Draft

Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement Atlantic Fleet Training and Testing

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4 CUMULATIVE IMPACTS

4.1 PRINCIPLES OF CUMULATIVE IMPACTS ANALYSIS

The approach taken herein to analyze cumulative effects meets the objectives of the National Environmental Policy Act (NEPA) of 1969, Council on Environmental Quality (CEQ) regulations, and CEQ guidance. CEQ regulations (40 Code of Federal Regulations [CFR] sections 1500-1508) provide the implementing procedures for NEPA. The regulations define "cumulative effects" as:

> *Effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from actions with individually minor but collectively significant effects taking place over a period of time* (40 CFR 1508.1(i)(3)).

CEQ guidance further identifies cumulative effects as those environmental effects resulting from spatial (geographic) and temporal (time) crowding of environmental perturbations. The CEQ provides detailed guidance and direction on cumulative impacts analysis in Considering Cumulative Effects Under the National Environmental Policy Act (Council on Environmental Quality, 1997).

4.1.1 DETERMINATION OF SIGNIFICANCE

The CEQ defines "effects or impacts" for the purposes of environmental impact analysis at 40 CFR section 1508.1(i) as "changes to the human environment resulting from the Proposed Action or alternatives that are reasonably foreseeable." "Effects or impacts" include direct effects, indirect effects, and cumulative effects. For a Proposed Action to have a cumulatively significant impact on an environmental resource the combined effects of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the effects of the Proposed Action, must be significant.

4.1.2 IDENTIFYING THE REGION OF INFLUENCE OR GEOGRAPHICAL BOUNDARIES FOR CUMULATIVE IMPACTS ANALYSIS

The region of influence or geographic boundaries for analyses of cumulative impacts can vary for different resources and environmental media. CEQ guidance (Council on Environmental Quality, 1997) indicates that geographic boundaries for cumulative impacts almost always should be expanded beyond those for the project-specific analyses. One method of evaluating geographic boundaries that is proposed by the CEQ guidance is to consider the distance an effect can travel and to identify potential cumulative assessment boundaries accordingly.

A region of influence for evaluating the cumulative impacts of the Proposed Action is defined for each resource in Section 4.4 (Resource-Specific Cumulative Impacts) of the 2018 *Final Atlantic Fleet Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement* (hereinafter referred to as the 2018 Final EIS/OEIS). Changes to the region of influence and analysis methods for air quality impacts are discussed in Section 3.1 (Air Quality). The basic region of influence or geographic boundary for the majority of resources analyzed for cumulative impacts in this Supplemental Environmental Impact Statement (EIS)/Overseas EIS (OEIS) is the entire Study Area (Figure 2.1-1, Atlantic Fleet Training and Testing Study Area), although the geographic boundaries for cumulative impacts analysis for some resources are expanded to include activities outside the Study Area that might impact migratory or wide-ranging animals. Other activities potentially originating from outside the Study Area

that are considered in this analysis include impacts associated with maritime traffic (e.g., vessel strikes and underwater noise) and commercial fishing (e.g., bycatch and entanglement).

4.2 Projects and Other Activities Analyzed for Cumulative Impacts

Cumulative impacts analysis includes consideration of past, present, and reasonably foreseeable future actions. For past actions, the cumulative impacts analysis only considers those actions or activities that have had ongoing impacts that may be additive to impacts of the Proposed Action. Likewise, present and reasonably foreseeable future actions selected for inclusion in the analysis are those that may have effects additive to the effects of the Proposed Action as experienced by specific environmental receptors.

The cumulative impacts analysis makes use of the best available data, quantifying impacts where possible and relying on qualitative description and best professional judgement where detailed measurement is unavailable. Because specific information and data on past projects and actions are typically scarce, the analysis of past effects is often qualitative (Council on Environmental Quality, 1997). Likewise, analysis for ongoing actions is often inconsistent or unavailable. All likely future development or use of the region is considered to the greatest extent possible, even when a foreseeable future action is not planned in sufficient detail to permit complete analysis (Council on Environmental Quality, 1997).

This cumulative impacts analysis is not bounded by a specific future timeframe (e.g., seven years). The Proposed Action includes general types of activities addressed by this Supplemental EIS/OEIS that are expected to continue indefinitely, and the associated impacts could occur indefinitely. Likewise, some reasonably foreseeable future actions and other environmental considerations addressed in the cumulative impacts analysis are expected to continue indefinitely (e.g., oil and gas production, maritime traffic, commercial fishing). While the Proposed Action training and testing requirements change over time in response to world events, it should be recognized that available information, uncertainties, and other practical constraints limit the ability to analyze cumulative impacts for the indefinite future. Environmental planning and compliance for military readiness activities is an ongoing process, and the Action Proponents anticipate preparing new or supplemental environmental planning documents covering changes in military readiness activities in the Study Area as necessary. These future environmental planning documents would include cumulative impacts analysis based on information available at that time.

Table 4.2-1 and Table 4.2-2 describe other actions that have had, continue to have, or would be expected to have some impact upon resources also impacted by the Proposed Action within the Study Area and surrounding areas. These activities are selected based on information obtained during the scoping process (refer to Appendix M, Public Involvement and Distribution), communications with other agencies, a review of other military activities, literature review, previous NEPA analyses, and other available information. Table 4.2-1 focuses on identifying past and reasonably foreseeable future actions (military mission, testing, and training; offshore energy development; ocean-dependent commercial industries; and research). Table 4.2-2 focuses on other major environmental stressors or trends that tend to be widespread and arise from routine human activities and multiple past, present, and future actions. Detailed activity descriptions and summaries of mitigation and minimization measures are provided in Appendix J (Cumulative Impacts Supporting Information). For perspective of general project locations, please refer to Figure 2.1-1 (Atlantic Fleet Training and Testing Study Area) through Figure 2.1-6 (Atlantic Fleet Training and Testing Study Area – Coastal Zones and Designated Ship Shock Trial and Sinking Exercise Area) in Chapter 2 (Description of Proposed Action and Alternatives), which depict the Study Area, boundaries of individual training and testing locations and open-ocean areas within and adjacent to the Study Area.

4.2.1 Past, Present, and Reasonably Foreseeable Future Actions

This section focuses on past, present, and reasonably foreseeable future actions that occur within or potentially impact resources analyzed in the Study Area.

Table 4.2-1 describes past and reasonably foreseeable future actions (military mission, testing, and training; offshore energy development; ocean-dependent commercial industries; and research) and provides a geographic and time overlap for each activity.

Table 4.2-1: Past, Present, and Reasonably Foreseeable Future Actions

Action	*Geographic Overlap*	*Time Overlap*	*Description*
Military Mission, Training, and Testing Activities			
Atlantic Fleet Training and Testing	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	Prior to this Supplemental EIS/OEIS, the 2018 *Final Atlantic Fleet Training and Testing Environmental Impact Statement/Overseas Environmental Impact Statement* (hereinafter referred to as the 2018 Final EIS/OEIS) provided the most recent comprehensive analysis of the full geographic scope of areas where Action Proponent military readiness activities have historically occurred as well as those projected into the reasonably foreseeable future (U.S. Department of the Navy, 2018). The Navy uses these analyses to support incidental take authorizations under the MMPA. In August 2018, the MMPA was amended to allow for 7-year authorizations for military readiness activities, increasing the previous authorization timeframe from 5 years. As such, the National Oceanic Atmospheric Administration Fisheries extended the MMPA incidental take permit for AFTT from November 2023 to November 2025 (National Marine Fisheries Service, 2018).
Eglin Gulf Test and Training Range	Gulf of Mexico	Past Present Future	The Air Force has consulted NMFS regarding effects to marine mammals and sea turtles through a Letter of Authorization that provides authorization for takes of marine mammals by Level A and Level B harassment for the period 2023 to 2030.
Undersea Warfare Training Range	Southeast	Past Present Future	Use of the range for anti-submarine warfare military readiness activities.
Joint Logistics Over-the-Shore Training	Mid-Atlantic	Past Present Future	May be conducted jointly by the Navy, Marine Corps, and Army and consists of loading/unloading of cargo and personnel onto ships without fixed port facilities.
Joint Base Langley-Eustis	Mid-Atlantic	Past Present Future	The Army conducts approximately 10 surface-to-surface gunnery training events per year in the Virginia Capes RC.

Table 4.2-1: Past, Present, and Reasonably Foreseeable Actions (continued)

Action	*Geographic Overlap*	*Time Overlap*	*Description*
United States Coast Guard	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	The U.S. Coast Guard performs maritime humanitarian, law enforcement, and safety services in estuarine, coastal, and offshore waters.
National Aeronautics and Space Administration	Southeast	Past Present Future	NMFS concluded that Wallops operations are infrequent enough to not warrant the need for an Incidental Take Statement for marine mammals or sea turtles from over-ocean rocket operations (National Aeronautics and Space Administration, 2018).
U.S. Outer Continental Shelf Energy Development			
Oil and Gas Leases	Southeast Gulf of Mexico	Past Present Future	As of August 1, 2023, there were 2,193 active oil and gas leases over 11,748,568 acres in the Gulf of Mexico Outer Continental Shelf Region (Western Area-Texas: 387 leases over 2,124,673 acres; Central Area-Alabama, Louisiana: 1,793 leases over 9,549,015 acres; and Eastern Area-Florida: 13 leases over 74,880 acres) (Bureau of Ocean Energy Management, 2023b).
Floating Systems	Gulf of Mexico	Past Present Future	At this time, two systems occur in the Walker Ridge area of the Gulf of Mexico: (1) Petrobras America, Inc., located 165 miles from Louisiana in approximately 2,500 meters of water (Bureau of Ocean Energy Management & Regulation and Enforcement, 2011) and (2) Royal Dutch Shell, located 200 miles southwest of New Orleans in 2,900 meters of water (The Times-Picayune, 2015).
Liquefied Natural Gas Terminals	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	The following Liquefied Natural Gas terminals are within the Study Area: Nine Existing Import: six Gulf of Mexico, three Atlantic (Federal Energy Regulatory Commission, 2023b) Seven Existing Export: five Gulf of Mexico, two Atlantic (Federal Energy Regulatory Commission, 2023a) Six Approved and under Construction Export: Gulf of Mexico (Federal Energy Regulatory Commission, 2023a) Eleven Approved Not Yet under Construction Export: Gulf of Mexico (Federal Energy Regulatory Commission, 2023a) Six Proposed Export: Gulf of Mexico (Federal Energy Regulatory Commission, 2023a) Three Projects in Pre-Filing Export: Gulf of Mexico (Federal Energy Regulatory Commission, 2023a)
Oil and Gas Structure Removal Operations	Southeast Gulf of Mexico	Past Present Future	Roughly 189 oil and gas structures are removed annually in the Gulf of Mexico (U.S. Government Accountability Office, 2015). Of these about half are removed using explosives, which are detonated inside pilings and well conductors at a depth of 15 feet below the seafloor (National Marine Fisheries Service, 2021b).

Table 4.2-1: Past, Present, and Reasonably Foreseeable Actions (continued)

Action	*Geographic Overlap*	*Time Overlap*	*Description*
Wind Energy Development	New England Mid-Atlantic Southeast	Past Present Future	Five wind turbines are established and active at Block Island, Rhode Island. Two wind turbines are established and active off the coast of Virginia Beach, Virginia. Twenty-nine commercial wind energy leases have been issued in federal waters on the Outer Continental Shelf, including those offshore Delaware, Massachusetts, Maryland, New Jersey, Rhode Island, Virginia, New York, and North Carolina (Bureau of Ocean Energy Management, 2023d). Various state offshore wind energy programs are also under development.
Marine Hydrokinetic Power Generation	New England	Future	There are no existing licensed hydrokinetic projects on the Atlantic coast. There is one hydrokinetic preliminary permit for the Bourne Tidal Test Site project located in the Cape Cod Canal in Massachusetts state waters; the preliminary permit expired March 1, 2023 (U.S. Department of Energy, 2015).
Other Commercial Industries			
Undersea Communication Cables	New England Mid-Atlantic Southeast	Past Present Future	Over 550,000 miles of cables currently exist in the world's oceans.
Marine Mineral Extraction	Mid-Atlantic Southeast	Past Present Future	Since 1995, 66 leases have been executed to extract minerals; there are currently six active leases and three proposed leases in seven states (Florida, Louisiana, Maryland, Mississippi, North Carolina, New Jersey, and Virginia) (Bureau of Ocean Energy Management, 2023c).
Commercial Fishing	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	There are more than 50 different fisheries in the Greater Atlantic region (National Oceanic and Atmospheric Administration, 2019). In the southeast region, there are 21 separate fisheries.
Recreational Fishing	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	Approximately 9% of the recreational fishing catch comes from federal waters, 54% from estuaries, and 36% from state territorial seas (National Marine Fisheries Service, 2021a).
Aquaculture	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	Although present throughout the Study Area, Florida and Massachusetts have the greatest number of saltwater farms in the Study Area, with 178 and 161, respectively (U.S. Department of Agriculture, 2019).

Table 4.2-1: Past, Present, and Reasonably Foreseeable Actions (continued)

Action	*Geographic Overlap*	*Time Overlap*	*Description*
Coastal Land Development & Tourism	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	Coastal land development adjacent to the Study Area is both intensive and extensive, including development of homes, businesses, recreation, vacation, and ship traffic at port facilities and marinas. The Study Area coastline also includes extensive coastal tourism and its supporting infrastructure.
Maritime Traffic	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	The East Coast of the United States is heavily traveled by commercial, recreational, and government marine vessels with several commercial ports near Navy operating areas (see Figure 3.11-4 in the 2018 Final EIS/OEIS for commercially used waterways in the Study Area).
Research			
Geological and Geophysical Oil and Gas Survey Activities	Mid-Atlantic Southeast	Past Present Future	The Bureau of Ocean Energy Management is reviewing one application from a single permittee for Atlantic Outer Continental Shelf seismic survey activities; the application area covers waters from Delaware to Florida (Bureau of Ocean Energy Management, 2023a).
Academic Research	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	Wide-scale academic research is conducted in the Study Area by federal entities, such as the Navy and the National Oceanic and Atmospheric Association/NMFS, as well as state and private entities and other partnerships. Academic geologists use seismic surveys/air gun arrays to study the ocean floor and beyond, including plate tectonics and volcanic activity.
Field Operations at National Marine Sanctuaries and Marine National Monuments (see Section 6.1.2, Marine Protected Areas)	New England Mid-Atlantic Southeast Gulf of Mexico	Past Present Future	The Programmatic Environmental Assessment of Field Operations in the Southeast and Gulf of Mexico National Marine Sanctuaries (National Oceanic and Atmospheric Administration, 2018b) and the Programmatic Environmental Assessment of Field Operations in the Northeast and Great Lakes National Marine Sanctuaries (National Oceanic and Atmospheric Administration, 2018a) analyze the options of maintaining the status quo and existing level of operations in national marine sanctuaries and monuments for the next five years, or increasing the number of small boat operations and stopping the requirement for small boat best management practices in some locations.

Notes: % = percent; AFTT = Atlantic Fleet Training and Testing; EIS = Environmental Impact Statement; MMPA = Marine Mammal Protection Act; NMFS = National Marine Fisheries Service; OEIS = Overseas Environmental Impact Statement; RC = Range Complex; U.S. = United States

Table 4.2-2 describes other major environmental stressors or trends that tend to be widespread and arise from routine human activities and multiple past, present, and future actions.

Table 4.2-2: Ocean Pollution and Ecosystem Alteration Trends

Stressor	*Location*	*Description*
Hypoxic zones	Global	Hypoxia, or low oxygen, is an environmental phenomenon where the concentration of dissolved oxygen in the water column decreases to a level that can no longer support living aquatic organisms. Hypoxia occurs from the rapid growth and decay of algal blooms in response to excess nutrient loading (primarily nitrogen and phosphorus from agriculture runoff, sewage treatment plants, bilge water, and atmospheric deposition). Animals that encounter the hypoxic zones flee, experience physiological stress, or suffocate (National Oceanic and Atmospheric Administration, 2016; Texas A&M University, 2011, 2014). Hypoxic zones can be natural phenomena but are occurring in increasing size and frequency due to human-induced nonpoint source water pollution (National Oceanic and Atmospheric Administration, 2016, 2017b).
	Gulf of Mexico	The northern Gulf of Mexico adjacent to the Mississippi River has the largest hypoxic zone in the United States and the second largest hypoxic zone worldwide. The 2023 Gulf of Mexico hypoxic zone measured 3,058 square miles and was the seventh smallest in the 36-year record of surveys. The 5-year average is now down to 4,347 square miles (U.S. Environmental Protection Agency, 2023a).
Harmful algal blooms	Global	Elevated nutrient loading has also been identified as a potential contributing cause of the increased incidence of harmful algal blooms, proliferations of certain marine and freshwater toxin-producing algae (National Oceanic and Atmospheric Administration, 2016, 2017b). Of the 5,000 known species of phytoplankton, there are about 100 species known to be toxic or harmful. Harmful algal blooms cause human illness and animal mortalities, including fish, bird, and marine mammals (Anderson et al., 2002; Corcoran et al., 2013; Sellner et al., 2003). Harmful algal blooms can be natural phenomena but are occurring in increasing size and frequency due to human-induced nonpoint source water pollution (National Oceanic and Atmospheric Administration, 2016, 2017b). With the projection of warming ocean waters, these harmful blooms may become more prevalent beginning earlier, lasting longer, and covering larger geographic areas (Edwards, 2013; Moore et al., 2008).
	Gulf of Mexico	In Florida, the deaths of 107 bottlenose dolphins in 2004 and 277 manatees in 2013 were linked to harmful algal blooms (Edwards, 2013; Flewelling et al., 2005).
	Atlantic Ocean	In the Saint Lawrence Estuary, unprecedented mass mortalities of multiple species including marine fish, birds, and marine mammals were linked to a harmful algal bloom that occurred in 2008 (Starr et al., 2017).
Major spill events	Global	Oil and other chemical spills related to oil and gas production activities are common throughout the Gulf of Mexico and Atlantic.
	Gulf of Mexico	From 2017 to 2021, there were a total of 72 spills, which includes spills of oil, drilling mud, and other chemicals (Bureau of Safety and Environmental Enforcement, 2023). In April 2010, the *Deepwater Horizon* offshore drill rig, 41 miles southeast of the Louisiana coast, exploded and sank during exploratory well drilling and resulted in the largest accidental marine oil spill in U.S. history releasing 4.9 million barrels (210 million gallons) of crude oil into the Gulf of Mexico (National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, 2011). Environmental impacts continue to be observed, including those arising from direct exposure of marine life to oil and oil dispersants, habitat degradation, and disturbances caused by cleanup activities. There has been extensive documentation of negative effects of the spill to deep-sea corals and benthos, fish, marine mammals,

Table 4.2-2: Ocean Pollution and Ecosystem Alteration Trends (continued)

Stressor	*Location*	*Description*
		Sargassum, sea turtles, and other shoreline species and habitats (National Oceanic and Atmospheric Administration, 2017a).
Marine debris (Section 3.2.2.2.1, Marine Debris and Water Quality)	Global	Marine debris is any anthropogenic object intentionally or unintentionally discarded, disposed of, or abandoned that enters the marine environment. An estimated 75% or more of marine debris consists of plastic (Hardesty & Wilcox, 2017). Approximately 80% of marine debris originates onshore and 20% from offshore sources. Marine debris is governed internationally by the 1972 London Convention and 1996 London Protocol and regulated in the United States through the Marine Protection, Research, and Sanctuaries Act. Marine debris has been discovered to be accumulating in gyres throughout the oceans, and a major accumulation zone exists in both the Pacific Ocean and in the Atlantic east of Bermuda. Marine debris degrades marine habitat and water quality and poses ingestion and entanglement risks to marine life and birds (National Marine Fisheries Service, 2006).
Noise	Global	Ambient noise is the collection of ever-present sounds of both natural and human origin. Ambient noise in the ocean is generated by sources that are natural physical (earthquakes, rainfall, waves breaking, and lightning hitting the ocean); natural biological (snapping shrimp and the vocalizations of marine mammals), and anthropogenic (human-generated) sources. Anthropogenic sources have substantially increased ocean noise since the 1960s, and include commercial shipping, oil and gas exploration and production activities (including air gun, drilling, and explosive decommissioning), commercial and recreational fishing (including vessel noise, fish-finding sonar, fathometers, and acoustic deterrent and harassment devices), military (testing, training, and mission activities), shoreline construction projects (including pile driving), recreational boating and whale watching activities, offshore power generation (including offshore windfarms), and research (including sound from air guns, sonar, and telemetry).
Climate change (Section 3.1, Air Quality)	Global	Predictions of long-term negative environmental impacts due to climate change include sea level rise; changes in ocean surface temperature, acidity/alkalinity, and salinity; changing weather patterns with increases in the severity of storms and droughts; changes to local and regional ecosystems (including the potential loss of species); shrinking glaciers and sea ice; thawing permafrost; a longer growing season; and shifts in plant and animal ranges, fecundity, and productivity. Anthropogenic greenhouse gas emissions have changed the physical and chemical properties of the oceans, including a 1-degree Celsius temperature rise, increased carbon dioxide absorption, decreased pH, alteration of carbonate chemistry, decline in dissolved oxygen, and disruption of ocean circulation (Poloczanska et al., 2016). Observations of species responses that have been linked to anthropogenic climate change are widespread, and trends include shifts in species distribution to higher latitudes and to deeper locations, earlier onset of spring and later arrival of fall, declines in calcification, and increases in the abundance of warm-water species. Climate change is likely to negatively impact the Study Area and will contribute added stressors to all resources in the Study Area.

Notes: % = percent; U.S. = United States

4.3 Cumulative Impacts on Environmental Resources

Since the information available on past, present, and reasonably foreseeable actions varies in quality and level of detail, impacts of these actions were quantified where available data made it possible; otherwise, professional judgement and experience were used to make a qualitative assessment of impacts. Due to the large scale of the Study Area and multiple activities and stressors interacting in the ocean environment (Table 4.2-1 and Table 4.2-2), the analysis for the incremental contribution to cumulative stress that the Proposed Action may have on a given resource is largely qualitative and speculative. The resource sections in Chapter 3 (Affected Environment and Environmental Consequences) of this Supplemental EIS/OEIS include a discussion of the threats affecting each resource, analysis of impacts from each stressor and substressor specific to areas where activities are concentrated (i.e., ranges/operating areas), and an analysis of the combined impacts of all stressors. A robust discussion of the general threats to each biological resource and all Endangered Species Act and Marine Mammal Protection Act listed species is included in Appendix F (Biological Resources Supplemental Information). The Chapter 3 analysis is referenced and briefly summarized below in order to provide the necessary context to support the conclusion that the Proposed Action will have an insignificant contribution to the cumulative stress experienced by these resources when specific past, present, and reasonably foreseeable future actions are added to the analysis.

Each resource section (Section 3.1, Air Quality, through Section 3.9, Birds and Bats) presents unique criteria for determining the significance of Proposed Action stressors. These criteria define impact descriptors through the context and intensity of stressor impacts in order to present consistent analysis throughout the resource sections. These impact descriptors (Negligible, Minor, Moderate, Major) from each resource section have been incorporated into the cumulative impacts analysis below.

Further, analysis was not separated by Alternative because the data available for the cumulative effects analysis was mostly qualitative in nature and, from a landscape-level perspective, these qualitative impacts are expected to be similar. Under Alternative 1 or Alternative 2 of the Proposed Action, the Action Proponents will implement the mitigation measures detailed in Chapter 5 (Mitigation) to avoid or reduce potential impacts on biological, socioeconomic, and cultural resources in the Study Area.

4.3.1 Air Quality

The region of influence for assessing cumulative air quality impacts from criteria pollutants and hazardous air pollutants includes the Study Area as well as adjoining land areas several miles inland, which at times would be downwind from emission sources associated with the action alternatives. The region of influence for the cumulative analysis of proposed greenhouse gas (GHG) emissions is worldwide because global sources of GHGs contribute to global climate change. These global impacts would be manifested as impacts to resources and ecosystems within the Study Area.

Section 3.1 (Air Quality) describes the existing air quality conditions, which reflect the aggregate impacts of past and present actions within the Study Area. Due to these actions, portions of coastal regions within the Study Area are in nonattainment and/or maintenance of national ambient air quality standards. Most activities associated with the action alternatives have been ongoing and therefore are captured in the current air quality conditions of the Study Area. The context for air quality analysis provided in Section 3.1 includes adherence to state and federal plans enacted to achieve and maintain ambient air quality standards.

Past, present, and future activities that could contribute to air quality impacts from the action alternatives and produce cumulative air quality impacts include oil and gas production, other military training activities, wind energy development, and non-military vessel operations, as identified in Table 4.2-1. Cumulative air quality impacts from the action alternatives are based on the increase in emissions that would occur from an action, in combination with emissions from these cumulative actions. The qualitative analysis considered the cumulative effects of these emissions in regard to their potential to (1) contribute to an exceedance of an ambient air quality standard, (2) contribute to significant public health impacts from hazardous air pollutants, and (3) affect climate change.

Criteria Pollutants and Hazardous Air Pollutants

The analysis in Section 3.1 (Air Quality) concluded that the proposed training and testing activities would result in negligible to minor impacts to all air quality stressors (criteria pollutants and hazardous air pollutants). The Proposed Action would result in localized and temporarily elevated emissions, but criteria pollutant emissions would not exceed conformity *de minimis* thresholds in any nonattainment or maintenance area. Thus, based on the analysis presented in Section 3.1 and given the meteorology of the Study Area, the frequency and isolation of proposed training and testing activities (Table 2.2-1 through Table 2.2-5 in Chapter 2, Description of Proposed Action and Alternatives), and the quantities of expected emissions, it is anticipated that the incremental contribution of the Proposed Action, when added to the impacts of all other past, present, and reasonably foreseeable future actions, would result in negligible to minor impacts on air quality in the Study Area or beyond.

Climate Change

Table 4.3-1 presents annual GHG emissions estimated for all training and testing activities proposed within the entire Study Area for each action alternative. Table 4.3-1 compares annual GHG emissions from each action alternative to those estimated for the preferred alternative in the 2018 Final EIS/OEIS. These data show that Alternatives 1 and 2 would result in minor decreases and increases in GHG emissions within the Study Area compared to those estimated for the preferred alternative in the 2018 Final EIS/OEIS. GHG emissions from either action alternative would incrementally contribute to future climate change, some effects of which are identified below.

Table 4.3-1: Total Annual Greenhouse Gas Emissions from All Study Area Training and Testing Activities (metric tons/year)

2018 Final EIS/OEIS Emission Estimates	*Alternative 1 Emissions*	*Alternative 1 Net Change from 2018 Estimates*	*Alternative 2 Emissions*	*Alternative 2 Net Change from 2018 Estimates*
1,188,000	1,160,000	-28,000	1,338,000	150,000

The CEQ has released interim guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses (Council on Environmental Quality, 2023). The guidance emphasizes when conducting climate change analyses in NEPA reviews, agencies should consider the following: (1) the potential effects of a proposed action on climate change, including by assessing both GHG emissions and reductions from the proposed action and (2) the effects of climate change on a proposed action and its environmental impacts. The guidance states that federal agencies should quantify the reasonably foreseeable direct and indirect GHG emissions of their proposed actions and reasonable alternatives (as well as the No Action Alternative). The guidance also recommends that

agencies provide additional context for GHG emissions, including through the use of the best available social cost of GHG (SC-GHG) estimates (Council on Environmental Quality, 2023).

The SC-GHG is the estimated monetary value of the future stream of net damages associated with adding GHGs such as those from the Proposed Action to the atmosphere (U.S. Environmental Protection Agency, 2023b). These costs include the value associated with impacts such as changes in net agricultural productivity, property damage from increased flood risk, and disruption of energy services. An SC-GHG estimate, when based on the best available science, can provide in many circumstances additional context to GHG emissions estimates, particularly to support a comparison of alternatives. Agencies can also provide accessible comparisons or equivalents to help the public and decision makers understand GHG emissions in more familiar terms. For example, the estimated SC-GHG emissions from Alternatives 1 and 2 are similar to that of electricity used by 197,000 and 232,100 average U.S. households annually (U.S. Environmental Protection Agency, 2024).

To minimize GHG emissions from the action alternatives, proposed emission sources would comply with applicable regulations and GHG policies, and for mobile sources, federal vehicle clean fuels, mileage efficiency, and emissions regulations. The Navy would continue to implement proactive measures to reduce their overall GHG emissions by decreasing the use of fossil fuels and increasing the use of alternative energy sources in accordance with the goals set by Executive Orders, the Energy Policy Acts of 2005 and 2020, and Navy and Department of Defense policies (such as the Navy Climate Action Plan; U.S. Department of the Navy, 2022). These GHG initiatives are not emission reductions proposed to offset GHG emissions generated by the action alternatives, but rather demonstrate initial responses for the Navy to factor GHG management into Navy proposals and impact analyses.

Climate change could impact implementation of the action alternatives and the adaptation strategies needed to respond to future conditions. For the greater Study Area region, the main effect of climate change is increased storminess and sea level rise, with additional effects documented by climate analyses presented in the Fifth National Climate Assessment (U.S. Global Change Research Program, 2023). Operations by the Navy and U.S. Coast Guard have adapted to these changes. However, exacerbation of these conditions in the future could impede proposed activities during extreme events. Regarding sea level rise, the Department of Defense has an active program that develops measures for installations to adapt to this threat and its potential to displace coastal operations and infrastructure (Strategic Environmental Research and Development Program, 2023).

4.3.2 Sediment and Water Quality

The analysis in Section 3.2 (Sediment and Water Quality) concludes that the combined impacts from all training and testing activity stressors on sediments and water quality, related to explosives and explosive byproducts, metals, chemicals and other materials not associated with explosives, would be minor and would not result in measurable additional impacts on sediment or water quality in the Study Area or beyond.

Stressors associated with training and testing activities within offshore locations typically would be dispersed over large expanses of the ranges. Due to the large size of the ranges, it is unlikely that released materials (e.g., explosives and byproducts) from these activities would accumulate at a single location and therefore, would not be concentrated within a small geographic area. Past, present, and future activities with the potential to affect sediments and water quality include offshore oil and gas removal and mineral extraction. However, it is unlikely that these activities would overlap spatially with

the Action Proponents' training and testing activities to an extent that would result in measurable additional impacts.

It is possible that Action Proponent stressors could combine with non-Action Proponent stressors in nearshore areas (bays and estuaries) that are already impaired as a result of industrial and/or watershed inputs. The magnitude of contaminant inputs (e.g., metals) associated with the Action Proponents' training and testing activities would be discountable relative to those of other existing and legacy inputs. Additionally, the Action Proponents would comply with all federal, state, and local laws, regulations, and executive orders applicable to sediment and water quality (see Section 6.1, Consistency with Regulatory Considerations). Compliance with the applicable laws and regulations, including any existing and future Total Maximum Daily Loads for portions of the Study Area designated as impaired water bodies under Section 303(d) of the Clean Water Act, would ensure cumulative impacts from the Proposed Action would be minor and would not result in measurable additional impacts on sediment and water quality.

4.3.3 HABITATS

The analysis presented in Section 3.3 (Habitats) indicates that marine habitats could be affected by underwater detonations and physical disturbance from vessels, military expended materials, seafloor devices, and pile driving.

Commercial activities that could impact marine habitats (e.g., fishing, coastal development, dredging, offshore energy and resource development) are conducted under permits and regulations that require companies to avoid and minimize impacts on sensitive habitats (e.g., live hard bottom). Further, the Action Proponents will implement mitigations to minimize impacts from explosives, some physical disturbances (e.g., anchoring, seafloor devices), and strike stressors on seafloor resources, including shallow-water coral reefs, live hard bottom, artificial reefs, and shipwrecks, as described in Chapter 5 (Mitigation) and National Marine Sanctuaries, as described in Chapter 6 (Regulatory Considerations). Proposed Action activities are not likely to occur at the same time/place as other activities in the Study Area that have a large effect on bottom habitats (e.g., commercial fishing operations). And in some locations, the impacts would not overlap at all, as nearly 30 percent of the seafloor impacted by the Proposed Action would be deeper than live hard bottom is expected (e.g., bathyal/abyssal zone). Thus, it is likely that the mostly soft bottom habitats impacted would have the opportunity to recover from the Proposed Action before impacts from fishing or other activities could interact or compound additional stress to the ecosystems.

The mostly temporary impact footprint from the Proposed Action of approximately 145 acres per year (from explosive crater, military expended materials, and seafloor devices) affects mostly soft substrate. The impact of the Proposed Action is also dwarfed by the estimated impact area of commercial trawling in the Gulf of Mexico alone; an estimated 23 million acres of bottom in the Gulf of Mexico was trawled per year from 2007 to 2009 (Amoroso et al., 2018). Per analysis detailed in Appendix I (Military Expended Materials and Direct Strike Impact Analysis), the area of hard bottom potentially impacted by military expended materials represents a negligible percentage (less than 0.01 percent) of the total hard bottom habitat in the Study Area.

Based on an assessment of cumulative impacts in the U.S. Northeast and Mid-Atlantic Planning regions, the greatest risk to the marine environment is from rapidly increasing sea surface temperatures, fisheries (mostly commercial), and shipping at 10 percent each. Military activities ranked very low at about 2 percent for stressors on offshore habitats (Wyatt et al., 2017); to explore cumulative risk to inshore and offshore habitats in the U.S. Northeast and Mid-Atlantic Ocean Planning regions, Wyatt et

al. (2017) applied an open-source assessment model to 13 habitats and 31 stressors (including military activities) in an exposure-consequence framework.

Potential impacts would be negligible to moderate (depending on the stressor) and include localized disturbance of the seafloor sediment (e.g., turbulence/turbidity), cratering and material burial in soft bottom habitats, accumulation of artificial material on hard bottom, and structural damage to unmapped hard bottom habitats. Although some habitats are impacted by stressors throughout the Study Area, the incremental contribution of the Proposed Action when added to the impacts of all other past, present, and reasonably foreseeable future actions would not result in measurable additional impacts on habitats in the Study Area.

4.3.4 VEGETATION

The analysis presented in Section 3.4 (Vegetation) indicates that marine vegetation could be affected by underwater detonations and physical disturbance from vessels, military expended materials, seafloor devices, and pile driving. Potential impacts would be negligible to moderate (depending on the stressor) and include localized disturbance of the seafloor sediment (e.g., turbulence/turbidity), cratering and material burial in soft bottom habitats, accumulation of artificial material on hard bottom, and structural damage to unmapped hard bottom habitats.

Commercial activities that could impact marine vegetation (e.g., fishing, dredging, offshore energy development) are conducted under permits and regulations that require companies to avoid and minimize impacts on sensitive vegetation (e.g., coastal wetlands, seagrass beds), and some harvested seaweeds are managed under Fishery Management Plans. The Action Proponents will implement mitigation to minimize impacts from explosives, some physical disturbances (e.g., anchoring, seafloor devices), and strike stressors on seafloor resources, including habitats that feature vegetation (shallow-water coral reefs, live hard bottom, artificial reefs, and shipwrecks) as described in Chapter 5 (Mitigation) and National Marine Sanctuaries, as described in Chapter 6 (Other Regulatory Considerations). The Navy will also implement observer-based mitigation for floating *Sargassum* to avoid impacts to associated biota from explosive ordnance on or near the surface (e.g., torpedoes).

The mostly temporary impact footprint from the Proposed Action of approximately 145 acres per year (from explosive crater, military expended materials, and seafloor devices) affects mostly resilience organisms and habitats (e.g., benthic microalgae on soft bottom habitats). The impact from the Proposed Action is also dwarfed by the estimated impact area of commercial trawling in the Gulf of Mexico alone; an estimated 23 million acres of bottom in the Gulf of Mexico was trawled per year from 2007 to 2009 (Amoroso et al., 2018). Per analysis detailed in Appendix I (Military Expended Materials and Direct Strike Impact Analysis), the area of live hard bottom (a habitat for benthic macroalgae) potentially impacted by military expended materials represents a negligible percentage (less than 0.01 percent) of the total live hard bottom in the Study Area.

Proposed Action activities are not likely to occur at the same time/place as other activities in the Study Area that have a large effect on vegetated bottom habitats (e.g., commercial fishing operations). And in some locations, the impacts would not overlap at all, as nearly 70 percent of the area impacted by the Proposed Action would be deeper than where vegetated hard bottom is expected. The impacted vegetation (mostly benthic microalgae, but also some benthic macroalgae and floating *Sargassum*) would likely have the opportunity to recover from the Proposed Action before impacts from fishing or other activities could interact or compound additional stress to the ecosystems.

Although some vegetation is impacted by stressors throughout the Study Area, the incremental contribution of the Proposed Action when added to the impacts of all other past, present, and reasonably foreseeable future actions would not result in measurable additional impacts on vegetation in the Study Area.

4.3.5 INVERTEBRATES

The analysis presented in Section 3.5 (Invertebrates) indicates that marine invertebrates could be affected by all the underwater stressors associated with the Proposed Action. Potential impacts would be negligible to moderate (depending on the stressor) and include impacts to individual marine invertebrates, localized disturbance of the seafloor sediment (e.g., turbulence/turbidity), cratering and material burial in soft bottom habitats, accumulation of artificial material on hard bottom, and structural damage to unmapped hard bottom habitats.

Commercial activities that could impact invertebrate habitats (e.g., commercial fishing, dredging, offshore energy development) are conducted under permits and regulations that require companies to avoid and minimize impacts on sensitive habitats (e.g., shallow-water coral reefs, oyster beds/reefs), and some harvested invertebrates are managed under Fishery Management Plans (e.g., shrimp, scallops). The Action Proponents will implement mitigations to avoid impacts from explosives, some physical disturbances (e.g., anchoring, seafloor devices), and strike stressors on seafloor resources, including shallow-water coral reefs, live hard bottom, artificial reefs, and shipwrecks, as described in Chapter 5 (Mitigation) and National Marine Sanctuaries, as described in Chapter 6 (Regulatory Considerations). The Action Proponents will also implement observer-based mitigation for jellyfish aggregations to avoid impacts to associated biota from explosive ordnance on or near the surface (e.g., torpedoes).

The mostly temporary impact footprint from the Proposed Action of approximately 145 acres per year (from explosive crater, military expended materials, and seafloor devices) affects mostly resilient soft substrate. The impact of the Proposed Action is also dwarfed by the estimated impact area of commercial trawling in the Gulf of Mexico alone; an estimated 23 million acres of bottom in the Gulf of Mexico was trawled per year from 2007 to 2009 (Amoroso et al., 2018). Per analysis detailed in Appendix I (Military Expended Materials and Direct Strike Impact Analysis), the area of live hard bottom potentially impacted by military expended materials represents a negligible percentage (less than 0.01 percent) of the total live hard bottom habitat in the Study Area.

Proposed Action activities are not likely to occur at the same time/place as other activities in the Study Area that have a large effect on bottom habitats (e.g., commercial fishing operations). And in some locations, the impacts would not overlap at all, as nearly 30 percent of the seafloor impacted by the Proposed Action would be deeper than live hard bottom communities are expected (e.g., bathyal/abyssal zone). Thus, the mostly soft bottom communities impacted would have the opportunity to recover from the Proposed Action before impacts from fishing or other activities could interact or compound additional stress to the ecosystems.

Invertebrates are generally abundant and relatively short-lived, and with the exception of sessile species located near areas of repeated Navy activities (e.g., highly altered pierside locations, established channels near large naval port facilities), few individuals would likely be affected repeatedly by the same event. With the exception of some species such as deep-water corals and sponges, invertebrates generally have high reproductive rates, short reproductive cycles, and resilient dispersal mechanisms; thus, the mostly soft bottom communities impacted would likely reestablish quickly and deep-water

corals/sponges would not likely be impacted based on their generally low percent coverage on live hard bottom habitat.

Although some invertebrate habitats are impacted by stressors throughout the Study Area, it is anticipated that the Proposed Action when added to the impacts of all other past, present, and reasonably foreseeable future actions would not result in measurable additional impacts on invertebrates in the Study Area.

4.3.6 Fishes

Section 3.6.2.1.4 (General Threats) includes an extensive discussion of the existing stressors, which often act on fish populations simultaneously, including habitat alteration, vessel strikes, diseases and parasites (susceptibility and incidence increases with habitat alteration and exposure to individuals that escaped sea farms), introduction of non-native species, pollution, and climate change. The additional threat of living in a noisy environment, such as that produced by offshore wind energy developments, construction noise within inshore waters, pile driving, sonar, seismic activity, shipping, and offshore construction projects, may contribute to cumulative stress experienced by fish populations.

It is anticipated that the Proposed Action would affect fish species within the Study Area, including Endangered Species Act (ESA)-listed fish species. Fishes could be affected by all the underwater stressors associated with the Proposed Action. The analysis in Section 3.6 (Fishes) concludes that the impacts on fishes would range from negligible to moderate, depending on the stressor. The majority of potential impacts include short-term behavioral and physiological responses (e.g., brief periods of masking or behavioral reactions, such as startle or avoidance responses, or no reaction at all). Some stressors (such as explosives) could also result in injury or mortality to a relatively small number of individuals. Overall, long-term consequences for most individual fishes or populations are unlikely because exposures from the majority of stressors are intermittent, transient, and unlikely to repeat over short periods. Some ESA-listed fish species that are known to occur within inshore water areas would be at higher risk during training and testing activities in these locations.

The aggregate impacts of past, present, and other reasonably foreseeable future actions contributing multiple water quality, noise, and physical risks to fishes will likely continue to have effects on individual fishes and fish populations. However, military readiness activities are generally isolated from other activities in space and time and the majority of the proposed training and testing activities occur in well-known, previously established training and testing range areas; are spatially distributed and not generally concentrated in any one location for any extended period of time; have few participants; and are of a short duration. Thus, although it is possible that the Proposed Action could contribute incremental stressors to a small number of individuals, which would further compound effects on a given individual already experiencing stress, it is not anticipated that the Proposed Action has the potential to put additional stress on entire populations. Therefore, it is anticipated that the incremental contribution of the Proposed Action, when added to the impacts of all other past, present, and reasonably foreseeable future actions would not result in measurable additional impacts on fishes in the Study Area.

4.3.7 Marine Mammals

In general, bycatch, vessel strikes, and entanglement are leading causes of injury and direct mortality to marine mammals throughout the Study Area. Although mitigated to the greatest extent practicable, the Proposed Action could result in injury and mortality to individuals of some marine mammal species from sonar, underwater explosions, and vessel strikes. The analysis in Section 3.7 (Marine Mammals)

concludes that the impacts on marine mammals would range from negligible to moderate, depending on the stressor. Implementation of measures discussed in Chapter 5 (Mitigation) would help avoid, but not absolutely eliminate, the risk for potential impacts, and any incidence of injury and mortality that might occur under the Proposed Action could be additive to injury and mortality associated with other non-military actions in the Study Area. While it is more likely that an individual of an abundant, common stock or species would be affected, there is a chance that a less abundant stock could be affected.

Ocean noise is already significantly elevated over historic, natural levels. Acoustic stressors (underwater explosions and sonar as well as vessel noise) associated with the Proposed Action could also result in additive acoustic impacts on marine mammals. However, sonar is not known to be a major threat to marine mammal populations or a significant portion of the overall ocean noise budget (Bassett et al., 2010; Baumann-Pickering et al., 2010; International Council for the Exploration of the Sea, 2005; McDonald et al., 2006). Other current and future non-military actions such as construction and operation of liquefied natural gas terminals; characterization, construction, and operation of offshore wind energy projects; seismic surveys; and construction, operation, and removal of oil and gas facilities could result in underwater sound levels that could cause behavioral harassment, temporary threshold shift, auditory injury (AINJ), or injury. Additionally, elevated ambient noise levels may cause physiological stress in individuals, to which the Proposed Action would contribute.

It is possible that some sounds from many of these non-military activities could travel over long distances and overlap in time and space with sounds from underwater explosions or Action Proponent sonar use, in particular distant shipping noise, which is more widespread and continuous. It is not known whether the co-occurrence of shipping noise and sounds associated with underwater explosions and sonar use would result in harmful additive impacts on marine mammals. However, these activities are widely dispersed, the sound sources are intermittent, and mitigation measures would be implemented. Furthermore, safety, security, and operational considerations would preclude some training and testing activities in the immediate vicinity of other actions, further reducing the likelihood of simultaneous or overlapping exposure. For these reasons, it is unlikely that an individual marine mammal would be simultaneously exposed to sound levels from multiple actions that could cause behavioral harassment, temporary threshold shift, AINJ, or injury.

The behavioral and physiological responses of any marine mammal to a potential stressor, such as underwater sound, could be influenced by various factors, including disease, dietary stress, body burden of toxic chemicals, energetic stress, percentage body fat, age, reproductive state, and social position. If the health of an individual marine mammal were already compromised, it is possible this condition could alter the animal's expected response to stressors associated with the Proposed Action. Synergistic impacts are also possible; for example, animals exposed to some chemicals may be more susceptible to noise-induced loss of hearing sensitivity (Fechter & Pouyatos, 2005). While the response of a previously stressed animal might be different from the response of an unstressed animal, no data is available at this time to accurately predict how stress caused by various ocean pollutants would alter a marine mammal's response to stressors associated with the Proposed Action.

In summary, the aggregate impacts of past, present, and other reasonably foreseeable future actions continue to impact some marine mammal species in the Study Area. The Proposed Action could contribute incremental stressors to individuals, which would further compound effects on a given individual already experiencing stress. However, with the implementation of standard operating procedures reducing the likelihood of overlap in time and space with other stressors and the implementation of mitigation measures reducing the likelihood of impacts, it is anticipated that the

incremental contribution of the Proposed Action, when added to the impacts of all other past, present, and reasonably foreseeable future actions, would not result in measurable additional impacts on marine mammals in the Study Area or beyond. Furthermore, the regulatory process administered by the National Marine Fisheries Service (NMFS), which includes Stock Assessments for all marine mammals and a 5-year reviews for all ESA-listed species, provides a backstop that informs decisions on take authorizations and Biological Opinions. Stock Assessments include estimates of Potential Biological Removal that stocks of marine mammals can sustainably absorb. The Marine Mammal Protection Act (MMPA) take authorizations require that the proposed action have no more than a negligible impact on species or stocks, and that the proposed action imposes the least practicable adverse impact on the species. MMPA authorizations are reinforced by monitoring and reporting requirements so that NMFS is kept informed of deviations from what has been approved. Biological Opinions for federal and nonfederal actions are similarly grounded in status reviews and conditioned to avoid jeopardy and to allow continued progress toward recovery. These processes help to ensure that, through compliance with these regulatory requirements, the Proposed Actions would not have measurable additional impacts on marine mammals.

4.3.8 REPTILES

According to scientific studies, reptiles may rely primarily on senses other than hearing for interacting with their environment and appear to quickly recover from noise stressors (Appendix D, Acoustic and Explosive Impacts Supporting Information); thus, the acoustic stressors produced by military readiness activities are anticipated to have minimal cumulative impact on reptiles. The Proposed Action will not affect turtle nesting or crocodilian habitat, and contaminants and debris discharged into the marine environment are not expected to be measurable or persistent (Section 3.2, Sediment and Water Quality). Effects from the Proposed Action to reptile food sources are avoided or insignificant (Section 4.3.3, Habitats; Section 4.3.4, Vegetation; and Section 4.3.5, Invertebrates). Likewise, Action Proponents' activities generally would not overlap in space and time with other stressors as they occur as dispersed, infrequent, and isolated events that do not last for extended periods of time.

The potential exists for the impacts of ocean pollution (disease, malnourishment), injury, nesting habitat loss, starvation, and the potential that in increased underwater noise environment can contribute multiple stressors to an individual animal. Further, it is possible that the response of a previously stressed animal to impacts associated with the Proposed Action could be more severe than the response of an unstressed animal, or that impacts from the Proposed Action could make an individual more susceptible to other stressors.

Aggregate impacts of past, present, and other reasonably foreseeable future actions continue to impact all reptile species in the Study Area. The Proposed Action would have minor to moderate impacts on reptiles and could contribute incremental stressors to individuals, which would further compound effects on a given individual already experiencing stress. However, with the implementation of standard operating procedures reducing the likelihood of overlap in time and space with other stressors and the implementation of mitigation measures reducing the likelihood of impacts, the incremental stressors anticipated from the Proposed Action are not anticipated to result in measurable additional impacts to reptiles. Additionally, as with marine mammals, the regulatory process includes population assessments and 5-year reviews for all ESA-listed species, which provides a backstop that informs decisions on take authorizations and Biological Opinions. Biological Opinions for federal and nonfederal actions are grounded in status reviews and conditioned to avoid jeopardy and to allow continued progress toward recovery. This process helps to ensure that, through compliance with these regulatory requirements, the

Proposed Action would not have measurable additional impacts on reptiles. Therefore, it is anticipated that the incremental contribution of the Proposed Action, when added to the impacts of all other past, present, and reasonably foreseeable future actions, would not result in measurable additional impacts on reptiles in the Study Area or beyond.

4.3.9 Birds and Bats

All projects in the Study Area that affect ESA-listed species, species protected under the Migratory Bird Treaty Act, and U.S. Fish and Wildlife Service Birds of Conservation Concern are subject to regulatory processes and permitting.

The analysis in Section 3.9 (Birds and Bats) indicates that birds and bats (to a lesser extent) could potentially be impacted by acoustic stressors, explosives, energy stressors, physical disturbance and strikes, entanglement, ingestion, secondary, and combined stressors. The Proposed Action is unlikely to result in injury or mortality of bird or bats. The most likely responses to training and testing activities are short-term behavioral or physiological responses, such as alert response, startle response, cessation of feeding, fleeing the immediate area, and a temporary increase in heart rate. Recovery from the impacts of most stressor exposures that elicit such short-term behavioral or physiological responses would occur quickly. Impacts from one stressor could combine with other stressors and contribute to combined impacts. However, most of the proposed activities would be widely dispersed in offshore areas where bats are infrequent, bird distribution is patchy, and concentrations of individuals are often low; therefore, the potential for interactions between bats, birds, and military readiness activities is low.

The potential exists for the impacts of other threats (habitat loss, interactions with fishing gear, predation and competition with introduced species, pollution, noise and light from human activities, collisions with structures, climate change, and disease) to affect individual birds and bats cumulatively along with the impacts of military readiness activities. It is also possible that the response of a previously stressed animal to impacts associated with the Proposed Action could be more severe than the response of an unstressed animal, or that impacts from the Proposed Action could make an individual more susceptible to other stressors.

The aggregate impacts of past, present, and other reasonably foreseeable future actions continue to impact all bird and bat species in the Study Area. The Proposed Action would have minor to moderate impacts on birds and bats and could contribute incremental stressors to individuals, which would further compound effects on a given individual already experiencing stress. However, with the implementation of standard operating procedures reducing the likelihood of overlap in time and space with other stressors and the implementation of mitigation measures reducing the likelihood of impacts, the incremental stressors anticipated from the Proposed Action are not anticipated to result in measurable additional impacts to birds. It is anticipated that the incremental contribution of the Proposed Action, when added to the impacts of all other past, present, and reasonably foreseeable future actions, would not result in measurable additional impacts on birds and bats in the Study Area.

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