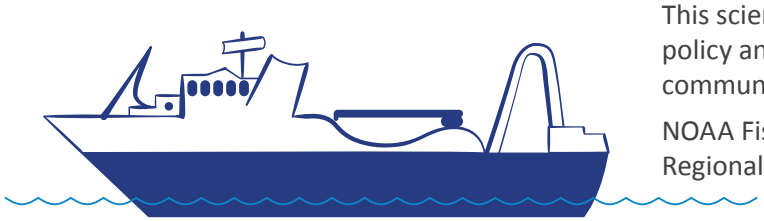
Overview: Alaska Regional Action Plan for the Gulf of Alaska

NOAA FISHERIES

The Gulf of Alaska supports valuable and diverse commercial, recreational, and subsistence fisheries. The region has some of the top fishing ports in the country and is deeply rooted in traditional and multi-generational fishing histories.

During 2014-2016, the Gulf of Alaska experienced an unprecedented marine heatwave. Coinciding with this, the Pacific cod population experienced a steep decline and Alaska's second largest commercial groundfish fishery was shut down. The region concurrently experienced multiple salmon fisheries disasters, which have continued for multiple years and spread geographically and to multiple species.

In the coming decades, extreme events like this are expected to increase. Other projected changes include decreases in ocean pH, melting glaciers and sea level rise, changes in ocean circulation and stratification, and potential changes in species distributions, ecosystem productivity and food-web structure.



Science to respond to climate change

To help increase the resilience of the region's valuable marine resources and the communities that depend on them, decision-makers need information on what's changing, why it's changing and how to respond.

Scientists at the Alaska Fisheries Science Center have updated their Gulf of Alaska Climate Regional Action Plan, producing a new draft plan for 2022-2024. In this 3-year plan, scientists identify their recommendations for ongoing and needed science to implement NOAA Fisheries Climate Science Strategy in Alaska.

Focal areas of research

- Long-term monitoring of marine life and marine ecosystems,
- Process-oriented research (i.e., studying environmental effects on species' reproductive potential, diets, and genetics),
- Climate and ecosystem modeling,
- Marine mammal studies,
- Studies to understand and address climate change impacts on human communities, and
- Synthesis of data for management decisions. .

This science will be used to inform preemptive and flexible policy and resource management decisions and help communities plan for the future.

NOAA Fisheries is soliciting public comments on the draft Regional Action Plans through July 29, 2022.

Public Input Requested: *https://www.fisheries.noaa.gov/national/climate/climate-science-strategy-regional-action-plans*

Projects Crosslinked to National Climate Science Strategy Objectives

Action	Objective	Sub Group	Time frame
Bottom trawl survey	6, 7		→
Summer acoustic survey	6,7		→
Winter acoustic survey	6,7		→
Longline survey	6,7		→
ADFG large-mesh trawl survey	6,7		→
Oceanographic moorings in the Gulf of Alaska	6,7		→
Spring larval survey	6,7		→
Young-of-the-year pollock and forage fish survey	6,7		→
Age-0 nearshore seine/ camera survey	6,7		→
Gulf Watch Alaska	6,7		→
Southeast Coastal Monitoring	6,7		→
Juvenile sablefish tagging program	6,7		→
Nearshore juvenile fish-rearing habitat.	6,7		→
Improve the efficiency of the AFSC survey enterprise	6,7		2022-2024
Increase spatial coverage of new autonomous sampling platforms and moorings	6,7		→

Action	Objective	Sub Group	Time frame
Changing Aleutian Low dynamics and ecosystem consequences	5		
Regional oceanography	5		→
Phytoplankton community composition and fatty acids	5, 6		2022-2024
Zooplankton community dynamics	5, 6		→
Euphausiid dynamics	5, 6		2022-2024
Recruitment processes	5		→
Thermal effects on age-0 Pacific cod	5, 6		2019-2023
Sablefish recruitment processes	5		2019-2024
Tracking changes in spring phenology	6		2022-2024
Climate effects on nutritional ecology	5, 6		→
Maturation, spawning, and reproductive potential	5, 6		→
Climate effects on growth and size-at-age	5,6		→
Trophic interactions and food habits	5,6		→
Experimental studies of ocean acidification and temperature on selected species in the Gulf of Alaska	5		2018-2023
Use of telemetry, archival and satellite tags for defining species niche and behavior for sablefish, Pacific cod, and other species	5		→
Temperature-dependent behavior and physiology	5		2022-2024
Genetic adaptation to temperature for walleye pollock	5		2022-2023

Action	Objective	Sub Group	Time frame
Vulnerability analysis of GOA marine fish populations	5		2022-2024
Gulf of Alaska IEA	1–4		→
Annual ecosystem considerations report for the Gulf of Alaska	6		→
Spring preview of ecosystem and economic conditions (PEEC)	3, 6		→
Add ecosystem and socioeconomic profiles (ESPs) to stock assessments	5,6		2022-2024
Risk Tables	3,6		→
Dynamic species distribution models for identifying changes to Essential Fish Habitat	3,6		2022-2024
Incorporating recruitment processes into life-cycle models for walleye pollock and Pacific cod	4, 5		2022-2024
GOA-CLIM Regional climate projections (GCM, ROMS, NPZ)	4		2022-2024
GOA-CLIM Atlantis ecosystem model	1–4		
Other ecosystem models	1–4		2022-2024
CEATTLE multispecies model for the GOA	1–4		2022-2024
Single-species MSEs for sablefish and several rockfish species	1–4		2022-2024
Climate Fisheries Initiative	1–4		→

OBJECTIVES

1. Climate-Informed Reference Points
2. Robust Management Strategies
3. Adaptive Management Processes
4. Project Future Conditions
5. Understand Mechanisms of Change
6. Track Change and Provide Early Warnings
7. Build and Maintain Adequate Science Infrastructure

PRIMARY AFSC SUB GROUP

- Long-term Monitoring
- Process Studies
- Modeling and Management - Oriented Synthesis
- Marine Mammals
- Socio-economic Impacts
- Communications and engagement strategy

→ Ongoing

National Climate Science Strategy Objectives

Action	Objective	Sub Group	Time frame
Abundance and trends of Steller sea lions	6,7		→
Steller sea lion foraging and condition in the Gulf of Alaska	6,7		2022-2024
Abundance & Trends of Harbor Seals in Response to Extreme Oceanographic Conditions in GOA	5–7		2022-2024
Abundance & Trends of Harbor Seals in Glacial Fjords	5–7		
Cook Inlet beluga "Species in the Spotlight" monitoring	5–7		2021-2024
Deploy passive acoustic systems on existing and new oceanographic moorings	4, 6,7		2021-2024
Long-term monitoring of humpback whale populations throughout northern Southeast Alaska	5,6		2022-
Killer whale population and diet monitoring	5,6		2022-2031
PacMAPPS: Pacific Marine Assessment Program for Protected Species	6,7		2021-2024
Cetacean distribution and abundance surveys and ecology studies	6,8		2022-2024
Harbor porpoise abundance, trends, bycatch, and bycatch mitigation	6,7		2021-2024
Remote sensing of phenology and pup growth and health in glacial ice habitats	5–7		2022-2024
Track incidence and overlap of rapidly expanding aquaculture farms with habitats used by harbor seals for pupping and molting, and by cetaceans for foraging.	4,7		2022-2024
Modeling overlap between vessel traffic and habitats traditionally used by marine mammals for migration, feeding, rearing young, molting, and other activities.	4–7		2022-2024
Evaluate impacts of climate-mediated habitat impacts to prey populations and subsequent changes/ shifts in prey, such as SE salmon runs, on harbor seal abundance and distribution.	4–7		2022-2024
Evaluate impacts of major environmental anomalies to Steller sea lions using 2013-2016 marine heatwave as a natural experiment	3–6		2021-2024
Integrated Predator-Prey Surveys 2022-2031: Humpback Whales, Marine Birds, Forage Fish	5,6		2022-2031
Monitor changes in northern fur seal and Steller sea lion foraging in response to environmental changes using biogeochemical tracers.	4,5		2021-2024
Health monitoring of marine mammals	6,7		2022-2024
Modernize marine mammal assessments			Post 2016
Maintain community vulnerability tracking indices	6,7		→
Annual Community Engagement and Participation Overview (ACEPO)	6,7		→
Develop fleet dynamics and fisheries management model for climate change scenarios	4,5		→
Develop community economic model linking climate change impacts with community economic impacts	4,5		→
Develop community adaptation model for climate change impacts	4,5		→
Develop Ecopath with Ecosim (EwE) model for Eastern Gulf of Alaska	4,5		→
Develop community vulnerability assessment to OA	4,5		→
Collect socio-cultural information from fisheries participants and communities	6,7		
Collect economic data for fishing fleets	6,7		
Collect information on absorptive, adaptive, and transformative capacity	6,7		
Collect information on adaptation potential across different levels and fisheries-related sectors	6,7		
Computable general equilibrium (CGE) model for Gulf of Alaska fisheries	1–4		2018-2023
Extend the CGE model to additional communities	1–4		2025-2030
Gulf of Alaska Pacific cod bioeconomic model	1–4		→
Communications and engagement strategy to support co-producing science with Gulf of Alaska communities			2020-2024
Improving community decision support tools			

OBJECTIVES

1. Climate-Informed Reference Points
2. Robust Management Strategies
3. Adaptive Management Processes
4. Project Future Conditions
5. Understand Mechanisms of Change
6. Track Change and Provide Early Warnings
7. Build and Maintain Adequate Science Infrastructure

PRIMARY AFSC SUB GROUP

- Long-term Monitoring
- Process Studies
- Modeling and Management - Oriented Synthesis
- Marine Mammals
- Socio-economic Impacts
- Communications and engagement strategy

→ Ongoing

Focal areas of research

www.fisheries.noaa.gov
June 2022

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