RESEARCH AND DATA NEEDS: PERSPECTIVES ON TOP MANAGEMENT AND SCIENCE CHALLENGES

The Pacific Fishery Management Council conducts a review to update and communicate research and data needs as required by the Magnuson-Stevens Act (MSA) to develop "multi-year research priorities for fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes". A framework for the current review cycle outlines the key steps, which includes an additional step to guide the prioritization process (Figure 1, Attachment 2).

To develop an effective process to identify research and data needs aligned to address current challenges of the Council, it is important to reflect on and identify what challenges the Council has been facing in recent years within each Fishery Management Plan (FMP) and across FMPs. These challenges can be focused on management and/or science aspects of work to support the Council process and decision-making. At times, management and science challenges may overlap. In this context, the term "challenge" can be thought of as a high-level research need that stretches across more than one FMP and for which multiple topics can be identified. Topics are actual science and/or management examples within each challenge for which various research and data needs could be prioritized and pursued for potential solutions.

To begin the review cycle exercise, the framework starts with the identification of recent reflections or observations of management and science challenges by PFMC staff, synthesized to the draft four presented below from a compilation of associated topics. These reflections offer a simple starting point to begin broader discussions, which subsequently focus the review process on which research and data needs to prioritize.

The Council's advisory bodies should consider these initial observations and provide their perspectives to the Council under Agenda Item D.3, in a similar or analogous manner with priority high-level challenges and associated key topics.

**Draft Challenges**

1. **Data limited stocks**: The Council manages well over one hundred species along the U.S. west coast, many of which can be considered data limited for a variety of reasons. This presents management challenges in the form of stock status and setting of acceptable fishing levels.

| Topics | FMP Examples | Science and/or Management |
|---|---|---|
| Need for life history data to improve stock assessments | HMS, Groundfish | Science |
| Need improved abundance indices including fishery independent methods such as close-kin-mark-recapture (CKMR) | HMS | Science |
| Improve and evaluate existing abundance forecast models | Salmon | Science |
| Develop models to account for natural and hatchery distinction | Salmon | Science/ Management |
| Cohort reconstructions for Council-managed salmon stock complexes | Salmon | Science |
| Tagging and marking: maintaining and improving current coded-wire-tag-based strategies | Salmon | Science |
| Improvements to identification of stock structure and boundaries (e.g. stock definition, Pacific sardine, etc.) | Groundfish, CPS | Science/ Management |

| Topics | FMP Examples | Science and/or Management |
|---|---|---|
| How to best utilize data moderate and data-poor stock assessment methodologies in fishery management | Groundfish | Science/ Management |
| Survey limitations to assess groundfish populations (e.g. coastwide fixed gear survey) | Groundfish | Science |
| Use of AT survey estimates for setting harvest specifications for other CPS species (e.g. northern subpopulation of northern anchovy) | CPS | Science/ Management |
| Assessment of nearshore biomass for CPS stocks | CPS | Science |

2. **Fishery impact projections**: Many Council-managed fisheries rely upon the projection of fishery impacts associated with trip limits, bag limits, season, areas, and other factors. These require research and data to inform a number of assumptions utilized in estimation.

| Topics | FMP Examples | Science and/or Management |
|---|---|---|
| Better understand movement and changes in distribution, especially in relation to climate forcing | HMS, Salmon | Science |
| Conduct management strategy evaluations to support harvest strategy development | HMS, Groundfish | Management |
| Improve and evaluate existing harvest/impact models | Salmon, Groundfish | Management |
| Develop models to account for natural and hatchery distinction | Salmon | Science/ Management |
| Improvements to discard mortality estimations (e.g. surface release, release at depth, etc.) | Groundfish | Science/ Management |
| Understanding closed area impacts on stocks | Groundfish | Management |
| Evaluate methods for apportionment of biomass within U.S. waters (e.g. values used in DISTRIBUTION factor) | CPS | Management |
| Use of $E_{MSY}$ and underlying assumptions in Pacific sardine harvest control rule | CPS | Science/ Management |
| Develop ways to use ecosystem indicators to guide management decisions | FEP | Management |
| Better understand how climate variability and climate change affect the distribution and availability of target stocks and bycatch species | FEP | Science/ Management |
| Floating offshore wind impacts to habitat and fisheries | | Science |
| Offshore wind: cumulative impacts analysis and data gaps | | Science |

3. **Socioeconomic resilience**: The social and economic effects of Council actions extend beyond the measurement of economic impacts. The resilience of communities and fishing sectors to the effects of change is taking on increasing importance.

| Topics | FMP Examples | Science and/or Management |
|---|---|---|
| Develop management strategies that are robust to forecast errors | Salmon | Science/ Management |
| Improvements to assessing management risk (P*) assumptions | Groundfish | Management |
| Understanding economic impacts of recreational fisheries at fine scale (e.g. CPFV fishery, for ports, etc.) | Groundfish | Management |
| Integration of citizen science data collection into stock assessments (e.g. CCFRP, etc.) | Groundfish | Science |
| Improve understanding of socio-economic dynamics of CPS fleets | CPS | Management |
| Develop gear/fishing methods to exploit underutilized stocks while avoiding protected species bycatch | HMS | Science |

| Topics | FMP Examples | Science and/or Management |
|---|---|---|
| Develop system-level methods to understand fishing community vulnerability and resilience | FEP | Science/ Management |

4. **Intersection of ecosystem dynamics and fishery science/management**: The effects of a more dynamic or changing ecosystem raise challenges for both fishery science and management to be responsive. Many of these challenges cross multiple FMPs.

| Topics | FMP Examples | Science and/or Management |
|---|---|---|
| Systematic evaluation of conservation objectives for salmon stocks managed under the FMP | Salmon | Science/ Management |
| A better understanding of marine and freshwater conditions and their impacts on salmon populations. Use indicators of these conditions to inform stock distributions and thus vulnerability to fisheries. | Salmon | Science/ Management |
| Ability to react faster to new information (e.g. fishery changes, science, etc.) | Groundfish | Management |
| Time-varying sigma review/revisions | Groundfish | Science/ Management |
| Integration of ecosystem indicators and climate change impacts into stock assessments; Develop more robust methods to integrate ecosystem information into stock assessments | Groundfish, Salmon | Science |
| Better understand how ecosystem conditions affect fishery dynamics | FEP | Management |
| Develop alternative stock assessment methods that account for ecosystem dynamics | FEP | Science |
| Offshore wind ecosystem indicators (e.g. Appendix Q of the most recent IEA report) | | Science |