NOAA Fisheries Science Centers

Kristen Koch, Southwest Fisheries Science Center Kevin Werner, Northwest Fisheries Science Center Robert Foy, Alaska Fisheries Science Center

> Pacific States Marine Fisheries Commission Annual Meeting Monterey, CA September 10, 2024



Outline

- State of the ecosystem, impacts on stocks, and CEFI
 - Alaska
 - California Current (NW & SW)
- Science Center priorities and challenges
 - \circ SWFSC
 - NWFSC
 - AFSC



Alaska: State of the ecosystem and impacts on fish stocks



Page 3 U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

Alaska has five Large Marine Ecosystems — State of the ecosystem focus on EBS, GOA, Al



Page 4 U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

Ecosystem Status – Eastern Bering Sea in 2023

Cooler conditions since 2021 Ecosystem in a transition

Northern Bering Sea

- Cool inner domain corridor from SEBS through Norton Sound
- Hot spots of zooplankton productivity around St. Lawrence Island
- Western AK salmon runs remain low
- Groundfish condition trends were mixed across species
- Seabirds appeared to do well at St. Lawrence Island
- Emerging stressor: HABs



Southeastern Bering Sea

- Average cold pool extent in 2023
- Benthic productivity indicators were mixed
- Lower trophic productivity was low
- Forage fish abundance remained low
 - Togiak herring and Bristol Bay sockeye biomass high
 - Groundfish condition declined from 2022 to 2023
 - Seabirds had a mixed year at the Pribilof Islands
 - Emerging stressor:

OA



How does climate variability and ecosystem changes affect fisheries in the Eastern Bering Sea?

- 1. Fish shift north
- 1. Some species are doing **poorly** while others are doing **well**











RESEARCH ARTICLE

Sub-Arctic no more: Short- and long-term global-scale prospects for snow crab (*Chionoecetes opilio*) under global warming

Darrell R. J. Mullowney 🔄, Krista D. Baker, Cody S. Szuwalski, Stephanie A. Boudreau, Frédéric Cyr, Brooks A. Kaiser

Human-induced borealization leads to the collapse of Bering

Sea snow crab

Michael A. Litzow^{1*}, Erin J. Fedewa¹, Michael J. Malick², Brendan M. Connors³, Lisa Eisner⁴, David G. Kimmel⁴, Trond Kristiansen^{5,6}, Jens M. Nielsen^{4,7}, and Emily R. Ryznar¹

Poor energetic condition of eastern Bering Sea snow crab during a population collapse and marine heatwave

Erin J. Fedewa¹, Louise Copeman² and Michael A. Litzow¹

- Multiple studies have linked the snow crab population collapse to a 2018–2019 Bering Sea marine heatwave
- Increased metabolic demands, decreased spatial extent, and declines in body condition suggest starvation may have played a role
- Snow crab are an ice-associated species, and snow crab productivity will likely decline alongside the loss of Arctic conditions in the Bering Sea





Ecosystem Status – Gulf of Alaska in 2023

Assessment 2023

- Highlights:
 - Increase in Pacific cod and capelin populations
 - Transition from three consecutive years of La Niña to El Niño conditions
- Average year of productivity in 2023 (decr. from 2022)
- Concerns around a decline in the zooplankton prey base.

Looking ahead to 2024 (El Niño)

Benefit?:

- Larval/juv. ATF, rex sole, P. halibut, rockfish, sablefish (slope spawned larvae) [*incr. cross shell transport*]
- Larval rockfish and sablefish [favorable late spring/summer warm surface waters]

Vulnerable?:

- Larval/juv. P. cod, walleye pollock, and northern rock sole
 - unfavorable early spring warm surface waters, reduced zooplankton quality
- Adult walleye pollock, Pacific Ocean perch, dusky & northern rockfish
 - reduced zooplankton quality
- *Deeper adult habitat is not predicted to warm unless El Niño-related warming persists long enough to be mixed to depth.



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Gulf of Alaska: Drivers & Processes





What about Sablefish? Too much of a good thing?

- Massive population/quota shift to EBS
 - Increase in discards
 - Increase in trawl catch
- Markets
 - Price disparity increases for size grades
 - Overall decline in price even at large sizes



Aleutian Islands: Drivers & Processes





Alaska's Climate, Ecosystems, and Fisheries Initiative







CEFI

- CEFI started as the Alaska Climate Integrated Modeling (ACLIM) project in 2017
- ACLIM: an interdisciplinary collaboration to project and evaluate climate impacts on marine fisheries in the Bering Sea, Alaska.
- CEFI: will build the end-to-end, operational modeling, and decision support system needed to provide the information and capacity resource managers and stakeholders need to reduce impacts and increase resilience in a changing climate.
- Recent accomplishments:
 - Species distribution models linked to climate are available now
 - Forecast locations of fisheries in the future
 - Predict overlap of commercial fish species in the future
 - Collective outcome models from Climate Scenarios workshop
- Near term products:
 - Hindcasts, seasonal forecasts, and long-term projections for the Alaska region via open access indices
 - Process for evaluation and skill testing of Climate Integrated Stock Assessments and reference points
 - Delivery of Climate enhanced stock assessments for 2-3 key stocks
 - Updated climate vulnerability and risk assessments for key species
 - Climate enhanced species distribution models for key species



State of the Ecosystem



California Current

State of the Ecosystem
Climate, Ecosystem, and Fisheries Initiative (CEFI)



2023-24 California Current Ecosystem Status Report

NOAA California Current IEA Team

Presented to PFMC March 9, 2024



Core Team: Andrew Leising, Mary Hunsicker, Greg Williams, Nick Tolimieri, Lynn Dewitt, Abigail Harley, Chris Harvey

Contributions from >90 individuals 23 different agencies/institutions

https://www.pcouncil.org/documents/2024/02/agenda-item-h-1-a-cciea-team-report-1-2023-2024-california-current-ecosystem-statusreport-electronic-only.pdf/



2023-24 CCIEA Ecosystem Status Report Highlights

KEY TAKEAWAYS FROM 2023



Mixed basin-scale climate indicators: Negative Pacific Decadal Oscillation (Neg PDO = cool, productive coastal waters) then a transition to El Niño



Atmospheric rivers added record mountain snowpack in early 2023, reducing prolonged drought conditions in California



Diverse and productive **prey communities** provide **positive preconditioning** ahead of emerging El Niño



2023-24 CCIEA Ecosystem Status Report Highlights

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Diverse and productive prey communities provide positive preconditioning ahead of emerging El Niño

Unfavorable conditions and Risk Factors

Ocean warming: 4th-largest marine heatwave



Extreme weather/flooding in early 2023



HAB events: closures/delays in fisheries, and deaths of marine mammals



Poor habitat conditions for CA salmon 3 last years



Declining catches and revenue for most sectors; Closure of CA salmon fishery



2023-24 CCIEA Ecosystem Status Report Highlights

KEY TAKEAWAYS FROM 2023



Mixed basin-scale climate indicators: Negative Pacific Decadal Oscillation (Neg PDO = cool, productive coastal waters) then a transition to El Niño



Atmospheric rivers added record mountain snowpack in early 2023, reducing prolonged drought conditions in California



Mixed to Positive Ecological Signals

- Total upwelling below-average; periods of intense local upwelling
- Cipid-rich northern copepods relatively stable off Oregon



Mixed indicators but encouraging expectations for Columbia / Snake R. Chinook salmon returns in 2024



Positive trends in productivity and seabird density

Increase in crab landings





Ecosystem Status Report Advancements:

Supporting Climate-Ready Fisheries

The resilience of the CCE is not likely to be sustained indefinitely, especially with climate change

The "Climate Change Appendix" includes new research to support climate-informed decision-making:

- Seasonal forecasts of marine heatwaves
- Projections of long-term shifts in the distribution and abundance
- Social-ecological vulnerability and climate risk for fishing fleets



<u>https://www.pcouncil.org/documents/2024/02/agenda-item-h-1-a-supplemental-cciea-team-report-2-appendix-e-developing-indicators-of-climate-change-and-variability.pdf/</u>



Ecosystem Status Report Advancements:

Ecosystem Status Report "modernization" project

- We are developing a new template (in Quarto) and code base for producing new ESRs
- Enables more automation, streamlined editing, and creating related products (e.g., 2-pagers, web content)
- Improved efficiency, reproducibility, transparency
- Roll-out coming for the 2024-25 ESR
- Contributors: staff from NWFSC and SWFSC, PSMFC (Greg Williams), and Lynker Technologies





What we're seeing in 2024

Strong Winter/Spring El Niño transitioned to Strong Summer Upwelling



What we're seeing in 2024



Transition from strong El Niño last winter to a La Niña watch for later this year

- Spring transition was delayed this year (~1 month) but consistent strong summer upwelling made up for delay.
- El Niño brought drought relief to south (but also some negative impacts from strong atmospheric rivers), while northwest remains dry
- La Niña forecast for fall/winter suggests cooling and productive spring

Heatwaves looming

- Large Marine Heatwave has now reached the coast
- 2023 and 2024 have been among the warmest years in the NEP ever recorded



Latest Marine heatwave conditions in the NE Pacific, September 1, 2024. Areas within black outlines meet marine heatwave criteria. Dashed blue line = West Coast EEZ. Courtesy of Dr. Andrew Leising, NOAA SWFSC. Data based on satellite observations.



What we're seeing in 2024

High abundance of some forage species, including juvenile
 rockfish, hake, and anchovy

- YOY Rockfish highest since 2015/16
- High anchovy abundance continues to cause thiamine deficiency in salmon, negatively affecting early survival
- Increased sightings of whales close to shore may related to high nearshore anchovy abundances

High abundances of Jellies of different types

Possibly El Niño related, but part of recent trend

Marine mammal and bird die offs

- Domoic acid event in early summer (similar to 2023)
- Pelicans starving in early year (possibly El Niño or storms)
- Unusual mortality event for Cassin's Auklet in the North





West Coast Climate, Ecosystems, and Fisheries Initiative (CEFI)



Overview: Climate, Ecosystems, and Fisheries Initiative

Why is CEFI important?

- Nation's LMRs are being significantly impacted by climate change.
- Better information on pending ecosystem change is needed to reduce risks, increase resilience, and develop adaptive strategies.
- While modest climate information has been provided to date, we've been unable to operationally provide the information required for climate-informed decision making.

What is CEFI's purpose?

• Develop a nation-wide, operational decision support system to provide the climaterelated information and advice needed for resource management and community adaptation including:

1) Forecasts and projections of future ocean conditions

2) Climate-informed assessments of stock state and ecosystem conditions

3) Risk assessments

4) Evaluation of best management and adaptation strategies



West Coast CEFI



Adapted from Tommasi et al. (2017)



West Coast CEFI will build on a strong foundation



CEFI Regional Ocean Modeling



New Northeast Pacific model (MOM6)

Coordination between OAR and NMFS

Multiple timescales

- Historical (past several decades)
- Seasonal predictions (1-12 months)
- Multi-annual predictions (1-10 years)
- Long-term projections (multi-decadal)

Delivery Timeline						
FY23	Initial Configurations					
FY24	Historical Simulations					
FY25	Develop seasonal forecasts and long-term projections					
FY26	Develop decadal forecasts Real-time seasonal forecasts					
FY27	Real-time seasonal and decadal forecasts					



West Coast Operational Forecast System (NOS)

Shorter time scales (nowcast \rightarrow 72 hours)



CEFI Science: Scoping Sentinel Applications

28 decision support project ideas scoped by NWFSC and SWFSC

Span key domains associated w/ partner (e.g., WCR, PFMC) needs

- Tactical ↔ Strategic
- Fish \leftrightarrow Protected Resources \leftrightarrow Habitat \leftrightarrow Economies \leftrightarrow People
- Stock ↔ Multispecies ↔ Fishery Management Plans ↔ Ecosystem
- Fishing \leftrightarrow Species Recovery \leftrightarrow Wind





CEFI Decision Support Team staff

NWFSC

- 1. Regional ocean and lower trophic modeler (Darren Pilcher CB ESP)
- 2. Climate-enhanced stock assessor (Megan Feddern FRAM PEP)
- 3. Spatial and ecosystem modeler (Owen Liu CB ESP)
- 4. Social scientist (Abigail Golden FRAM ESSRP)
- 5. Data scientist (Brooke Hawkins CB ESP)
- 6. Co-Lead (Jameal Samhouri CB ESP)

SWFSC

- 1. Regional ocean and lower trophic modeler (Allison Cluett ESD)
- 2. Climate-enhanced stock assessor / MSE (Robert Wildermuth FRD)
- 3. Spatial and ecosystem modeler / data scientist (Heather Welch ESD)
- 4. Economist (Phoebe Vavoulis FED)
- 5. Co-Lead (Mike Jacox ESD)



Southwest Fisheries Science Center Priorities & Challenges



SWFSC Vision

FOUNDATIONAL AND BREAKTHROUGH SCIENCE

Conduct foundational and breakthrough science to advance the long-term viability and sustainability of our ocean and coastal ecosystems, species, and habitats.

SCIENCE FORCE MULTIPLIERS

Couple the power of collaboration, partnerships, innovative technologies, and big data to propel scientific breakthroughs and mission impacts.

MISSION ENABLERS

Sustain a high-performing workforce and organization that thrives in the face of a changing world and complex scientific challenges.



SWFSC FY25 Priorities

Sustainable Fisheries and Protected Species

- <u>Surveys</u> Integrated CPS/hake, Pacific salmon, marine mammals and turtles, white abalone, etc.
- <u>Stock Assessments</u> Pacific sardine and mackerel, groundfish, Pacific salmon, Antarctic krill, and west coast Marine mammals
- <u>Management Strategy Evaluation (MSEs)</u> Pacific bluefin
- <u>Management Support</u> WCR (for Recovery Science), PFMC, Int'I bodies

Ecosystems and Cross-cutting Efforts

- IRA-supported efforts:
 - West Coast Integrated Survey (CPS/hake)
 - Essential Data Acquisition (EDA) strategic initiatives
 - Pacific salmon recovery science & Klamath dam removal / tribal engagement
 - CEFI
- Offshore wind
- Take Reduction Teams & bycatch monitoring





SWFSC Priorities: FY25 Surveys

- CalCOFI
 - Summer (July); Fall (Oct); Spring (Apr); Winter (Jan)
 - Glider deployments off Northern CA (Jul-Aug)
- Juvenile Rockfish Recruitment Survey (May-Jun)
- EXPRESS habitat mapping of wind energy areas (Aug)
- Integrated West Coast Pelagics Survey (Jun-Sept)
- White abalone outplanting (year-round)
- West Coast marine mammal & turtle aerial surveys (Jul-Dec)
- West Coast marine mammal ship based survey (Oct-Dec)





Pacific salmon research: adult thermal thresholds

Use information on adult salmon captured and released:



Build a model to simulate energy use during migration



<u>CalFishTrack</u> for real-time tracking





SWFSC / PSMFC: Highly Migratory Species (HMS)

Two collaborative projects on HMS sampling yield the only length data we have for US fisheries, used in ISC stock assessments.

- North Pacific albacore port sampling from commercial fisheries in collaboration with ODFW and WDFW
- Pacific bluefin tuna length sampling onboard the recreational CPFV fleet in collaboration with the Sportfishing Association of California (SAC)
 - <u>2024 stock assessment</u> shows that the <u>stock rebuilt</u> decades ahead of schedule





SWFSC / PSMFC: Pacific HMS Data

Pacific HMS Data Warehouse - IRA Funded Project

Collaborative team includes members from:

- West Coast and Pacific Islands regional offices and science centers
- Pacific States Marine Fisheries Commission
- \circ State partners California, Oregon, Washington, and Hawaii

• Objectives:

- Create a Pacific-wide Data Warehouse for HMS fisheries dependent data collected from landings, logbooks, observers, sampling and other sources, supporting data needs for stock assessments, reports, and other scientific products.
- Facilitate a streamlined data flow that ensures the efficient collection, storage, and analysis of critical fisheries data.

• Challenges:

- Harmonizing data use agreements for Federal and State entities to optimize data sharing procedures and streamline fisheries management reporting.
- Ensuring the seamless integration while conforming with the diverse data standards, security protocols, and regulatory requirements across multiple NOAA offices and organizations.





SWFSC / PSMFC: Pacific HMS Data

West Coast HMS Electronic Logbook Application Collaboration between:

○SWFSC

∘WCR

○**PSMFC**

 NMFS Fisheries Information Systems (FIS) Program - provided funding

• Objectives:

- The HMS Progressive Web Application (PWA) electronic logbook seamlessly integrates with the NMFS West Coast Nontrawl Groundfish Electronic Logbook system.
- The application supports real-time data synchronization with NMFS databases, ensuring compliance with federal regulations.
- Application is in beta testing phase and distribution for end-user testing is anticipated for FY25.

• Challenges:

 Integrating additional sources of logbook data into the PacFIN data workflow, with the upcoming implementation of new electronic logbook applications.

West Coast HMS Fishery Electronic Logbook Application

← 🔒 HMS Current Delivery			← 🔒 Set Info 😶			
Vessel*			Flahing Date * Thursday, Jul 11, 2024			
Vessel Operator*			_{Gear} * B TrollLine			
Departure Date * Monday, July 8, 2024			Fishing Mode*			
Departure Port* LONG BEACH			Latitude* 32° 52.17'N			
Arrival Date * Tuesday, July 9, 2024			Longitude* 117° 15.22'W			
Arrival Port* SAN DIEGO			Hours Fished * 6			
Unloadings		+	Catch		(+)	
Unloading Port	Unloading Date	Species		Retained	Released	
SAN DIEGO	07-09-24	Albacore	Species	Count	Count	
Sets Included in Delivery +			Albacore 35 2			
Fishing Date: Monday, Jul 8, 2024 🗸					I	
			Comments			
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Re-envisioning Recreational Fishing Data Partnership

- Joint initiative underway to re-evaluate our partnership approaches and to transition to a new, collaboratively developed vision for the state-federal partnership that better meets regionally specific needs
- 4 virtual briefings in spring 2024 with key partners to introduce initiative and collect feedback on process and draft objectives
- Internal interviews largely completed as of July

Working Goal

A state-federal data collection system for marine and estuarine recreational fisheries that is regionally specific and nationally coherent and leverages partner expertise and resources to obtain the best quality data possible from available sources to inform sustainable, adaptive fisheries

Objectives



- Clear roles, responsibilities, and lines of transparent communication among partners
- Enhanced recreational data precision, accuracy, and timeliness
- Adherence to data collection standards
- Transparent, consistent, and centralized data warehousing and access
- Survey, estimation and review improvement frameworks that promote data integrity and accountability
- Data stream connectivity and effective integration
- Enhanced partner/angler collaboration and participation



Re-envisioning Rec Fishing Data Partnership Public Engagement Timeline (Pacific)

Engagement	Timeline
West Pacific Regional Fishery Management Council SSC (additional meetings throughout week), Honolulu, HI	Sept. 11, 2024
Pacific Coast Recreational Fisheries Information Network (RecFIN) Technical Committee, San Diego, CA	Oct. 8 - 9, 2024
American Sportfishing Association Policy Summit (National), San Diego, CA	Oct. 15 - 18, 2024
West Coast Roundtable, Costa Mesa, CA	Nov. 16, 2024



Integrated West Coast Pelagics Survey



Integrated West Coast Pelagics Survey

CPS Survey

Cabo San Lucas

Newport

Crescent City

San Francisco

Los Angeles

Monterey

- The Northwest and Southwest Fisheries Science Centers are charged by NOAA to integrate the Integrated Ecosystem & Pacific Hake Survey with the Coastal Pelagic Species (CPS) Survey by 2025
- Our goal is to develop a robust fisheries-independent integrated survey that supports sustainable fisheries for Pacific hake and coastal pelagics, and maintains ecosystem data collection and the survey schedule

Building the Integrated Survey

VISION:

- One NOAA ship with other charter vessels, autonomous platforms, and international partners covering the west coast from Mexico to Canada gathering:
 - Acoustics, Biosampling, and Ecosystem data
- An opportunity to develop resource and process efficiencies, incorporate the latest technology, and learn from industry expertise, methods, and innovations



Timeline to Integration



Summer 2024 Milestone: Multi-Function Trawl (MFT)

- Capable of fishing on hake in the midwater & CPS at the surface
- Increased flexibility of survey methods & platforms
- Increased safety by eliminating need to change out nets &





Northwest Fisheries Science Center Priorities and Challenges



NWFSC Priorities



Sustainable Fisheries

Our researchers coordinate marine fisheries monitoring, fisheries data management, fisheries interactions, fish life history studies, and stock assessments.



Protected Species

Our researchers collect information on a wide variety of marine and freshwater habitats used by marine species for spawning, breeding and feeding.



Aquaculture

Our research supports the growing aquaculture industry in America through process understanding and technique development.

FY25 Focus on IRA Implementation

Integrated Survey

Pacific Salmon

Data Acquisition CEFI and Modernization **Facilities**





Help build a **dynamically managed fisheries system** that will incorporate **climate and ecosystem environmental data to provide real-time advice and long-range projections** to inform and support management decisions for affected sectors and communities.



Pacific Salmon IRA Funds: \$42M Total

(\$15M WCR, \$16.2M NWFSC, \$10.8M SWFSC)

Salmon Habitat Restoration	Pacific Coastal Salmon Recovery Fund (PCSRF)	Salmon habitat restoration and reconnection actions by State and Tribal partners	\$15M	\$15M
West Coast Salmon Science and Research	Integrated Model Development and Application	Life cycle model development, generalized models, integrative modeling, recovery strategy evaluation	\$8M	
	Restoration, Reintroduction, and Recovery Techniques	Present and future habitat quality, reintroduction effectiveness, adaptive capacity of salmonids	\$6M	
	Habitat Stressors in Freshwater and Estuary Environments	Urban stormwater effects, resilience under climate change, habitat stressors, thiamine deficiency	\$3M	\$27M
	Ocean and Nearshore Ecology	Indicators of marine survival, predation rates, coastal ecology, lower trophic level energetics	\$7M	
	Cross-project support	FTE labor, supplies & equipment, and travel across projects and research themes	\$3M	

Management Applications

SALMON SCIENCE THEMES



OUTPUTS

- Quantitative predation rates
- Toxicity thresholds
- Measures of genetics variability
- Indicators of ocean primary production
- Robust life cycle models

APPLICATIONS

ESA consultations

Scenario planning



Hatchery management

Risk assessment

Management Strategies

Rebuilding & recovery



Research Surveys











SWFSC/NWFSC Challenges

• Funding:

- One-time IRA opportunities to address data collection/ management needs and climate ready fisheries will give way to flat budgets and increasing costs
- **Surveys**: fewer days at sea (NOAA ships)
- New and emerging priorities: related to climate, ecosystems, and offshore wind



Challenge: Assessment Capacity

Currently unable to fill all stock assessment and related vacancies due to funding.

We expect initiation of **new Council-Science Center dialogue about better-aligning the current assessment development and review process with available resources** (staff and data). This discussion will likely continue for several years.

•This imbalance was addressed in a report to the Council in June



Challenge: Survey Data Collection

Budgets may constrain future data collection and analysis.

PFMC Stock Definitions process may (TBD) change Science Centers' roles for specific stocks.

Catch constraints (quillback), uncertainty from Stock Definitions discussions, and funding levels limit planning new long-term surveys or expanding current surveys (e.g., in untrawlable habitat).

Offshore wind energy development requires additional baseline data collection, ongoing monitoring, and survey mitigation, but new resources are uncertain.



Challenge: Consistent Biological Sampling

- Fish maturity varies with temperature → spawning biomass
- 2024 Pacific Hake stock assessment first in the U.S. to model temperature-driven maturity
- Relies on temperature from ocean models and forecasts
- Few other species on the West Coast are sampled consistently enough to investigate environmental drivers
- Without biological data, we can't provide climate-informed management advice

Status of the Pacific Hake (whiting) stock in U.S. and Canadian waters in 2024







Challenge: Data Analysis

We face **severe challenges in completing desired ageing for 2025 assessments** (among PSMFC-CAP, ODFW, and WDFW ageing labs).

We will continue to have **too few age readers to keep up with the volume of structures from fisheries and surveys**, <u>as they are</u> <u>collected.</u>

The large inventory of unaged otoliths (nearing 1 million for assessed species since 2000) also **limits new research on ecosystem drivers of recruitment success** and other research that requires the availability of age data from specific periods.



Opportunity: Data Analysis

Fish ages are integral to high-quality stock assessments, and we are exploring ways to age fish faster.

We are **actively engaged in NMFS' Strategic Initiative** that is evaluating the potential **to age fish using Near-Infrared Spectroscopy** (NIRS).

We are exploring the use of Neural Network modeling of spectral and other sample data to replicate traditional age reads, which are used to train the model.

This approach will be reviewed early October by the Groundfish Subcommittee of the Council's Scientific and Statistical Comm.

We hope to use some of these ages in 2025 assessments!



Alaska: challenges and priorities



Page 60



 Alaska EEZ = 1.5 million nm²

- 60% U.S.-caught seafood
- \$15 B economic output to U.S.
- Top 3 volume fishing ports in U.S.
- Seafood industry supported 52,702 jobs, generated \$4.3 billion in sales, \$1.9 billion in income, and \$2.4 billion in value-added impacts in Alaska.

CHALLENGE — The complexity and geographic scope of the mission is increasing





NOAA FISHERIES

AK Seafood Snapshot

AK Seafood Industry

The AK seafood industry is:

- An important way of life, sense of place, community, and identity
- A prominent food security provider for many Alaskans

Recent changes:

- Caused significant revenue losses in AK (state, towns, communities)
- Threaten the sustainability of AK fisheries-dependent communities and that way of life

Revenue Losses, 2023

Largely driven by low seafood prices across nearly all AK species

The result of global market forces:

- Exchange rates and tariffs
- High inventories, high levels of global supply
- Lower global consumer demand for seafood due to inflation
- Lower cost of seafood production and processing in countries that compete with U.S. seafood products

Not disaster-eligible causes for federal fisheries disaster support

Total Losses (Estimated)

\$1.8 B loss in direct revenue in AK seafood industry, 2022-2023

>38,000 loss in U.S. jobs (fishing and non-fishing)

\$4.3 B loss in U.S. output

\$269 M decrease in U.S. state/local tax revenues

50% decline in Ex-Vessel Margin Index (profitability measure), 2022 and 2023:

 Compound effect of decreased prices (2023) and increased costs (2022+) for key production process inputs (wages, energy prices, interest rates)



Bering Sea Survey Modernization

- Update EBS/NBS/EBS-Slope survey Design
 - Integrate into one cohesive survey design increasing efficiency and nimbleness to respond to a changing environment.
- Modernize sampling net
 - Current 83-112 eastern trawl dates from the 1970's
- Incorporate new sampling technologies
 - eDNA
 - Greater use of Optical systems/AI
 - Increased capacity for environmental sampling (PH, oxygen, etc)
- Increase design capacity to accommodate multimission survey operations
 - e.g. acoustics, oceanography, marine mammals, etc.







Climate Ready Fisheries IRA

- Survey modernization
- CEFI
- UxS
- Omics
- Remote Sensing
- Optical
- Acoustics (passive and active)
- Social Science
- Environmental Equity and Justice (EEJ)



Pollock acoustic eDNA integration study



AFSC/PSMFC

- AFSC works with PSMFC on more than 30 projects
- The Composite award includes 15 projects which provide expertise on a range of topics including:
 - Groundfish Ageing Assistance
 - Electronic Monitoring of Large Sharks
 - Climate and Communities in the Gulf of Alaska
- The IRA award includes 9 projects that support new work and complement existing projects.
- AFSC also has three stand-alone awards with PSMFC (next slide)



AFSC/PSMFC

- AKFIN
 - Catch and survey data served via web application
 - Catch Estimation Design and
 Integration
 - Modernizing, integrating, streamlining data access
- Economic Data Reports
- Electronic Technologies
 - Fixed Gear EM Video Review
 - EM Innovation
 - Pelagic Trawl Electronic Monitoring



Shout-out to Matt Callahan for all his support and positive energy to AFSC's Ecosystem Status Reports



Caren and Geana - thanks for always being responsive, flexible, and thoughtful!

> Thank you to the Alaska EM review

team who make

electronic monitoring

possible!!

Mahalo Caren and Bob for you brilliance getting the grant package together and working so diligently with us all to make that happen. You are my heroes!!!!

Thanks to Caren Braby and Geana Tyler for helping with contracting and taking great care of Pac States employees process!

> Huge thanks to Bob R., Rob A., everyone who touches EM anything, Matt C and Jean L for rocking it and of course Caren and Geana for keeping me organized!

Thank You!!

Matt Kerr and Rachel the Year

IRA award

Way to go! Team Members of

Bob Ryznar for your positivity and assembling a great team for ESR website development!

Thanks to Teresa Fairchild for expedited and expert assistance with Alaska native travel support!!



Thank you to Kathrin Bayer for all that you do for A&G and for being so helpful, flexible, hard working, and dependable! You are such an asset to the team!

Huge thanks to Caren, Teresa, and Geana for all their support and help!!! You are amazing!

Caren Braby you rocked the Special thanks to Dr. Arny Blanchard for his superb technical support on the NETS project. No doubt this was made possible by strong administrative support

Cameron Lan Hop **Martin Park**

Thank

you

Stephen

Phillips!

Analysts and IT Specialists You complete the FMA teams!

Graeme LeeSon cahalan