

Alaska Fisheries Science Center FY20 State of the Center

Robert Foy
AFSC Research and Science Director

Presentation to North Pacific Fisheries Management Council
January 27, 2019



AFSC State of the Center

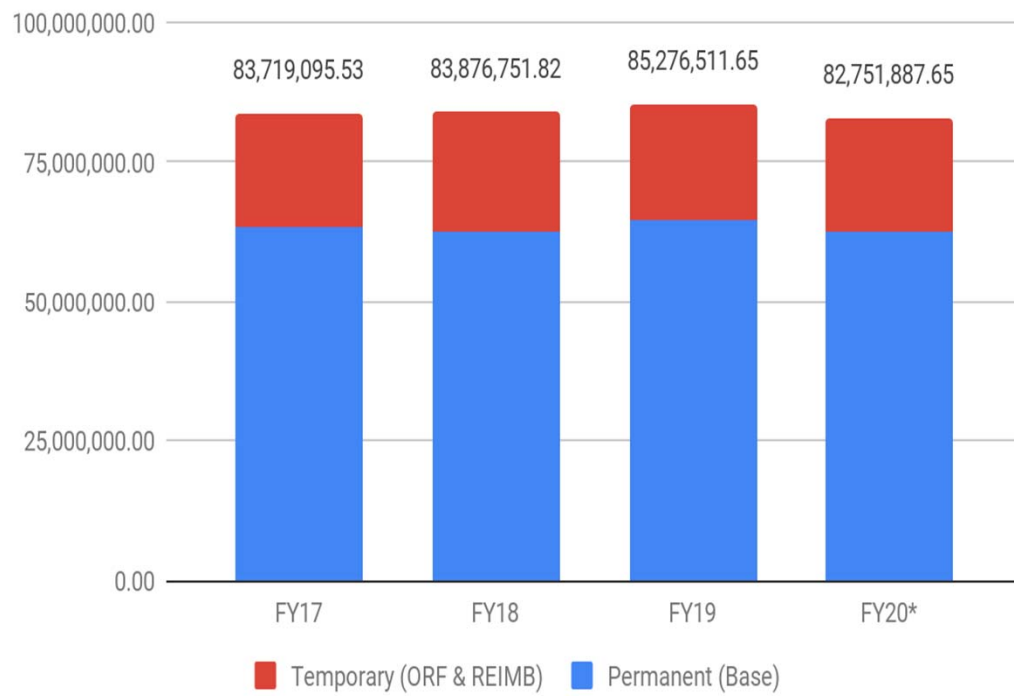
- **Resource trends, expectations, and challenges**
- **Prioritization process**
- **Adaptive strategy to changing resources**



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AFSC Budget Trends

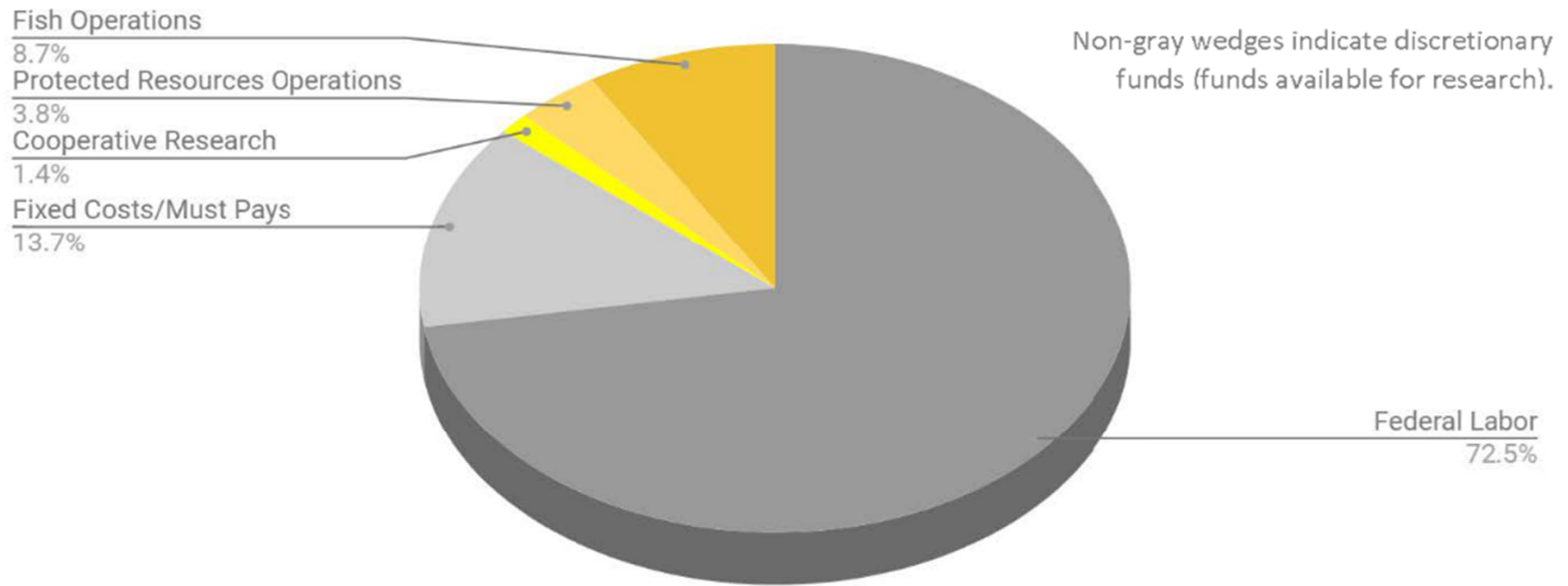
Total Funding Trend FY17-20



- 3% permanent allocation reduction in FY20 (-\$1.9M)
 - Focused funds, facility, and overhead
- Temporary funds 24-26% of total
 - Risk to depending on temp funds
- Does not include likely ~\$1.0M increase to support surveys



AFSC FY20 base funds

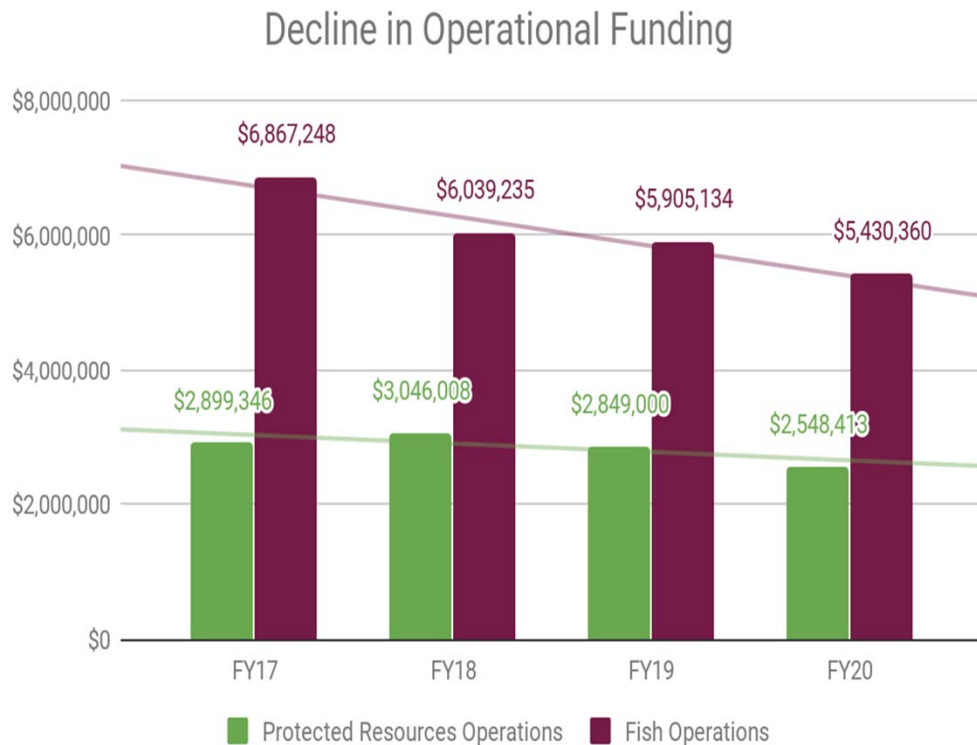


Fixed Costs/Must Pays include facilities, mandatory travel, and other costs that are required to be paid annually.
Observer Operations are primarily covered by temporary funding.
All Divisions receive temporary funds which are not included here.



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AFSC Budget Trends



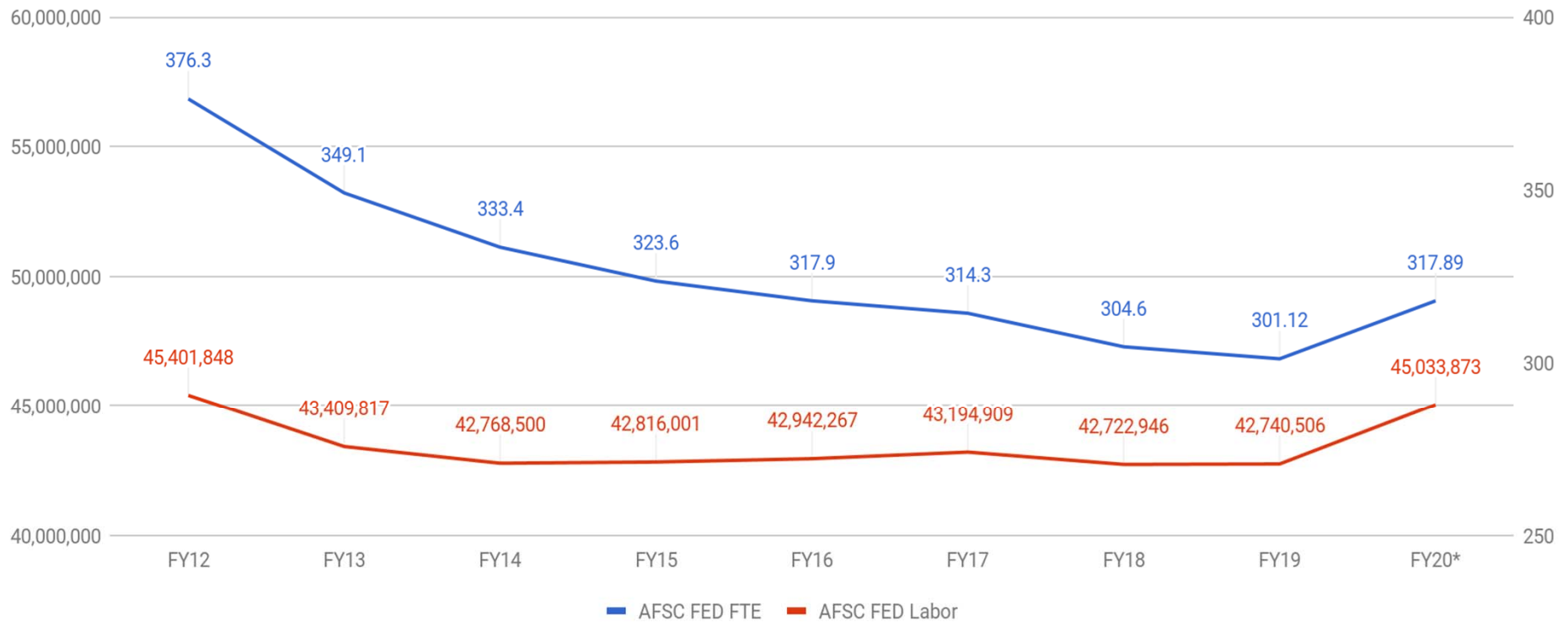
- Continued pressure on operational funds due to inflationary cost increases (“flat” budget)
- FY20 Operational funding at 12.8% (\$8M) of total permanent allocation down from 15.5% (\$9.8M) in FY17
- Impacting our ability to maintain a balanced research portfolio not just surveys



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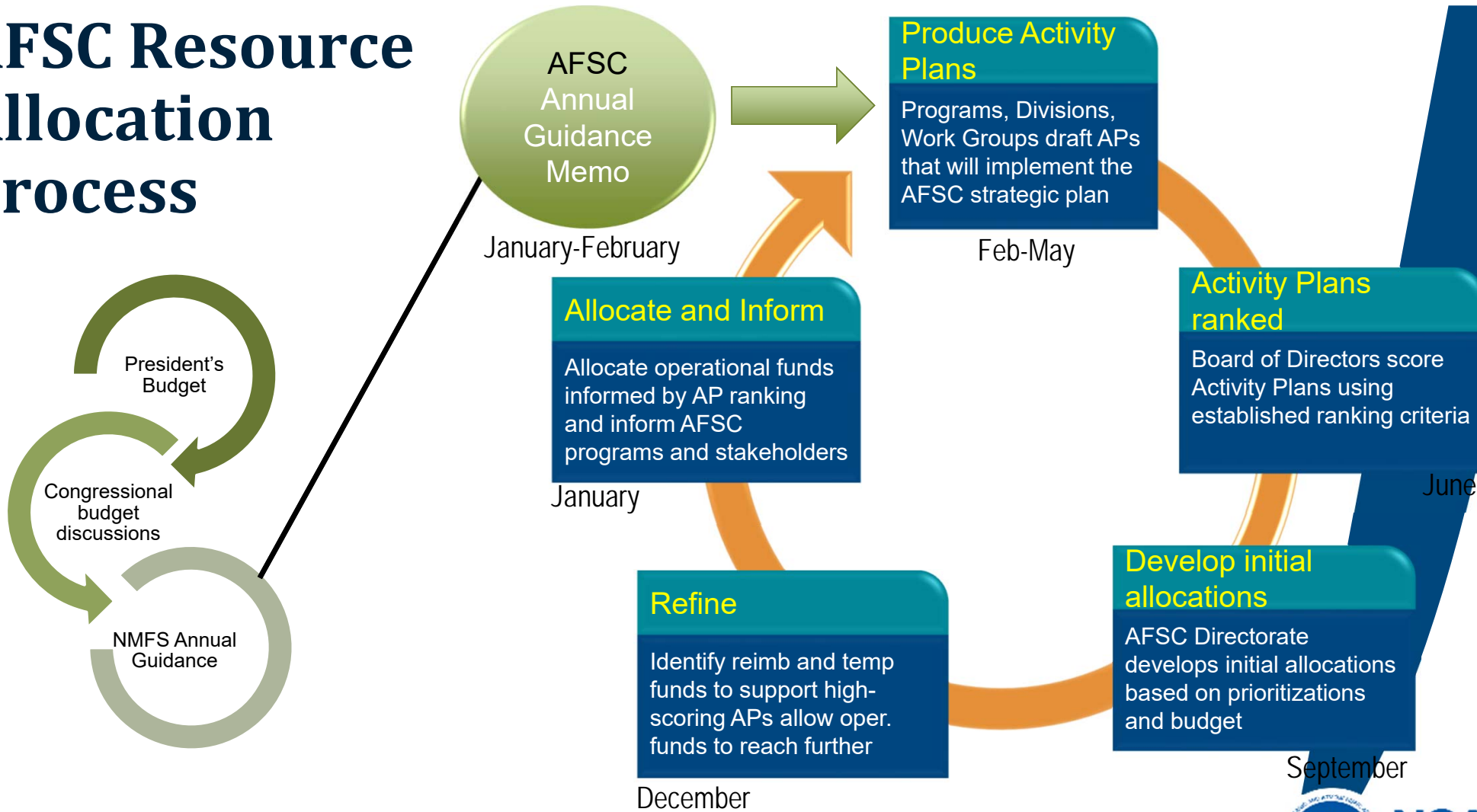
AFSC Budget Trends

AFSC FED FTE

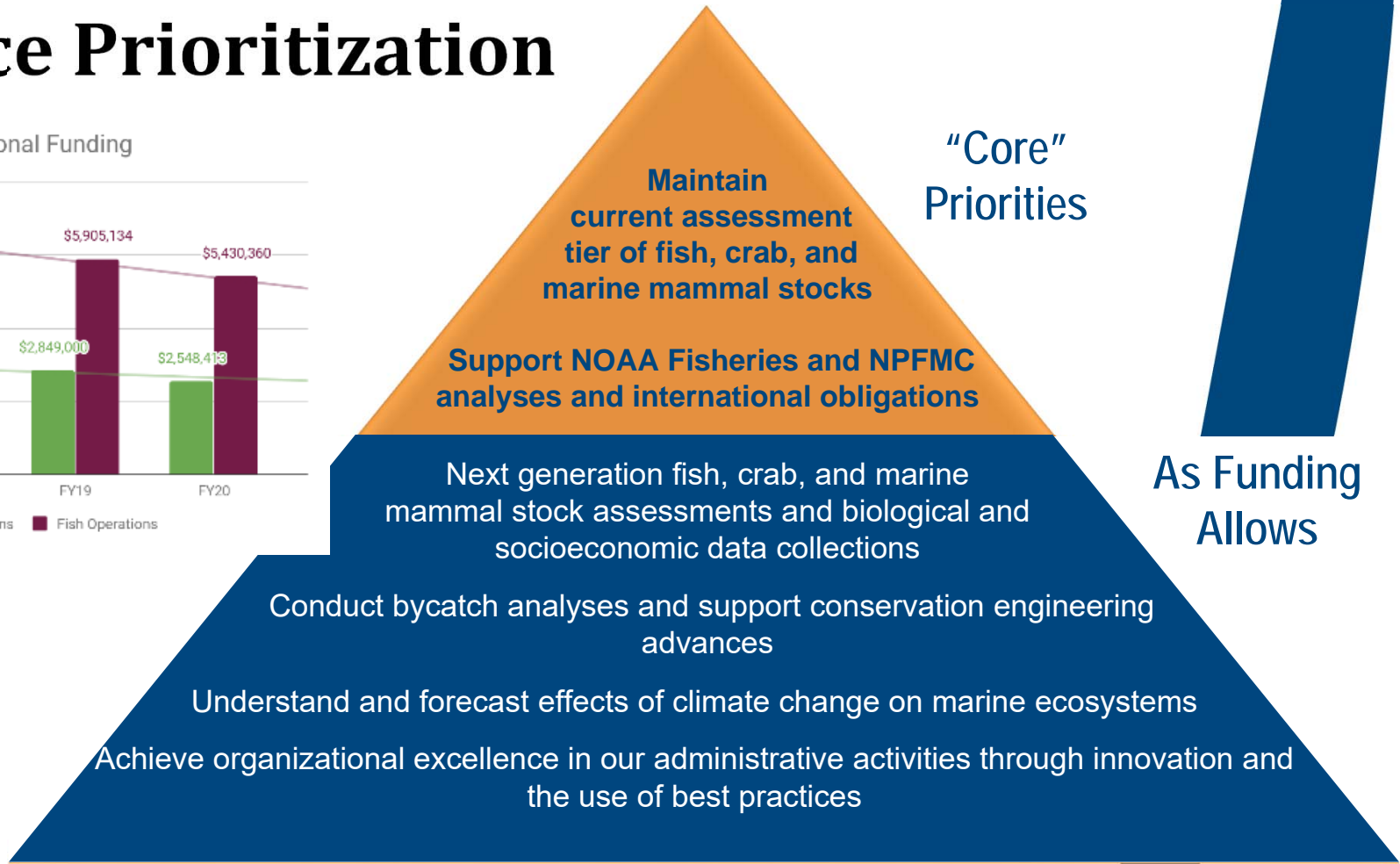
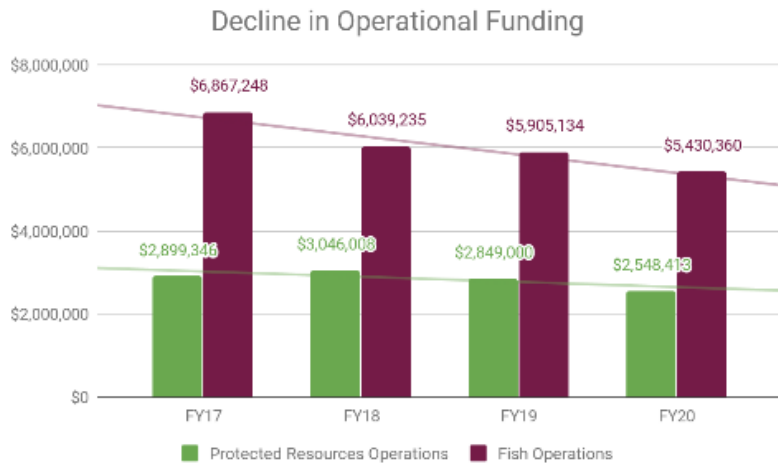


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AFSC Resource Allocation Process



AFSC Science Prioritization

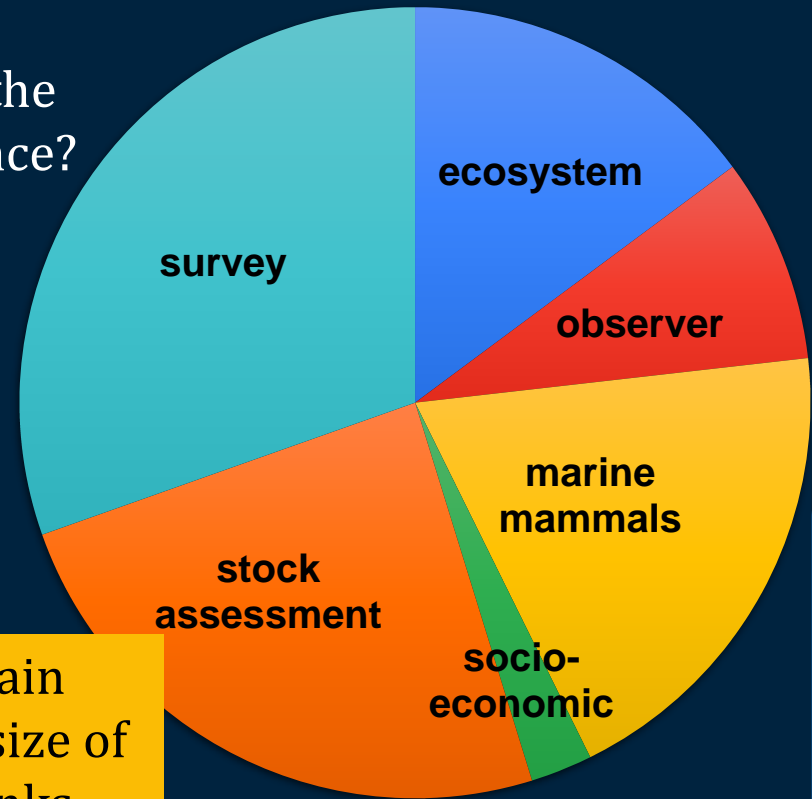


Balancing the survey & research portfolio

Do we have the proper balance?

Why?

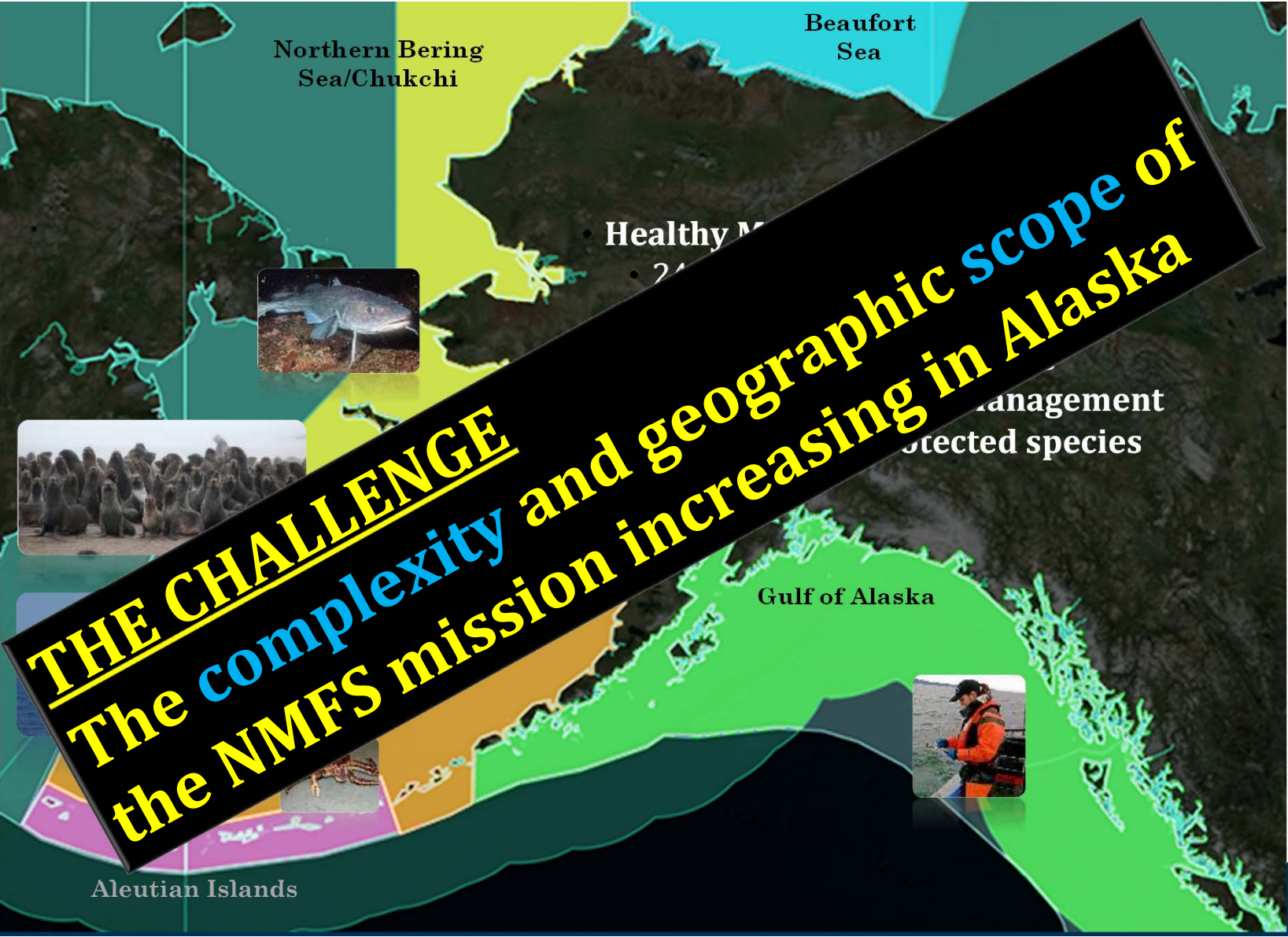
- **Building resilience in shifting states**
- Environmental variability & climate change
- Static management tools
- **Cannot wait for the change to happen**



- Must maintain balance as size of the pie shrinks



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Northern Bering Sea/Chukchi

Beaufort Sea

Healthy M

24

management
protected species

Gulf of Alaska

Aleutian Islands



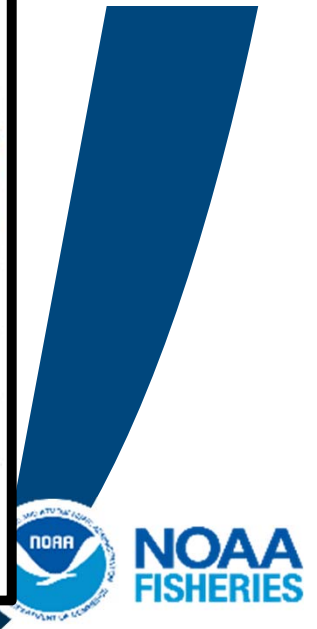
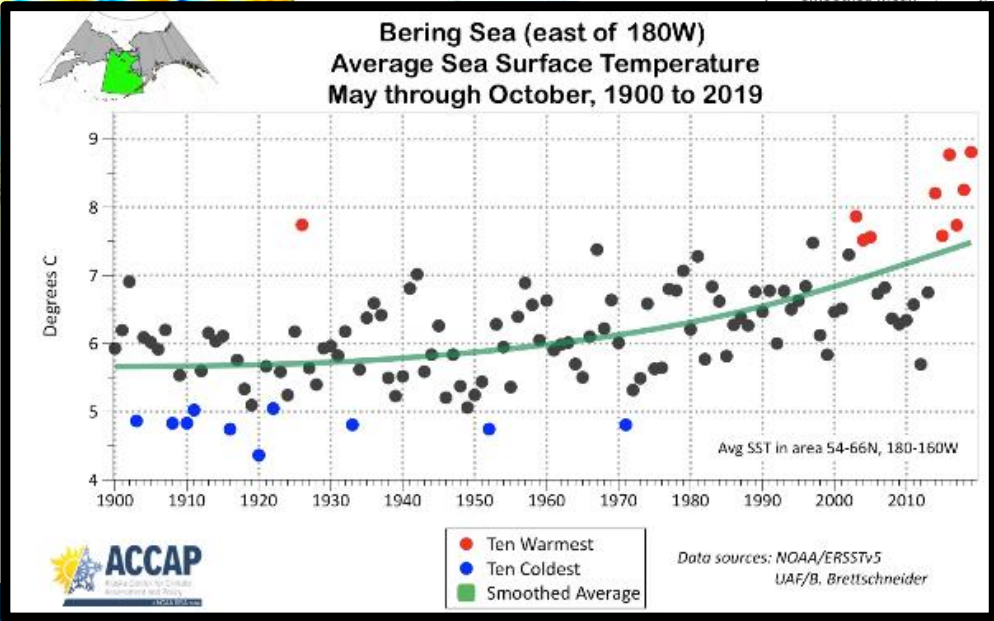
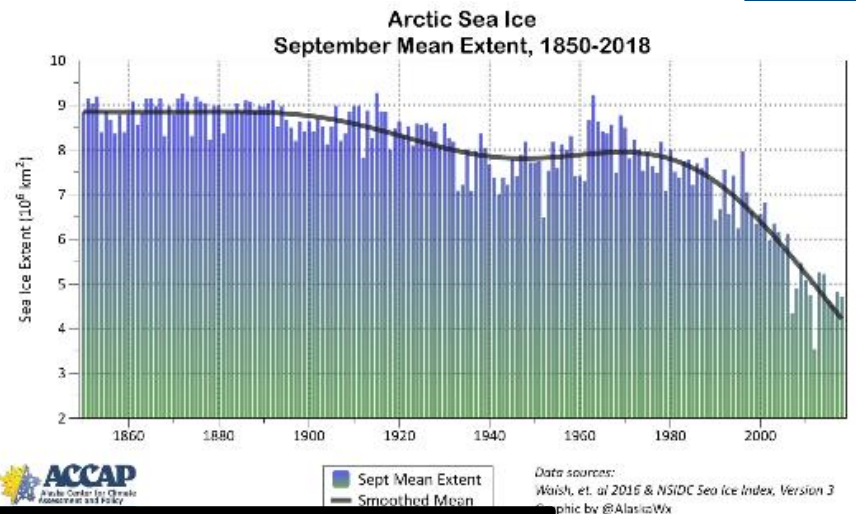
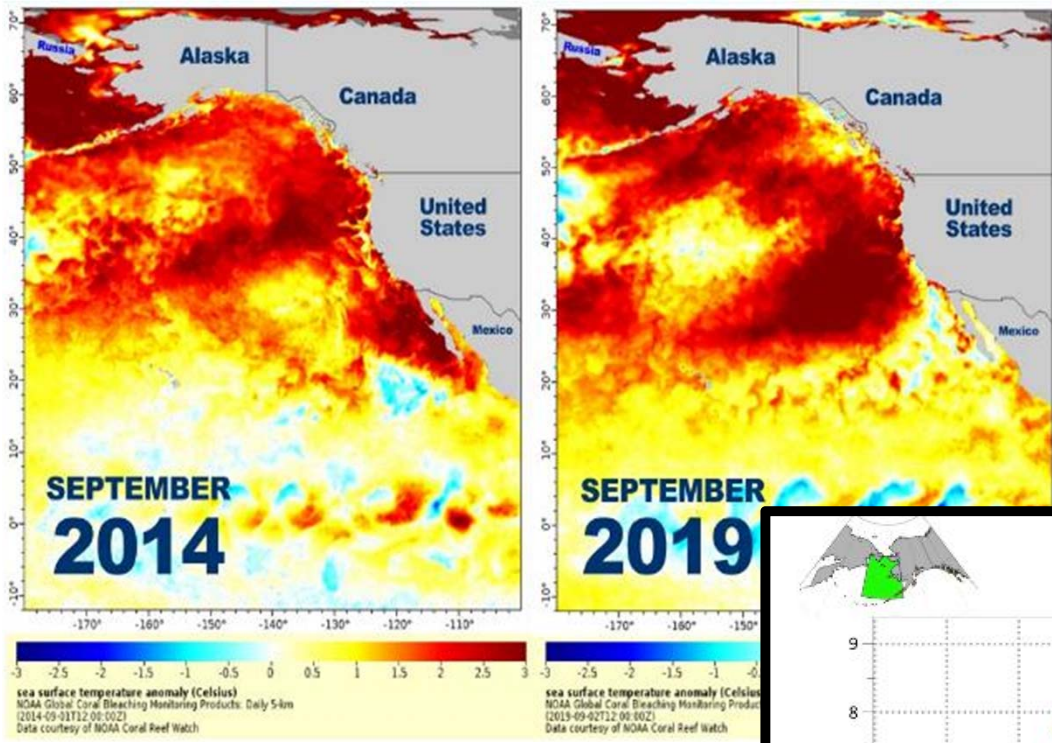
THE CHALLENGE
The complexity and geographic scope of
the NMFS mission increasing in Alaska

Alaska Fisheries Science Center

- Alaska EEZ = 1.5 million nm²
- 5 Large Marine Ecosystems
- 60% U.S. seafood
- \$13.8B economic output to U.S.
- Top 2 volume fishing ports in U.S.



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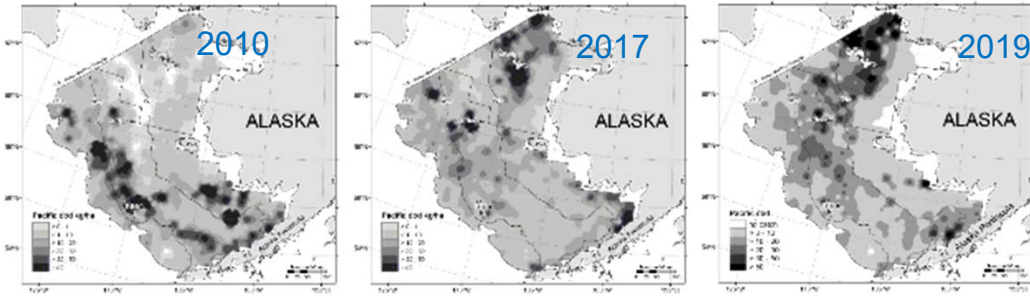


Large scale movement



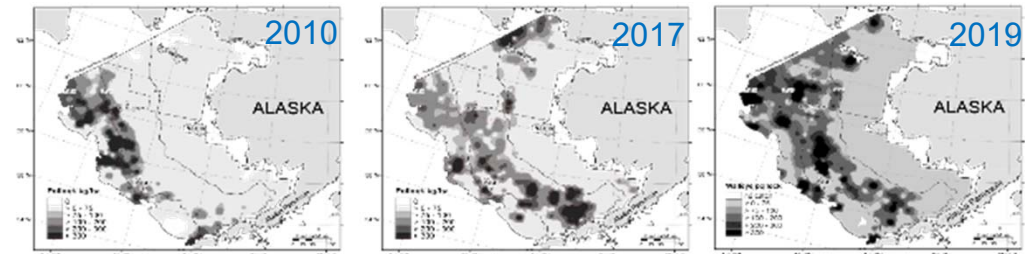
Pacific Cod

1,000 km shift



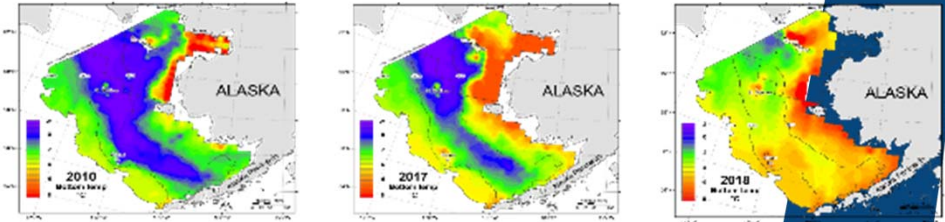
Walleye Pollock

>30km/y shift



~15% stock moves across international boarder

The Cold Pool WALL



SEVENTEENTH DISTRICT
Migration of Fishing Activity Challenges USCG Capability

Primary C/F/L Concerns:

- SAR/MRCS
- Enforcement
- Arctic Closed Area

Freezer Longline Fleet Targeting Pacific Cod

- Unprecedented Northern Concentration (relaxation through USCG, NOAA SF Arctic Biopact)
- 25nm from Arctic Closed Area
- 775-800nm from SAR/LE Support (2 day outer transit)
- Supports scientific research on the effects of climate change

Analysis:

- Less sea ice
- Cold pool shrinking in Bering Sea
- Fish stocks moving north
- More productive fishing

C-130 Flight: 16 Nov
FV Arctic Prowler- 191ft 20 IPDB

Deadly Algae Are Creeping Northward

In a warming ocean, *Alexandrium* algae are shredding marine food webs—and disrupting beloved Alaska traditions.

Story by *Miranda Weiss*

OCTOBER 29, 2018 | SCIENCE

Meeting the Challenge in Alaska

Survey expansion

Innovation

Management Adaptation

Collaboration



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Meeting the Challenge in Alaska

Survey expansion

- Temporal and spatial shift in coverage
- DANGER: spatial variance in aggregated species
- DANGER: stock assessments need to accept separate survey input
- DANGER: Δ in survey bias (LF, age, sex ratio)
- ICES workshop
- New spatial statistical tools

Innovation

Management Adaptation

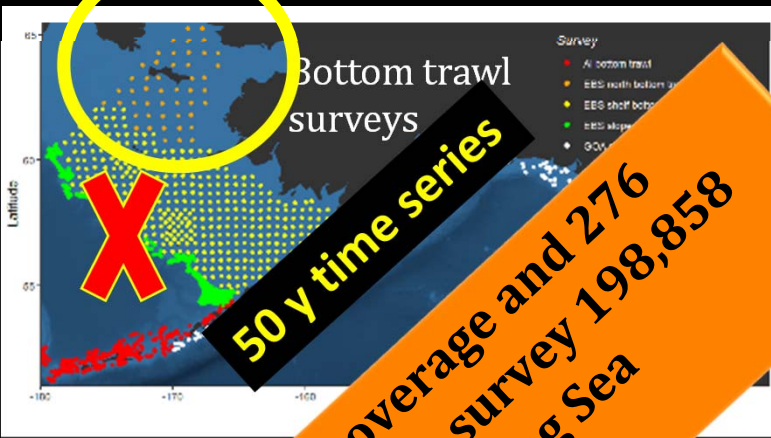
Collaboration

- Catch distribution
- Safety
- Local concern
- Food security



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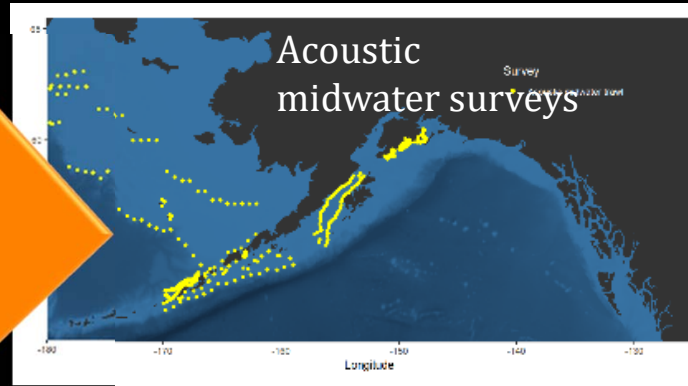
AFSC stock assessment surveys



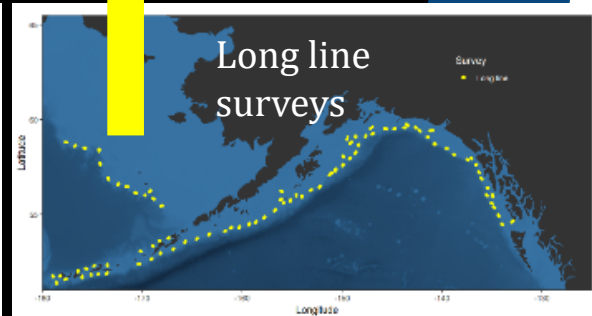
Gulf of Alaska Continental Shelf Bottom Trawl Survey (May-Aug, F/Vs Alaska Knight and Vesteraalen)
 Eastern Bering Sea Continental Shelf Bottom Trawl Survey (May-Aug, F/Vs Alaska Knight and Vesteraalen)
 Northern Bering Sea Continental Shelf Bottom Trawl Survey (August, F/Vs Alaska Knight and Vesteraalen)

50 y time series

Added survey coverage and 276 person sea days to survey 198,858 km² northern Bering Sea Survey NOT sustainable



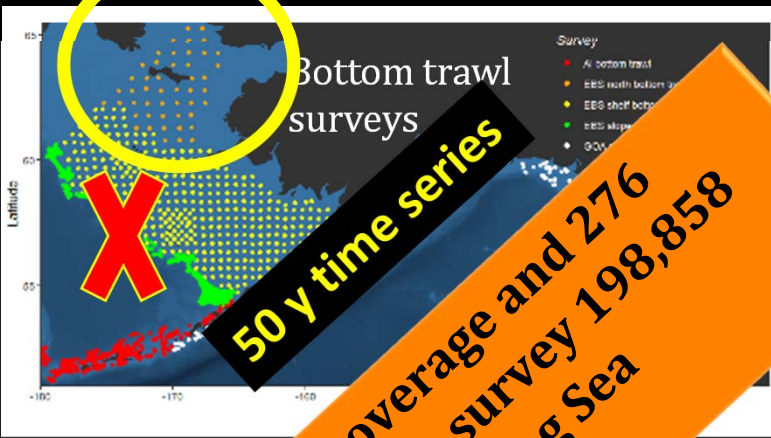
Winter Acoustic Trawl Survey (Gulf of Alaska, March, FSV Shimada)
 Summer Acoustic-Trawl Survey EBS (Island of Four Mountains to Yakutat Bay May-Aug, FSV Oscar Dyson)
 Northern Bering Sea Mid-Water Acoustic Survey (Northern Bering Sea to Southern Chukchi Sea 60 N to 69.5 N, Aug-Sept, F/V Northern Explorer)



Longline Survey (Gulf of Alaska, Bering Sea, May-June)



AFSC stock assessment surveys



Gulf of Alaska Continental Shelf Bottom Trawl Survey (May-August) Storms Sea Eastern Bering Sea Shelf Bottom Trawl Survey (August-November) Alaska Knight and Vesteraalen

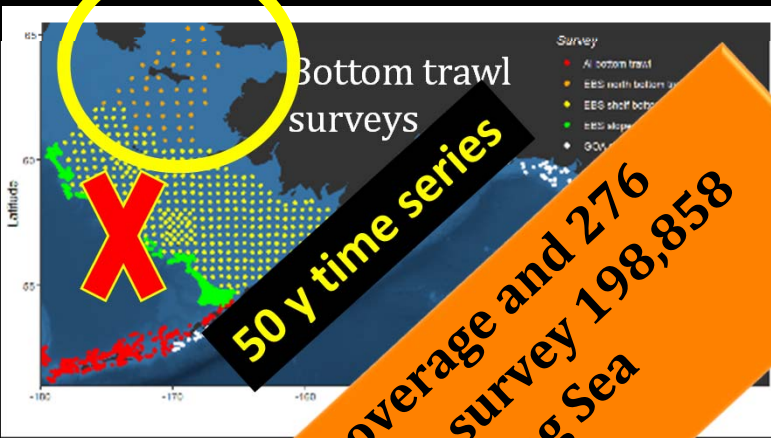
50 y time series

→ Added survey coverage and 276 person sea days to survey 198,858 km² northern Bering Sea Survey NOT sustainable

- ## Slope survey
- Assessment inputs: Greenland turbot (44-55%), ATF (20-50%), Kamchatka flounder (20-30%), and POP
 - Only 13-57% of ABC fished
 - blackspotted/rougeye rockfish and POP subarea ABCs
 - EBS POP catch 33% BSAI TAC
 - Biomass index: Pacific sleeper shark
 - Skate complex data
 - Tier 5 grenadier ecosystem component



AFSC stock assessment surveys



Gulf of Alaska Continental Shelf Bottom Trawl Survey (May-August) (Storm) Sea
Eastern Bering Sea Shelf Bottom Trawl Survey (August) (Alaska Knight and Vesteraalen)

50 y time series

→ Added survey coverage and 276 person sea days to survey 198,858 km² northern Bering Sea
→ Survey NOT sustainable

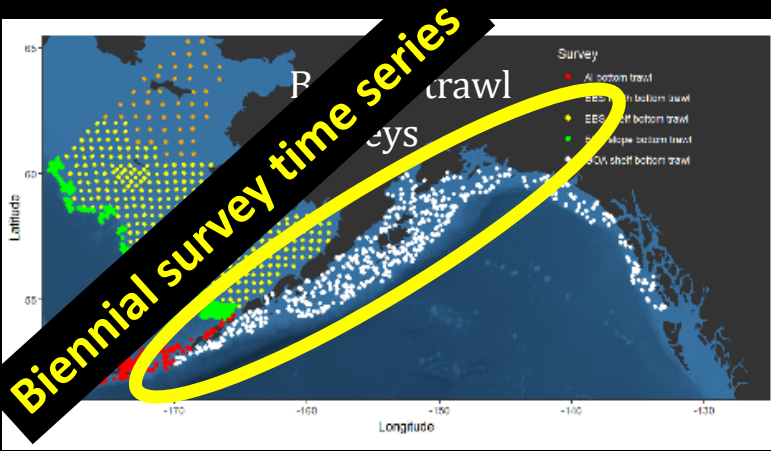
FY20

- Bottom trawl: AI surveys and EBS surveys (including **NBS**) will be completed
- **No Slope** survey
- All boats for FY20 surveys funded with FY19 funds

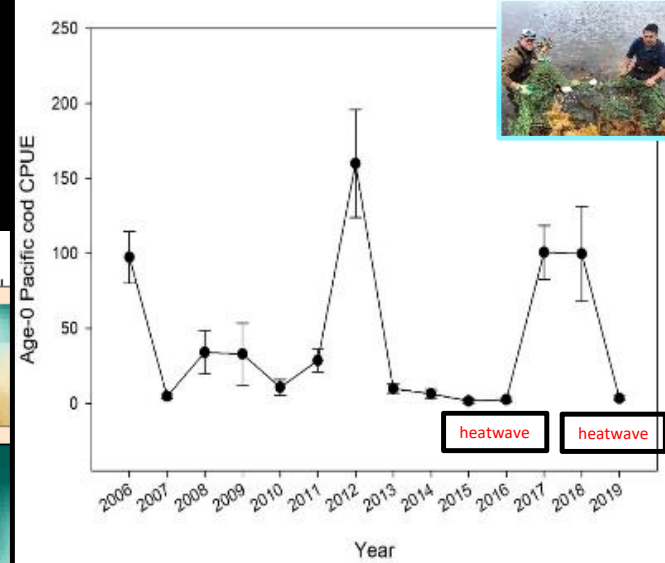
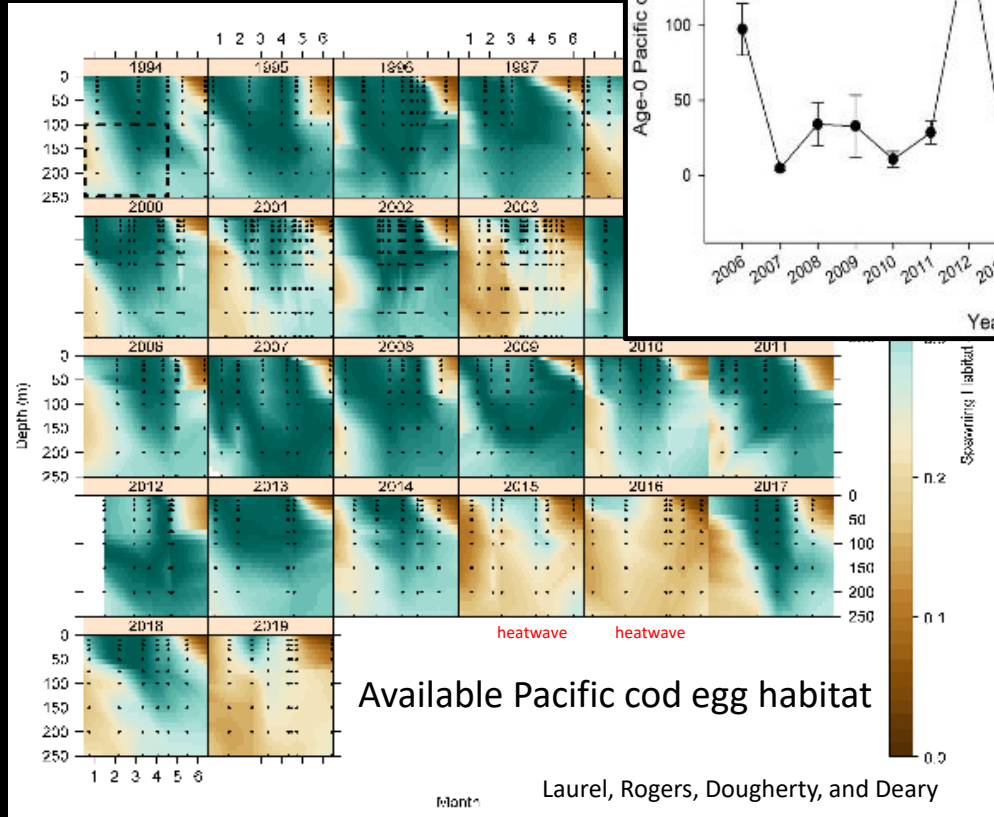


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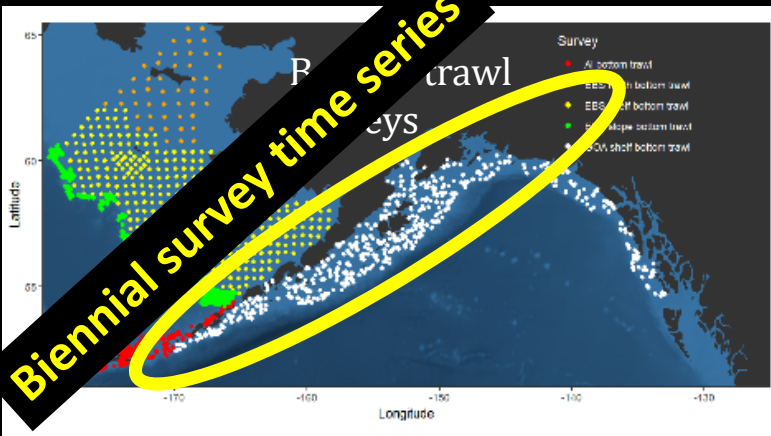
AFSC stock assessment surveys



- Gulf of Alaska Continental Shelf Bottom Trawl (May-Aug, F/Vs Ocean Explorer and Sea Storm)
- Eastern Bering Sea Continental Shelf Bottom Trawl Survey (May-Aug, F/Vs Alaska Knight and Vesteraalen)
- Northern Bering Sea Continental Shelf Bottom Trawl Survey (August, F/Vs Alaska Knight and Vesteraalen)



AFSC stock assessment surveys



Gulf of Alaska Continental Shelf Bottom Trawl
(May-Aug, F/Vs Ocean Explorer and Sea Storm)

Eastern Bering Sea Continental Shelf Bottom Trawl Survey
(May-Aug, F/Vs Alaska Knight and Vesteraalen)

Northern Bering Sea Continental Shelf Bottom Trawl Survey
(August, F/Vs Alaska Knight and Vesteraalen)

GOA shelf survey 2020

- New survey data (off year) would add uncertainty (data weighting, catchability)
- ADFG survey extension (3 days around Portlock Bank) to inform 2017 and 2018 YC strength (and M)
- IPHC observer added for length comp data collection
- Future: incorporate IPHC, ADFG indices
- Western GOA cod tagging



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FY21 Bottom Trawl Survey Scenarios

- FY20 Funding Opportunities Impacting our FY21 Bottom Trawl Survey Scenarios
 - \$2M Congressional add for “West Coast” Bottom Trawl Surveys split between AFSC and NWFSC
 - Temporary charter funding support from the NMFS Office of Science and Technology
 - Changes on other permanent allocation lines (Up or Down) not related to the congressional add



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FY21 Bottom Trawl Survey Scenarios

- **Best Case:** \$3M+ from FY20.
 - **FOUR** bottom trawl vessels (**2 EBS & 2 GOA**) including the NBS. Maintain AN...
Balance current research portfolio to reach high priority science. **Not enough staffing to use 5th boat AND NBS!**
- **Worst Case:** \$750K from FY20.
 - **TWO** bottom trawl vessels with FY20 funding which would put significant pressure on our FY21 allocation and require us to reduce our current research portfolio.
- **Most Likely:** Receive \$2M from FY20.
 - **THREE** bottom trawl vessels with FY20 funding. Will ensure that we have the resources available to maintain most of the current research portfolio in FY21.



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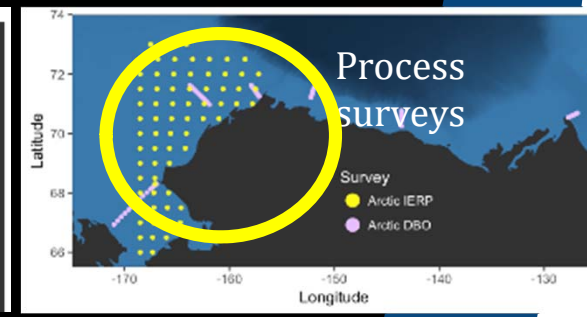
AFSC ecosystem/process surveys (includes partnerships!)



- Spring Ichthyoplankton Surveys (Shelikof Strait, Sea Valley, Gulf of Alaska, May, FSV Oscar Dyson)
- Southeast Alaska Coastal Monitoring (Gulf of Alaska and inside state waters of SE Alaska, June-Sept) (ADF&G survey we provide staff, R/V Medeia)
- Fall Juvenile Fish Survey (Coastal Gulf of Alaska, odd years, Aug-Sept, FSV Oscar Dyson)
- St. John Baptist Bay Juvenile Sablefish Tagging (July 15-19, Southeast Alaska)



- Spring/Fall Mooring and Ecosystem Observation Survey (Eastern Bering Sea, 70m isobath, Apr-May/PMEL, FSV Oscar Dyson)
- RWP Moorings Project (estimating pollock flux across the U.S./Russia Border)
- Salmon Excluder Work (Bering Sea, June-Sept, F/V Pacific Explorer)
- Red King Crab Tagging/Saildrone Research (Bristol Bay, June/Oct)
- Pacific Cod Tagging (Aleutians, Feb-Mar, RV Ocean Explorer/Sept TBD) Gulf of Alaska, March, FSV Shimada)



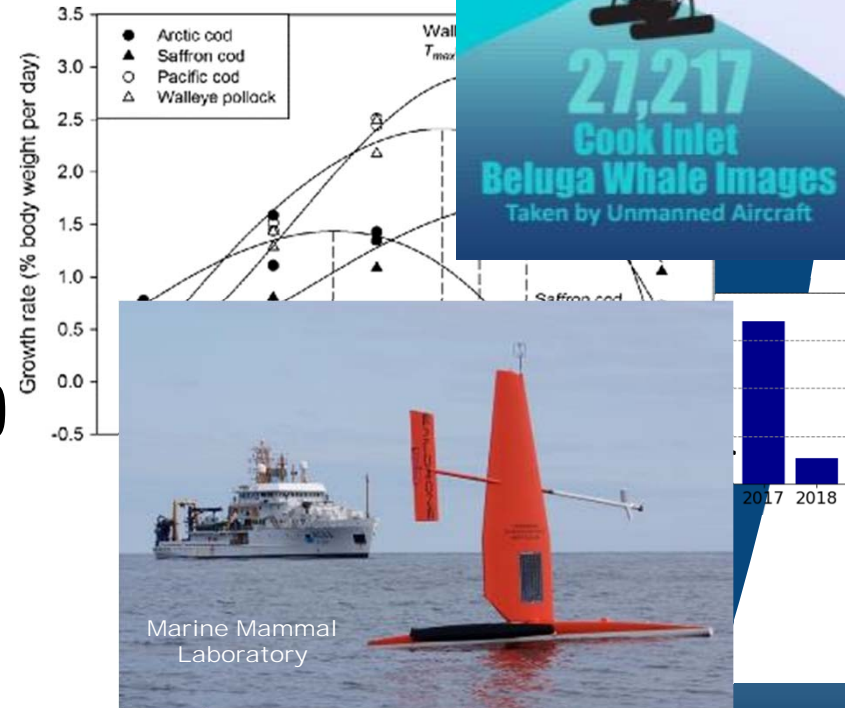
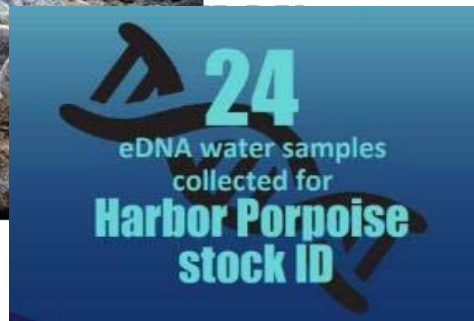
Purpose: Collect observations - sea ice, atmospheric measurements, ocean physics, phytoplankton, HABS zooplankton, infauna, larval fish, benthic and midwater fish, seabirds, mammals. Determine changes to distributions, fitness, food web dynamics



Meeting the Challenge in Alaska

Survey expansion Innovation

- Drones and tracking
 - NOT likely a 1:1 replacement
- ↑ SA model sophistication (e.g. VAST)
- Physiological studies
- Coupled bio-physical ocean models



Meeting the Challenge in Alaska

Survey adaptation

Innovation

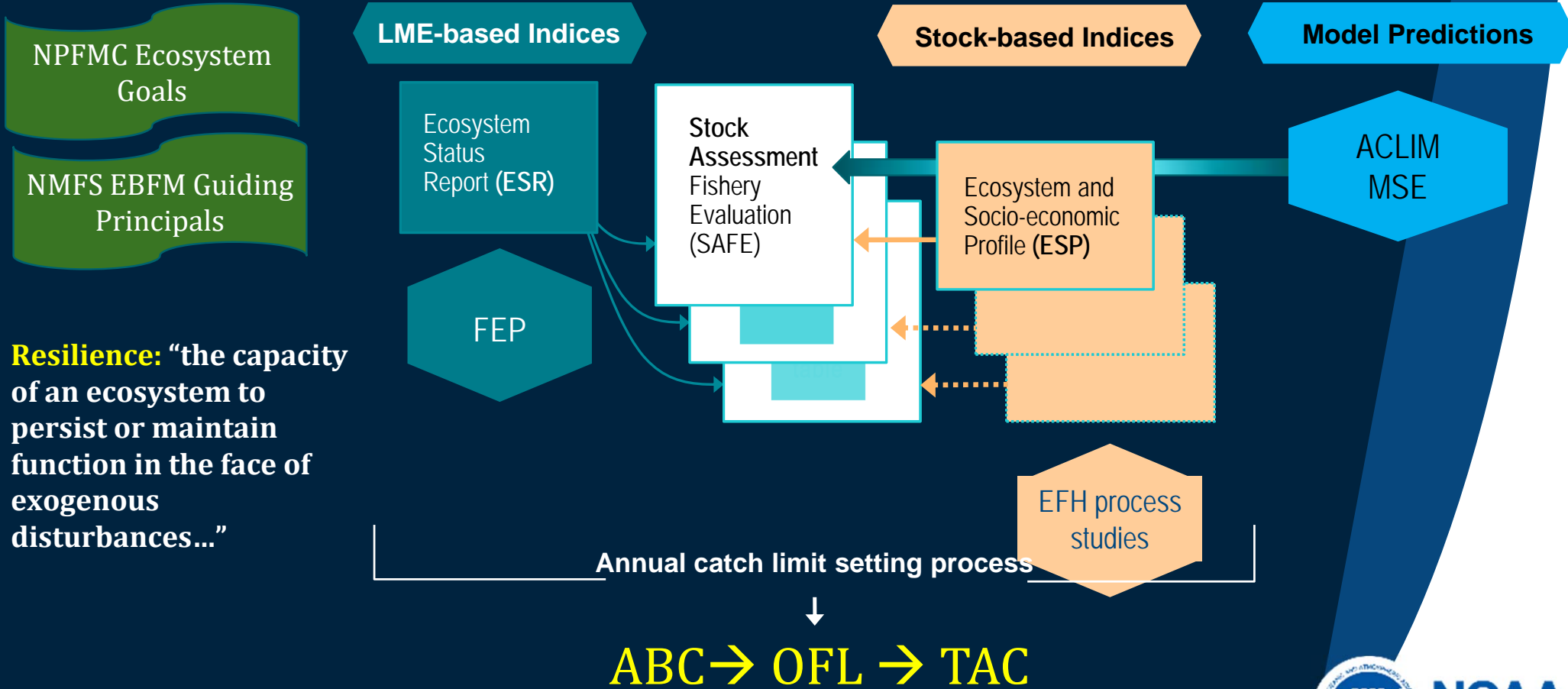
Management Adaptation

Collaboration



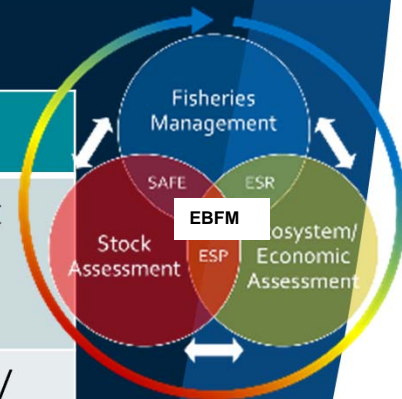
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Ecosystem Based Fishery Management Processes



Ecosystem-Based Fisheries Management (EBFM) : how are ecosystem, social, and economic data used?

	ECOSYSTEM	SOCIAL and ECONOMIC
Category 1	Informs stock assessment model	Predicting the impact of management actions, setting TAC, and providing context for management actions
Category 2	Used to inform the Allowable Biological Catches	Used to inform the stock assessment / understand fishery data
Category 3	Indicators inform other Ecosystem-Based Management Processes	Retrospective analysis of the impact of past management actions
Category 4	Exploratory	Economic and social status report



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Examples of **Ecosystem** Information Use

Category 1: Inform Stock Assessment Model

Alaska Sablefish:
whale depredation
used directly in the
model on fishing
mortality

Bering Sea
Yellowfin Sole:
temperature used
to inform
catchability
parameter in the
assessment model

Category 2: Inform ABC

Gulf of Alaska
Pacific Cod:
temperature and
larval indices used
to adjust ABC

Bering Sea Pollock:
zooplankton index
and other
indicators to adjust
ABC

Category 3: Inform other EBFM Processes

ACLIM: economic
indicators to
inform MSEs

FEP: Local and
Traditional
Knowledge
indicators in
development

Category 4: Exploratory Research

Research linking
temperature to cod
larval survival

Research linking
copepod
abundance to
Pollock
recruitment



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Examples of **Social and Economic** Information Use

Category 1: Context for management actions

Achieving OY (NS1) by setting TACs based on stock status as well as markets

Regulatory Impact Reviews (RIR), Social Impact Assessments (SIA), Catch Share 5/7 year reviews, allocation reviews, marine mammal issues

Category 2: Inform Assessment

Economic Performance Report (EPR) in 10 stock assessments

22 Ecosystem Status Report (ESR) Contributions

Category 3: Context for management actions

Economic, Social, and distributive impacts of catch shares and allocative management measures

Efficacy of past bycatch management measures (NS9)

Category 4: Status report

Fishery/species performance metrics (NS4&5);
Groundfish and Crab Econ SAFEs

Sustained participation of fishing communities (NS8)



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Meeting the Challenge in Alaska

Survey adaptation

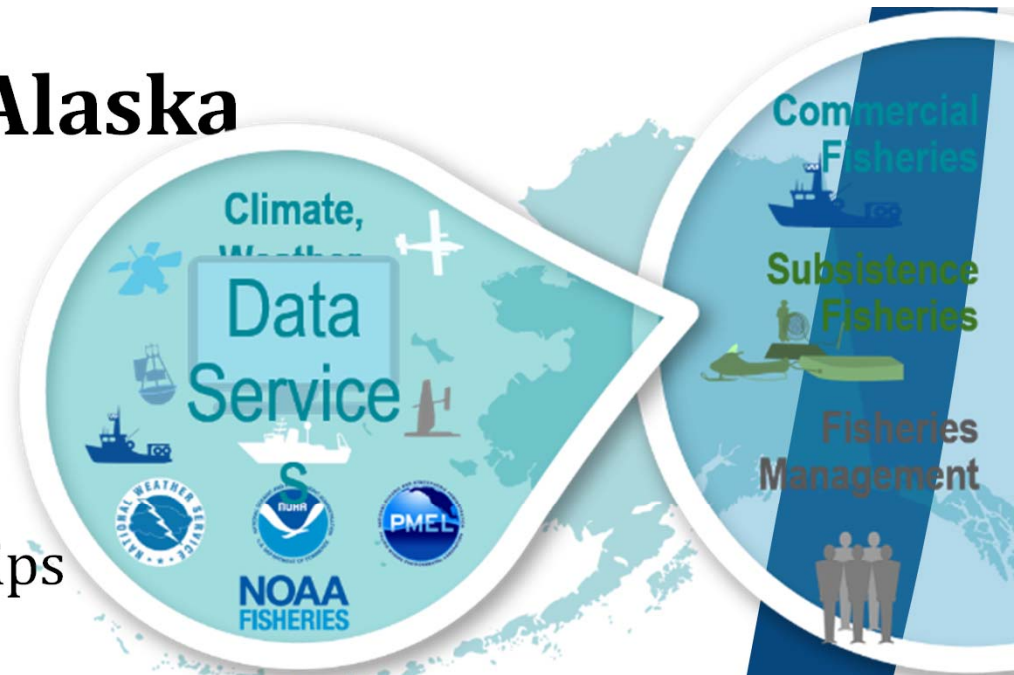
Innovation

Management Adaptation

Collaboration

- Industry/community partnerships
 - New surveys?
 - Cost recovery
- Research collaboration
 - Biological data collection,
 - MOU/CRADA

- **Process** of cooperative research
- How to **engage** in a partnership
- Examples of **actions** to produce something



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How to Engage: AFSC communications plan

- Communicate before, during, and after

Alaska Fisheries Science Center | 2018 Summer/Fall Arctic Surveys



Northern Bering Sea Surface Trawl Survey

Why are you working in the area?
NOAA Fisheries conducts fisheries oceanographic surveys to gather needed data to understand the impact of the loss of sea ice on the pelagic (middle water column) ecosystem of the northern Bering Sea. Alaska Fisheries Science Center scientists who participate in these surveys, which have been occurring annually since 2003, partner with the Alaska Department of Fish and Game and U.S. Fish and Wildlife Service. They provide annual information on the status of salmon, groundfish, forage fish and scallops as well as the state of the pelagic ecosystem in the northern Bering Sea. This year, the survey was conducted aboard a charter vessel, the *West Explorer*.

What did you do?
From September 1-29, we conducted an integrated ecosystem survey (physical environment, nutrients, phytoplankton, and zooplankton).

is not unusual for a warm year. We will conduct additional testing on samples collected to determine the "fitness" of various fish—that is we will analyze the lipid content in trophic stages. We found a few adult walleye pollock throughout the northeastern Bering Sea in our surface trawl samples (see SC). These adults do not appear to be in good shape as they were long and thin.

What are the research impacts or implications?
Through this long term survey we are able to monitor the distribution and fitness of (age-0) groundfishes in their first year of life (juvenile Pacific salmon, and forage fishes), and monitor shifts in ecosystem indicators including sea temperature, nutrients, phytoplankton, and zooplankton. We are also able to produce an annual Yukon River Chinook salmon forecast based on juvenile Yukon River Chinook salmon catch per unit effort. The strength of the "cold pool" is potentially related to movement of groundfish to the north. Capelin are an important "high fat" forage fish for juvenile Chinook salmon in the region. The relative abundance of juvenile Yukon River Chinook salmon is a leading indicator for future (2-to-3 years) adult returns to the coast. Less juvenile Chinook salmon suggests a decline in future returns. Recent information from western Alaska suggests that the number of adult Chinook salmon returning to the region is down and that these lower returns may impact local fisheries and management of Yukon River Chinook salmon stocks (i.e., much of this subsistence and potential for commercial fishing on Yukon Chinook salmon occurs in Alaska; yet nearly 50% of the Yukon River Chinook salmon spawns





Timetable: Proposed Operations for the Northeastern Bering Sea Shelf Survey, August 2017

Schedule for the 2017 Northeastern Bering Sea Shelf Survey

Vessels arrive for survey mobilization in Nome, AK	August 5th
Survey vessels depart Nome, AK	August 6th
Survey operations begin	August 6-7th
Survey operations end	August 23rd
Vessels arrive in Dutch Harbor, AK to demobilize	August 25th
Demobilization complete and scientists depart	August 28th

* Current schedule based on two chartered survey vessels and 45 contained vessel days. In the event that only one survey vessel is chartered, the schedule would be extended into the later part of September with a mid-survey break in Nome, AK around August 23rd.



Stations to be sampled (n=144) Aug to Sept 2017
 Stations within 30 nm of Gambell Is., Savoonga Is., Pughughaq Is., Diomedes Is.
 Stations within 12 nm of Arctic coastline


U.S. Secretary of Commerce
Wilbur Ross

Administrator of National Oceanic and Atmospheric Administration and Under Secretary of Commerce
Dr. Timothy Gallaudet

Assistant Administrator for Fisheries
Chris Oliver

November 2018
www.nmfs.noaa.gov
OFFICIAL BUSINESS

National Marine Fisheries Service
1315 Ford-Wad Highway
BSCWC 3, FWSF, Phone 43362
Silver Spring, MD 20910



Lyle Brill, Survey coordinator
Fishery Bering Sea shelf and northern Bering Sea bottom trawl Resource Assessment and Conservation Engineering (RACE) Division,
Alaska Fisheries Science Center
7600 Sand Point Way, NE
Seattle, WA 98115
Email: lyle.brill@noaa.gov

U.S. Department of Commerce (National Oceanic and Atmospheric Administration) | National Marine Fisheries Service



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How to Engage: AFSC communications plan

- Continued engagement
- Consistent education about perspective

BERING SEA CRAB SCIENCE SYMPOSIUM X
Sponsored by the Alaska Bering Sea Crabbers



Friday, September 18, 2015
Leif Erikson Lodge
2245 NW 57th Street Seattle, WA 98107
9:30 am – 2:00 pm

9:30 – 9:50 Coffee and pastries

9:50 – 10:00 Welcome and introductions

10:00 – 10:40 Dr. Bob Foy (NMFS – Kodiak)

- Overview, camera studies, and results from the 2015 NMFS summer trawl survey

10:40 – 11:20 Scott Goodman (Natural Resources Consultants)

- Overview and results from the 2015 Bering Sea Fisheries Research Foundation side-by-side trawl selectivity and pre-recruitment survey

11:20 – 12:00 Dr. Andre Punt (University of Washington)

- NMFS Stock Assessment 101

12:00 – 12:40 Doug Pengilly (ADF&G – Kodiak)

- ADF&G TAC-Setting 101

12:40 – 1:15 Laura Stichert (ADF&G – Kodiak)

- Chionoecetes Reproduction and Connection to Sex-Selective Harvest Strategy



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National Marine Fisheries Service
Alaska Fisheries Science Center

Cultural Orientation
Workshop and Panel
Discussion

The AFSC is developing a strategic communications plan to build partnerships and strengthen working relationships with Alaska constituents. Key among these are Alaska Native communities. In May, we will be offering two trainings to help researchers more effectively communicate and work with Alaska Native communities.

Monday, May 6 9 am to 5 pm
Traynor Seminar Room 2076



Must Knows About Cultures, People & Environment to Work Effectively in the Northern Bering Sea Region

Dawn Miller



This day-long training provides a comprehensive orientation to the northern Bering Sea region including it's cultures, languages, people and environment. The workshop will combine presented material with group discussions and interactive activities. Participants will conclude the training with a more in-depth understanding of the cultures and peoples of the Bering Strait region, an increased understanding of co-production of knowledge and its components, and an awareness of Tribal concerns about and interests in Bering Sea-related research activities.

Colleen Reynolds

(Please note: due to the interactive nature of this training, participation is in-person only)



Julie Raymond-Yakoubian



Lisa Bilanna



Brendon Raymond-Yakoubian



Raychelle Daniel

High Priority Underfunded Work (Fish)

Partially Funded

- RPA: Eastern Bering Sea Fisheries Surveys and Ecosystem Assessments
- RPA: Infrastructure for biochemical analysis
- RPA: Northern Bering Sea Surface Trawl Survey and Ecosystem Assessments
- Next generation ecosystem-based assessments and management strategy evaluations
- Food habits collections and analysis



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High Priority Underfunded Work (Fish)

Unfunded

- BSAI, GOA seabird and fisheries interactions
- Pacific cod early life-history dynamics
- Identifying and Surveying Untrawlable Habitat
- Seabed characterization and modeling to improve stock assessments and support ecosystem studies
- Improving stock assessment and IEA through experimental parameterization of biological processes



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High Priority Underfunded Work (PR)

Partially Funded

- North Pacific Right Whale Assessment – Bering Sea
- Impacts from loss of Bering Sea ice on abundance and health of ribbon and spotted seals
- Cook Inlet Beluga UAS study for abundance estimation and photogrammetry

Unfunded

- An integrative approach for quantifying relationships between northern fur seals, their prey, fisheries, and climate
- An integrative bioenergetics and spatial approach for quantifying relationships between northern fur seals, their prey, fisheries, and climate

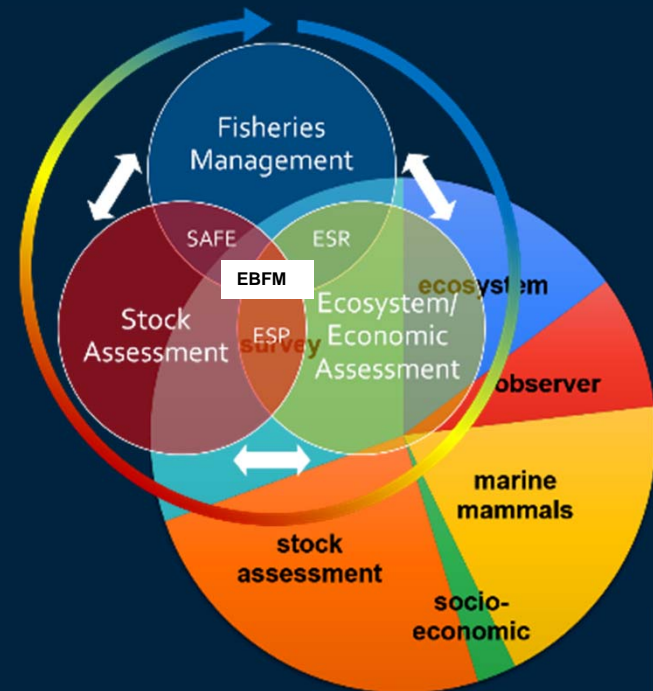


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Balancing the survey & research portfolio

NPFMC messages

- Mission has expanded in complexity and scope
- Increased uncertainty expected if flat budgets continue
- Do we have the proper balance?



Thank You!



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