on impacts that are “truly meaningful.” The level of analysis for each resource is commensurate with the intensity of the impacts identified in Chapter 3 (Affected Environment and Environmental Consequences) and the level to which impacts from the Proposed Action are expected to mingle with similar impacts from existing activities. A full analysis of potential cumulative impacts is provided for marine mammals. Rationale is also provided for an abbreviated analysis of the following resources: fishes, sea turtles, birds, and socioeconomic resources and environmental justice.

For air quality, sediments and water quality, marine habitats, marine vegetation, marine invertebrates, cultural resources, and public health and safety, the Navy determined that changes to the project and new research, literature, laws, and regulatory guidance addressed in this SEIS/OEIS resulted in little or no change to the findings of the impact analyses in the 2016 GOA Final SEIS/OEIS. There have been changes in some platforms and systems used as part of the proposed activities, but those changes would not affect the conclusions reached in the 2016 GOA Final SEIS/OEIS. Because the existing baseline conditions have not changed appreciably, and no new Navy training activities are proposed in the TMAA in this SEIS/OEIS, the cumulative impact assessments from the 2016 GOA Final SEIS/OEIS in Chapter 4 (Cumulative Impacts) remain valid and are not described further in this SEIS/OEIS.

4.4.1 Fishes

The analysis presented in Section 3.6 (Fish) of the 2011 GOA Final EIS/OEIS and the 2016 GOA Final SEIS/OEIS detailed the potential for impacts on fish from the various stressors related to Navy training activities. As discussed in Section 3.6 (Fishes) of this SEIS/OEIS, there have been no substantial changes to the activities analyzed in the previous 2011 GOA Final EIS/OEIS or 2016 GOA Final SEIS/OEIS that would change the conclusions reached regarding ESA-listed fish species, groundfish species, or Essential Fish Habitat in the TMAA. Analysis of cumulative impacts on fishes was specifically addressed in the 2011 GOA Final SEIS/OEIS (Section 4.2.6) with additional information provided in the 2016 GOA Final SEIS/OEIS (Chapter 4). However, new information since the 2016 GOA Final SEIS/OEIS suggests that additional ESA-listed salmonids and green sturgeon may occur in the TMAA. As such, it is important to re-evaluate cumulative effects to fishes and their habitat that may occur in relation to the Proposed Action.

Marine fishes and their habitat in the TMAA will continue to be threatened by commercial fishing, pollution, shipping, underwater noise, oil and gas development, disease, and climate change (Bureau of Ocean Energy Management, 2017; Melnychuk et al., 2013; Wisniewska et al., 2018). Many of these issues currently present threats but are expected to increase in the future (U.S. Fish and Wildlife Service, 2016). Further, as scientists increasingly link the ingestion of plastic chemicals with harmful health impacts, plastic debris potentially threatens ESA-listed fish which make up a portion of the commercial fisheries (Senate Hearing 114-390, 2016; Wilson, 2019). While it is not proven whether long-term climate change is driving the emergence of the Blob and other forms of climate variability in the GOA (such as El Niño and warm Pacific Decadal Oscillation phases), there is concern that eventually the long-term prevailing conditions will come to approximate effects on fisheries productivity (Johnson, 2016).

Many of the cumulative stressors identified in Section 4.4.9 (Birds) for birds also apply to fish. The aggregate impacts of past, present, and reasonably foreseeable future actions, including those summarized in Table 4.3-1, may have a significant effect on fish. The Proposed Action could also result in injury, mortality, or behavioral impacts to some individual fish from explosive ordnances. However, the

percentage of any ESA-listed Evolutionarily Significant Unit or Distinct Population Segment that is expected to be injured or killed from these activities is expected to be very low and similar to that described in the 2017 National Marine Fisheries Service (NMFS) Biological Opinion. Injury and mortality that might occur under the Proposed Action would be additive to injury and mortality associated with other actions. However, there is no evidence indicating that the combined noise of other anthropogenic noise-generating activities would result in harmful additive impacts on fish. Further, there are no data indicating that a fish affected by ocean pollution would be more susceptible to stressors associated with the Proposed Action.

In summary, based upon the analysis in Section 3.6 (Fishes), and the reasons summarized above, the incremental contribution of the Proposed Action to cumulative impacts on fish populations and their habitat would be low. Therefore, further analysis of cumulative impacts on fish is not warranted. Continued fisheries harvest management and habitat protection are crucial to ensure that fish resources are effectively managed in the GOA and TMAA.

4.4.2 Sea Turtles

No new Navy training activities are being proposed in this SEIS/OEIS. The Navy Acoustic Effects Model was used to quantitatively estimate potential impacts on leatherback sea turtles in the TMAA. No impacts on leatherback sea turtles were predicted. No other sea turtle species are expected to occur in the TMAA. Furthermore, conclusions for impacts on sea turtles, made for the alternatives analyzed in the 2011 GOA Final EIS/OEIS and 2016 GOA Final SEIS/OEIS, remain unchanged in this SEIS/OEIS. Other projects proposed to occur within or near the TMAA may add to stressors on sea turtles in the TMAA; however, the Proposed Action would not contribute significantly to the cumulative impacts on sea turtles in the TMAA, as discussed in Section 3.7 (Sea Turtles). Therefore, as stated in the 2016 GOA Final SEIS/OEIS, detailed analysis of cumulative impacts on sea turtles is not necessary as the incremental contribution of the Proposed Action to cumulative impacts would be low and was assessed in the 2011 GOA Final EIS/OEIS.

4.4.3 Marine Mammals

The analysis presented in the 2016 GOA Final SEIS/OEIS detailed the potential for impacts on marine mammals from the various stressors related to Navy training and testing activities, and an updated analysis has been completed in this current SEIS/OEIS. As discussed in Section 3.8.3 (Environmental Consequences), in general there have been no substantial changes to the activities analyzed in the 2016 GOA Final SEIS/OEIS that would change the overall conclusions reached regarding populations of marine mammals in the TMAA. The current analysis has incorporated all applicable new marine mammal science, thresholds and criteria, and methods of determining potential effects that have emerged since 2016. Analysis of cumulative impacts on marine mammals was specifically addressed in the 2016 GOA Final SEIS/OEIS Section 4.4.3.4 (Cumulative Impacts on Marine Mammals) and is also presented in the current SEIS/OEIS in Section 3.8.4 (Summary of Stressor Assessment [Combined Impacts of All Stressors] on Marine Mammals) with reference to new emergent applicable science available since the 2016 GOA Final SEIS/OEIS.

In association with the 2016 GOA Final EIS/OEIS, NMFS determined that within the TMAA, only acoustic stressors and explosive stressors could potentially result in harassment or the incidental taking of marine mammals from Navy training and testing activities (National Marine Fisheries Service, 2017b) and that none of the other stressors would result in significant adverse impacts or jeopardize the continued existence of any ESA-listed marine mammals (National Marine Fisheries Service, 2017a). In

addition, NMFS determined that the vast majority of impacts expected from sonar exposure and underwater detonations are behavioral in nature, temporary and comparatively short in duration, relatively infrequent, and specifically not of the type or severity that would be expected to be additive for the small portion of the stocks and species likely to be exposed, and therefore would not contribute to cumulative impacts.

The National Marine Fisheries Service specifically incorporated the impacts from other past and ongoing anthropogenic activities (see Section 3.8.2.1.5, General Threats) into their negligible impact analyses pursuant to the Marine Mammal Protection Act (MMPA) and ESA (National Marine Fisheries Service, 2017b). The NMFS Biological Opinion included an explanation of how the results of NMFS' baseline and effects analyses in Biological Opinions relate to those contained in the cumulative impact section of the 2016 GOA Final SEIS/OEIS (National Marine Fisheries Service, 2017a). The National Marine Fisheries Service found that Navy training and testing activities are not likely to jeopardize the continued existence of threatened or endangered species in the TMAA during any single year or as a result of the cumulative impacts of the five-year authorization under the MMPA (ending in 2022). There has been no emergent science that would necessitate changes to conclusions reached by Navy or NMFS (as a cooperating agency) in association with the 2016 GOA Final SEIS/OEIS with regard to marine mammals. It has long been understood that the cumulative effects of stressors on marine organisms in general and marine mammal populations in particular is extremely difficult to predict (National Academies of Sciences Engineering and Medicine, 2017). Recognizing the difficulties with measuring trends in marine mammal populations, the focus has been on indicators for adverse impacts, including health and other population metrics (Bradford et al., 2014; Murray et al., 2020; National Academies of Sciences Engineering and Medicine, 2017; Ward et al., 2009). This recommended use of population indicators is the approach Navy has presented in the previous environmental analyses of Navy training and testing activities; see in particular the 2016 GOA Final SEIS/OEIS Section 3.8.4 (Summary of Monitoring and Observations During Navy Activities), and the update to that information in this SEIS/OEIS (Section 3.8.6.1, Summary of Science in the Temporary Maritime Activities Area by the Navy Related to Potential Effects on Marine Mammals Since 2006). Since the 2016 analyses, neither the present nor the reasonably foreseeable actions change the previous assessment that the Navy's contribution to any cumulative impacts on marine mammal populations would be negligible.

Based on the analysis presented in Section 3.8 (Marine Mammals) of this SEIS/OEIS, the findings from NMFS regarding cumulative impacts on marine mammals in the TMAA (National Marine Fisheries Service, 2017a, 2017b), and the reasons summarized above relating to the 2016 GOA Final SEIS/OEIS, the incremental contribution of the Proposed Action to cumulative impacts would be negligible. Therefore, further analysis of cumulative impacts on marine mammals is not warranted.

4.4.4 Birds

The analysis presented in Section 3.9 (Birds) of both the 2011 GOA Final EIS/OEIS and the 2016 GOA Final SEIS/OEIS detailed the potential for impacts on birds from the various stressors related to Navy training and testing activities. As discussed in Section 3.9 (Birds) of this SEIS/OEIS, there have been no changes to the activities analyzed in the 2011 GOA Final EIS/OEIS nor the 2016 GOA Final SEIS/OEIS that would change the conclusions reached regarding populations of birds in the TMAA. Analysis of cumulative impacts on birds was specifically addressed in the 2011 GOA Final EIS/OEIS Section 4.2.9 (Seabirds).

Marine birds in the TMAA are threatened by continued overfishing, pollution, shipping, and oil and gas development (Bureau of Ocean Energy Management, 2017; Melnychuk et al., 2013; Wisniewska et al., 2018). Many of these actions are currently present but are expected to increase in the future (U.S. Fish and Wildlife Service, 2016). Approximately 90 percent of the world's fisheries are already overfished threatening the ocean life and habitat. The shipping industry is expected to increase as global trade grows, particularly trans-Pacific and trans-Arctic container ship trade. Increasing the size of ships carrying containers and cargo goods increase oil spills, dumping of trash, ballast water, and oily waste. Therefore, the aggregate impacts of past, present, and reasonably foreseeable future actions may have a significant effect on birds. The Proposed Action could also result in injury and mortality to individual birds from underwater explosions, sonar, and strikes. Injury and mortality that might occur under the Proposed Action would be additive to injury and mortality associated with other actions. Section 3.9 (Birds) also analyzed potential cumulative impacts on the short-tailed albatross (*Phoebastria albatrus*), an ESA-listed species known to occur within the TMAA during the same general timeframe when military activities would be scheduled within the TMAA.

It is likely that distant shipping and aircraft noise (which is more pervasive and continuous) and sound associated with underwater explosions and sonar would overlap in time and space. However, there is no evidence indicating that the combined noise of shipping activities and aircraft noise, and sounds associated with underwater explosions and sonar use, would result in harmful additive impacts on birds.

The potential also exists for the impacts of ocean pollution and acoustic stressors associated with the Proposed Action to be additive or synergistic. It is possible that the response of a previously stressed animal would be more severe than the response of an unstressed animal. However, there are no data indicating that a seabird affected by ocean pollution would be more susceptible to stressors associated with the Proposed Action.

In summary, based upon the analysis in Section 3.9 (Birds), and the reasons summarized above, the incremental contribution of the Proposed Action to cumulative impacts on bird populations would be low. Therefore, further analysis of cumulative impacts on birds is not warranted.

4.4.5 Socioeconomic Resources and Environmental Justice

As stated in the 2011 GOA Final EIS/OEIS and the 2016 GOA Final SEIS/OEIS, the Proposed Action could contribute to impacts on accessibility to nearshore areas popular for commercial and recreational fishing and some tourism activities that access the marine environment. However, limits on accessibility to these areas are not expected to significantly impact these resources, because restrictions would be temporary and of short duration (hours). To ensure public safety, access to waters within exclusion areas would be limited during military training activities. The same limitations on accessing portions of the TMAA designated as restricted areas, and warning areas as described in the 2011 GOA Final EIS/OEIS. In addition, the U.S. Coast Guard (USCG) has published a final rule establishing protection zones extending 500 yards around all Navy vessels in navigable waters of the United States and within the boundaries of Coast Guard Pacific Area (32 CFR Part 761). All vessels must proceed at a no-wake speed when within a protection zone. Non-military vessels are not permitted to enter within 100 yards of a U.S. naval vessel, whether underway or moored, unless authorized by an official patrol.

When training activities are scheduled that require specific areas to be free of non-participating vessels and aircraft, the military requests that the USCG issues a Notice to Mariners and that the Federal Aviation Administration issues a Notice to Airmen, as applicable for the activity. These measures are intended to alert the public of pending training activities and to ensure the safety of the public and

military personnel. Providing advance notice of scheduled activities should allow members of the public to avoid unexpected delays or interruptions to their planned activities due to restrictions on accessing areas used for military activities.

The Port of Alaska (formerly the Port of Anchorage) was the nation's 38th-highest ranked port (out of 63) by value of international trade (imports + exports) in 2017. The volume of international trade at the Port of Alaska peaked in 2011 at just over 430 thousand metric tons, declining to just over 11 thousand metric tons in 2014. While recent trends show a decline that peaked in 2014, the volume of goods since has been increasing steadily (U.S. Maritime Administration, 2019).

Overall, harvest and catch from the commercial fisheries off Alaska have been consistent except for some minor exceptions. These trends suggest that the volume and value of fisheries off of Alaska will likely remain consistent in coming years (Fissel et al., 2019).

Waterways in the TMAA are heavily traveled by commercial, recreational, and other vessels, including military and USCG vessels. Several commercial ports are located in or near the TMAA, including the ports of Alaska and Kodiak. Commercial vessel traffic has the potential to limit access by the public to waterways, which would also include access by tourism related activities and businesses (e.g., whale watching vessels).

Several commercial airways cross over the Gulf of Alaska, mainly connecting Ted Stevens Anchorage International Airport to other airports in the continental United States. There are also numerous smaller commercial and general aviation airports along Alaska's southern coast. Airborne noise generated by commercial and private aircraft using airways traversing the Pacific Northwest and Southern Alaskan Coast may disturb, or otherwise impact the enjoyment of, tourist activities in the Gulf of Alaska.

Cumulative impacts from intermittent and short-term impacts on accessibility to areas within the TMAA, physical disturbances and interactions, airborne acoustics that disturb people on the ground, and secondary impacts (e.g., to tourism) resulting from effects on marine species populations are not anticipated. No cumulative impacts on commercial transportation and shipping are anticipated, because major shipping routes and airways are well defined, and training activities would avoid those areas. The Navy would continue to reduce or avoid impacts on commercial and recreational fishing and tourism and recreation by continuing to notify the public of upcoming activities that may limit accessibility to certain areas of the TMAA popular to participants in these activities. Broader socioeconomic metrics generally indicate that the state of Alaska's maritime economy has been on a downward trend since 2012. For example, data reported by the National Ocean Economics Program show that the Gross Domestic Product for the state of Alaska's ocean related activities and industries has decreased by over half since 2012 (National Ocean Economics Program, 2019). Short duration limits on accessibility, potentially impacting recreational and tourism related activities, are expected to be intermittent and have no long-term, cumulative impacts. Airborne acoustics from aircraft overflights in the GOA, potentially impacting recreational and tourism activities in the GOA and regions surrounding it, are expected to be brief (seconds) and discrete and are not expected to have long-term negative impacts on the enjoyment of the region.

In addition to this, no new Navy training activities are being proposed in this SEIS/OEIS. The analysis presented in Section 3.13 (Environmental Justice and Protection of Children) of the 2011 GOA Final EIS/OEIS, 2016 GOA Final SEIS/OEIS, and in Section 3.11 (Socioeconomic Resources and Environmental Justice) of this SEIS/OEIS demonstrates that the Proposed Action would not contribute incrementally to impacts on environmental justice. Under this SEIS/OEIS, the Proposed Action is not expected to

contribute significantly to disproportionate impacts on environmental justice populations or children. Other projects proposed to occur within or near the TMAA may add to cumulative impacts on environmental justice in the TMAA; however, the Proposed Action would not contribute significantly to the cumulative impacts on environmental justice in the TMAA. Therefore, further analysis of cumulative impacts on environmental justice is not warranted.

4.5 Summary of Cumulative Impacts

The analyses presented in this chapter and Chapter 3 (Affected Environment and Environmental Consequences) indicate that the incremental contribution of the Proposed Action to cumulative impacts on fishes, sea turtles, birds, and socioeconomic resources and environmental justice would not rise to a level of significance. Marine mammals are the primary resources of concern for this cumulative impacts analysis for the following reasons:

- Past human activities have impacted these resources to the extent that several marine mammal species occurring in the TMAA are ESA-listed.
- These resources would be impacted by multiple ongoing and future actions.
- Acoustic and explosive stressors under the Proposed Action could result in injuries or disturbance to marine mammals.

In summary, based on the analysis presented in Section 3.8 (Marine Mammals), the current aggregate impacts of past, present, and other reasonably foreseeable future actions are not significantly different than the assessment in the 2011 GOA Final EIS/OEIS and the 2016 GOA Final SEIS/OEIS. No new information or circumstances are significant enough to warrant further cumulative impact review.

REFERENCES

- Alaska Department of Commerce. (2018). *Economic Impact of Alaska's Visitor Industry for FY 2016–2017*. Anchorage, AK: State of Alaska, Alaska Department of Commerce, Community, and Economic Development.
- Alaska Department of Environmental Conservation. (2012). *Southeast Alaska Vessel Traffic Study*. Seldovia, AK: Nuka Research & Planning Group.
- Alaska Marine Council. (n.d.). *Fisheries Council*. Retrieved from <https://www.akmarine.org/fisheries-conservation/>.
- Batchelder, H. (2019). *Providing sound scientific data about environmental changes related to the Exxon Valdez oil spill*. Retrieved from <https://gulfwatchalaska.org/>.
- Battelle. (2015). *Final Independent External Peer Review Report Draft Integrated Feasibility Report, Draft Environmental Assessment, and Draft Finding of No Significant Impact Alaska Deep-Draft Arctic Port System Study*. Columbus, OH: Department of the Army, U.S. Army Corps of Engineers, Deep Draft Navigation Planning Center of Expertise, Mobile District
- Boesch, D. F., D. M. Anderson, R. A. Horner, S. E. Shumway, P. A. Tester, and T. E. Whitledge. (1997). *Harmful Algal Blooms in Coastal Waters: Options for Prevention, Control and Mitigation* (Special Joint Report with the National Fish and Wildlife Foundation). National Oceanic and Atmospheric Administration.
- Bradford, M. J., R. G. Randall, K. S. Smokorowski, B. E. Keatley, and K. D. Clarke. (2014). *A framework for assessing fisheries productivity for the Fisheries Protection Program*. Ottawa, Canada: Canadian Science Advisory Secretariat.
- Brehmer, E. (2019). *Assembly begins critical look at Anchorage port plan*. Retrieved from <https://www.alaskajournal.com/2019-02-27/assembly-begins-critical-look-anchorage-port-plan>.
- Bureau of Ocean Energy Management. (2013). *Alaska G&G Permits*. Retrieved from <https://www.boem.gov/about-boem/alaska-gg-permits>.
- Bureau of Ocean Energy Management. (2017). *Record of Decision and Approval of the 2017–2022 Outer Continental Shelf Oil and Gas Leasing Program*. Washington, DC: U.S. Department of the Interior.
- Council on Environmental Quality. (1997). *Considering Cumulative Effects Under the National Environmental Policy Act*. Washington, DC: The Council on Environmental Quality.
- Council on Environmental Quality. (2005). *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*. Washington, DC: Executive Office of the President.
- Dorn, M. W., C. J. Cunningham, M. T. Dalton, B. S. Fadely, B. L. Gerke, A. B. Hollowed, K. K. Holsman, J. H. Moss, O. A. Ormseth, W. A. Palsson, P. A. Ressler, L. A. Rogers, M. A. Sigler, P. J. Stabeno, and M. Szymkowiak. (2018). *A climate science regional action plan for the Gulf of Alaska* (NOAA Technical Memorandum NMFS-AFSC-376). Washington, DC: U.S. Department of Commerce.
- Exxon Valdez Oil Spill Trustee Council. (2019). *Search Results - Restoration Projects*. Retrieved from <http://www.evostc.state.ak.us/index.cfm?FA=searchResults.year>.
- Exxon Valdez Oil Spill Trustee Council. (n.d.). *About Us*. Retrieved from www.evostc.state.ak.us/index.cfm?FA=aboutUs.home.

- Federal Energy Regulatory Commission. (2019). *Licensed Marine and Hydrokinetic Projects*. Retrieved from <https://www.ferc.gov/industries/hydropower/gen-info/licensing/hydrokinetics.asp>.
- Fissel, B., M. Dalton, B. Garber-Yonts, A. Haynie, S. Kasperski, J. Lee, D. Lew, A. Lavoie, C. Seung, K. Sparks, M. Szymkowiak, and S. Wise. (2019). *Stock Assessment and Fishery Evaluation Report for the Groundfish Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Islands Area: Economic Status of the Groundfish Fisheries Off Alaska, 2017*. Seattle, WA: Economic and Social Sciences Research Program, Resource Ecology and Fisheries Management Division, Alaska Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration.
- Grassi, B. (2019). *Pondering the power of the ocean*. Retrieved from <https://news.uaf.edu/pondering-the-power-of-the-ocean/>.
- Johnson, T. (2016). *Climate Change and Alaska Fisheries*. Fairbanks, AK: Sea Grant Alaska.
- KnikBridgeFacts.org. (2019). *Dunleavy Administration Spending Money on Ineligible Project to Attempt to Revive Bridge*. Retrieved from <https://knikbridgefacts.org/>.
- Matanuska-Susitna Borough. (2016). *Port MacKenzie Master Plan 2016 Update*. Port MacKenzie, AK: Matanuska-Susitna Borough.
- Melnychuk, M. C., J. A. Banobi, and R. Hilborn. (2013). Effects of management tactics on meeting conservation objectives for Western North American groundfish fisheries. *PLoS ONE*, 8(2), e56684.
- Mintz, J. D., and R. J. Filadelfo. (2011). *Exposure of Marine Mammals to Broadband Radiated Noise (Specific Authority N0001-4-05-D-0500)*. Washington, DC: Center for Naval Analyses.
- Murray, C., L. Hannah, and A. Locke. (2020). *A Review of Cumulative Effects Research and Assessment in Fisheries and Oceans Canada*. Sidney, Canada: Canadian Technical Report of Fisheries and Aquatic Sciences.
- National Academies of Sciences Engineering and Medicine. (2017). *Approaches to Understanding the Cumulative Effects of Stressors on Marine Mammals*. Washington, DC: The National Academies Press.
- National Marine Fisheries Service. (2005). *Record of Decision - Final EIS for Essential Fish Habitat Identification and Conservation in Alaska*. Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Region.
- National Marine Fisheries Service. (2007). *Alaska Groundfish Harvest Specifications Final Environmental Impact Statement*. Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Region.
- National Marine Fisheries Service. (2015). *Alaska Groundfish Fisheries Programmatic Supplemental Environmental Impact Statement*. Juneau, AK: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Region.
- National Marine Fisheries Service. (2017a). *Biological Opinion on Navy Gulf of Alaska Activities and NMFS' MMPA Incidental Take Authorization*. Silver Spring, MD: National Oceanic and Atmospheric Administration.
- National Marine Fisheries Service. (2017b). *Gulf of Alaska Letter of Authorization*. Silver Spring, MD: Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

- National Ocean and Atmospheric Administration. (2018). *OAP Projects in the Gulf of Alaska*. Retrieved from <https://oceanacidification.noaa.gov/CurrentProjects/GulfofAlaska/TabId/2907/PgrID/14222/PagelID/1/Default.aspx>.
- National Ocean Economics Program. (2019). *Ocean Economy Search Results*. Retrieved from <https://www.oceaneconomics.org/Market/ocean/oceanEconResults.asp?IC=N&dataSource=E&selState=2&selYears=All&selSector=8&selIndust=All&selValue=All&selOut=display&noePID=unknown>.
- ShoreZone. (2019). *ShoreZone - About Us*. Retrieved from <http://www.shorezone.org/about-us>.
- Simkins, J. D. (2019). *Navy quietly ends climate change task force, reversing Obama initiative*. Retrieved from <https://www.navytimes.com/off-duty/military-culture/2019/08/26/navy-quietly-ends-climate-change-task-force-reversing-obama-initiative/>.
- Southall, B., R. J. Schusterman, D. Kastak, and C. Reichmuth Kastak. (2005). Reliability of underwater hearing thresholds in pinnipeds. *Acoustics Research Letters Online*, 6(4), 7.
- The Associated Press. (2019). *Number of Alaska cruise-ship passengers expected to rise again in 2020*. Retrieved from <https://www.seattletimes.com/seattle-news/northwest/group-predicts-jump-in-alaska-cruise-ship-passengers-in-2020/>.
- The Pebble Partnership. (2018). *The Pebble Project*. Anchorage, AK: The Pebble Partnership Limited.
- U.S. Army Corps of Engineers. (2019). *Port of Nome Modification Feasibility Study*. Elmendorf AFB, AK: US Army Corps of Engineers Alaska District.
- U.S. Department of Homeland Security, and United States Coast Guard. (2014). *Draft Programmatic Environmental Assessment Arctic Operations and Training Exercises Alaska*. Washington, DC: U.S. Department of Homeland Security.
- U.S. Department of the Interior. (2018). *Interior Approves Long-Awaited First Oil Production Facility in Federal Waters Offshore Alaska*. Retrieved from <https://www.doi.gov/pressreleases/interior-approves-long-awaited-first-oil-production-facility-federal-waters-offshore>.
- U.S. Department of the Navy. (2011). *Gulf of Alaska Final Environmental Impact Statement/Overseas Environmental Impact Statement*. Silverdale, WA: Naval Facilities Engineering Command, Northwest.
- U.S. Department of the Navy. (2016). *Gulf of Alaska Navy Training Activities Final Supplemental Environmental Impact Statement/Overseas Environmental Impact Statement Final Version*. Silverdale, WA: U.S. Pacific Fleet.
- U.S. Department of the Navy. (2018). *Draft SEIS/SOEIS for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar*. Washington, DC: U.S. Department of the Navy.
- U.S. Department of the Navy. (2019). *OPNAV-M 5090.1E, Environmental Readiness Program Manual*. Washington, DC: Secretary of the Navy.
- U.S. Environmental Protection Agency. (2019). *Our Nation's Air, Status and Trends Through 2018*. Washington, DC: U.S. Environmental Protection Agency.
- U.S. Fish and Wildlife Service. (2016). *Biological Opinion on the U.S. Navy's Proposed Northwest Training and Testing Program that Occurs in the Offshore Waters of Northern California, Oregon, and*

Washington, the Inland Waters of Puget Sound, and Portions of the Olympic Peninsula.
Washington, DC: U.S. Department of the Interior.

U.S. Maritime Administration. (2019). *U.S. Waterborne Foreign Container Trade by U.S. Customs Ports 2000 – 2017*. Retrieved from <https://www.maritime.dot.gov/data-reports/data-statistics/us-waterborne-foreign-container-trade-us-customs-ports-2000-%E2%80%93-2017>.

Ward, E. J., E. E. Holmes, and K. C. Balcomb. (2009). Quantifying the effects of prey abundance on killer whale reproduction. *Journal of Applied Ecology*, 46, 632–640.

Wilson, C. (2019). *An ocean of plastic changes everything — even what we eat*. Retrieved from <https://www.timescolonist.com/news/local/an-ocean-of-plastic-changes-everything-even-what-we-eat-1.23666068>.

Wisniewska, D. M., M. Johnson, J. Teilmann, U. Siebert, A. Galatius, R. Dietz, and P. T. Madsen. (2018). High rates of vessel noise disrupt foraging in wild harbour porpoises (*Phocoena phocoena*). *Proceedings of the Royal Society B: Biological Sciences*, 285(1872), 10.