

# Alaska Fisheries Science Center - updates on surveys and climate research

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AFSC Research and Science Director

Presentation to North Pacific Fisheries Management Council  
May, 2021



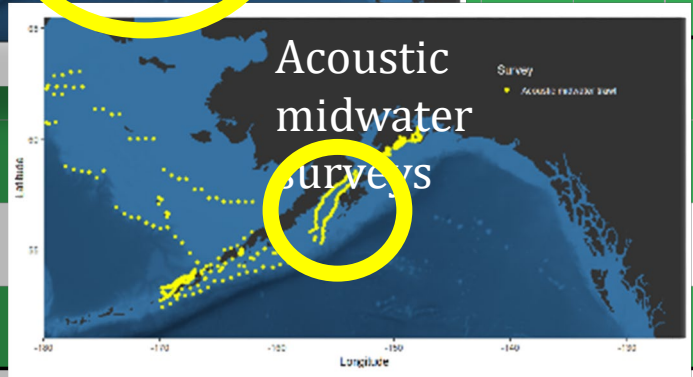
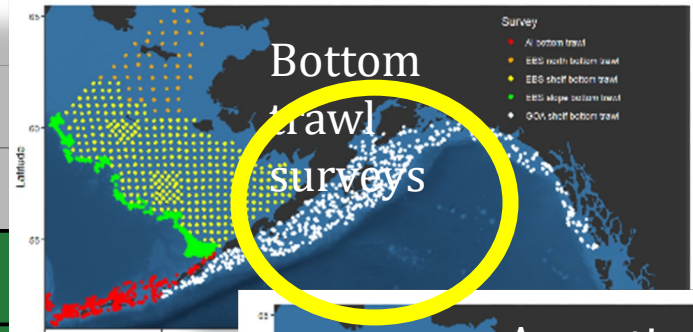
# Alaska Fisheries Science Center

- 2021 Survey Update
- Execution of 2021 Executive Orders
  - AFSC **climate** informed science for management
  - AFSC and **environmental justice** in research



# Gulf of Alaska fish/eco surveys

Survey	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
GOA BT vessel 1												
vessel 2												
vessel 3												
Deep shelf and slope groundfish longline												
Winter Acoustic-Trawl Shumagin/Sanak												
Winter Acoustic-Trawl Bogoslof												
Winter Acoustic-Trawl PWS/Kenai												X
Winter Acoustic-Trawl Shelikof												
Summer Acoustic-Trawl GOA												2/3
GOA larval												
Spring GOA Ichthyoplankton												
Summer GOA Age-0												X
Kodiak Pacific cod nursery habitat												
Large-Scale GOA Pacific cod nursery												
GulfWatch oceanography&forage												



• Limited coverage of GOA deep (>700 m) stations in favor of NBS

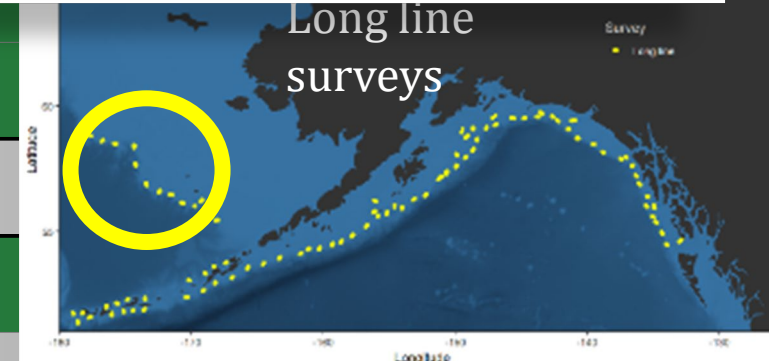
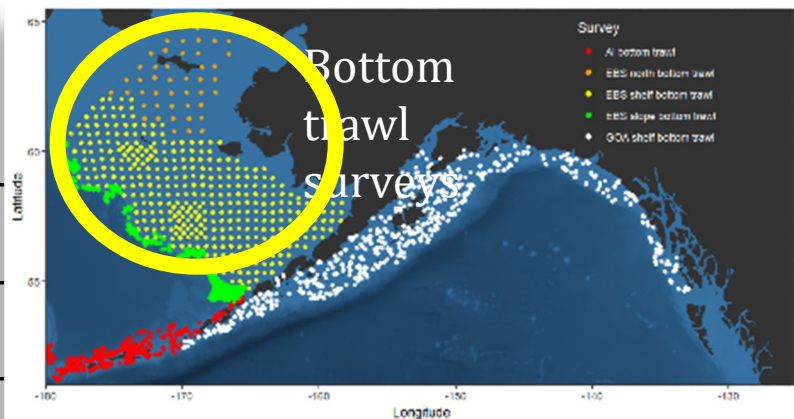
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Possible charter backup



# Bering Sea fish/eco surveys

Survey	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Eastern Bering Sea vessel 1												
vessel 2												
Summer Acoustic-Trawl EBS											Drone	
Bering Sea Slope												
Northern Bering Sea vessel 1												
vessel 2												
Deep shelf and slope groundfish longline survey												
Spring EBS Ichthyoplankton												
Summer EBS Age-0 (Inc. BASIS)												
Spring EBS Ecosystem/Moorings												
Fall EBS Ecosystem/Moorings												
Northern Bering Sea juvenile salmon and age-0												
Distributed Biological Observatory (Ecosystem)	AE	AE	AE/RUSALCA A IES	AE EIS	AE RUSALCA	AE	AE	AIERP DBO	DBO AIERP	AIERP DBO	DBO	



possible saildrone backup

charter backup



# 2021 Executive Orders associated with climate change

## EO 14008 (2021): Tackling the Climate Crisis at Home and Abroad

Section 203. National Climate Task Force

Section 207: Renewable Energy (DOI led ...double offshore wind by 2030)

Section 208. Oil and Natural Gas (DOI led)

Section 215. Civilian Climate Corp (DOI led)

Section 216. Conserving Lands and Waters

Section 216(a) [conserve 30% by 2030].

Section 216(c).

Directs **DOC/NOAA** to ...”to collect input”...”on how to make fisheries and protected resources more resilient to climate change, including changes in management and conservation measures, and improvements in science, monitoring, and cooperative research.”


Climate considerations shall be an essential element of U.S. foreign policy and national security. The U.S. will move quickly to build resilience, both at home and abroad, against the impacts of climate change that are already manifest and will continue to intensify according to current trajectories.



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# NMFS Ecosystem Based Fishery Management

LEGAL AUTHORITIES AND MANDATES: MSA, MMPA, ESA, NEPA

 **Magnuson-Stevens  
Fishery Conservation and  
Management Act**

2004, 2016-current

Single species or sector  
EBM



Or



Multiple species or  
sectors EBM



Or



EBM of the entire system



10 YEAR ANNIVERSARY



Adapted from UNEP, 2011

**EBFM Policy → EBFM Road Map** (Plan, Advance, Prioritize, Explore trade-offs, Ecosystem management, Resilience/Community well being)

# AFSC Ecosystem Based Fishery Management

## AK Integrated Ecosystem Assessment (IEA) program

- ✓ Support development of early warning systems and ecological forecasts
- ✓ Support the Preview of Ecological and Economic Conditions (PEEC)
- ✓ Participatory science to support conceptual models and scenario planning (e.g. for use in **FEPs**)...**onramps to short and long term management advice**
- ✓ Leveraged support for Ecosystem Status Reports (ESR) development
- ✓ Maintain operational readiness of ecosystem models and risk frameworks
- ✓ Support ROMSNPZ virtual ocean predictions and forecasts
  - Data access, model webpage, R tools



AK IEA Steering Committee:  
Kirstin Holsman, Kerim Aydin, Jamal Moss, Stephen Kasperski, Libby Loggerwell, and Phyllis Stabeno



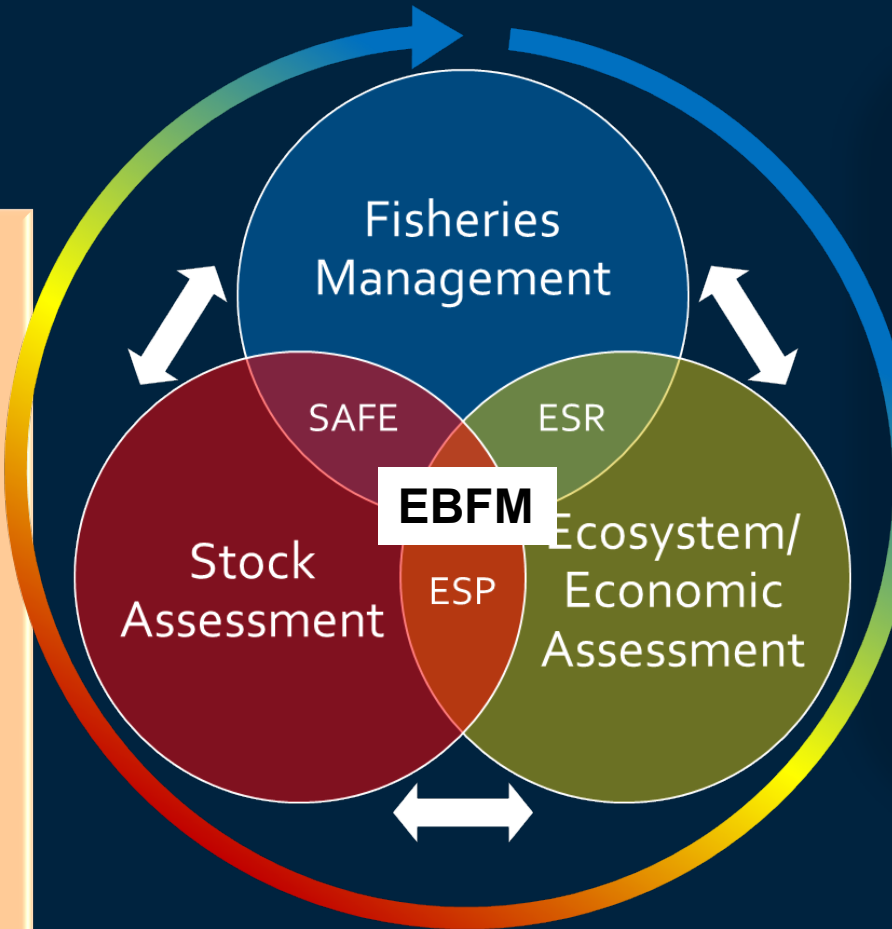
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# AFSC Ecosystem Based Fishery Management

## Ecosystem Status

### Reports (~20 years)

- Indicator-based assessments by region
- Tailored to the North Pacific Fisheries Management Council
- Linked with annual stock assessment cycle
- Provide context for Ecosystem-Based Fisheries Management



## Ecosystem

## Socioeconomic Profiles

**Category 1:** Informs stock assessment model

**Category 2:** Used to inform the Allowable Biological Catches

**Category 3:** Indicators inform other Ecosystem Based Management Processes

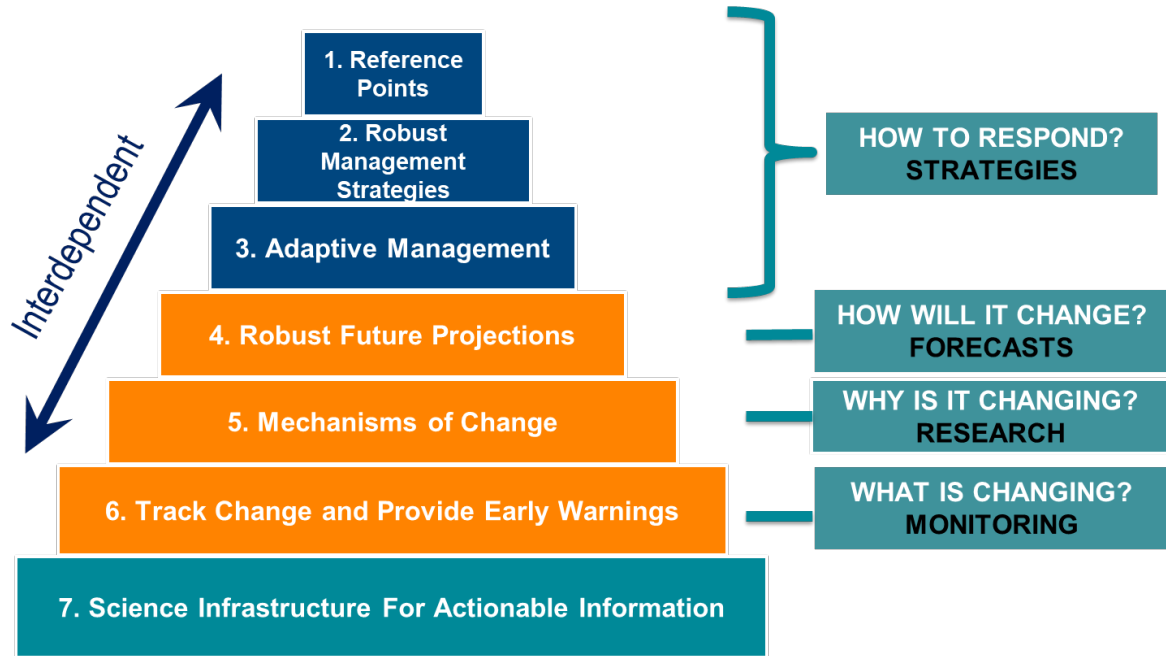
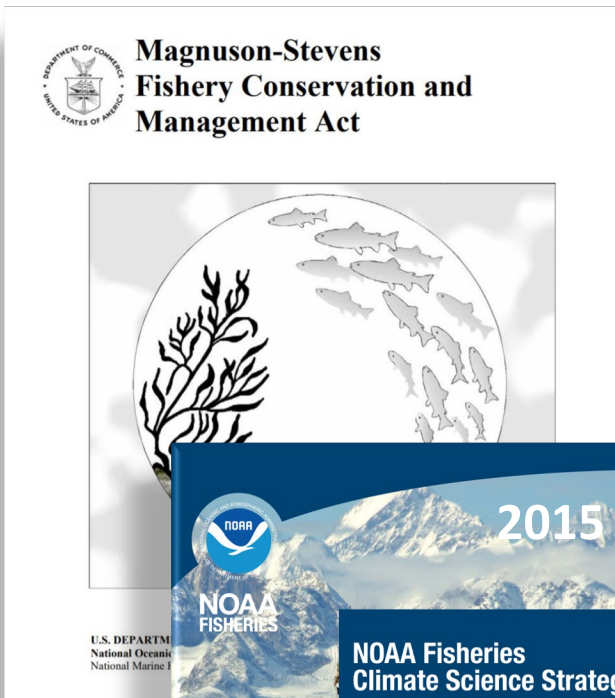
**Category 4:** Exploratory



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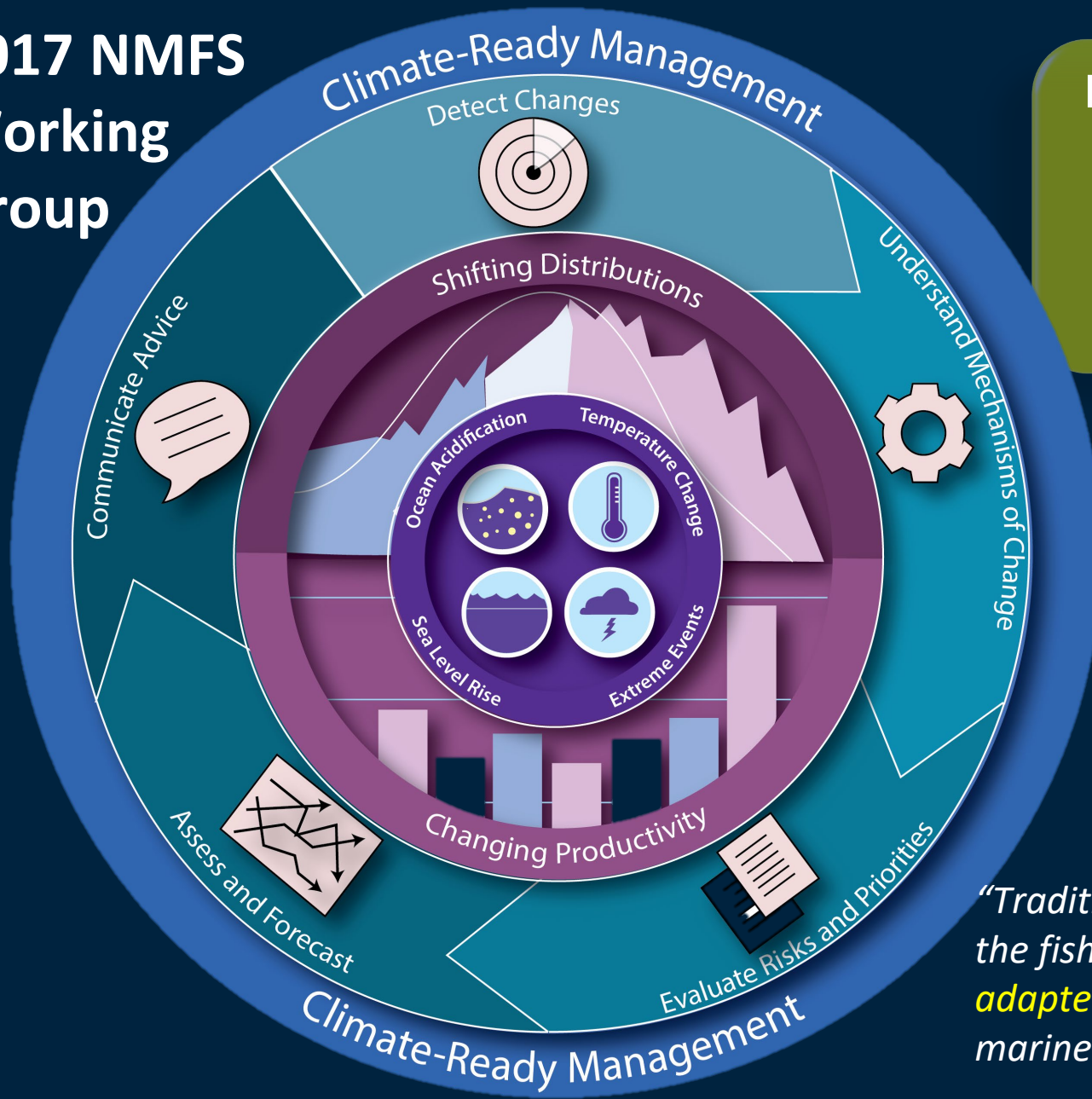
# NMFS climate informed science for management



- ✓ Science Capacity
- ✓ Climate-Ready Management
- ✓ Resilience and Adaptation



# 2017 NMFS Working Group



## Potential fisheries management impacts

- Allocation issues
- Spatial & temporal management
- Estimates of spawning biomass, MSY, biological reference points

*“U.S. National Marine Fisheries Service has called for increasing the production, delivery, and use of climate and environmental information to fulfil its living marine resource stewardship mandates”*

Karp et al. 2019. Accounting for Shifting Distributions and Changing Productivity in the Development of Scientific Advice for Fishery Management. ICES JMS doi: 10.1093/icesjms/fsz048

*“Traditional methods and assumptions used in the fishery management process need to be **adapted** to ensure effective stewardship of living marine resources under changing conditions.”*



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# AFSC climate informed science for management

## EBS & GOA Regional Action Plans (2015-today)

- ✓ Climate-informed reference points
- ✓ Advance robust management strategies (e.g. FEP, ACCLIM, multi-spp. )
- ✓ Advance adaptive management processes (Ecosystem socio-Economic Profile-ESP, risk tables)
- ✓ Project Future Conditions (physical forecasts, projections, IBM)
- ✓ Mechanisms (lab, movement, heatwaves, place-based IEA, LKTK)
- ✓ Track and provide early warnings (Ecosystem Status Report-ESR)
- ✓ Build and maintain adequate science infrastructure (surveys, research [trophodynamics, aging], stock assessments)

## EBS & GOA 2.0 and Arctic 1.0 -> October 2021

- Process Studies
- Monitoring
- Management Oriented Synthesis
- Socio-economic
- Marine Mammals

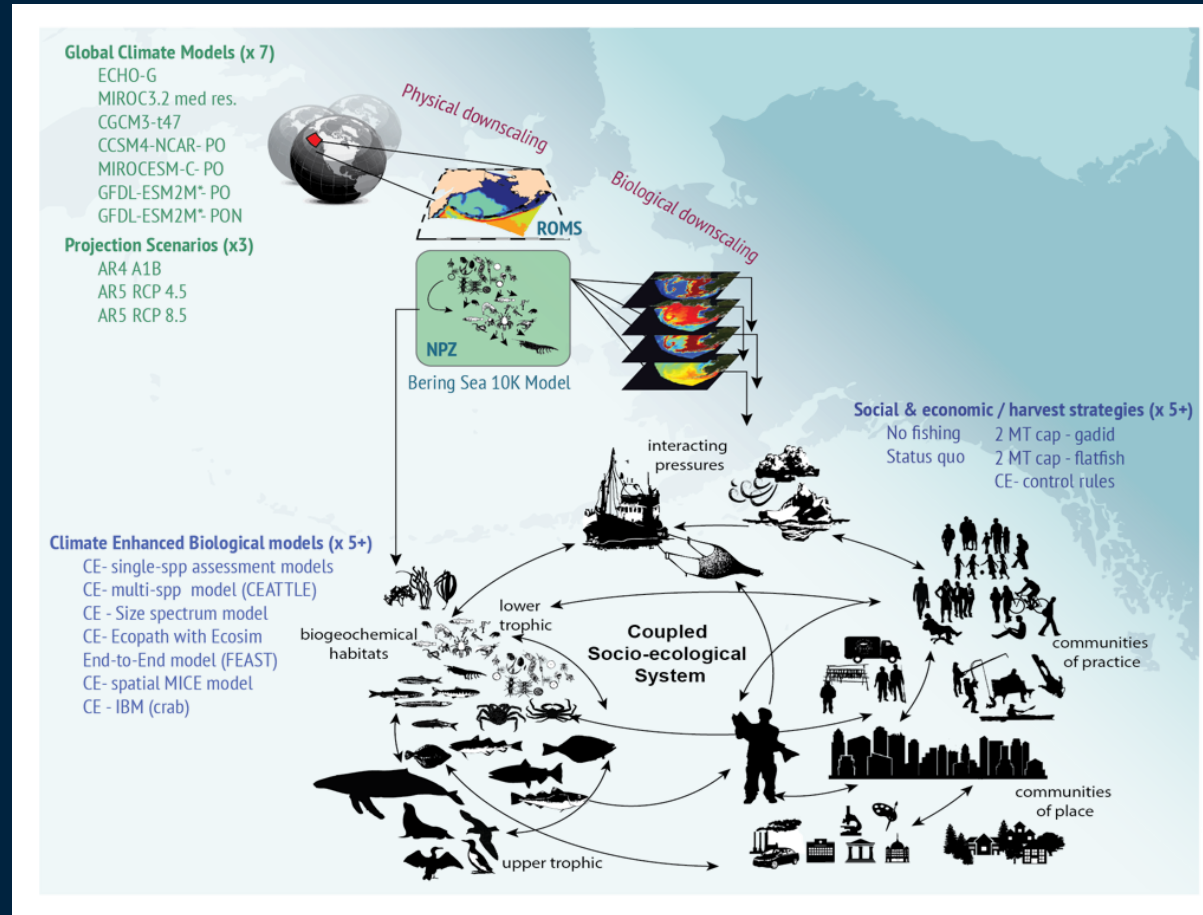


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# Alaska Climate Integrated Modeling Project

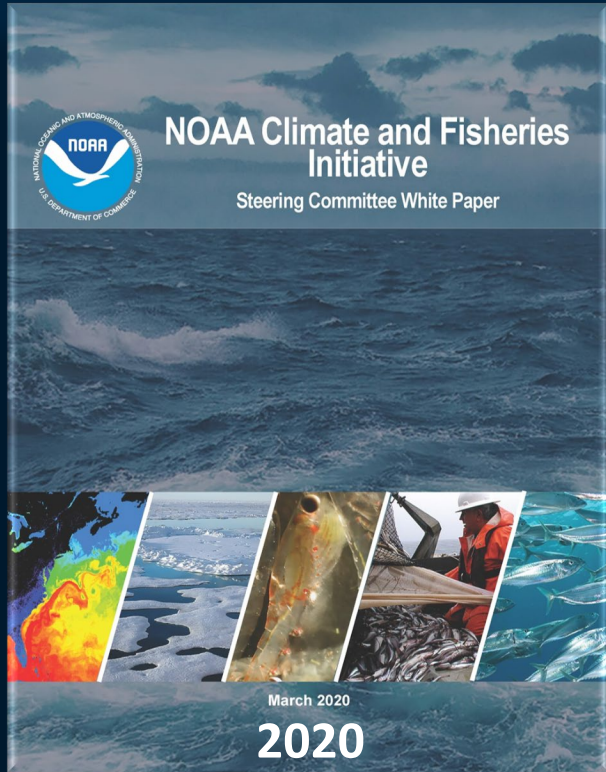
*Operational suite of coupled socio-ecological models for climate fisheries hindcasts, forecasts, projections and Management Strategy Evaluation*

**EBFM can forestall climate declines and provide critical time to adapt**

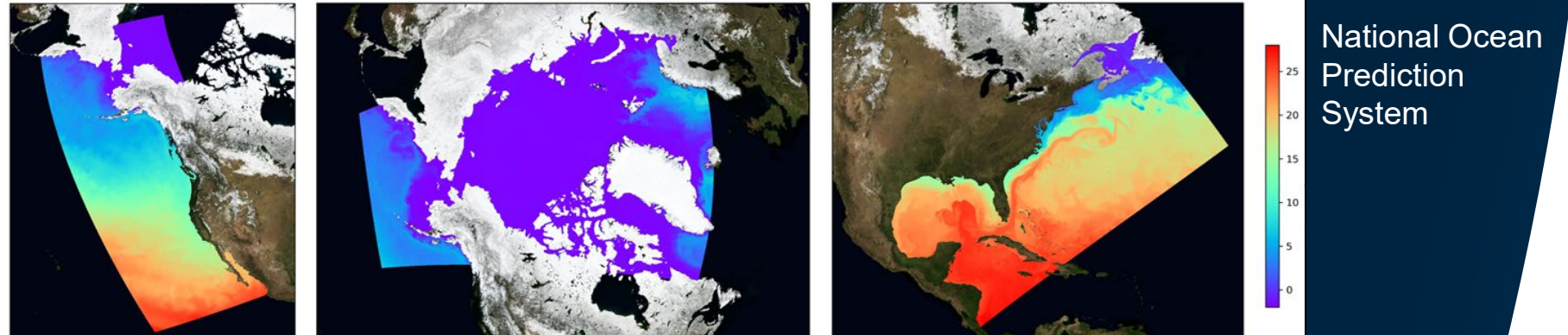


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# NOAA Climate and Fisheries Initiative



## *end-to-end operational ocean modeling & decision support system*



▶ Advancing Ocean, Ecosystem, and Climate Understanding

▶ Operational Ocean, Climate, and Ecosystem Prediction Systems

▶ Climate Ready Decision Making

- Habitat and distribution maps
- Spp. forecasts and projections
- Ecosystem-wide forecasts and projections
- Tipping points and thresholds



# 2021 Executive Orders associated with environmental justice (and climate)

## EO 14008 (2021): Tackling the Climate Crisis at Home and Abroad

Section 219-223. SECURING ENVIRONMENTAL JUSTICE AND SPURRING ECONOMIC OPPORTUNITY

## EO 13985: Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

NOAA: “Advancing Equity for All Roadmap”

NMFS: [Equity and Environmental Justice Working group](#)

## EO 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

Section 1. Policy

- “....listen to the science;.....to bolster resilience to the impacts of climate change; to restore and expand our national treasures and monuments;....”

Section 3. Restoring National Monuments (DOI led)

Section 4 (b). Arctic Refuge

- [Reinstates EO 13754 \(December 9, 2016\) Northern Bering Sea Climate Resilience - to maintain existing prohibitions on commercial non-pelagic trawl gear in Bering Sea and Aleutian Islands FMP and Arctic FMP](#)

## Presidential Memorandum: Tribal Consultation and Strengthening Nation-to-Nation Relationships (2021)

Executive Order 13175 (2000): Consultation and Coordination With Indian Tribal Governments

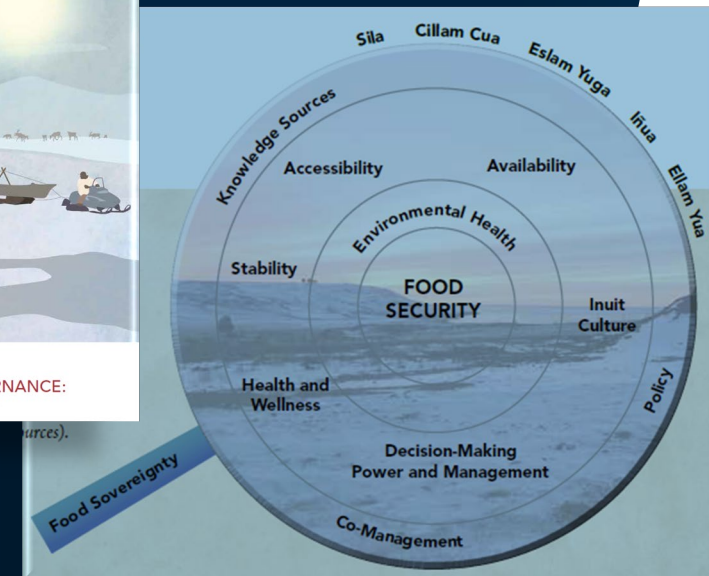


# AFSC and **environmental justice** in research

“Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”

## Environmental Justice in Alaska includes Food Security

- Policy (subsistence, co-management, IWC, MSA-NPFMC)
- Data collection/analysis
- Cooperation
- Collaboration
- Communication
- Co-development

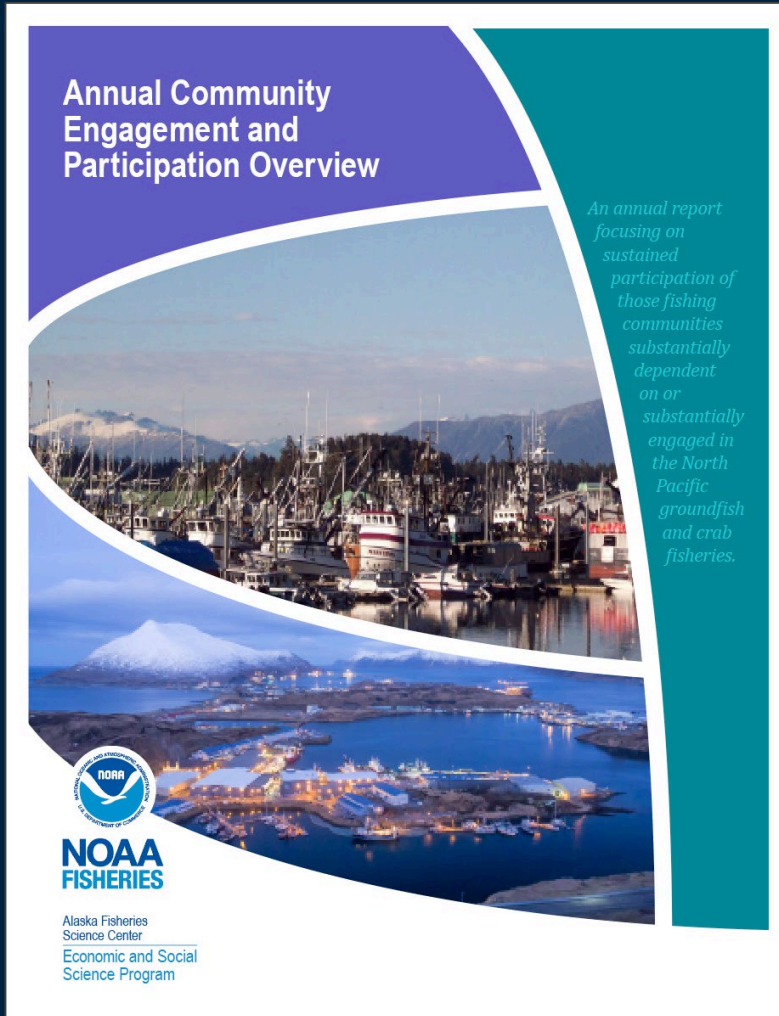


[https://iccalaska.org/wp-icc/wp-content/uploads/2020/09/FSSG-Report\\_-LR.pdf](https://iccalaska.org/wp-icc/wp-content/uploads/2020/09/FSSG-Report_-LR.pdf)



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# AFSC and **environmental justice** in research



**Engagement Indices** - *A relative score (compared to all other AK communities in that fishery)*

Commercial Processing  
Commercial Harvesting

**Regional Quotient** – *A relative share % of landings relative to all other AK communities in that fishery)*

Commercial Processing  
Commercial Harvesting

### **Community Sketches**

*Community Vitality (by proxy)*

- Deep dive into Highly Engaged communities
- school enrollment – direct metric
- Average pounds delivered and % of revenue landed
- Fish taxes

### **Community Sketches**

- Demographics
- Area Description
- Social Indicators
- Infrastructure & Transportation
- School Enrollment
- Current Economy
- Fish Taxes
- Fishing History & Regulatory Background



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# AFSC and environmental justice in research



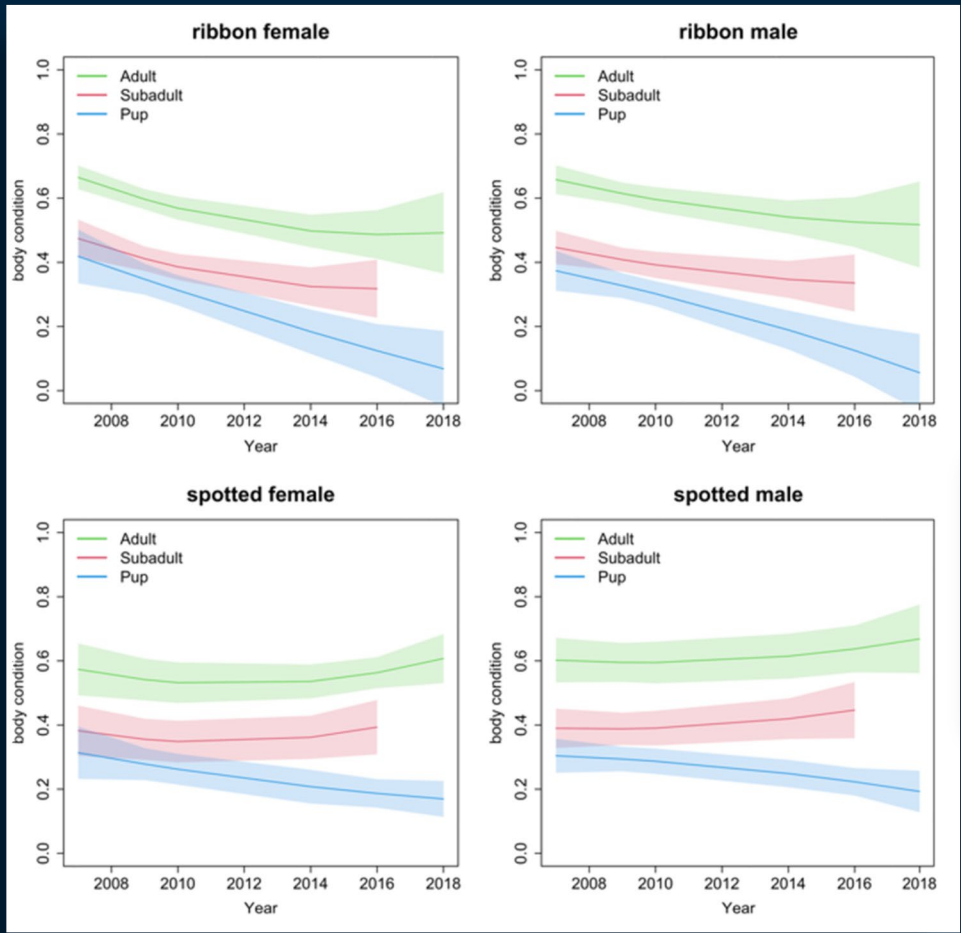
<https://www.fisheries.noaa.gov/alaska/commercial-fishing/alaska-fisheries-science-center-interactive-data-maps>



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# AFSC and environmental justice in research

Changing sea ice affecting ice seal biology



Boveng, P. L., H. L. Ziel, B. T. McClintock, and M. F. Cameron. 2020. Body condition of phocid seals during a period of rapid environmental change in the Bering Sea and Aleutian Islands, Alaska. *Deep Sea Research Part II: Topical Studies in Oceanography*:104904.



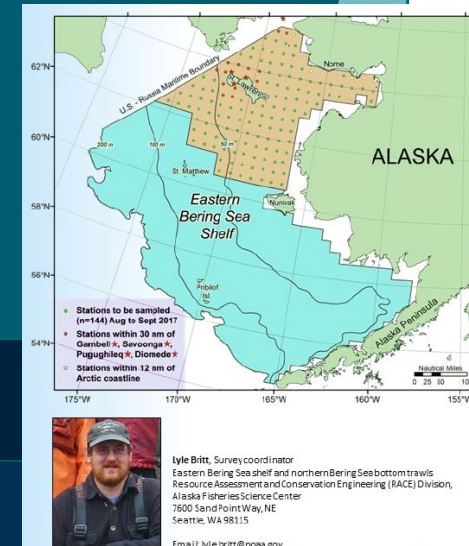
# AFSC and **environmental justice** in research

Co-develop best practices for building relationships and partnerships with communities

- Communication and engagement (sharing information)
- Framework for identifying, prioritizing, and implementing research Cooperation
  - Data production: providing information.
  - Research project or data gathering that is a priority
  - Co-production of knowledge: development to implementation and communication of results.

Survey and research communication plan

- Provide clear and accessible information about AFSC scientific surveys and research activities and how they support science-based management
- Improve and increase dialogue and feedback mechanisms in target areas
- Facilitate cross-cultural learning opportunities for Alaska Native K-12 and college students



# AFSC and **environmental justice** in research

Co-develop (in progress) symposium - 2022

Building relationships: co-development of knowledge through a dialogue between ocean hunters and western science researchers

## Goal and Vision

To develop a framework to build relationships between and among Alaskan Indigenous communities and marine mammal researchers to improve **communication, coordination, collaboration**, and to create a framework for the co-development of knowledge through a dialogue between marine hunters and western science researchers.



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# Challenges for research informing management

## Climate change

- Non-stationarity; is the change in productivity due to climate or fishing pressure? When do we change reference points?
- Limited resources
- Acceptable levels of uncertainty, risk
- Balance of management informed indicators and mechanisms
- What don't we know?

## Environmental justice

- Identifying community specific research needs within NOAA Fisheries mission scope
- Identifying and prioritizing co-developed research questions (threatened communities, sectors)
- Applying resources within the entire Alaska EEZ
- Assessing inequality in effects of environmental change (communities, fishing sectors)



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# Thank You!

“We must listen to science — and act.”  
[EO 14008 (2021)]

“Agencies shall make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts.”  
[EO 14008 (2021)]



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