PACIFIC FISHERY MANAGEMENT COUNCIL RESEARCH AND DATA NEEDS

Pacific States Marine Fisheries Commission
Annual Meeting – 2025

Merrick Burden
Executive Director
Pacific Fishery Management Council

OVERVIEW

- Ecological basis
- Conservation objectives
- Economic health of the fishing industry
- Social dimension and coastal communities
- How these factors intersect
- PFMCs list of priorities

ECOLOGICAL BASIS: THE CALIFORNIA CURRENT ECOSYSTEM

The CCE is an eastern boundary upwelling system - wind-driven upwelling brings nutrient-rich waters to the surface.

This drives large seasonal swings in productivity, fish distributions, and recruitment success.

The CCE is strongly influenced by climate variability:

Pacific Decadal Oscillation and ENSO cycles affect ocean temperature, upwelling strength, and food web structure.

Marine heatwaves alter fish distributions, migration patterns, and predator-prey dynamics.

Climate change is layering long-term warming, acidification, and hypoxia onto this natural variability.

This increases uncertainty in stock assessments, habitat viability, and ecosystem resilience.

These dynamics create large uncertainties in predicting stock abundance, recruitment, and other factors important for management of marine resources.

CONSERVATION OF MARINE RESOURCES

- The Magnuson-Stevens Act mandates that Councils engage in several aspects of marine resource conservation (preventing overfishing, establishing essential fish habitat, and more)
- Uncertainty in measuring stock status, abundance, and growth makes it difficult to set harvest limits that appropriately conserve resources impacted by fishing
- Effective conservation requires:
  - Biological surveys and monitoring (especially to reduce stock assessment uncertainty and variability)
  - Ecosystem science that integrates environmental and food-web indicators
  - Management strategy evaluation to test harvest control rules under uncertainty
- Our research priorities are intended to strengthen the ability to appropriately conserve fish stocks and maintain ecosystem integrity, while providing for robust fishing opportunities and meeting our legal obligations.

ECONOMIC IMPERATIVE

- The West Coast fishing industry relies heavily on sustainable harvests of groundfish, salmon, coastal pelagic species, and highly migratory species.
- These fisheries contribute hundreds of millions of dollars annually in ex-vessel revenues, with even greater impacts being generated when accounting for processing, distribution, and export markets.
- Recreational economic impacts stem from millions of recreational angler days, which support over 10,000 jobs
- Supporting this economic activity depends upon:
  - *Accurate catch and bycatch estimates to meet domestic regulations and international obligations*
  - *Predictable management that minimizes year-to-year volatility in quotas and access*
  - *Economic and social data to design catch share programs, evaluate fleet profitability, and support adaptive capacity*
- Fishery-dependent data, economic impact analysis, and monitoring technologies are relied upon to manage and stabilize the industry while ensuring conservation.

SOCIAL DIMENSION AND COASTAL COMMUNITIES

- Many coastal communities rely on fishing as a cultural and economic cornerstone.
- Research priorities ensure:
  - Management decisions account for community vulnerability and impact, not just biological stock status.
  - Socioeconomic data (employment, revenue distribution, participation trends) are available to understand localized impacts of regulations.
  - Stakeholder participation (via co-produced research, surveys, and advisory input) grounds Council decision-making in community realities.

HOW THESE CONSIDERATIONS INTERSECT

Driver	**Management Challenge**	**Some PFMC Research Responses**
Eastern boundary upwelling system	Highly variable productivity & species distributions	Stock surveys, Oceanographic monitoring
PDO, El Niño/La Niña, marine heatwaves	Unpredictable recruitment and range shifts	Ecosystem modeling, climate-ready reference points
Climate change (warming, acidification, hypoxia)	Long-term shifts in habitat, growth, survival	Multi-species & ecosystem research, habitat monitoring
Conservation mandates	Prevention of overfishing, rebuild stocks, conserve EFH, and more	Better surveys, MSE, environmental indicators, bycatch management tools
Economic health of industry	Need for stability, competitiveness, efficiency	VMS and other effort data, economic data collection, econ impact models
Coastal community reliance	Vulnerability to quota cuts, closures, stock collapses	Socioeconomic impact analysis, participatory research

PFMC RESEARCH PRIORITIES

Data collection	Data collection is required to conduct stock and ecosystem assessments, evaluate policies, and support management. It is necessary to continue and expand existing data collection efforts, develop new data streams (e.g., to support indices of abundance or life history parameter estimation) and improve access to relevant databases. Community-based participatory research programs can aid in this effort.
Stock assessment methodologies	Routine methodological development and advancement are required to improve the best scientific information available for stock status determinations. This will include the development and testing of data-limited and data-moderate assessments, dynamic reference points, and methods to account for large spatial closures.
Life history and stock structure	Regular collection and evaluation of scientific information is needed to parameterize life history traits, inform the degree of population connectivity and ensure appropriate spatial scales for management actions.
Evaluating fishery impacts	Many federally-managed fisheries rely on the evaluation of fishery impacts associated with trip limits, bag limits, season or area closures, incidental mortality, and other factors. These require research and data to inform a number of assumptions utilized in estimation.
Ecosystem dynamics	The effects of a changing ecosystem and habitats raise challenges for fishery science and management. Continued efforts to account for ecosystem and habitat change can involve approaches such as collecting diet data, developing ecosystem models, evaluating the use of ecological indicators in stock assessments and identifying environmental thresholds.

PFMC RESEARCH PRIORITIES (CONT)

Harvest policy	Improved methods are needed to evaluate harvest policies, including harvest control rules and reference points, which are integral to Council decision-making, especially during periods of nonstationary environmental conditions.
Economics	Data and analytical tools are needed to develop and evaluate fishery management policies that aim to ensure the economic viability of recreational, Tribal, and commercial fisheries, including post-harvest sectors and infrastructure.
Social Science	Data and analytical tools are needed to develop and evaluate fishery management policies intended to address social and cultural objectives of participants in fisheries and fishing communities.
Habitat science and spatial management	Ongoing and emerging uses of marine, estuarine, and freshwater resources are diverse, potentially conflicting, and likely to impact fished stocks and their habitats, as well as the surveys used to inform science and management. Continued development of the models used to designate essential fish habitat and otherwise inform spatial management are needed, including those for transboundary stocks.

THANK YOU!

https://www.pcouncil.org/resources-archives/research-and-data-needs/