4 Cumulative Impacts

Gulf of Alaska Navy Training Activities

Final Supplemental Environmental Impact Statement/

Overseas Environmental Impact Statement

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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, 2019b). This analysis incorporates by reference the 2011 GOA Final EIS/OEIS (U.S. Department of the Navy, 2011) and the 2016 GOA Final SEIS/OEIS (U.S. Department of the Navy, 2016), and 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 Study Area. In general, the GOA Study Area includes those areas previously identified in Chapter 3 (Affected Environment and Environmental Consequences). The geographic boundaries for cumulative impacts analysis for marine mammals were expanded to include activities outside the GOA Study Area that might impact migratory marine mammals. Primary considerations from outside the GOA Study Area 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 GOA Study Area. 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 4-1.

Table 4-1: 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, 2021).		O	O	O
Cook Inlet Planning Area, Oil and Gas Lease Sale 244	Cook Inlet, Alaska	The Bureau of Ocean Energy Management released a Final EIS in 2016 for the lease sale of 244 outer continental shelf blocks. Following the Final EIS, in 2017 there were bids over $3 million for the blocks; the Cook Inlet lease blocks sale occurred in 2017 (Bureau of Ocean Energy Management, 2017a). The production of oil and gas in the Cook Inlet could have cumulative effects on marine mammals, fishes, sea turtles, and socioeconomic resources and environmental justice.		C	O	O

Table 4-1: 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*
Yakutat Alaska Wave Energy Project	Yakutat, Alaska	This project is underway and is monitored by the University of Alaska Fairbanks, Bureau of Ocean Energy Management (BOEM), and other regulating entities for both environmental impacts and the potential to further spread wave and tidal energy to remote communities in Alaska (Bureau of Ocean Energy Management, 2021b). This project could have cumulative effects on air quality, sediments and water quality, fishes, marine mammals, and socioeconomic resources and environmental justice.	Upon completion, this project would reduce the amount of diesel used by the city to generate electricity.		C	O

Table 4-1: 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 GOA 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). In addition to this EIS, the National Marine Fisheries Service (NMFS) also releases annual Alaska groundfish harvest specifications for more relevant catch limits (National Marine Fisheries Service, 2021). Operations carried out under this EIS and subsequent annual specifications 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 GOA 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

Table 4-1: 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*
Cook Inlet Beluga Whale Subsistence Harvest Final EIS	Cook Inlet, Alaska	A 2015 SEIS was published with the intention to specify Beluga whale subsistent 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, 2008). However, because the population of the Cook Inlet Beluga Whale has continued to decline and remained below the 350 individuals threshold—even with harvest control—subsistence harvesting has not been allowed (Marine Mammal Commission, 2021). Operations carried out under this SEIS could have cumulative effects on sediments and water quality, marine mammals, and socioeconomic resources and environmental justice.	The 2015 SEIS defines the number of Belugas that may be harvested by local tribes, setting a limit that NMFS determines will not pose a long-term threat to the species. Furthermore, no subsistent harvests are allowed until the Cook Inlet Beluga Whale population has passed the 350 individuals threshold.	O	O	O
Final EIS for Essential Fish Habitat Identification and Conservation in Alaska	GOA Study Area	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

Table 4-1: 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*
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 changes in the GOA Study Area on resources affected by the oil spill (Matkin et al., 2018). 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 effects on air quality, marine mammals, birds, and socioeconomic resources and environmental justice.	The NMFS take authorization 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 4-1: 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*
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 (BSEE), Alaska Region, has regulatory oversite 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 are multiple active leases in Alaskan waters permitted by the BSEE (Bureau of Safety and Environmental Enforcement, 2022). Activities carried out under the leases permitted by the BSEE could have cumulative effects on sediments and water quality, marine habitats, marine vegetation, marine invertebrates, fishes, marine mammals, and birds.		O	O	O

Table 4-1: 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*
Oceanographic Research	GOA Study Area, and open ocean areas	There are currently scientific research permits and General Authorizations for research issued by various agencies for work in the northern Pacific. For example, the Navy funds the University of Alaska Fairbanks to conduct Chinook salmon studies, while the BOEM funds the University of Alaska Fairbanks to conduct steelhead research. In addition, NMFS has issued permits for cetacean work in the North Pacific, as well as research studies on salmonids. As of May 2022, BOEM has no active survey permits in the Alaskan region. Currently, there is one pending permit with BOEM for 3D Marine Geohazard which would be permitted to Hilcorp Alaska LLC. However, no dates are projected for when the permit would begin if approved (Bureau of Ocean Energy Management, 2021a).This research could have cumulative effects 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 GOA Study Area.	O	O	O

Table 4-1: 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	GOA Study Area, 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 GOA, 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 GOA Study Area.	O	O	O

Table 4-1: 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*
Exxon Valdez Oil Spill Trustee Council	GOA	The Exxon Valdez Oil Spill 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, 2019a). 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, 2019b).	O	O	O
Alaska Marine Conservation Council	Northeast Pacific	This council has several 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, 2020).	The projects enacted by this council help to collect data, pass litigation, and promote healthy fishing practices in the Northeast Pacific.	O	O	O

Table 4-1: 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*
Ocean Acidification Program (OAP) – GOA	GOA 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 Oceanic and Atmospheric Administration, 2021). 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	GOA	The North Pacific Research Board has three main hypotheses guiding research and monitoring programs for their GOA Project, centered around producing peer-reviewed research. 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 4-1: 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						
Joint Pacific Alaska Range Complex Final EIS/OEIS	Military Land Ranges, Maritime Training Areas, and Airspace Based in Alaska	This FEIS/OEIS was led by the U.S. Departments of the Army and Air Force to modernize and enhance JPARC in Alaska and to best support the military exercises in and near Alaska. JPARC provides a realistic training environment and allows the Services to train for full spectrum engagements, ranging from individual skills to complex, large-scale joint engagements. Training exercises under the JPARC EIS/OEIS overlap with the Northern Edge training described in Chapter 2 (Description of the Proposed Action) and the JPARC FEIS/OEIS (U.S. Department of Army & Air Force, 2013). The activities carried out under this Final EIS/OEIS, including construction and training, could have cumulative effects on all resource categories analyzed in this document.		C/O	O	O
Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar Final SEIS/OEIS	Western and Central North Pacific and Eastern Indian Oceans	The Navy released a Record of Decision regarding the Final SEIS/OEIS for SURTASS LFA Sonar in 2019 to continue to train with low-frequency sonar with its surveillance ships. (U.S. Department of the Navy, 2019a)The training occurs outside of GOA Study Area (84 FR 40397). 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

Table 4-1: 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*
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
United States Coast Guard						
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 4-1: 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 construction and pile driving in the Gulf of Alaska coastal waters	Kodiak, Sitka, Ketchikan, Valdez, Cordova, Juneau, Petersburg, and Seward, Alaska	Project activities include rock socket drilling, vibratory hammering, pile cutting or clipping, power washing, and pile driving using an impact driver. The USCG-proposed activities may result in the incidental taking of marine mammals, specifically sea otters.	USCG has proposed six mitigation measures to reduce sea otter disturbance from acoustic stimuli to ensure that the USCG's activities will have the least practicable adverse impact on the species, their habitat, and the availability of this species for subsistence uses; and requirements for monitoring and reporting.			C

Table 4-1: 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 GOA	GOA	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 4-1: 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 Environmental Considerations						
Commercial and Recreational Fishing	GOA Study Area, and open ocean areas	Commercial and recreational fishing constitutes an important and widespread use of the ocean resources throughout the GOA Study Area. 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 GOA Study Area 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
Maritime Traffic	GOA Study Area, and open ocean areas	In previous years, cruises and other marine tourism constituted a significant portion of Alaska's maritime traffic. Since the beginning of the coronavirus pandemic (COVID-19), the CDC has restricted all non-essential maritime traffic in the GOA. As such, the cruise industry in Alaska has seen a stark reduction and the volume of maritime traffic from tourism in the GOA has decreased in 2020 and 2021 (State of Alaska, 2021). However, in May of 2021 Congress passed H.R. 1318, the Alaska Tourism Recovery Act, that would		O	O	O

Table 4-1: 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*
		allow for cruises to continue between Alaska and the lower 48 beginning July of 2021. (State of Alaska, 2021)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. This ferry service was closed temporarily following the beginning of the coronavirus pandemic (COVID-19) and has since reopened under restrictions set by the Center for Disease Control (Alaska Marine Highway System, 2021). This temporary closure and restricted operations resulted in overall lower maritime traffic. 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.				

Table 4-1: 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*
Knik Arm Crossing	Cook Inlet Knik Arm	The Knik Arm Crossing is a proposed project that would include construction of a 2-mile toll bridge servicing the Municipality of Anchorage and the Matanuska-Susitna Borough (State of Alaska Department of Natural Resources, n.d.). 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. In April of 2022, the Alaska Department of Transportation & Public Facilities announced that it was continuing to pursue the project and should have the right-of-way complete sometime within the year. In their announcement, they addressed the project's history, the new landscape in the wake of the pandemic, and their desire to continue pursuing this project (Alaska Department of Transportation & Public Facilities, 2022).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.				C/X

Table 4-1: 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 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). Construction related to this project could potentially have cumulative effects on sediments and water quality, fishes, marine mammals, socioeconomic resources and environmental justice, and safety.			C	C
Hilcorp Alaska and Harvest Alaska Oil and Gas Activities	Cook Inlet	Hilcorp Alaska and Harvest Alaska have requested a Letter of Authorization for unintentional take of marine mammals from NMFS in 2021 to facilitate the beginning of oil and gas activities in the Cook Inlet(Hilcorp Alaska LLC & Harvest Alaska LLC, 2021). Oil and gas activities include exploration, development, and production activities. If granted, the authorization would expire in June of 2024 (Hilcorp Alaska LLC & Harvest Alaska LLC, 2021). Activities described above could have cumulative effects on marine mammals, fishes, and socioeconomic resources and environmental justice.			C/O	C/O

Table 4-1: 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 Expansion	Port of Alaska	The Port of Alaska is aiming to complete its new petroleum and cement terminal by fall of 2021 (Brehmer, 2020); however, at the time this document was prepared in June 2022 there is still no confirmation that this project is complete. 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	C/O
Shoreline Development	Northern coastline of GOA	Shoreline development adjacent to the TMAA portion of the Study Area 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 entire GOA Study Area 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

Table 4-1: 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*
Ocean Noise	GOA Study Area, 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 may have a cumulative impact 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 GOA. 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 4-1: 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*
Ocean Pollution, Tsunami Debris, and Other Marine Debris in Alaska	GOA Study Area, 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 4-1: 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	GOA Study Area, 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 *Our Nation's Air*, 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 4-1: 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	GOA Study Area, 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). The State of Alaska has released a report stating the impacts of the 2020 and 2021 cruise ship season cancelation due to the coronavirus pandemic (COVID-19) (State of Alaska, 2021). The economic effects of the pandemic are not isolated to the cruise industry alone and will have effects on all tourism-related industries in Alaska. The Alaska Tourism Recovery Act S.593 was approved in May 2021 and will facilitate the return of the cruise industry beginning July 2021. Marine tourism is essential to Alaska's growing economy, and even with a temporary reduction due to the coronavirus pandemic (COVID-19) it still 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

Table 4-1: 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 Nome Modification	Bering Sea	In March 2020 a Final Integrated Feasibility Report and EA, and 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, 2020). Modification and an increased threshold of operational activities 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/O
Alaska Deep-Draft Arctic Port System Study	Bering Sea and GOA	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). This project has been temporarily suspended for several years but has not been officially canceled (U.S. Army Corps of Engineers, 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.				C

Table 4-1: 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*
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). At the time this document is being prepared in June of 2022, the EPA has just proposed to block this project by prohibiting the mines use of certain water ways under the Clean Water Act Section 404(c) (U.S. Environmental Protection Agency, 2022). If this proposition is approved, this project would likely be rejected from moving forward. However, if this project is not blocked, this project could have cumulative effects on air quality, sediments and water quality, and socioeconomic resources and environmental justice.		X	X	C/O

Table 4-1: 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*
Oil Spills	GOA Study Area, and open ocean areas	Oil and other hydrocarbon spills are a specific type of ocean contamination that can have damaging effects on some marine mammal species (Marine Mammal Commission, 2011), sea turtles, birds, and fishes. Marine mammals, sea turtles, and fishes can be affected directly by contact or ingestion of oil, indirectly by activities during the containment and cleanup phases, and through long-term impacts on prey and habitat. The Exxon Valdez oil spill is an example of a historic oil spill near the GOA Study Area that may have direct and indirect long-term effects and cumulative population-level impacts if it affects the development or mortality rate of several life stages of marine life. Spills can also occur at the site of the well if drilling procedures are not maintained or executed properly. Past and potential future oil spills from sources such as oil rigs, oil wells, and oil tankers could have cumulative effects on fishes, sea turtles, marine mammals, and birds.		X	X	X
The Effects of Climate Change on the Marine Environment	GOA Study Area, and open ocean areas	While the exact effects of climate change over time are unknown, there are several effects on marine environments that have been documented due to anthropogenic emissions and steady global temperature rise. The global mean sea level has risen by 0.19 m over the period from 1901 to 2010, based on tide gauge records and (more recently) satellite data with an accelerated nature in more recent		X	X	X

Table 4-1: 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*
		decades (Rhein et al., 2013). Oceanic heatwaves in the GOA were studied by Suryan et al. (2021) who found varied but largely negative effects on all trophic levels of marine species including planktonic, forage fish, bird, and mammal species during and post-heatwaves. Additional potential consequences of climate change on biological resources in the GOA include changes to primary productivity and prey base; invasive species; and harmful algal blooms (Johnson, 2016). Climate change has the potential to impact species abundance, geographic distribution (both laterally and vertically), migration patterns, timing of seasonal activities (Intergovernmental Panel on Climate Change, 2014), and species viability into the future. Increased ocean acidification and storm severity are also attributed to climate change—both phenomena could have direct and indirect effects on marine life in and around the GOA Study Area. Overall, climate change could have meaningful impacts on all resources analyzed in this SEIS/OEIS.				

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, WMA = Western Maneuver Area; FR = Federal Register, CDC = Center for Disease Control, BOEM = Bureau of Ocean Energy Management, JPARC = Joint Pacific Alaska Range Complex.

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 GOA Study Area 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, the addition of the WMA would not result in 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 Endangered Species Act (ESA)-listed fish species, groundfish species, or Essential Fish Habitat in the GOA Study Area. However, the addition of the Continental Shelf and Slope Mitigation Area would reduce Navy training-related stressors on some ESA-listed fish species and habitats designated as EFH. 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 GOA Study Area. 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 GOA Study Area 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, 2017b; 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 federally and state managed sport and commercial fish, non-managed fish, and 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 (refer to Section 3.6.2.1.4 [General Threats] 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 affect Alaskan fisheries productivity (Johnson, 2016).

Many of the cumulative stressors identified in Section 4.4.9 (Birds) for birds also apply to fishes. The aggregate impacts of past, present, and reasonably foreseeable future actions, including those summarized in Table 4-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis, 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 (National Marine Fisheries Service, 2017a). 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 (as discussed in Table 4-1) 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 Study Area.

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 GOA Study Area. No impacts on leatherback sea turtles were predicted. No other sea turtle species are expected to occur in the GOA Study Area. 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 GOA Study Area may add to stressors on sea turtles in the GOA Study Area; however, the Proposed Action would not contribute significantly to the cumulative impacts on sea turtles in the GOA Study Area, 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 2011 GOA Final EIS/OEIS and summarized in the 2016 GOA Final SEIS/OEIS described the potential for impacts on marine mammals from the various stressors related to Navy training activities. The analysis has been updated in Section 3.8 (Marine Mammals) of this SEIS/OEIS. As discussed in Section 3.8.3 (Environmental Consequences), there are no substantial changes to the activities analyzed in the 2016 GOA Final SEIS/OEIS that would change the overall conclusions that populations of marine mammals would not be significantly impacted by training activities in the TMAA. The addition of the WMA to the GOA Study Area is a change to the affected environment, but the mainly vessel and aircraft maneuvering activities proposed for the WMA would not significantly impact marine mammals or marine mammal populations based on the analysis of similar activities conducted in the TMAA. No activities using sonar and other transducers or explosives would be conducted in the WMA. The activities that would be conducted in the WMA are the same activities that would have been conducted in the TMAA and were analyzed for potential impacts in the 2011 GOA Final EIS/OEIS and

summarized in the 2016 GOA Final SEIS/OEIS and in this SEIS/OEIS. The consistent conclusion of the analyses in all three documents is that vessel and aircraft maneuvering activities and the infrequent use of non-explosives munitions in the GOA Study Area would have no significant impacts on marine mammals or marine mammal populations.

The current analysis has incorporated new, applicable marine mammal research, the Navy's most recent (at time of the analysis) thresholds and criteria, and updated 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 this 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 activities (National Marine Fisheries Service, 2017c) and that none of the other stressors analyzed in the 2011 GOA Final EIS/OEIS would result in significant adverse impacts or jeopardize the continued existence of any ESA-listed marine mammals (National Marine Fisheries Service, 2017b). 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.

NMFS specifically incorporated the impacts from other past and ongoing anthropogenic activities identified by Navy (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, 2017c). The 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, 2017b). NMFS concluded that Navy training 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 since the 2016 GOA Final SEIS/OEIS that would necessitate changes to the conclusions reached by Navy and NMFS (as a cooperating agency) that significant impacts on marine mammals are not anticipated as a result of training activities in the GOA Study Area.

It has long been understood that the cumulative effects of stressors on marine organisms in general and marine mammal populations in particular are extremely difficult to predict (National Academies of Sciences Engineering and Medicine, 2017). Scientists and resource managers recognize that predicting trends in marine mammal populations is challenging and depends on coordinated, long-term efforts to measure abundance and track fluctuating distributions. Therefore, the focus of assessing populations has often been on indicators of adverse impacts, including health and other population-related 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 activities; see in particular Section 3.8.4 (Summary of Monitoring and Observations During Navy Activities) in the 2016 GOA Final SEIS/OEIS and updated information in Section 3.8.6.1 (Summary of Science in the Temporary Maritime Activities

Area by the Navy Related to Potential Effects on Marine Mammals) in this SEIS/OEIS. Since the 2016 analyses, neither the present nor the reasonably foreseeable actions change the assessment that the Navy's contribution to any cumulative impacts on marine mammal populations would be negligible.

The U.S. Fish and Wildlife Service has jurisdiction over the northern sea otter. The current training activities and reasonably foreseeable activities in the GOA Study Area have the potential to result in impacts on sea otters; however, the potential for impacts is limited by the lack of overlap between sea otter habitat and the GOA Study Area. Sea otters prefer shallow coastal waters with depths less than 40 m or within 400 m from shore. Sea otters are primarily benthic foragers, and a depth of 100 m represents the upper limit of their foraging depth range (Bodkin, 2015; Bodkin et al., 2004; Coletti et al., 2011; Thometz et al., 2014; Tinker et al., 2019). The majority of the TMAA and all of the WMA is located in deep offshore waters beyond the continental slope where depths exceed 4,000 m. The Navy's proposed activities, specifically those conducted over the continental shelf, have the potential to contribute to cumulative behavioral impacts on sea otters, but the relative contribution of these impacts would be negligible considering the unlikely occurrence of sea otters in the GOA Study Area and the short duration (a maximum of 21 days) over which Navy training activities would occur. Furthermore, the Navy's proposed Continental Shelf and Slope Mitigation Area excludes the use of explosives below 10,000 feet altitude (including at the water surface) over the continental shelf and slope. While no impacts on sea otters from the use of explosives in the TMAA were predicted by the Navy's acoustic effects model, eliminating the future use of explosives in the mitigation area would add additional protection for sea otters in the portion of the GOA Study Area where they are most likely to occur, if only on rare occasion.

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, 2017b, 2017c), and the reasons summarized above from previous analyses in the 2011 GOA Final EIS/OEIS and 2016 GOA Final SEIS/OEIS, the incremental contribution of the Proposed Action to cumulative impacts on marine mammals would be negligible.

Furthermore, under Alternative 1, the Navy will implement the Continental Shelf and Slope Mitigation Area prohibiting the use of explosives below 10,000 feet altitude (including at the water surface) over the continental shelf and slope in the TMAA. Explosives are not used in the WMA, and the WMA does not overlap with the continental shelf and slope. The mitigation area is designed to help avoid or reduce impacts during biologically important life processes, such as foraging and migration, used by several marine mammals species. The benefits of the mitigation area are discussed qualitatively in terms of the context of impact avoidance or reduction in Section 3.8 (Marine Mammals) and described in more detail in Chapter 5 (Mitigation). Therefore, a more in-depth 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 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 or the wider GOA Study Area. 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 GOA Study Area are threatened by continued overfishing, pollution, shipping, and oil and gas development (Bureau of Ocean Energy Management, 2017b; 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. Commercial ships may also attract pelagic birds with artificial lighting, which may increase the potential for vessel strikes of birds, especially at night. Therefore, the aggregate impacts of past, present, and reasonably foreseeable future actions may have a significant effect on birds. Section 3.9 (Birds) includes descriptions of anthropogenic and natural threats to seabirds that may occur within the GOA Study Area.

It is likely that distant shipping and aircraft noise (which is more pervasive and continuous) and sound associated with in-air 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 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. Furthermore, under Alternative 1, the Navy will implement the Continental Shelf and Slope Mitigation Area prohibiting the use of explosives below 10,000 feet altitude (including at the water surface) over the continental shelf and slope in the TMAA. Explosives are not used in the WMA, and the WMA does not overlap with the continental shelf and slope. The mitigation area is designed to help avoid or reduce impacts during biologically important life processes, such as foraging and migration, used by several marine mammals species. The benefits of the mitigation area are discussed qualitatively in terms of the context of impact avoidance or reduction in Section 3.8 (Marine Mammals) and described in more detail in Chapter 5 (Mitigation). Therefore, a more in-depth analysis of cumulative impacts on birds within the GOA Study Area is not warranted.

4.4.5 Socioeconomic Resources and Environmental Justice

As stated in the 2011 GOA Final EIS/OEIS and summarized in the 2016 GOA Final SEIS/OEIS, the Proposed Action has the potential to limit accessibility to areas where commercial and recreational fishing and some tourism activities take place. Within the GOA Study Area, these would primarily be shallower areas over the continental shelf and slope within the TMAA. Parts of the GOA Study Area that are farther offshore, including the entire WMA and the remaining portion of the TMAA, are not expected to be used by fishers or for tourism activities as frequently due to their distance from shore and water depths exceeding 4,000 meters. Limiting accessibility to the shelf and slope areas in the TMAA to facilitate Navy training activities are not expected to significantly impact fishing and tourism activities, because restrictions would be temporary and of short duration (hours), and Navy activities would take place over a maximum of 21 days.

To ensure and maintain public safety, access to waters within exclusion areas would be limited during military training activities. The limitations on accessing portions of the GOA Study Area designated as restricted areas and warning areas would be the same 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 Code of Federal Regulations 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.

In 2020, there were 5,139 commercial ship transits (both inbound and outbound) from the ports and harbors of Valdez, Anchorage, Homer, Seward, Kodiak, and Cordova (U.S. Army Corps of Engineers, 2022). This is a significant reduction in vessel traffic from 2017 when 7,934 vessel transits were recorded at these same ports. (U.S. Army Corps of Engineers, 2018). The reduction in vessel transits is attributable to the impact of the worldwide economic shutdowns due to the coronavirus pandemic and major restrictions on international shipping. The city of Unalaska, which includes Dutch Harbor, is located inshore of the western boundary of the WMA. In addition to other commodities, the port processed over 800,000 short tons of fish and shellfish in 2020 and reported 907 vessel transits (inbound and outbound) (U.S. Army Corps of Engineers, 2022). The total for all commodities passing through the port was 1,241 short tons, down from 1,437 in 2019 and a recent peak of 1,817 short tons in 2017 (U.S. Army Corps of Engineers, 2022). Increases in international shipping in 2021 and 2022 are anticipated as the pandemic is brought under control and the world recovers from the economic disruptions.

With few exceptions, harvest and catch from the commercial fisheries off Alaska have remained relatively consistent and the GOA supports one of the most sustainable fisheries in the world (National Marine Fisheries Service, 2020). These trends suggest that the volume and value of fisheries off of Alaska will likely remain consistent in coming years (Fissel et al., 2019). The addition of the Continental Shelf and Slope Mitigation Area within the TMAA portion of the GOA Study Area will further reduce potential impacts to commercial and recreational fishing by prohibiting the use of explosives below 10,000 feet altitude (including at the water surface) over the continental shelf and slope in the TMAA. Explosives are not used in the WMA, and the WMA does not overlap with the continental shelf and slope.

Waterways traversing and adjacent to the GOA Study Area are heavily traveled by commercial, recreational, and other vessels, including military and USCG vessels, with the majority of vessel traffic occurring shoreward of the Study Area. Several important commercial ports are located inshore of the GOA Study Area, such as Dutch Harbor, and Kodiak, and vessels from these ports may need to enter or cross the Study Area to deliver goods. Commercial vessel traffic also has the potential to limit access by the public to waterways used for the transport of goods and products, which would limit access by recreational boaters and tourism related businesses (e.g., whale watching vessels) to those waterways.

Several commercial airways cross over the GOA, mainly connecting Ted Stevens Anchorage International Airport in Anchorage, Alaska to other airports in the continental United States. There are also numerous smaller commercial and general aviation airports along Alaska's southern coast that service coastal communities and communities located farther inland. Airborne noise generated by commercial and private aircraft traversing the Southern Alaskan Coast and accessing these airports may disturb, or otherwise impact the enjoyment of, tourist activities in the GOA.

Cumulative impacts due to intermittent and short-term limits on accessibility to areas within the GOA Study Area, physical disturbances and interactions, airborne acoustics that disturb people on the ground or on the water, and secondary impacts (e.g., to tourism) resulting from effects on marine species populations as a result of the Proposed Action are not anticipated to be significant. No cumulative impacts on commercial transportation and shipping are anticipated because major shipping routes and airways are well-defined, and Navy training activities would largely avoid those areas to avoid disruptions to commerce and Navy training activities. The Navy would continue to reduce or avoid impacts on commercial and recreational fishing and tourism-related activities by continuing to notify the public of upcoming activities that may limit accessibility to certain areas of the GOA Study Area. The USCG would continue to issue Notices to Mariners and the FAA would continue to issue Notices to Airmen in advance of planned Navy training 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 short term and intermittent and have no long-term, cumulative impacts. Airborne acoustics from aircraft activities in the GOA Study Area would mainly occur far offshore and at high altitudes but could potentially disturb participants in recreational and tourism activities in the GOA. Disturbances, if they were to occur, would be brief (seconds) and discrete and are not expected to have long-term negative impacts on the enjoyment of the region or the Alaska maritime economy. Therefore, further analysis of cumulative impacts on socioeconomic resources is not warranted.

The analyses 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 demonstrate that the Proposed Action would not contribute significantly to impacts on environmental justice. As shown in the previous analyses and in Section 3.11 (Socioeconomic Resources and Environmental Justice), in general, due to the distance from any population centers regardless of social or economic status, the Proposed Action is not expected to disproportionately impact low income and minority populations or children. Other projects proposed to occur within or near the GOA Study Area may add to cumulative impacts on environmental justice in the GOA Study Area; however, the Proposed Action would not contribute significantly to the cumulative impacts on environmental justice in the GOA Study Area. 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 GOA Study Area 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 harassment 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 a further review of cumulative impacts.

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