

EXECUTIVE SUMMARY

INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS) has prepared this Final Programmatic Environmental Impact Statement (PEIS) to analyze the potential environmental impacts associated with NOS's recurring data collection projects (surveying and mapping) to characterize underwater features (e.g., habitat, bathymetry, marine debris) throughout United States (U.S.) waters. Data obtained from these projects are used to produce many products, including charts and maps that are relied upon by mariners, scientists, the shipping and fishing industries, and countless other users in the U.S. and beyond.

The Proposed Action evaluated in this Final PEIS is to continue NOS's surveying and mapping projects over the next five years. These projects would include surveys performed from crewed vessels and remotely operated or autonomous vehicles. Field crews would include NOS personnel, other NOAA personnel on behalf of NOS, contractors, grantees, or permit/authorization holders. These crews and vehicles may use echo sounders and other active acoustic equipment and employ other equipment, including bottom samplers and conductivity, temperature, and depth instruments to collect the needed data. The "action area" for these projects includes the U.S. territorial sea; the contiguous zone; the U.S. Exclusive Economic Zone (U.S. EEZ); rivers; and states' offshore waters. The action area also includes coastal and riparian lands for activities such as the installation, maintenance, and removal of tide gauges. This analysis has been carried out to meet the requirements of the National Environmental Policy Act of 1969 (NEPA). NOS opted to prepare a programmatic NEPA document because the NOS mapping and surveying represents a suite of similar activities over a broad geographic region.

This Final PEIS evaluates three alternatives: 1) the No Action Alternative (Alternative A), under which NOS would continue to gather accurate and timely data on the nature and condition of the marine and coastal environment, reflecting the technology, equipment, scope, and methods currently in use by NOS at the current level of effort (i.e., the status quo); 2) Alternative B, under which NOS would increase the adoption of new technologies to more efficiently perform surveying, mapping, charting and related data gathering; and 3) Alternative C, which also includes the adoption of new techniques and technologies and includes an overall funding increase of 20 percent. The Final PEIS has been prepared to: 1) inform NOS and the public on the physical, biological, economic, and social impacts of NOS mapping and surveying projects; and 2) assist NOS in deciding how to execute its mapping and surveying program over the next five years.

This Final PEIS was prepared in accordance with NEPA (42 United States Code [U.S.C.] § 4321, et seq.); Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR § 1500–1508 (1978)); NOAA Administrative Order 216-6A and other relevant federal and state laws and regulations. NOS revised the Final PEIS from the June 2021 draft version to reflect feedback received through interagency coordination and consultation, stakeholder input, and public comments.

PUBLIC INVOLVEMENT

NOS published a "Notice of Availability of a Draft Programmatic Environmental Impact Statement for Surveying and Mapping Projects in U.S. Waters for Coastal and Marine Data Acquisition" in the *Federal Register* on June 25, 2021 to announce the availability of the Draft PEIS for public review. Agency and public comments were received on the Draft PEIS, which was available for public review from June 25, 2021 to November 22, 2021. During the public comment period for the Draft PEIS, NOS received 31

comment submissions from 30 commenters via Regulations.gov and email. Commenters included State Historic Preservation Officers (SHPOs), Tribal Historic Preservation Officers (THPOs), state Coastal Management program offices, federally recognized tribes, Alaska Native corporations, Alaska Native Organizations, Non-Governmental Organizations (NGOs), and members of the public. The comments addressed a range of issues including the following:

- Protection of cultural and historic resources;
- Federal consistency under the Coastal Zone Management Act (CZMA);
- Incorporation of mitigation measures;
- Environmental justice concerns pertaining to subsistence hunting and fishing in Alaska communities;
- Future coordination between NOS and key stakeholders, such as Alaska Eskimo Whaling Commission (AEWC), North Slope Borough Department of Wildlife Management, Calista Corporation in Alaska, Donlin Gold, Natural Resources Defense Council, Cultural Heritage Partners representing the Upper Mattaponi Indian Tribe, the Chickahominy Indian Tribe, and the Seneca Nation of New York;
- The NEPA process, scope of the PEIS, selection of a programmatic NEPA approach, alternatives to the Proposed Action, cumulative effects analysis, references and data cited in the effects analysis;
- Impacts to marine mammals, fish, habitats, birds, and sea turtles;
- Methodology and data consideration for the acoustic modeling;
- Impacts to socioeconomic resources such as fisheries; and
- Access to surveying and mapping data collected during NOS projects through data sharing.

NOS has thoroughly considered all of the input received and has responded to comments in Appendix C. Revisions to the Final PEIS have been made in response to comments where appropriate.

NOS developed a public webpage specifically for development of the Draft and Final PEIS, which can be found at <https://oceanservice.noaa.gov/about/environmental-compliance/surveying-mapping.html>. NOS will publish a Record of Decision no sooner than 30 days after publication of the U.S. Environmental Protection Agency's Notice of Availability for the Final PEIS in the Federal Register.

Coordination with Other Agencies

NOS coordinated with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) during preparation of this Final PEIS. NMFS has legal jurisdiction over most marine mammal species (through the Marine Mammal Protection Act [MMPA]), most threatened or endangered marine plant and animal species (through the Endangered Species Act [ESA]), and Essential Fish Habitat (through the Magnuson Stevens Fishery Conservation and Management Act [MSA]). USFWS has legal jurisdiction over certain marine mammal species including manatees, walruses, polar bears, and sea otters (through the MMPA), most threatened or endangered terrestrial plant and animal species (through the ESA), and over 1,000 species of birds (through the Migratory Bird Treaty Act [MBTA]).

Both agencies provided a comprehensive Technical Assistance Review prior to publication of the Draft PEIS. In coordinating with NOS, NMFS and USFWS participated in multiple meetings and reviews during the development of the Draft PEIS. On December 8, 2021, USFWS sent NOS a letter requesting additional

information for completing consultation under Section 7 of the ESA for the Proposed Action. NOS provided the requested additional information and proposed revisions to the Draft PEIS on June 1, 2022. These revisions have been incorporated into the Final PEIS where appropriate.

NOS also initiated consultation with NMFS under the MMPA, ESA, and MSA and with USFWS under the MMPA. Additionally, in compliance with the National Marine Sanctuaries Act (NMSA), NOS prepared and submitted a Sanctuary Resource Statement (SRS) to the Office of National Marine Sanctuaries (ONMS) to address the required analyses necessary to initiate a consultation under Section 304(d) of the Act.

Table ES-1 summarizes the status of NOS coordination and consultation as of the publication of the Final PEIS:

Table ES-1. Consultation with Other Federal Agencies

Federal Agency	Statute	Documentation	Consultation Initiated/ Completed
Completed Consultations			
National Marine Fisheries Service Office of Habitat Conservation	Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat	Essential Fish Habitat Assessment	June 2, 2022 Final Response received from NMFS OHC on November 1, 2022
Ongoing Consultations			
National Marine Fisheries Service Office of Protected Resources	Endangered Species Act	Biological Assessment (Draft PEIS)	August 26, 2021 Ongoing
Office of National Marine Sanctuaries	National Marine Sanctuaries Act	Sanctuary Resource Statement	June 1, 2022 Ongoing
National Marine Fisheries Service Office of Protected Resources	Marine Mammal Protection Act	Letter of Authorization Application	June 3, 2022 Ongoing
U.S. Fish and Wildlife Service	Endangered Species Act	Biological Assessment (Draft PEIS)	June 1, 2022 Ongoing
U.S. Fish and Wildlife Service	Marine Mammal Protection Act	Incidental Take Regulation Request	September 12, 2022 Ongoing

Coordination with Tribes

On June 28, 2021, NOS sent letters to tribes notifying them of the availability of the Draft PEIS and inviting them to request government-to-government consultation under Executive Order (EO) 13175, Consultation and Coordination with Indian Tribal Governments. Federally recognized tribes are American Indian or Alaska Native tribal entities recognized as having a government-to-government relationship with the U.S., with the responsibilities, powers, limitations, and obligations attached to that designation, and are eligible for funding and services from the Bureau of Indian Affairs. See 86 FR 7554, updated by 87 FR

4636, for the full list of 574 federally recognized tribes. NOS recognizes its unique relationship with tribes and trust responsibility with tribal governments as set forth in the U.S. Constitution, treaties, statutes, executive orders, and court decisions. It is the policy of NOAA to consult on a government-to-government basis with federally recognized tribal governments when the federal actions and decisions have tribal implications.

NOS did not receive any requests from federally recognized tribes to initiate government-to-government consultation on the Draft PEIS. Additionally, no requests were received to initiate government-to-corporation consultation from any Alaska Native corporation. NOS intends to notify individual federally recognized tribes consistent with EO 13175 before conducting any project that may have tribal implications. Federally recognized tribes are welcome to request government-to-government consultation at any time for a project that may have tribal implications. The consultation and coordination process would be conducted in accordance with NOAA's Procedures for Government-to-Government Consultation with Federally Recognized Indian Tribes and Alaska Native Corporations (NOAA 13175 policy, November 12, 2013).

REVISIONS SINCE THE DRAFT PEIS

NOS updated the Draft PEIS to include additional mitigation measures designed to minimize the impacts of surveying and mapping activities on the human environment. Additional mitigation measures incorporated into the Final PEIS are expected to result in a reduction of adverse environmental impacts analyzed in the Draft PEIS.

Due to the timing of the consultations and the publication of the Final PEIS, the temporal scope of the Proposed Action has been reduced from six years (2022-2027) to five years (2023-2027). The annual numbers for project activities and project miles are expected to remain consistent with those estimated in the Draft PEIS; however, since the Final PEIS covers one less year than the Draft PEIS, the total estimated survey effort has decreased.

NOS, in coordination with the National Marine Fisheries Service, has incorporated additional data sources into the determination of marine mammal density, and has made technical corrections to the acoustic exposure estimates. The updated data are included in the Final PEIS.

PURPOSE AND NEED STATEMENT

The purpose of the Proposed Action is to gather accurate and timely data on the marine and U.S. coastal environment. The need for the Proposed Action is to provide the public and private sectors with nautical charts, benthic habitat condition maps, current and tide charts, and other products necessary for safe navigation, economic security, and environmental sustainability. The public and decision-makers need these products to ensure safety at sea, economic well-being, and the efficient stewardship of public trust resources.

PROPOSED ACTION AND ALTERNATIVES

Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels

Under Alternative A, NOS would continue to operate a variety of equipment and technologies to gather accurate and timely data on the nature and condition of the marine and coastal environment. This

alternative reflects the technology, equipment, scope, and methods currently in use by NOS, at the level of effort reflecting NOS fiscal year 2019 funding levels. NOS operations were widely disrupted during the 2020 field season due to the COVID-19 pandemic. Therefore, the PEIS relies on 2019 as the baseline year for Alternative A as it is the most recent example of typical field operations that would be enacted if NOS chose to continue historical levels of project effort.

Alternative B: NOS Preferred Alternative – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations

Alternative B consists of Alternative A plus the more widespread adoption of new techniques and technologies (such as remotely operated vehicles (ROVs), microwave water level (MWL) radar sensors, etc.) to more efficiently perform surveying, mapping, charting and related data gathering. Specific examples of adaptive methods and equipment that NOS programs are likely to adopt under Alternative B in the next five years include:

- Greater use of ROVs with echo sounder technologies;
- Greater use of autonomous underwater vehicles (AUVs) and uncrewed surface vehicles (USVs) with echo sounder technologies;
- Conversion of one or more existing 10-m (33 feet) crewed survey boats into USVs;
- Greater use of more efficient, wide-beam sonar systems (i.e., phase-differencing bathymetric systems) for nearshore hydrographic surveys;
- Increased field operations in the National Marine Sanctuary system with associated requirements for hydroacoustic charting, surveying, mapping and associated activities; and
- Installation, operation, and maintenance of additional water level stations, including transitioning to mostly microwave water level (MWL) radar sensors and upgraded storm strengthening to make stations more climate resilient.

Under Alternative B, all of the activities and equipment operation described in Alternative A would continue, many at a higher level of effort. The nature of these actions would not change, but the overall level of activity would be increased.

Alternative B is NOS's preferred alternative because it takes advantage of newer, more efficient technology, responds to the needs of anticipated new marine sanctuaries, and more effectively addresses the nation's needs for coastal and marine data.

Alternative C: Upgrades and Improvements with Greater Funding Support

Like Alternative B, Alternative C adopts new techniques and technologies to encourage greater program efficiencies regarding surveying, mapping, charting, and related data gathering activities. In addition, Alternative C would consist of NOS program implementation with an overall funding increase of 20 percent relative to Alternative B. Under Alternative C, all of the activities and equipment operation described in Alternative B would continue, many at a higher level of effort. The nature of these actions would not change, but the overall level of activity would be augmented.

Table ES-2 compares the three alternatives.

Table ES-2. Comparison of NOS Annual Planned Surveying and Mapping Activities under Alternatives A, B, and C*

Activity	Described in Section	Alternative A	Alternative B	Alternative C
Crewed vessel operations	2.4.1	518,000 nm (959,000 km)	577,000 nm (1,070,000 km)	637,000 nm (1,180,000 km)
Anchoring**	2.4.2	55 projects	59 projects	64 projects
ROV/USV/ASV movement	2.4.3	28,600 nm (53,000 km)	86,300 nm (160,000 km)	102,300 nm (189,000 km)
Use of echo sounders	2.4.4	479,000 nm (887,000 km)	534,000 nm (988,000 km)	589,000 nm (1,090,000 km)
Use of sub-bottom profilers	2.4.4	3,210 nm (5,940 km)	5,310 nm (9,830 km)	7,710 nm (14,300 km)
Use of mobile ADCPs	2.4.5	5,890 nm (10,900 km)	11,200 nm (20,700 km)	15,200 nm (28,200 km)
Stationary ADCPs installed/visited for maintenance/removed	2.4.5	37 installed/78 maintenance visits/33 removed	39 installed /79 maintenance visits /33 removed	40 installed /79 maintenance visits /33 removed
Use of acoustic communication systems	2.4.6	24 projects	33 projects	39 projects
Sound speed data collection	2.4.7	56 projects	64 projects	71 projects
Drop/towed cameras/video system operation	2.4.8	31 projects	36 projects	41 projects
Bottom sample collection	2.4.9	54 projects	61 projects	68 projects
Use of passive listening systems***	2.4.10	21 projects	24 projects	29 projects
SCUBA operations	2.4.11	248 projects	254 projects	269 projects
Tide gauges installed/visited for maintenance/removed	2.4.12	32 installed /305 maintenance visits /30 removed	37 installed /305 maintenance visits /35 removed	40 installed /305 maintenance visits /38 removed
GPS reference system installation	2.4.13	12 installed	13 installed	15 installed

*All numbers are approximate and represent an annual level of effort. Projects for each activity were reported by NOS agencies without respect to the combination of activities within projects (e.g., a project involving both crewed vessel operation and echo sounder use would be reported as one crewed vessel project and one echo sounder project).

** NOS estimates that 20 percent of crewed vessel projects include an anchoring component.

***In addition to the projects presented in the table, NOS's Center for Operational Oceanographic Products and Services uses passive listening systems on an as-needed basis. This entails the use of transponder or interrogator sensors during the deployment or retrieval of ADCPs.

ENVIRONMENTAL CONSEQUENCES

Table ES-3 presents a summary of the assessed environmental consequences associated with Alternatives A, B, and C for the resources analyzed in the Final PEIS. A more complete description of impacts is provided in Chapter 3. All environmental consequences from each of the alternatives are anticipated to be adverse, ranging from negligible to moderate, and insignificant, except for the environmental consequences to socioeconomic resources which are anticipated to be indirect, beneficial, and moderate. The primary difference in impacts among the alternatives is one of scale, with the impacts from Alternative B the same or slightly, but not appreciably, larger than those under Alternative A, and from Alternative C the same or slightly, but not appreciably, larger than those under Alternatives A and B for each impact causing factor.

NOS identified the potential for acoustic disturbance to marine mammals as an area warranting detailed analysis. In this Final PEIS, NOS finds that, after conducting quantitative acoustic impacts modeling, impacts on marine mammals under all alternatives are expected to be limited to behavioral disturbances that would be temporary or short-term and would not be considered outside the natural range of variability of species' populations, their habitats, or the natural processes sustaining them. For a few individual high-frequency cetaceans, potential impacts from underwater acoustic sources include injury exposures in the form of hearing loss.

Table ES-3. Summary Comparison of Impacts

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
Habitats	<p>Impacts to habitats from water column disruptions under Alternative A would continue to be adverse and negligible.</p> <p>Impacts to habitats from activities involving physical disturbance to bottom substrate; sedimentation, turbidity and chemical contaminants; increased ambient underwater sound levels; and onshore activities under Alternative A would continue to be adverse and negligible to minor.</p> <p>The impact on habitats from invasive species dispersal facilitated by activities under Alternative A would likely continue to be adverse and minor.</p> <p>Impacts to habitat areas resulting from Alternative A would not cause long-term changes in the availability of space, shelter, cover, or nutrients necessary for dependent species.</p>	<p>Impacts of Alternative B on habitats throughout the action area would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor.</p> <p>Impacts to habitat areas resulting from Alternative A would not cause long-term changes in the availability of space, shelter, cover, or nutrients necessary for dependent species and would not substantially increase in intensity with the increased level of effort of Alternative B.</p> <p>Overall, impacts to habitats under Alternative B would be adverse, minor, and insignificant.</p>	<p>Impacts of Alternative C on habitats throughout the action area would be the same or slightly, but not appreciably, larger than those under Alternatives A and B for each impact causing factor.</p> <p>Impacts to habitat areas resulting from Alternatives A and B would not cause long-term decreases in the availability of space, shelter, cover, or nutrients necessary for dependent species and would not substantially increase in intensity with the increased level of effort of Alternative C.</p> <p>Overall, impacts to habitats under Alternative C would be adverse, minor, and insignificant.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	Overall, impacts to habitats under Alternative A would continue to be adverse, minor, and insignificant.		
Marine Mammals	<p>Impacts on marine mammals (cetaceans, pinnipeds, sirenians, and fissipeds) from trash and debris and air emissions under Alternative A would continue to be adverse and negligible.</p> <p>Impacts from human activity under Alternative A would continue to be adverse and negligible on cetaceans and sirenians and adverse and minor on pinnipeds and fissipeds.</p> <p>Impacts on marine mammals (cetaceans, pinnipeds, sirenians, and fissipeds) from accidental oil, fuel, or chemical spills under Alternative A would continue to be adverse and negligible to minor.</p> <p>Impacts on marine mammals (cetaceans, pinnipeds, sirenians, and fissipeds) from active underwater acoustic sources, vessel and equipment sound, vessel presence and movement of equipment in the</p>	<p>Impacts of Alternative B on marine mammals would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor.</p> <p>Impacts to marine mammals resulting from Alternative A would be temporary or short-term and would not be considered outside the natural range of variability of species’ populations, their habitats, or the natural processes sustaining them. These impacts would not substantially increase in intensity with the increased survey effort of Alternative B.</p> <p>Overall, impacts of Alternative B on marine mammals, including ESA-listed species, and habitat, including designated critical habitat, would be adverse, minor, and insignificant.</p>	<p>Impacts of Alternative C on marine mammals would be the same or slightly, but not appreciably, larger than those that would occur under Alternatives A and B for each impact causing factor.</p> <p>Impacts to marine mammals resulting from Alternatives A and B would be temporary or short-term and would not be considered outside the natural range of variability of species’ populations, their habitats, or the natural processes sustaining them. These impacts would not substantially increase in intensity with the increased survey effort of Alternative C.</p> <p>Overall, impacts of Alternative C on marine mammals, including ESA-listed species, and habitat, including designated critical habitat, would be adverse, minor, and insignificant.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	<p>water under Alternative A would continue to be adverse and minor.</p> <p>Impacts on pinnipeds and fissipeds from air emissions under Alternative A would continue to be adverse and negligible.</p> <p>Although a vessel strike is very unlikely, debilitating injury or mortality of one or a few individuals could occur and impacts would be adverse and moderate, or greater if an ESA-listed species is affected. If a walrus stampede occurs due to vessel or aircraft disturbance, the impact could be adverse and moderate or greater. If polar bears are disturbed at denning sites or if polar bear-human interactions occur, the impact could be adverse and moderate.</p> <p>Potential impacts from underwater acoustic sources include injury exposures in the form of hearing loss (PTS) on cetaceans, but such injury would be rare and confined to a few individual high-frequency cetaceans. It would also include behavioral</p>		

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	<p>disruption exposures of cetaceans, pinnipeds, sirenians and fissipeds, but the amount of time individuals may exceed the behavioral exposure threshold would be on average less than a few minutes.</p> <p>Impacts to marine mammals resulting from Alternative A would be temporary or short-term and would not be considered outside the natural range of variability of species' populations, their habitats, or the natural processes sustaining them.</p> <p>Overall, impacts of Alternative A on marine mammals, including ESA-listed species, and habitat, including designated critical habitat, would continue to be adverse, minor, and insignificant.</p>		
Sea Turtles	<p>Impacts to sea turtles and their habitats from active underwater acoustic sources, vessel and equipment sound, and onshore activities under Alternative A would continue to be adverse and negligible.</p>	<p>Impacts of Alternative B on sea turtles and their habitats would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor.</p>	<p>Impacts of Alternative C on sea turtles and their habitats would be the same or slightly, but not appreciably, larger than those that would occur under Alternatives A and B for each impact causing factor.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	<p>Impacts to sea turtles and their habitats from vessel presence and movement, underwater activities, and air emissions under Alternative A would continue to be adverse and negligible to minor.</p> <p>Impacts to sea turtles and their habitats from accidental oil, fuel, or chemical spills would continue to be adverse and negligible to minor.</p> <p>Although the effects of impact causing factors on sea turtles and their habitats range from negligible to moderate, moderate impacts could occur in the very unlikely event of an accidental spill of oil, fuel, or chemicals. Likewise, in the very unlikely event of a vessel strike, injury or death to sea turtles would also constitute a moderate or greater impact.</p> <p>Impacts to sea turtles resulting from Alternative A would not cause long-term changes in habitat availability and use, sea turtle behavior, or energy expenditures.</p>	<p>Impacts to sea turtles resulting from Alternative A would not cause long-term changes in habitat availability and use, sea turtle behavior, or energy expenditures and would not substantially increase in intensity with the increased survey effort of Alternative B.</p> <p>Overall, impacts on sea turtles and their habitat, including designated critical habitat, would be adverse, minor, and insignificant.</p>	<p>Impacts to sea turtles resulting from Alternatives A and B would not cause long-term changes in habitat availability and use, sea turtle behavior, or energy expenditures and would not substantially increase in intensity with the increased survey effort of Alternative C.</p> <p>Overall, impacts on sea turtles and their habitat, including designated critical habitat, would be adverse, minor, and insignificant.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	<p>Overall, impacts under Alternative A on sea turtles and their habitats, including designated critical habitat, would continue to be adverse, minor, and insignificant.</p>		
<p>Fish</p>	<p>Impacts to fish and their habitats from vessel wake and turbulence; vessel sound; accidental spill of oil, fuel, or chemicals; and disturbance of the ocean/lake/river bottom under Alternative A would continue to be adverse and negligible to minor.</p> <p>Impacts to fish and their habitats from active underwater acoustic sources and air emissions under Alternative A would continue to be adverse and minor.</p> <p>Impacts to fish resulting from Alternative A may include some stress responses without permanent physiological damage, and may disturb breeding, feeding, or other activities but without any impacts on population levels; additionally, there would not be long-term changes in</p>	<p>Under Alternative B, impacts on fish and fish habitat would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor.</p> <p>Impacts to fish resulting from Alternative A may include some stress responses without permanent physiological damage, and may disturb breeding, feeding, or other activities but without any impacts on population levels; additionally, there would not be long-term changes in habitat availability and use or in fish behavior. These impacts would not substantially increase in intensity with the increased survey effort of Alternative B.</p>	<p>Impacts of Alternative C on fish and fish habitat would be the same or slightly, but not appreciably, larger than those that would occur under Alternatives A and B for each impact causing factor.</p> <p>Impacts to fish resulting from Alternatives A and B may include some stress responses without permanent physiological damage, and may disturb breeding, feeding, or other activities but without any impacts on population levels; additionally, there would not be long-term changes in habitat availability and use or in fish behavior. These impacts would not substantially increase in intensity with the increased survey effort of Alternative C.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	<p>habitat availability and use or in fish behavior.</p> <p>Overall, impacts of Alternative A on fish, including ESA-listed species, and fish habitat, including designated critical habitat, would continue to be adverse, minor, and insignificant.</p>	<p>Overall, impacts of Alternative B on fish, including ESA-listed species, and fish habitat, including designated critical habitat, would be adverse, minor, and insignificant.</p>	<p>Overall, impacts of Alternative C on fish, including ESA-listed species, and fish habitat, including designated critical habitat, would be adverse, minor, and insignificant.</p>
Aquatic Macroinvertebrates	<p>Impacts to aquatic macroinvertebrates and their habitats from underwater acoustic sources, vessel sound, and air emissions under Alternative A would continue to be adverse and negligible.</p> <p>Impacts to aquatic macroinvertebrates and their habitats from vessel wake and underwater turbulence; accidental spill of oil, fuel, or chemicals; and disturbance of the ocean/lake/river bottom under Alternative A would continue to be adverse and negligible to minor.</p> <p>Overall, impacts of Alternative A on aquatic macroinvertebrates, including ESA-listed species, and habitats, including designated critical habitat,</p>	<p>Under Alternative B, impacts on aquatic macroinvertebrates and their habitats would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor. These impacts would not substantially increase in intensity with the increased survey effort of Alternative B.</p> <p>Overall, impacts of Alternative B on aquatic macroinvertebrates, including ESA-listed species, and habitats, including designated critical habitat, would be adverse, minor, and insignificant.</p>	<p>Under Alternative C, impacts on aquatic macroinvertebrates and their habitats would be the same or slightly, but not appreciably, larger than those that would occur under Alternatives A and B for each impact causing factor. These impacts would not substantially increase in intensity with the increased survey effort of Alternative C.</p> <p>Overall, impacts of Alternative C on aquatic macroinvertebrates, including ESA-listed species, and habitats, including designated critical habitat, would be adverse, minor, and insignificant.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	would continue to be adverse, minor, and insignificant.		
Essential Fish Habitat (EFH)	<p>Impacts to EFH from disturbance of the water column under Alternative A would continue to be adverse and negligible.</p> <p>Impacts to EFH from physical impacts to bottom habitat; increase in sedimentation, turbidity, or chemical contamination; dispersal of invasive species; and increase in ambient sound under Alternative A would continue to be adverse and negligible to minor.</p> <p>Impacts to EFH resulting from Alternative A would be infrequent, geographically widely distributed, and likely to elicit a minimal or temporary response from prey species or cause short-term changes to physical characteristics (i.e., changes in water quality).</p> <p>Overall, impacts of Alternative A on EFH would continue to be adverse, minor, and insignificant.</p>	<p>Under Alternative B, impacts on EFH would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor.</p> <p>Impacts to EFH resulting from Alternative A would be infrequent, geographically widely distributed, and likely to elicit a minimal or temporary response from prey species or cause short-term changes to physical characteristics (i.e., changes in water quality). These impacts would not substantially increase in intensity with the increased survey effort of Alternative B.</p> <p>Overall, impacts of Alternative B on EFH would be adverse, minor, and insignificant.</p>	<p>Under Alternative C, impacts on EFH would be the same or slightly, but not appreciably, larger than those that would occur under Alternatives A and B for each impact causing factor.</p> <p>Impacts to EFH resulting from Alternatives A and B would be infrequent, geographically widely distributed, and likely to elicit a minimal or temporary response from prey species or cause short-term changes to physical characteristics (i.e., changes in water quality). These impacts would not substantially increase in intensity with the increased survey effort of Alternative C.</p> <p>Overall, impacts of Alternative C on EFH would be adverse, minor, and insignificant.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
<p>Seabirds, Shorebirds and Coastal Birds, and Waterfowl</p>	<p>Impacts to birds and their habitats from active underwater acoustic sources and vessel and equipment sound under Alternative A would continue to be adverse and negligible.</p> <p>Impacts to birds and their habitats from aircraft sound, vessel presence and movement, underwater activities, onshore activities, and air emissions under Alternative A would continue to be adverse and negligible to minor.</p> <p>Impacts to birds and their habitats from accidental oil, fuel, or chemical spills would continue to be adverse and minor to moderate.</p> <p>Although the effects of impact causing factors on birds and their habitats range from negligible to moderate, moderate impacts could occur in the very unlikely event of an accidental spill of oil, fuel, or chemicals. Likewise, in the very unlikely event of a vessel strike, injury or death to birds could constitute greater impacts.</p>	<p>Under Alternative B, impacts on birds and their habitats would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor.</p> <p>Impacts to birds resulting from Alternative A would generally persist only for the duration of an activity and would not be expected to cause any long-term changes in habitat use and availability or energy expenditure outside of the natural range of variation. These impacts would not substantially increase in intensity with the increased survey effort of Alternative B.</p> <p>Overall, impacts on of Alternative B on birds, including ESA-listed species, and habitats, including designated critical habitat, would be adverse, minor, and insignificant.</p>	<p>Under Alternative C, impacts on birds and their habitats would be the same or slightly, but not appreciably, larger than those that would occur under Alternatives A and B for each impact causing factor.</p> <p>Impacts to birds resulting from Alternatives A and B would generally persist only for the duration of an activity and would not be expected to cause any long-term changes in habitat use and availability or energy expenditure outside of the natural range of variation. These impacts would not substantially increase in intensity with the increased survey effort of Alternative C.</p> <p>Overall, impacts on of Alternative C on birds, including ESA-listed species, and habitats, including designated critical habitat, would be adverse, minor, and insignificant.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	<p>Impacts to birds resulting from Alternative A would generally persist only for the duration of an activity and would not be expected to cause any long-term changes in habitat use and availability or energy expenditure outside of the natural range of variation.</p> <p>Overall, impacts on of Alternative A on birds, including ESA-listed species, and habitats, including designated critical habitat, would continue to be adverse, minor, and insignificant.</p>		
Cultural and Historic Resources	<p>Impacts to cultural and historic resources from installation, maintenance, and removal of tide gauges, buoys, and GPS reference stations under Alternative A would continue to be adverse and negligible to minor.</p> <p>Impacts to cultural and historic resources from bottom sampling under Alternative A would continue to be both adverse and beneficial, permanent, and negligible to minor. Beneficial impacts would occur if a resource were discovered that led to</p>	<p>Under Alternative B, impacts on cultural and historic resources would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor. These impacts would not substantially increase in intensity with the increased survey effort of Alternative B.</p> <p>Overall, impacts of Alternative B to cultural and historic resources would be adverse, moderate, and insignificant.</p>	<p>Under Alternative C, impacts on cultural and historic resources would be the same or slightly, but not appreciably, larger than those that would occur under Alternatives A and B for each impact causing factor. These impacts would not substantially increase in intensity with the increased survey effort of Alternative C.</p> <p>Overall, impacts of Alternative C to cultural and historic resources would be adverse, moderate, and insignificant.</p>

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	<p>the identification of a culturally-significant artifact or a previously undocumented historic site.</p> <p>Impacts to cultural and historic resources from anchoring under Alternative A would continue to be adverse, permanent, and negligible to moderate.</p> <p>Impacts on subsistence hunting and fishing, including Traditional Cultural Places, under Alternative A would continue to be adverse and negligible to moderate.</p> <p>Although the effects of impact causing factors on cultural and historic resources range from negligible to moderate, moderate impacts that could occur if the integrity of a resource is diminished would be very unlikely.</p> <p>Overall, impacts of Alternative A to cultural and historic resources would continue to be adverse, moderate, and insignificant.</p>		

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<p>Socioeconomic Resources</p>	<p>The economic impacts of ocean data procured under Alternative A on health and safety, recreational economic activity, transportation, and energy-related activities would continue to be indirect, beneficial, and moderate.</p> <p>Impacts to commercial fishing under Alternative A would continue to be adverse and negligible.</p> <p>Data collected under Alternative A would continue to improve the quality and quantity of ocean data and data products.</p> <p>Overall, Alternative A would continue to have indirect, beneficial, and moderate impacts on the ocean economy.</p>	<p>The economic benefits of impacts of Alternative B would be the same or slightly, but not appreciably, larger than those discussed above under Alternative A. These impacts would not substantially increase in intensity with the increased survey effort of Alternative B.</p> <p>Overall, Alternative B would have indirect, beneficial, and moderate impacts on the ocean economy.</p>	<p>The economic benefits of impacts of Alternative C would be the same or slightly, but not appreciably, larger than those under Alternatives A and B. These impacts would not substantially increase in intensity with the increased survey effort of Alternative C.</p> <p>Overall, Alternative C would have indirect, beneficial, and moderate impacts on the ocean economy.</p>
<p>Environmental Justice</p>	<p>Impacts of underwater acoustic sources on subsistence hunting of marine mammals under Alternative A would continue to be adverse and moderate, and the impacts to subsistence fishing communities would continue to be adverse and minor.</p>	<p>Under Alternative B, impacts on environmental justice would be the same or slightly, but not appreciably, larger than those that would occur under Alternative A for each impact causing factor. These impacts would not substantially increase in intensity with the</p>	<p>Under Alternative C, impacts on environmental justice would be the same or slightly, but not appreciably, larger than those that would occur under Alternatives A and B for each impact causing factor. These impacts would not substantially increase in intensity</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	<p>Impacts of vessel and equipment noise on subsistence hunting of marine mammals under Alternative A would continue to be adverse and minor, and the impacts to subsistence fishing communities would continue to be adverse and negligible.</p> <p>Impacts of vessel and equipment presence and movement on subsistence hunting of marine mammals under Alternative A would continue to be adverse and moderate, and the impacts to subsistence fishing communities would continue to be adverse and negligible.</p> <p>Impacts of human activities and accidental leakage or spillage of oil, fuel, and chemicals on subsistence hunting and fishing under Alternative A would continue to be adverse and minor.</p> <p>Impacts of marine trash and debris and air emissions on subsistence hunting and fishing activities under</p>	<p>increased survey effort of Alternative B.</p> <p>Overall, impacts of Alternative B on environmental justice would continue to be adverse, minor to moderate, and insignificant.</p>	<p>with the increased survey effort of Alternative C.</p> <p>Overall, impacts of Alternative C on environmental justice would continue to be adverse, minor to moderate, and insignificant.</p>

Resource	Alternative A: No Action – Conduct Surveys and Mapping for Coastal and Marine Data Collection with Current Technology and Methods, at Current Funding Levels	Alternative B: Conduct Surveys and Mapping with Equipment Upgrades, Improved Hydroacoustic Devices, and New Tide Stations	Alternative C: Upgrades and Improvements with Greater Funding Support
	<p>Alternative A would continue to be adverse and negligible.</p> <p>The availability of new mapping and charting information under Alternative A would have beneficial effects on EJ communities.</p> <p>Overall, impacts of Alternative A on environmental justice would continue to be adverse, minor to moderate, and insignificant.</p>		

