



**NOAA**  
**FISHERIES**

# STRATEGIC SCIENCE PLAN

**FY2023 - FY2027**

# Table of Contents

<b>Introduction</b> .....	1	<b>Science Goals, Objectives, and Strategies</b> . . .	13
Vision, Mission, and Core Values .....	1	<b>Goal 1:</b> Monitor and assess fish, crab, and marine mammal populations, fisheries, and marine ecosystems. ....	14
<b>AFSC Overview</b> .....	2	<b>Objective 1.A:</b> Conduct high utility and quality assessments which will directly contribute to the most effective assessment tier of fish and crab, and level of excellence for marine mammal stocks, while improving efficiency of fisheries-dependent and independent data collection. ....	14
Organizational Structure .....	4	<b>Objective 1.B:</b> Conduct applied marine ecosystem and socioeconomic analyses and assessments to support sustainable fisheries management and marine mammal conservation. ....	15
Federal Budget Structure .....	5	<b>Objective 1.C:</b> Create next generation fish, crab, and marine mammal stock assessments. ....	15
Human Capital Resources .....	6	<b>Objective 1.D:</b> Reduce bycatch using fishery-dependent bycatch analysis, spatial modeling, data on environmental conditions, and conservation engineering. ....	16
Facilities Assets.....	6	<b>Goal 2:</b> Investigate, model, and predict ecosystem and climate impacts on living marine resources. ....	17
Challenges and Opportunities .....	6	<b>Objective 2.A:</b> Investigate ecosystem-level changes (habitat, food webs, trophic dynamics, distributional shifts, etc.) with field and modeling studies. ....	17
<b>Organizational Excellence</b> .....	8	<b>Objective 2.B:</b> Hindcast, forecast, and project direct and indirect effects of climate change on fish, crab, and marine mammals and the associated communities which rely on these resources.....	18
<b>Commitment 1:</b> Continue to foster an AFSC culture that values and practices transparency, engagement, accountability, and respect. ....	9	<b>Objective 2.C:</b> Identify and implement Arctic research priorities. ....	18
<b>Commitment 2:</b> Continue to value diversity, equity, inclusion, and accessibility in our workplace. ....	10	<b>Goal 3:</b> Advance new initiatives and innovations. ....	19
<b>Commitment 3:</b> Continue to enhance processes that ensure integrity of business operations (financial accountability and effective workforce management functions), a safe work environment, and proactive and strategic communication. ....	10	<b>Objective 3.A:</b> Promote data innovation and quality improvement to facilitate science and support data-driven decision making.....	19
<b>Commitment 4:</b> Continue to provide state-of-the-art information technology that advances the AFSC mission. ....	11	<b>Objective 3.B:</b> Develop innovative technologies to support our mission with improved performance and cost effectiveness. ....	20
<b>Commitment 5:</b> Continue to embrace change management as our approach for maintaining an operational budget and balanced research portfolio. ....	11	<b>Objective 3.C:</b> Expand ‘omics research capacity. ..	21
<b>Commitment 6:</b> Continue to strengthen organizational resilience to crises. ....	12	<b>Objective 3.D:</b> Expand aquaculture research capacity. ....	21
<b>Commitment 7:</b> Continue to develop and promote stakeholder partnerships and collaborations. ....	12	<b>Appendices</b> .....	22
		Appendix A: Acronyms .....	22
		Appendix B: Executive Orders relevant to the AFSC.....	23



# Introduction

This **Strategic Science Plan for the Alaska Fisheries Science Center (AFSC)** of the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) identifies our priorities for the next five years (FY2023–FY2027). The demand for our services is high and continues to increase and become more complex. As part of the AFSC's commitment to actualizing a transparent and inclusive workplace culture, this plan was developed with the expertise and perspectives of our staff. The plan will guide internal decision-making and resource allocation, and provide insight on our priorities to external partners.

The AFSC Strategic Science Plan includes a vision and mission statement, as well as our commitments to maintain organizational excellence. It also includes science goals, objectives, and strategies designed to support and advance the mission of [NOAA](#) and [NOAA Fisheries](#) and is aligned with their current strategic plans. Accompanying this plan is the AFSC's Annual Guidance Memoranda, which will prioritize a single year's activities to make progress toward meeting the longer-term objectives identified in this Strategic Science Plan. Together, the Strategic Science Plan and the Annual Guidance Memo lay out the priorities that inform the AFSC's Activity Planning and Prioritization process. This process is used to make decisions about the allocation of funding in a transparent, unbiased, and consistent manner.

## Vision, Mission, and Core Values

**AFSC Vision Statement:** To be scientific leaders for the stewardship of living marine resources<sup>1</sup> in the U.S. federal waters of Alaska with a steadfast commitment to provide stakeholders<sup>2</sup> with the information necessary to address ecosystem and resource management challenges now and into the future.

<sup>1</sup> Living marine resources include fish, invertebrates, and most marine mammals, and the habitats on which they depend.

<sup>2</sup> Stakeholders include resource managers, industry, local communities, Alaska Natives, and other members of the public.

**AFSC Mission Statement:** To provide science and services in support of productive and sustainable fisheries, recovery and conservation of protected resources, and healthy ecosystems in the marine waters of Alaska.

**AFSC Core Values:** Consistent with NOAA Fisheries Strategic Plan and [NOAA's Administrative Order on Scientific Integrity](#), we continue to embrace the following values when conducting business:

**Integrity** - Being open, honest, and transparent.

**Respect** - Encouraging open discussion, promoting engagement in a constructive and collaborative manner, and treating others equally and with dignity.

**Accountability** - Accepting responsibility for our actions and decisions and operating together to address the priorities of the agency.

**Inclusion** - Recognizing that success relies upon a culture of teamwork where diverse input makes for more comprehensive and better-informed decisions.



## AFSC Overview

The AFSC conducts essential research on living marine resources and their habitats in the marine waters of Alaska to support sustainable resource management and the communities that rely on those resources. This region of nearly 1.5 million square miles includes waters in five **Large Marine Ecosystems (LME)** defined by NOAA as: the Gulf of Alaska, Aleutian Islands, eastern Bering Sea, northern Bering Sea and Chukchi Sea, and Beaufort Sea<sup>3</sup>. Together, these waters support some of the most productive and valuable fisheries in the world, and are home to some of the largest populations of marine mammals in the Nation.

Activities conducted at the AFSC are mandated or guided by [laws](#), [policies](#), [executive orders](#) ([Appendix B](#)), memoranda, and treaties including but not limited to:

- [Magnuson–Stevens Fishery Conservation and Management Act \(MSA\)](#): The MSA (including ten [National Standards](#)) is the primary law that governs marine fisheries management in U.S. federal waters and specifies that conservation and management measures shall be based upon the best scientific information available. Through the MSA, the [North Pacific Fishery Management Council \(NPFMC\)](#) was established to manage the federal fisheries off Alaska. The AFSC conducts scientific research and provides information products as a basis for NPFMC and NOAA Fisheries Alaska Regional Office (AKRO) management decisions. As a result, Alaska boasts some of the most well-managed and sustainable federal fisheries in the world. This includes supporting development of [Fishery Management Plans \(FMP\)](#) and identification and protection of [Essential Fish Habitat \(EFH\)](#).
- [Endangered Species Act \(ESA\)](#): The ESA protects endangered and threatened species and their critical habitat. NOAA Fisheries is responsible for specific marine and anadromous species listed under the ESA. The AFSC conducts research that supports regional management and recovery of ESA listed species and identification and conservation of critical habitat.
- [Marine Mammal Protection Act \(MMPA\)](#): The MMPA is intended to prevent adverse impacts to marine mammal populations. Through the MMPA, the AFSC is responsible for assessing cetacean and most pinniped populations in Alaska (except for sea otter, walrus, and polar bear) and some pinniped populations in the California Current. The MMPA also establishes a framework for NOAA Fisheries to establish agreements with Alaska Native Organizations for the [co-management](#) of marine mammals in Alaska.
- [National Environmental Policy Act \(NEPA\)](#): The NEPA requires federal agencies to consider the environmental impacts of their major actions. Specifically, the AFSC must ensure our planned activities comply with NEPA

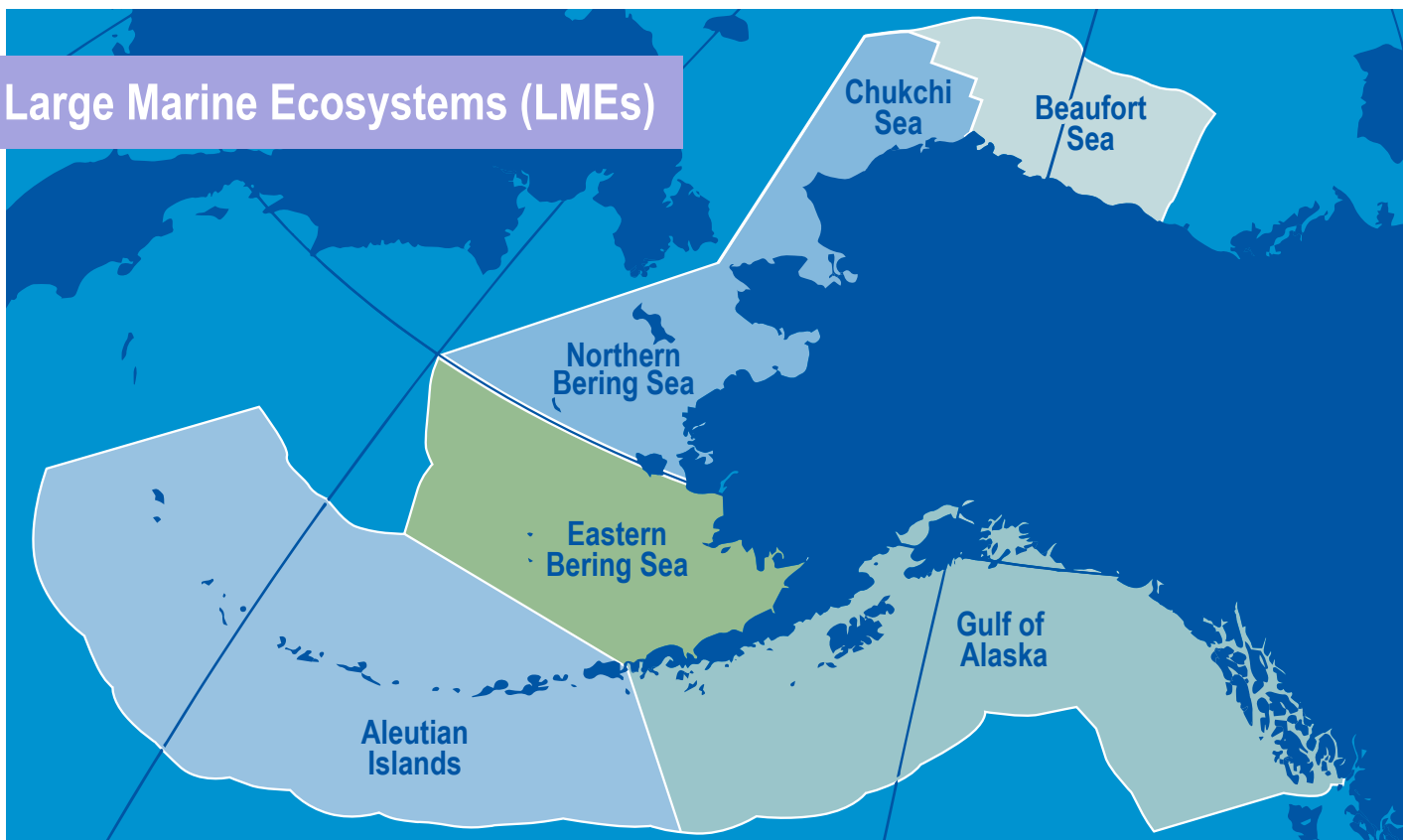
<sup>3</sup> Note that the boundaries of these LMEs are distinct from the North Pacific Fishery Management Council's Fishery Management Plans (FMP) which include the Gulf of Alaska Groundfish FMP, the Bering Sea and Aleutian Islands Groundfish FMP (which groups the eastern Bering Sea Shelf and the northern Bering Sea together), and the Arctic FMP (which groups the Chukchi and Beaufort together), as well as Crab, Salmon, and Scallop FMPs.



and other statutory and regulatory requirements. We also conduct research to support NEPA evaluation of activities proposed by other federal agencies in Alaska.

- [The Ecosystem Based Fisheries Management \(EBFM\) Policy](#) and the [EBFM Roadmap](#) direct continued progress to develop and implement EBFM. They also reinforce NOAA Fisheries' commitment to incorporate EBFM into its resource management decisions. The AFSC develops ecosystem indicators that contribute to stock assessments and fisheries management in Alaska.
- [The National Aquaculture Act](#) and the U.S. [Department of Commerce and NOAA Aquaculture Policies](#) establish aquaculture as a national priority. The AFSC conducts research to guide the development of environmentally sustainable aquaculture in Alaska.
- [Pacific Salmon Treaty](#): The Treaty ratified the agreement between the United States and Canada to cooperate in the management, research, and enhancement of Pacific salmon stocks of mutual concern. It also established the Pacific Salmon Commission (PSC). The AFSC provides scientific guidance to the PSC.
- The Convention establishing the [International Pacific Halibut Commission](#) (IPHC): The IPHC was established by a Convention between the United States and Canada to manage Pacific halibut stocks. The AFSC provides scientific information to allow optimum yield and sustainability of these stocks.
- [National Habitat Policy](#): This policy outlines a set of guiding principles that are used to inform NOAA's actions and strategic priorities related to habitat conservation. The AFSC conducts comprehensive research on habitat and ecological processes and assists the NPFMC and AKRO in identification and protection of EFH.
- [Regulatory Flexibility Act](#): This act requires agencies to consider the impact of their rules on small entities and to evaluate alternatives that would accomplish the objectives of the rule without unduly burdening small entities when the rules impose a significant economic impact on a substantial number of small entities.
- [NOAA's Arctic Vision and Strategy](#) provides a high-level framework and six strategic goals to address NOAA's highest priorities in the Arctic. [NOAA's Arctic Action Plan](#) provides a roadmap to make progress in monitoring, understanding, and protecting this region. The AFSC is the primary NOAA Fisheries Science Center that conducts research in the Arctic.

## Large Marine Ecosystems (LMEs)



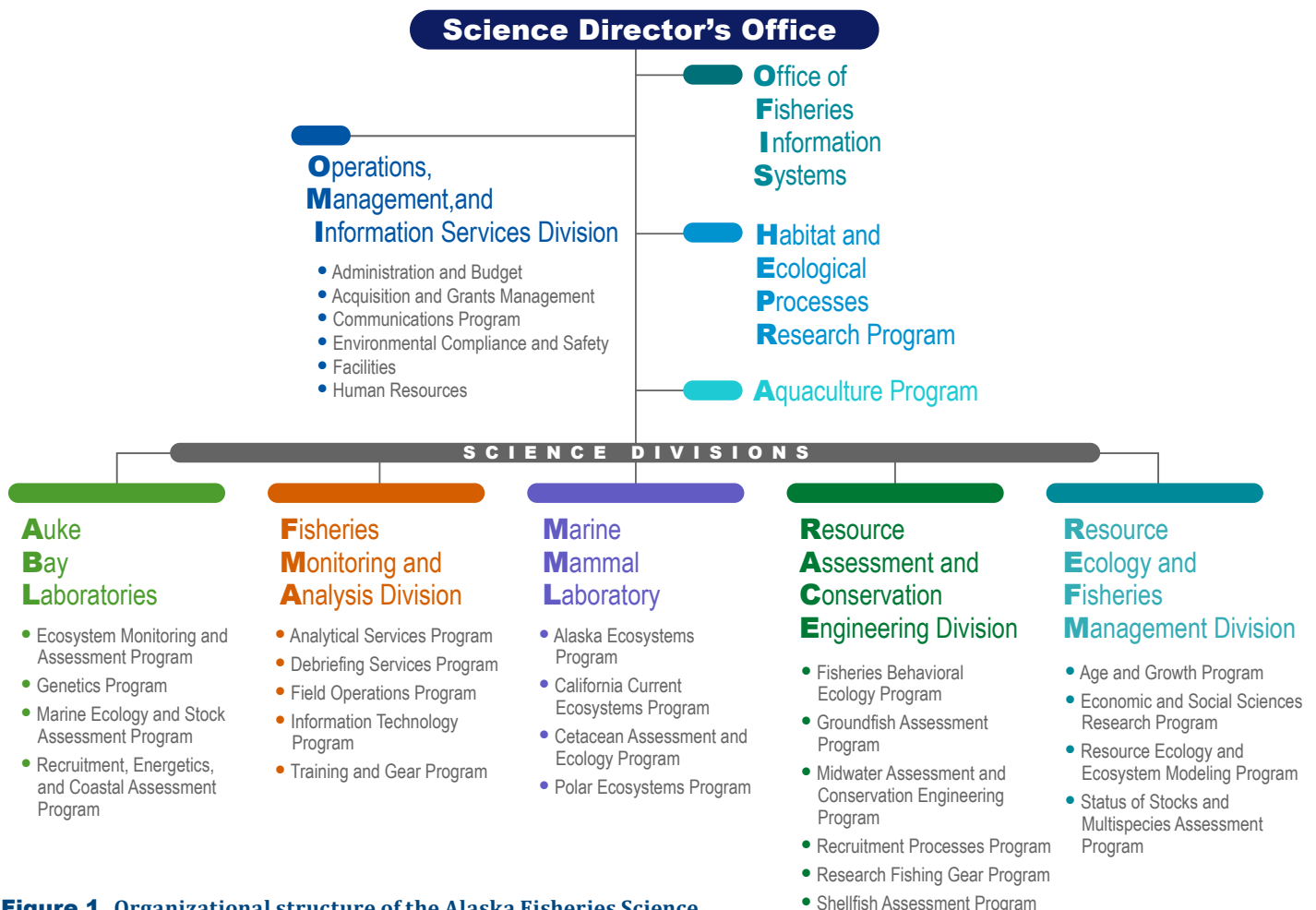
## Organizational Structure

The AFSC is composed of six divisions overseen by the Science Director’s Office (Figure 1), which lead and carry out mission-essential research, operations, and administrative activities.

Science Director’s Office (SD): This office provides guidance and leadership for the science conducted at the AFSC. The SD also oversees the Habitat and Ecological Processes Research Program (HEPR), the Aquaculture Program, the Office of Fisheries Information Services (OFIS), and the Planning Officer. OFIS provides technical support and development services for AFSC’s information technology (IT) enterprise.

- Operations, Management, and Information Services Division (OMI): This division supports the day-to-day administrative and business operations of the AFSC, including overseeing administrative services, budget formulation and execution, acquisition and grants management, workforce management, communications, safety and environmental compliance, and facilities operations.

- Auke Bay Laboratories (ABL): Housed at the Ted Stevens Marine Research Institute in Juneau, this division consists of four programs that conduct research on fish energetics, population dynamics, distributions, and genomics, and marine food webs, habitats, and ecosystems. These data are used to develop and deliver stock assessments of commercially marketable species, to develop climate-informed fisheries models, and to provide information vital to sustainable fisheries management.
- Fisheries Monitoring and Analysis Division (FMA): With five programs, this division enables management and supports stock assessment through the monitoring of groundfish and halibut fishing activities in the US Exclusive Economic Zone (EEZ) off Alaska. They are responsible for training, briefing, debriefing, deploying, and overseeing observers who collect data onboard fishing vessels and at processing plants, and for quality control/quality assurance of observer data. Associated research includes development and implementation of electronic monitoring technologies.



**Figure 1. Organizational structure of the Alaska Fisheries Science Center. Science divisions include support staff for operations, facilities, and administration.**





**Figure 2.** Federal budget structure for NOAA Fisheries.

- Resource Assessment and Conservation Engineering Division ([RACE](#)): Scientists in six programs support stock assessment and fisheries management by conducting research surveys and oceanographic studies to measure the distribution and abundance of commercially important fish and crab stocks throughout Alaska. The resulting long time series allows scientists to understand population trends and study how marine habitats and ecosystems vary naturally and due to climate change. They also integrate field, laboratory, and modeling studies to determine how varying biological and physical factors influence large marine ecosystems within Alaskan waters. Together with the commercial fishing industry, scientists also explore technologies to help reduce bycatch and bycatch mortality.
- Resource Ecology and Fisheries Management Division ([REFM](#)): This division consists of four programs that conduct research to support sustainable management of Alaska's groundfish and crab resources. Division scientists produce stock, ecosystem, and economic assessments annually. They conduct research on fish population dynamics, genetics, diets, age, and growth. Division scientists also evaluate how fish stocks, human dimensions, and other ecosystem components might be affected by current and future fisheries management actions in a changing climate.
- Marine Mammal Laboratory ([MML](#)): This division consists of four programs and conducts research on

cetaceans and pinnipeds off the coast of Alaska and the Arctic, and in the California Current. The division collects data on marine mammal behavior, population dynamics, life history, migration patterns, distribution, and trends in abundance.

## Federal Budget Structure

NOAA Fisheries has 4 major enterprises with 14 major Program Project and Activities (PPA) (Figure 2) that direct and guide how we allocate our Operations Research and Facilities (ORF) base funding at the AFSC. Each PPA has a specific definition that determines how the associated funding may be used. Note that the AFSC does not receive funds from all 14 PPAs. In addition to ORF base funds, the AFSC also receives temporary (from within NOAA) and reimbursable (from outside of NOAA) funds directed toward specific projects.

As of FY2021, the AFSC receives approximately \$63M in base funding and operates with a total annual budget of approximately \$85M (including temporary and reimbursable funding). Relatively flat budgets in the past five years have resulted in reduced operational funds due to inflationary costs which include labor, facilities, contracts, technology, and corporate fees. Annual uncertainty in budgets requires balancing expectations regarding staffing and other infrastructure, support for long-term data collection, and planning for expanding requirements to meet our mission-related goals.



## Human Capital Resources

The ability of the AFSC to meet its mission relies on the diverse skills and backgrounds of our 325 federal employees and 125 contractors and affiliate staff, who are geographically dispersed across our locations. These significant human capital resources are our most valuable asset, contributing both to scientific, operational, and administrative mission activities and to education, mentoring, and outreach activities to attract and train the next generation of scientists.

## Facilities Assets

The AFSC maintains 10 facilities across three states: Alaska, Oregon, and Washington (Table 1). We also utilize multiple observation platforms to maximize our ability to collect data.

**Table 1. AFSC facilities and associated locations.**

Facility	Location
NOAA Western Regional Center	Seattle, WA
Ted Stevens Marine Research Institute	Juneau, AK
Kodiak Fisheries Research Center	Kodiak, AK
Hatfield Marine Science Center	Newport, OR
Anchorage Field Office	Anchorage, AK
Dutch Harbor Field Office	Dutch Harbor, AK
Auke Creek Weir	Juneau, AK
Juneau Support Dock	Juneau, AK
Little Port Walter Field Station	Baranof Island, AK
Pribilof Islands Research Facility	St. Paul, AK

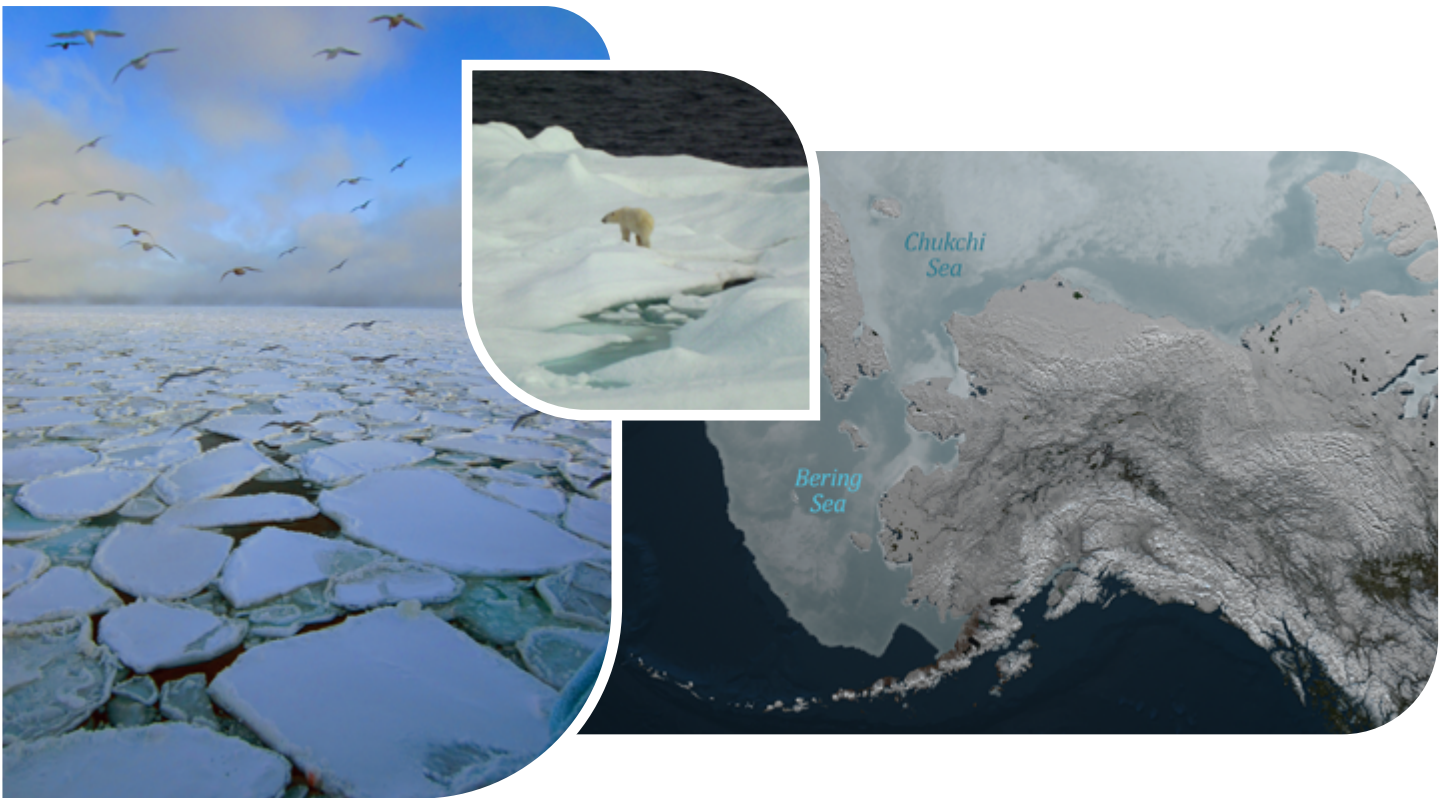
## Challenges and Opportunities

The AFSC is required to conduct population assessments and monitor harvests as mandated by the laws described above. We must also strive to achieve a balanced and diversified research portfolio. This is critical if we are to continue to provide the science needed to support sustainable fisheries management, conserve protected resources, and maintain healthy ecosystems and communities, especially in light of shifting populations and the new challenges we are facing due to climate change.

Climate change and subsequent changes in ecosystems are responsible for non-stationary responses in biological communities with increased regularity. In Alaska, in particular, we have observed expanding fish and marine mammal stock boundaries in the northern Bering Sea and Chukchi Sea and unprecedented population level responses (e.g., phenological shifts and changes in community structures) due to multiple marine heatwaves and loss of sea ice. These changes exemplify the need to reassess data collection frequency, density, and spatial coverage.

Ocean acidification presents an additional environmental challenge because the ocean is absorbing excess atmospheric carbon dioxide, leading to lower pH and greater acidity. Alaska is expected to experience ocean acidification faster than any other coastal waters in the country, due to its colder water, coastal hydrodynamics, freshwater discharge, and naturally corrosive bottom waters.





Loss of sea ice is changing the Arctic. Since the 1980s, Arctic sea ice extent has [declined by 50%](#). As a result, every summer, an area encompassing more than 300 km is open water north of Alaska. In contrast, 30 years ago, only 50 km of open water was typically observed each year. The ice-free season north of the Bering Strait is projected to increase from 2-3 months at present to about 5-6 months over the next few decades. By 2040, the Arctic Ocean is expected to be nearly ice-free during the summer months.

Shifting stocks may lead to changes in commercial bycatch patterns. National Standard 9 of the MSA states that conservation and management measures shall, to the extent practical, minimize bycatch, and to the extent bycatch cannot be avoided, minimize the mortality of such bycatch. Impacts from bycatch and bycatch mortality vary across fisheries, and may have adverse biological, economic, and social consequences that require evaluation of trade-offs. Bycatch can negatively affect protected species and have ecological impacts that affect marine ecosystems and fishery productivity. It also can have negative economic and social impacts on the fishing industry and communities that rely on the fishery or bycaught species.

While we have challenges, there are also opportunities. Through strategic and focused efforts, we can build on our strengths and identify areas where we can have the greatest impact. This includes maintaining and advancing our fish, crab, and marine mammal stock assessments; improving the way we collect, process, and analyze field- and laboratory-based data and communicate results to our stakeholders; and refining our approach to ecosystem-based management to be more inclusive of our diverse stakeholder communities. The AFSC aims to be responsive to existing and new stock assessment, sustainable yield, and bycatch challenges. The AFSC plans to grow our capacity in aquaculture and ‘omics<sup>4</sup> research (specifically genomics). We also commit to make investments in the development of new technologies (such as electronic monitoring and artificial intelligence) and to continue, and expand, our critical climate-related research.

The AFSC is well poised, given our long history of monitoring and research in Alaska, to lead the way in understanding the current state of the ecosystem and predicting future changes. The AFSC does, and will, continue to provide valuable data and information to resource managers, the fishing industry, and coastal communities so they can respond and adapt to environmental change. We are a model for the Nation and world in delivering trusted science to support sustainable fisheries management and protected species and habitat conservation.

<sup>4</sup> ‘Omics describes a suite of cutting-edge tools used to analyze DNA, RNA, proteins, or metabolites.



## Organizational Excellence

Underpinning all of the scientific work we do is the AFSC's continued commitment to maintain a strong organizational culture that fosters scientific excellence. This includes an intentional workforce culture; diversity of, and equity across, our workforce; effective operations; proactive and strategic communications, education, outreach, and stakeholder engagement; excellent information technology (data integrity, storage, and computing capacity); thoughtful change and crisis management; and constructive partnerships. Our overarching goal is to achieve the highest standards of integrity, transparency, and service in all AFSC operations so that we may succeed in carrying out our mission as an organization. While there is overlap among many of these commitments, we have divided them into discrete sections to facilitate their descriptions.





**Commitment 1: Continue to foster an AFSC culture that values and practices transparency, engagement, accountability, and respect.**

The AFSC recognizes that to be a world-class scientific organization, we need to continue to build and support a culture that enables us to realize the full benefit of the diverse skills and experiences of our staff. We are committed to creating an environment where all staff feel knowledgeable, included, valued, and respected through AFSC Leadership communicating clearly and frequently, seeking feedback, and explaining how and what decisions are made. We strive to empower staff to engage in important decisions facing the Center and to lead at all levels of the organization. Faced with significant fiscal, climate, and social challenges, as well as substantial new technological and analytical opportunities, our continued success relies on harnessing the collective perspectives and expertise at the Center for maximum impact. Our actions promote work environments that are respectful, constructive, and professional at all times. The AFSC acknowledges that providing equitable opportunities for professional growth and development, succession planning, and recognizing individual and team contributions are the foundation for recruiting and retaining highly skilled staff, developing our next leaders, strengthening our resilience, and achieving organizational excellence. The AFSC is committed to:

- Creating a culture of transparency, engagement, accountability, and wellness. This includes reinforcing the AFSC Code of Conduct, collaborating with the Workforce Collaboration Team, and actively promoting and participating in activities and programs sponsored by the NOAA Fisheries Total Worker Wellness Program.
- Encouraging cross-divisional collaboration through formal and informal working groups.
- Promoting a culture of continual growth and improvement to support a resilient organization by:
  - Providing training opportunities to keep staff current in their fields, to improve and refine their interpersonal and communication skills, strengthen cultural awareness so they can be responsive and successful in communicating to and working with stakeholders, and to help them pursue individual development opportunities.
  - Advancing succession planning and developing training, mentoring, and shadowing programs to meet projected staffing needs to promote a more successful and diverse work environment.
  - Recognizing and rewarding achievement.





### **Commitment 2: Continue to value diversity, equity, inclusion, and accessibility in our workplace.**

Providing an inclusive workplace culture where all staff feel respected and appreciated is a core commitment for the AFSC. We envision a culture where all staff (federal employees and affiliates alike) are engaged in their work, are empowered to advance our mission, and feel comfortable bringing their whole selves to work. An inclusive culture leverages the talents of our workforce, maintains job satisfaction, and makes the AFSC a more welcoming place to work. The AFSC is committed to:

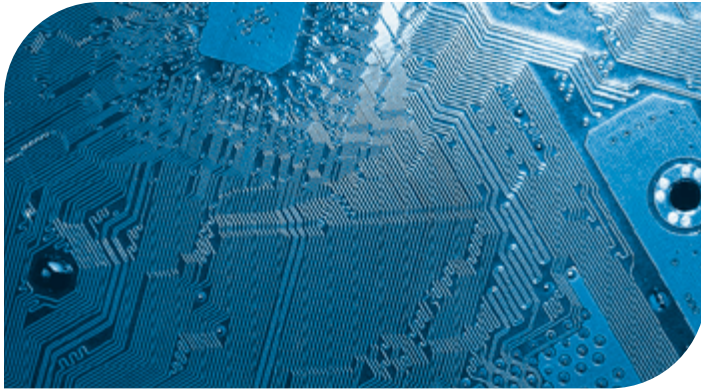
- Recruiting and retaining high quality, diverse, and dedicated employees to achieve the AFSC mission.
- Supporting the Team for Inclusion, Diversity, and Equity, the Equity Analysis Committee, and the Harassment Prevention Working Group.
- Finalizing and implementing the AFSC Diversity, Equity, Inclusion, and Accessibility Strategic Plan.



### **Commitment 3: Continue to enhance processes that ensure integrity of business operations (financial accountability and effective workforce management functions), a safe work environment, and proactive and strategic communication.**

It is critical that the AFSC uses processes and tools for accountability and the responsible management of public funds. All personnel must be able to perform their duties in a workplace free of all recognized safety and occupational health hazards in order to maintain safety and environmental compliance. We must also be proactive and strategic in our communications and provide responsive and efficient service to internal and external partners and stakeholders. The AFSC is committed to:

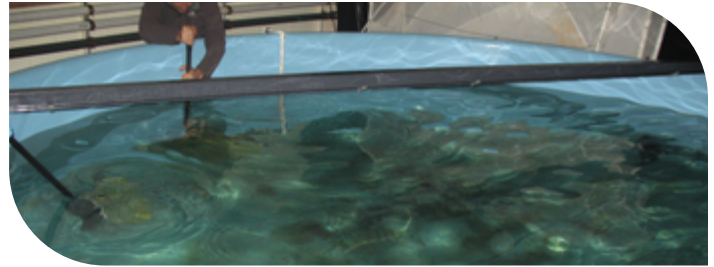
- Providing service-oriented operations for our performance-based management, workforce planning, and budget execution.
- Integrating safety compliance and environmental stewardship into our everyday work activities and planning through the Safety Council.
- Identifying and supporting divisional education, outreach, and communications priorities that support the overall AFSC goals and objectives to effectively communicate our mission and research findings.
- Facilitating communications internally and externally for high profile events, activities, and subject matter.



**Commitment 4:** Continue to provide state-of-the-art information technology that advances the AFSC mission.

The AFSC strives to provide secure information technology (IT) services and support, help our staff use technology more effectively, and make available a supportive research IT ecosystem for continuous innovation. The Office of Information Services (OFIS), through trusting partnerships with our staff, programs, and external entities, provides innovative IT solutions, and meets the diverse existing and emerging technology needs of our research community. The AFSC is committed to:

- Delivering excellent IT customer service to the AFSC community that is proactive, responsive, and consistent.
- Developing systems and applications that are secure, reliable, integrated, and that enable the work of the AFSC community, focusing on services that are most valued by staff.
- Aligning data initiatives with strategic research priorities to make data more available and accessible while balancing the competing needs for security, privacy, and regulatory compliance.
- Embracing advancements of data science, make available new approaches and capabilities to AFSC research teams and intentionally directing more of our IT efforts to supporting research innovation, early access to, and experimentation with emerging methods and technologies.
- Establishing robust infrastructure, support, and services that enable cost-effective and at-scale provisioning of on-premise and cloud-based computing, storage, networking, and visualization services and tools.
- Developing and improving services, minimizing barriers to internal and external collaboration, and increasing awareness and adoption of available research services and technologies.



**Commitment 5:** Continue to embrace change management as our approach for maintaining an operational budget and balanced research portfolio.

Change management is the application of a structured process and set of tools for leading people through organizational change. We want staff to understand why change is happening and to play an active role in how we move forward as a Center. Organizational change is necessary to ensure our long-term success as we face the challenges of implementing an increasingly complex mission with a flat operational budget. We must constantly review and revise the way we do business to meet these challenges through innovation and strategic planning. Ideally, the change entails both continuing to improve efficiency (through streamlining, cost cutting, and reducing effort in some areas of our operations), while refocusing effort and building capacity in strategic areas of strength to take advantage of new opportunities. Although change can be uncomfortable, especially when it includes uncertainty, the AFSC is committed to:

- Communicating early and often about any changes that will be made (internally and externally).
- Continuing to implement strategic resource management to review and optimize base resource allocations and execution through our annual Activity Plan Prioritization process.
- Developing guidance for strategic staffing. Strategic staffing ensures we have adequate expertise for our priority activities and maximizes staff's skills with an overall goal of reducing labor costs. Guidance will provide clear expectations for when we will hire positions (new and backfills) and when we will not.
- Streamlining Our Success. The AFSC will invigorate our efforts to address our fiscal challenges by utilizing top down and bottom up approaches to identify ways we can reduce effort in some areas of our operations, become more effective and efficient in the operations we maintain, and refocus and build capacity in strategic areas to accommodate emerging topics and opportunities.





### **Commitment 6: Continue to strengthen organizational resilience to crises.**

Periodically, an organization's resilience to crises are tested. Crises occur at multiple scales, from the COVID-19 pandemic to the unexpected loss of key personnel. AFSC priorities during crises are to foster the safety and well-being of staff, avoid or minimize disruptions to our mission, and enable flexibility to meet changing demands. Resilience requires careful planning and learning from our performance in past crises. To strengthen our resilience, the AFSC is committed to:

- Actively promoting and participating in activities and programs sponsored by the NOAA Fisheries Total Worker Wellness Program.
- Engaging in consistent and thoughtful crisis communications planning.
- Documenting decision-making authority and lines of communication that will be implemented in times of crisis.
- Empowering leadership and input on decision-making at all levels.
- Building on lessons learned from the Covid-19 pandemic, large-scale oil spills (Deep Water Horizon and Exxon Valdez), and weather-related events.
- Conducting annual staffing capability and capacity reviews to identify potential single points of failure and where cross-training is needed.



### **Commitment 7: Continue to develop and promote stakeholder partnerships and collaborations.**

We rely on our external partnerships to achieve the AFSC mission. As the mission of AFSC becomes more complex, strengthening these partnerships becomes increasingly important. We use inclusive and participatory approaches to identify stakeholders and priority information needs, and to facilitate equitable, inclusive decision-making internally and externally. The AFSC is committed to:

- Continuing to support the NPFMC by providing science and participating in committees, including leadership roles, to support sustainable fisheries management in Alaska.
- Collaborating with Indigenous Knowledge holders to develop bi-directional and parallel knowledge pathways to support climate-informed fisheries and ecosystem policies regionally and internationally. We do this by:
  - Integrating communications protocols for survey and research operations that have the potential to overlap with subsistence activities into our annual activity planning process.
  - Employing our Tribal Research Coordinator to work with staff to identify research priorities for collaborative and co-produced knowledge.
  - Instituting regular cultural awareness training for staff.
- Building on successful partnerships with the commercial fishing industry, the State of Alaska, and the Pacific States Marine Fisheries Commission to conduct many of our fisheries surveys and other research and monitoring activities that support common goals to improve resource assessment and management.
- Continuing to develop and foster relationships with private sector businesses to extend our technical capabilities.
- Expanding our partnerships with academic institutions to generate high caliber science products, provide growth and learning opportunities for the AFSC, and mentor the next generation of marine scientists.
- Fostering collaborations with existing and new partners to support our scientific mission.



## Science Goals, Objectives, and Strategies

Three goals will guide our work over the next five years. These goals reflect NOAA Fisheries' core mission to maintain sustainable fisheries and conserve and recover protected species. Under each goal, we have identified objectives to describe more specifically what outcomes or impact we are trying to achieve with each goal. Under each objective, we have further identified a series of strategies that we will use to achieve each objective. In some cases, more details will be found in topic-specific Strategic Plans and planning documents. *Please note that the elements of organizational excellence described above apply to all science goals.*





### **Goal 1: Monitor and assess fish, crab, and marine mammal populations, fisheries, and marine ecosystems.**

The work of monitoring and assessing fish, crab, and marine mammal populations, fisheries, and marine ecosystems is mandated by legislation described above (AFSC Overview). The Alaska region supports some of the most important fisheries in the world, as well as diverse marine mammal populations and productive ecosystems. The AFSC conducts surveys and stock assessments in Alaska to guide decisions for sustainable management of federal fisheries; co-management of marine mammals for subsistence and conservation of protected species; and stewardship of marine ecosystems. The first two Objectives in Goal 1 describe research activities that represent work the AFSC must continue under the most restrictive budget scenarios.

**5** Stock Assessment Tier: NPFMC tiers are defined in the introduction of the annual Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska Groundfish and BSAI Crab Stock Assessment and Fishery Evaluation (SAFE) reports. In general, assessments in lower-numbered tiers (e.g., Tier 1) include more information such as the age structure of the population, while assessments in high-numbered tiers (e.g., Tier 6) have minimal information. It is the goal of NOAA Fisheries to continually improve stock assessments by increasing the number of stocks with lower-numbered tiers.

**6** Marine mammal level of excellence is linked to criteria for assessing the tiers of marine mammal stock assessment. These criteria were initially developed by [NOAA Fisheries in 2004](#) and have been adjusted slightly by NOAA Fisheries Office of Science and Technology. Assessments with low values have no or very poor stock assessments; stocks in tiers 2 and 3 have at least minimally acceptable assessment information.

**Objective 1.A:** Conduct high utility and quality assessments which will directly contribute to the most effective assessment tier<sup>5</sup> of fish and crab, and level of excellence<sup>6</sup> for marine mammal stocks, while improving efficiency of fisheries-dependent and independent data collection.

The stock assessments produced by the AFSC provide critical information to fishery and protected resource managers to prevent overfishing while achieving optimum yield (per National Standard Guidelines) and to prevent adverse impacts to and promote conservation of protected species. Maintaining stock assessment activities requires adequate resources and personnel to (1) collect data from surveys and fisheries, (2) conduct stock assessments, and (3) evaluate the likely biological and socioeconomic outcomes of management options. Fish and crab stock assessments include recommendations for overfishing levels and acceptable biological catch. These recommendations are used by the NPFMC and the State of Alaska (for crab stocks) when setting total allowable catches and are a key contributor to ensuring that federal fisheries off Alaska remain sustainable and are managed based on the best scientific information available. Annual marine mammal stock assessments are critical to AKRO protected resources managers as they provide the information necessary for annual evaluations of the level of fishery-related incidental serious injury and mortality of marine mammals relative to a marine mammal stock's Potential Biological Removal (PBR) level.

1. **Strategy:** Conduct surveys at sufficient geographic scope and frequency to support effective stock assessments.
2. **Strategy:** Maintain and/or optimize collection and processing of the data required for fish, crab, and marine mammal stock assessments:
  - a. Time series of relative and/or absolute abundance or biomass of the population to monitor trends.
  - b. Time series of biological data (age, weight, length, maturity) from fisheries-dependent and independent sources.
  - c. Targeted and incidental harvest data from direct observation or electronic monitoring.
  - d. Species distribution and/or stock boundaries inside and outside the EEZ, including international collaborations for shared stocks.
3. **Strategy:** Conduct quantitative modeling to produce stock assessments to support the MSA (including National Standards 1–8), ESA, and MMPA.
4. **Strategy:** Develop and implement quantitative methods to evaluate likely impact of proposed reductions in survey sampling density, protocols, or frequency on fishery stock and marine mammal assessments.
5. **Strategy:** Support and maintain robust fishery monitoring which integrates observer and electronic monitoring data collections to meet quota management and stock assessment needs.

**Objective 1.B:** Conduct applied marine ecosystem and socioeconomic analyses and assessments to support sustainable fisheries management and marine mammal conservation.

Provide scientific data and analysis and expert technical advice to the NOAA Fisheries' headquarters and AKRO, NPFMC, the State of Alaska, Alaska Tribal governments, and U.S. representatives participating in international fishery and marine mammal negotiations.

1. **Strategy:** Synthesize and assess ecosystem information at ecosystem- and stock-scales (e.g., Ecosystem Status Reports (ESR), Ecosystem and Socio-economic Profiles (ESP)) to support tactical ecosystem-based fishery management (MSA National Standard 1).
2. **Strategy:** Conduct scientific research to inform and develop products such as Fishery Ecosystem Plans and Regional Action Plans for Climate Science that support critical strategic management decisions and analyses.



3. **Strategy:** Conduct scientific research to identify spatial habitat utilization for FMP species to inform essential fish habitat (EFH) designations, pursuant to the MSA mandate.
4. **Strategy:** Improve ecosystem indicators through coordinated survey efforts (data sharing and platform coordination), validation of ocean models with process studies, or development of remote sensing products to inform, evaluate, and support management decisions.
5. **Strategy:** Conduct risk analyses (using simulation or empirical analytical approaches), management strategy evaluations, and trade-off analyses to optimize ecosystem-based fisheries management performance.
6. **Strategy:** Support socioeconomic data monitoring and analyses of global fishery markets relative to Alaska fish stocks to inform management actions.
7. **Strategy:** Improve targeted socioeconomic data collection and analyses of the impacts on stakeholders of regulatory decisions to support long term optimum yield principles in fisheries management.
8. **Strategy:** Increase communication and visibility of ecosystem-based management (EBM) efforts through a coordinated web presence to create a unified portfolio of ecosystem and socioeconomic research activities and identify areas for improving efficiency and synergy among the EBM programs.

**Objective 1.C:** Create next generation fish, crab, and marine mammal stock assessments.

In order to effectively and efficiently manage fisheries and conserve protected resources, the AFSC must transition into next generation methodologies. For stock assessments this means alignment with the [NOAA Fisheries Next Generation Stock Assessment Enterprise](#) which emphasizes: stock assessments that consider ecosystem and socioeconomic factors that affect the dynamics of



fish stocks and fisheries; the continued use of innovative science for data collection and analysis to reliably and efficiently provide data for maximizing use of advanced modeling methods; and an assessment process that is more timely, efficient, and effective at optimizing available resources and delivering results to fishery managers and the public. The MSA and National Standard guidelines stipulate that we should not only prevent overfishing, but distinguish between stocks that are overfished due to temporary environmental changes (fishing mortality must be constrained), permanent environmental changes (reference points must be redefined), or due to man-made habitat changes (habitat must be restored or ameliorated). Implementing National Standard 1 therefore requires ecosystem information to determine legal management responses to overfished stocks. The MMPA states that “... stocks of marine mammals ... should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part,” and further requires consideration of factors, including habitat, that may be causing the decline or impeding the recovery of strategic stocks.

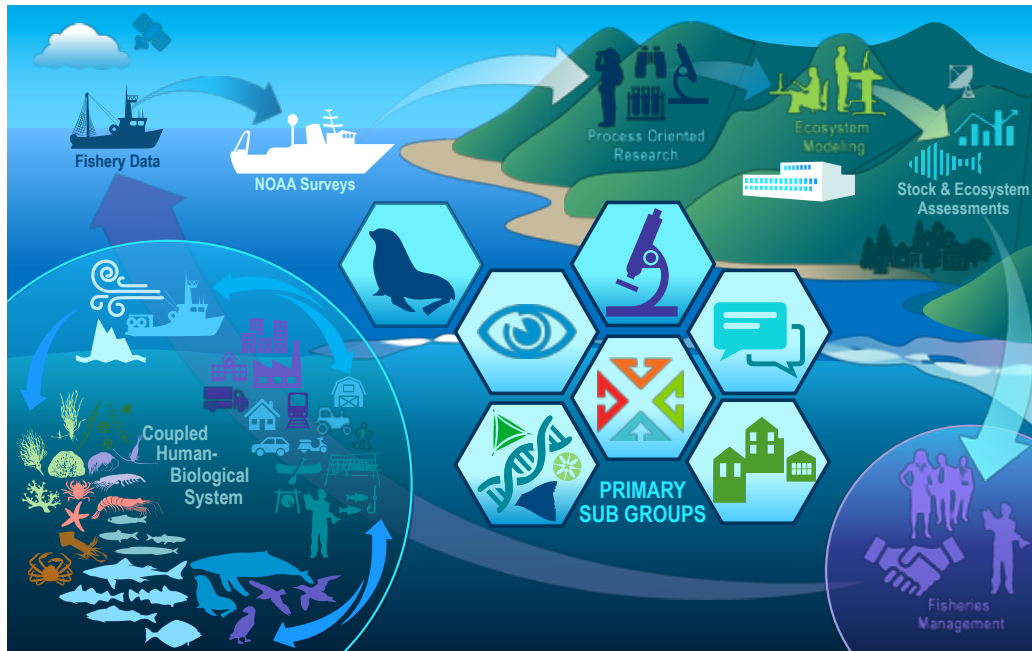
1. **Strategy:** Identify implementation paths and resources required for the improvement and expansion of spatial and multi-species stock assessment approaches. Identify the species, data, and collection techniques required to do this work.
2. **Strategy:** Develop, support, and validate long-term multi-species ecosystem climate models for incorporation into management decisions that support long-term optimal yield principles and cumulative ecosystem effects as per NEPA requirements.
3. **Strategy:** Support ecosystem and socioeconomic indicators for immediate use in stock assessment, considering the physical environment, prey, predators, and competitors of assessed species. Regularly evaluate the suite of indicators identified for a given stock so we may better understand changing conditions and processes in the future.
4. **Strategy:** Integrate human dimensions and coproduction of knowledge into stock assessment report products such as Stock Assessment Reports, ESRs, ESPs, and Economic Performance Reports. Reference economic and community assessment reports to identify stock-specific socioeconomic indicators to address the priorities of the stock assessment.
5. **Strategy:** Improve effectiveness of the data required for fish and crab stock assessments and augment design based sampling approaches with model-based approaches.

6. **Strategy:** Expand data collection on marine mammal stocks that are not well studied and find efficiencies with current foci stocks where stock trajectories and life histories are better understood.

**Objective 1.D:** Reduce bycatch using fishery-dependent bycatch analysis, spatial modeling, data on environmental conditions, and conservation engineering.

Conduct empirical, quantitative, and conservation engineering research that supports the minimization or mitigation of [bycatch](#) and bycatch impacts to address MSA National Standard 9. The AFSC collects critical data to quantify bycatch rates and conducts research in support of bycatch mitigation, particularly focused on prohibited species catch (e.g., herring, salmon, Tanner and king crab, halibut) and protected species (including marine mammals and seabirds). Analyses of bycatch data are necessary to resolve the spatiotemporal and environmental factors that may drive the presence and abundance of bycatch species, especially those that could lead to socially, economically, and politically consequential fishery closures. Recent environmental conditions have resulted in unexpected and unprecedented bycatches of species like herring and sablefish, requiring an agile research response and a better understanding of the potential mechanisms underlying such inter-annual variability. Collaboration with industry is critical to successfully minimizing bycatch while achieving commercially effective catch rates of target species.

1. **Strategy:** Conduct directed research and modeling to evaluate the abundance and distribution of bycatch species relative to target species and environmental drivers of bycatch.
2. **Strategy:** Develop fishing gear and fishing methods that minimize bycatch while maximizing target catch.
3. **Strategy:** Analyze the economic, social, and biological impacts of bycatch in Alaska fisheries to understand drivers of fishing behavior and human dimensions, and to prioritize management that addresses bycatch reduction.
4. **Strategy:** Use bycatch data from the fishery monitoring program to develop and refine models to inform uncertainty in observer coverage and improve bycatch management. Leverage technological capabilities in data collection, data modernization, state-of-the-art genetic sequencing, and next generation analytics to improve the rate, capacity, and overall efficiency with which the AFSC faces the challenge of bycatch.



## Goal 2: Investigate, model, and predict ecosystem and climate impacts on living marine resources.

The Earth's climate and oceans are changing, and these changes are significantly impacting Alaska's marine ecosystems. Warming waters, rising seas, decreasing sea ice and oxygen levels, changing currents and productivity, and increasing ocean acidification and extreme events (e.g., marine heatwaves, harmful algal blooms) are affecting the distribution and abundance of Alaska's living marine resources. The number, frequency, and magnitude of impacts are expected to increase with continued changes in the Earth's climate system. Building climate resilience and addressing the effects of climate change, play an important role in the AFSC's strategies for managing sustainable fisheries, recovering protected species, and conserving their habitat. The AFSC will continue to provide cutting edge science and focus management strategies on effectively preparing for, and responding to, a rapidly changing environment by investigating, using, and sharing ecosystem and climate-related information.

### Objective 2.A: Investigate ecosystem-level changes (habitat, food webs, trophic dynamics, distributional shifts, etc.) with field and modeling studies.

Predicting climate impacts on ecosystems requires understanding mechanistic relationships underpinning the response of living marine resources to changes in environmental conditions. Field- and lab-based studies, and partnering with others conducting this research, provide the scientific foundation for potential application to modeling, assessments, and projections.

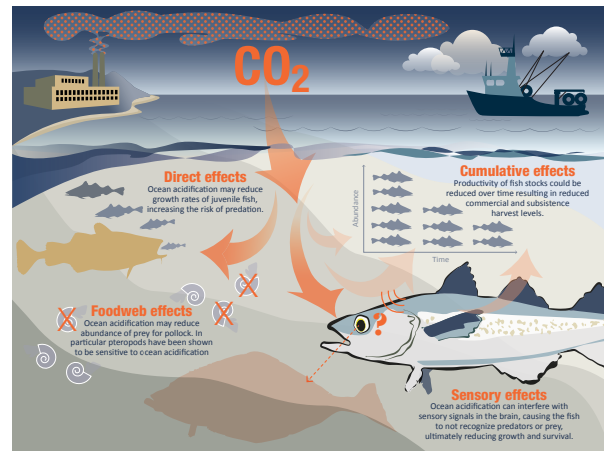
- 1. Strategy:** Conduct field and modeling studies of habitat, food webs, trophic dynamics, distributional shifts, etc., designed to understand mechanistic links between living marine resources and the environment.
- 2. Strategy:** Conduct laboratory and field studies to examine physiological and population responses of commercially important crab and fish species to ocean acidification (OA), temperature, and other climate-related environmental variables to inform syntheses and assessments.
- 3. Strategy:** Work with partners who study harmful algal blooms (HABs), invasive species, and disease to understand impacts on living marine resources (invertebrates, fish, seabirds, and marine mammals) and the environment.



**Objective 2.B:** Hindcast, forecast, and project direct and indirect effects of climate change on fish, crab, and marine mammals and the associated communities which rely on these resources.

There is a high and growing demand for robust information on past, current, and potential future climate and ocean conditions over multiple temporal and spatial scales as called for in the [NOAA Fisheries Climate Science Strategy](#). The long-term climate science approach of the AFSC involves modeling, retrospective analyses, and management strategy evaluations. Ecosystem monitoring, process and laboratory studies (Objective 2.A) together inform the analysis component. Modeling, retrospective studies, and management strategy evaluations provide a framework for jointly understanding the results of the ecosystem monitoring and process studies, and for making predictions about future scenarios.

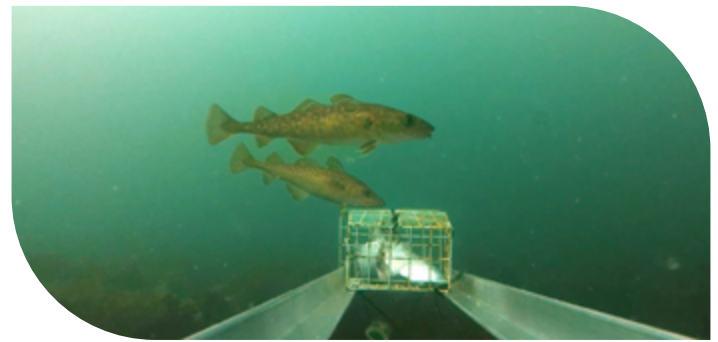
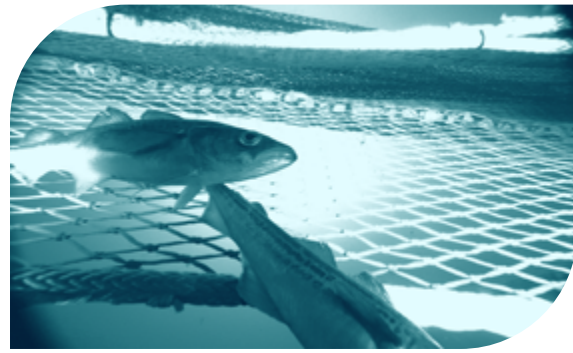
- 1. Strategy:** Support the Climate and Fisheries Initiative, a cross-NOAA program, designed to create and implement a nationwide operational ocean modeling and decision-support system that addresses four core requirements: (1) operational delivery of ocean forecasts and projections for use by NOAA Fisheries and others; (2) operational capability to turn ocean forecasts into climate-informed management advice; (3) capacity for continuous validation and innovation through observations and research; and (4) increased capability to use climate-informed advice to reduce risks and increase the resilience of resources and the people that depend on them.
- 2. Strategy:** Engage researchers and Local Knowledge and Traditional Knowledge holders to identify and monitor the indirect and direct effects of climate change on living marine resources and communities and to identify tipping points and critical thresholds under changing conditions.
- 3. Strategy:** Accelerate the development and delivery of advice on climate change impacts, risk, and adaptation options (including assessments of adaptation effectiveness and feasibility). Through participatory approaches (e.g., co-production of knowledge), identify and communicate strategies for adaptation to support long-term social-ecological system resilience.
- 4. Strategy:** Support the development of early warning systems, operational oceanographic and ecosystem model-based forecasts, and long-term projections to inform tactical and strategic decision making to support resilient communities and economies.



**Objective 2.C:** Identify and implement Arctic research priorities.

The AFSC’s mission in the Arctic is to provide reliable, world-class, scientific information on the coupled ecological and social systems pertaining to fisheries and protected resources unique to the Arctic, with the focused goal of facilitating climate-informed EBM. Complex social-ecological systems in the Arctic directly affect regional, national, and global communities, particularly given the rapid pace of climate change. The AFSC follows the definition of the “Arctic” as established by the US Arctic Research and Policy Act of 1984, which includes the Aleutian Islands, Bering Sea, Chukchi Sea, and Beaufort Sea. The bulk of the AFSC’s Arctic work over many years has been focused in the eastern Bering Sea and Aleutian Islands (i.e., sub-Arctic) and more recently, fisheries surveys in the Northern Bering Sea and ice-associated marine mammal surveys, which are covered in other Goals and Objectives. This Objective focuses solely on exploratory activities pertaining to the High Arctic (the Northern Bering, Chukchi, and Beaufort Seas).

- 1. Strategy:** Develop an AFSC strategic plan for the High Arctic defining clear objectives and identifying strategies to achieve those objectives.
- 2. Strategy:** Strengthen focused baseline data collection, studies to define unique Arctic processes, and integrated analyses and modeling to understand social-ecological system dynamics.
- 3. Strategy:** Actively participate in and lead domestic and international Arctic groups (e.g., committees, working groups) to address emergent issues and identify research priorities. Strengthen transboundary collaboration to support research initiatives, conduct risk assessments and scenario evaluations of management actions, facilitate intergovernmental partnerships, increase cost-effectiveness of research, and accelerate production and delivery of EBM advice.



### Goal 3: Advance new initiatives and innovations.

In addition to our primary mission requirements to assess populations of commercial fish and crab species, marine mammals, and the habitat on which they all depend, it is critical that the AFSC maintains a diverse research portfolio. By advancing specific foci and initiatives of national interest, while also emphasizing the development of innovative technologies (where they offer improvements to data collections or cost efficiencies), the AFSC maintains our relevancy and stays on the cutting edge of scientific research in support of our living marine resources. In doing this, we also improve the quality and timeliness of our products and services.

**Objective 3.A:** Promote data innovation and quality improvement to facilitate science and support data-driven decision making.

Efficient and effective use of data underpins all of the scientific work that we do at the AFSC. The majority of our research is done through diverse teams collaborating and sharing data among individuals and across institutions, relying on advances in fisheries research methods and data science to gain new insights. In line with the [NOAA Data Strategy](#), and to optimize use of new technologies that vastly increase data storage and organizational needs, the AFSC will target efforts to improve data management.

- 1. Strategy:** Support access to ecosystem and socio-economic data through improved data management systems and repositories to allow for continued refinement of indicators for incorporation into management products.
- 2. Strategy:** Maximize usage of new and historical (i.e., data rescue) data collection.

- 3. Strategy:** Pursue partnerships to streamline our data processing, provide ready access to data, and improve our science products.
- 4. Strategy:** Continually assess AFSC research and administrative data priorities, and achieve them by improving data management lifecycle, data infrastructure and services, data governance, and making available support for data science capabilities including data inference, algorithm development, visualization, integration, and technology.
- 5. Strategy:** Integrate satellite data and environmental and fishery data within AFSC databases into our operational workflows in a robust, automated, and reproducible fashion for seamless access by stock assessment authors, partners, and research applications (e.g., climate science and bycatch models).
- 6. Strategy:** Improve data literacy and awareness by promoting an informed data culture.





**Objective 3.B:** Develop innovative technologies to support our mission with improved performance and cost effectiveness.

Due to the increasing complexity of our mission, we must develop and refine novel ways to efficiently and cost effectively collect, process, and analyze data. We will invest in new technologies that allow us to survey an increased geographic range and process and analyze more data at lower cost, as well as increase the safety and well-being of our staff. We will also support development of analyses that achieve results consistent with historic methods using less effort, leading to a reduction in the cost of data collection. Cost-benefit analyses will be critical to understanding the trade-offs between the efficiency of a new technology and the level of certainty achieved by traditional techniques. Ultimately, we will integrate appropriate technologies and applications into ongoing AFSC science activities.

1. **Strategy: Artificial Intelligence** (AI), including computer vision and machine learning, will continue to be developed to advance the quality and timeliness of AFSC products and services resulting in significant improvements in performance and skill at greatly reduced costs and computing time.
  - a. Multispectral (i.e., infrared, visual, ultraviolet) imaging technology in combination with AI can quickly provide accurate information for sustainable fisheries and marine mammal management. The AFSC will refine Fourier Transform-Near Infrared

Spectroscopy to analyze otoliths for ageing and fish identification. Collection of multispectral aerial imagery will be refined to detect and classify marine mammals to estimate abundance.

- b. Computer vision algorithms will be implemented for more rapid analysis of fishery data and plankton samples collected at-sea, facilitating a faster turn-around time for integrating survey collections into ecosystem and management deliverables.
  - c. Species distribution models integrate a suite of information on species locations and environmental information. Such models are poised to improve bycatch avoidance for prohibited species catches by facilitating machine learning-based probabilistic modeling efforts.
2. **Strategy: Electronic Monitoring** (EM) provides an alternative method to collect some fisheries data, especially in situations where deploying personnel is difficult, unsafe, or otherwise impractical. The AFSC will continue to improve EM technology and explore the potential for wider application, including the impact on ancillary data collection.
  3. **Strategy: Uncrewed Systems** (UxS) can maximize the collection and utilization of critical, high accuracy, and time-sensitive data. Such systems are critical for ameliorating the impacts of unforeseen circumstances on fishery surveys. The AFSC will increase the capacity and application of UxS (aircraft and marine) that support

ongoing mission priorities such as marine mammal and acoustic fish surveys needed for conservation and recovery of protected species, and management of commercial fisheries.

4. **Strategy:** Develop [innovative tagging tools](#) and applications to track movement of fish and marine mammals in support of spatial management models. Such tagging data and tools are critical for understanding how species may respond to climate change, how fishers might avoid catches of prohibited species, and how fishing fleets may be impacted by climate-based species shifts.
5. **Strategy:** [Acoustic sensing](#) is an effective way to detect and characterize physical and biological features of ocean areas. The AFSC will advance autonomous acoustic technologies to improve detection and quantification of marine mammals.

### Objective 3.C: Expand 'omics research capacity.

Advances in 'omics methodologies can improve the ability to monitor and understand biological communities, and support mission applications that demand detailed biological information. In the next five years, the AFSC will continue to invest in 'omics technology with the primary goals of (1) developing validated eDNA methods and sampling techniques to efficiently assess species and ecosystems across Alaska and (2) applying population genomic, transcriptomic, and epigenetic methods to understand stock structure, movement, and adaptive and physiological responses of focal species in response to a rapidly changing environment.

1. **Strategy:** Develop an 'Omics Strategic Plan to guide research, set research priorities, and facilitate collaborations across AFSC programs and divisions and with the broader [NOAA 'omics initiatives](#). Major focal areas of the strategic plan will include eDNA, population genomics, and pairing transcriptomics with physiology.
2. **Strategy:** Serve as a premiere 'omics research center for Alaska and a centralized resource for AFSC researchers interested in 'omics research. Collaborate with other researchers by readily lending in-house 'omics expertise.
3. **Strategy:** Conduct 'omics research and applications which allow for new insights into important life history and ecosystem questions. Invest in the continued development of 'omics analytical approaches.

### Objective 3.D: Expand aquaculture research capacity.

Aquaculture plays a critical role in providing equitable access to seafood, boosting local economies, and restoring species and habitat. [Marine aquaculture](#) is part of NOAA's strategy for economic and environmental resilience in coastal communities and supporting healthy oceans. Alaska's working waterfronts and marine-focused communities are well suited to aquaculture innovation and expansion which can provide a year-round source of high-quality jobs and economic opportunities in coastal communities that augment seasonal tourism and commercial fishing. Aquaculture is also a resource-efficient method of increasing and diversifying Alaska seafood production that can expand and stabilize seafood supply and jobs in the face of rapid environmental change and economic uncertainty. Shellfish and seaweed aquaculture may also be used to strategically restore depleted stocks and habitats.

1. **Strategy:** Develop an AFSC Aquaculture Strategic Plan to guide research across AFSC divisions and collaborations with other NOAA offices in support of Alaska aquaculture that avoids or minimizes impacts to fisheries, ecosystems, and protected species.
2. **Strategy:** Identify resource needs and knowledge gaps in order to efficiently enhance aquaculture research capacity at the AFSC.
3. **Strategy:** Engage with University, State, Tribal, and industry groups to identify and pursue collaborative aquaculture research projects.





# Appendices

## Appendix A: Acronyms

Alaska Fisheries Science Center (AFSC)

Alaska Regional Office (AKRO)

Artificial Intelligence (AI)

Auke Bay Laboratories (ABL)

Ecosystem Based Fisheries Management (EBFM)

Ecosystem Based Management (EBM)

Ecosystem and Socio-economic Profiles (ESP)

Ecosystem Status Reports (ESR)

Electronic Monitoring (EM)

Endangered Species Act (ESA)

Essential Fish Habitat (EFH)

Exclusive Economic Zone (EEZ)

Fishery Management Plan (FMP)

Fisheries Monitoring and Analysis Division (FMA)

Information Technology (IT)

International Pacific Halibut Commission (IPHC)

Large Marine Ecosystem (LME)

Magnuson–Stevens Fishery Conservation and Management Act (MSA)

Marine Mammal Laboratory (MML)

Marine Mammal Protection Act (MMPA)

National Environmental Policy Act (NEPA)

National Oceanic and Atmospheric Administration (NOAA)

National Marine Fisheries Service (NOAA Fisheries)

North Pacific Fishery Management Council (NPFMC)

Operations Research and Facilities (ORF)

Operations, Management, and Information Services Division (OMI)

Pacific Salmon Commission (PSC)

Program Project and Activities (PPA)

Resource Assessment and Conservation Engineering Division (RACE)

Resource Ecology and Fisheries Management Division (REFM)

Science Director's Office (SD)

Uncrewed Systems (UxS)

## Appendix B: Executive Orders relevant to the AFSC.

While the following list is not exhaustive, it highlights many of Executive Orders (EO) that guide our work.

- EO 12866 - Regulatory Planning and Review
- EO 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- EO 13175 - Consultation and Coordination With Indian Tribal Governments
- EO 13186 - Responsibilities of Federal Agencies To Protect Migratory Birds
- EO 13771 - Reducing Regulation and Controlling Regulatory Costs
- EO 13754 - Northern Bering Sea Climate Resilience
- EO 13840 - Ocean Policy to Advance the Economic, Security, and Environmental Interests of the United States
- EO 13960 - Promoting the Use of Trustworthy Artificial Intelligence in the Federal Government
- EO 13921 - Promoting American Seafood Competitiveness and Economic Growth
- EO 13985 - Advancing Racial Equity and Support for Underserved Communities Through the Federal Government
- EO 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis
- EO 14008 - Tackling the Climate Crisis at Home and Abroad
- EO 14030 - Climate-Related Financial Risk
- EO 14035 - Diversity, Equity, Inclusion, and Accessibility in the Federal Workforce





**Gina M. Raimondo**

U.S. Secretary of Commerce

**Richard W. Spinrad**

Under Secretary of Commerce  
for Oceans and Atmosphere

**Janet Coit**

Assistant Administrator for Fisheries

December 2021

[www.fisheries.noaa.gov](http://www.fisheries.noaa.gov)

OFFICIAL BUSINESS

**National Marine Fisheries Service**

Alaska Fisheries Science Center  
7600 Sand Point Way N.E.  
Seattle, WA 98115-6349

