

Pelagic Fisheries (PF) Research Priorities

The Pelagic Fisheries Program is governed by the Pelagic Fisheries Ecosystem Plan and activities associated with international fisheries management objectives. Research priorities revolve around domestic longline and the small trolling vessel pelagic fisheries.. These priorities also feed into the information needed for international stock assessments of tuna, bill fish and tuna-like species.

PF1 Improving the understanding of fishery performance for Western Pacific fisheries.

This includes territorial pelagic fisheries, non-longline fisheries, longline fisheries, and incidental species.

Information Gap 1: Small scale pelagic fisheries in Hawaii and the US Territories target tunas and catch other pelagic management unit species (MUS) like mahimahi, wahoo, and monchong. Some of these species in the territories may have nascent population dynamics with very little exploitation. There is a lack of clear understanding on what is driving fishery performance in these fisheries. Other species may have ample ideal habitat in Territorial waters. Projects are needed to determine the feasibility of directed fisheries for these species. Additionally, biological and life history characteristics from seemingly unexploited pelagic species in Territorial waters should be compared with those of their conspecific populations in the Hawaiian Islands.

Associated Research Priorities

- PF1.1** Improve the estimation of non-commercial catches in state and territorial non-longline fisheries
- PF1.2** Conduct feasibility studies on the development of targeted fisheries for PMUS species in state and territorial fisheries
- PF1.3** Conduct biosampling of PMUS species in the territories aside from BMUS, in cooperation with regional science providers and international sampling initiatives

Information Gap 2: Over half of the landings of the Hawaii longline fishery are comprised of bigeye tuna, followed by swordfish, opah, and yellowfin. However, monchong, mahimahi, and spearfish also comprise approximately 20% of landings. Through international cooperation, stock assessments are conducted for the major tuna, billfish (e.g., swordfish, blue marlin, striped marlin), and shark stocks. Lack of fishery indicators for incidental species and pelagics in territories. There is a lack of clear understanding on what is driving fishery performance. Stock assessments and stock indicators are lacking for other important species retained and marketed by the Hawaii longline fishery such as opah, monchong, and shortbill spearfish. The stock assessments for the non-target pelagic species need to be included and prioritized in the WPSAR Schedule. Species such as mahimahi, wahoo, and monchong are commonly caught in small scale pelagic fisheries in the US Territories.

Associated Research Priorities

- PF1.4** Analyze fishery performance of non-target pelagic management unit species (PMUS), including effects due to climate change. Priority species are mahimahi, ono, opah complex, monchong complex, and shortbill spearfish
- PF1.5** Develop status, productivity, or risk indicators for PMUS that currently lack stock assessments or have historically lacked complete landings information. Investigate available size-based indicators, if possible;
- PF1.6** Work with regional fishery management organization science providers to collect and develop CPUE time series and other necessary information to conduct stock assessments on non-target PMUS currently lacking stock status evaluation in the following priority: mahimahi, ono, opah complex, monchong complex, and shortbill spearfish

PF2 Understanding the effects of spatial closures and large-scale marine protected areas on fisheries, island communities, and population dynamics on target and non-target species

Two of the world's largest marine protected areas (MPAs) are located within the US Exclusive Economic Zone (EEZ) of the Pacific Islands Region and approximately 50% of the US waters in the region are closed to commercial fishing. Large-scale MPAs have displaced fishing effort of Hawaii longline and US purse seine vessels into international waters, which are also fished by tuna fleets of several nations. There is an emerging United Nations (UN) Law of the Sea Convention on Protecting Marine Biodiversity in areas Beyond National Jurisdiction, which may establish MPAs in international waters. The Biden Administration is also proceeding with the "America the Beautiful" Initiative which includes endeavors to reserve 30% of marine and terrestrial ecosystems for conservation purposes.

Information Gap: There is a lack of information on the effects of large-scale MPAs on US fishing fleets in the US Pacific Islands Region.

Associated Research Priority

- PF2.1** Synthesis of existing studies available to examine the impacts of closures with respect to displaced fishing effort on target and non-target species, economic performance, and competition with international fisheries
- PF2.2** Evaluate strategies of static and dynamic area-based management tools utilizing large centralized management areas versus a network of smaller management areas and gauge effectiveness through balancing management objectives (i.e., maximize target catch, minimize non-target catch, economic optimization, etc.).
- PF2.3** Evaluate near-real time area-based non-regulatory management strategies that are adaptive in nature and can be utilized by vessels at sea to minimize interactions with protected species while optimizing target catch and whether such a strategy could be climate-informed
- PF2.4** Examining social, economic, and biological impacts due to existing or proposed fishery closures, including opportunity loss to US fisheries

PF3: Improving knowledge on stock structure, distributions, and life history of pelagic management unit species and their responses to environmental factors

Information Gap: Connectivity between tropical tunas (bigeye tuna, yellowfin tuna, and skipjack tuna) found in the equatorial band (10⁰ N – 10⁰ S) and higher latitudes is not well known, and understanding bigeye stock structure and movement continues to be priority for stock assessment and management. Demographics of billfish and tuna species caught around Hawaii and United States (US) Territories are not well understood. Additionally, there are many data gaps in the early life history ecology of these target pelagic species pertaining to connectivity, survivorship, and trophic ecology that require immediate scientific attention

Associated Research Priorities

- PF3.1** Discerning impacts of climate change on distributions and connectivity of PMUS through synthesizing existing studies and through what other needs
- PF3.2** Identifying environmental variables that have a direct effect on PMUS life history
- PF3.3** Mixing of target and incidental species between U.S. fisheries and sub-populations and/or larger populations
- PF3.4** Estimate proportional impacts of U.S. fisheries on internationally managed tuna stocks, including bigeye tuna and South Pacific albacore, and their impacts relative to competing foreign fisheries
- PF3.5** Provision of knowledge stock structure of key fisheries that are under international CMMs and how CMMs are affected by this information. Focus should be on fisheries that target tropical tunas and South Pacific albacore
- PF3.6** Influence of ocean circulation on fishery performance of Hawaii longline fleet on bigeye and other PMUS

PF4 Advancing ecosystem-based fisheries management

Ecosystem-based fisheries management (EBFM) is a holistic way of managing fisheries and marine resources by taking into account the entire ecosystem of the species being managed. The goal of ecosystem-based management is to maintain ecosystems in a healthy, productive, and resilient condition so they can provide the services humans want and need. EBFM is comprised of accounting for multiple processes affecting the environment, not just climate change or large-scale ocean processes.

The Annual SAFE Report now contains the annual summaries of environmental parameters that are readily available in the NOAA website. This will be included in the online version of the Annual SAFE reports – how do we utilize this information more effectively for adaptive and climate-ready fisheries

Information Gap: As fisheries target certain species, there is a need to understand dynamics between multiple species, their interdependency and means to predict species shifts. With that comes with a need to assess the relative importance of epi-pelagic and meso-pelagic prey organisms on trophic structure, including those species used as bait in Pacific fisheries. We also need to include the role of fishing communities as well as the role of local governments of state,

territories, and commonwealth enhancing and protecting their fisheries. Further, determining appropriate metrics of ecosystem health need to be explored.

Associated Research Priorities

- PF4.1** Investigate response or sensitivity of population dynamics and distribution to ocean variability and projecting climate futures
- PF4.2** Connecting ichthyoplankton surveys to fishery production, and identifying readily available environmental proxies that may reflect these mechanistic processes
- PF4.3** Developing species distribution models to predict the distribution of key tuna and non-target species as a result of changing conditions (similar to EcoCast on West Coast)
- PF4.4** Improvement of the PIFSC bigeye tuna recruitment index and possible development of such an index for American Samoa for albacore, North Pacific swordfish, or other PMUS.
- PF4.5** Determine the influence of mesoscale oceanographic features on island fisheries
- PF4.6** Develop and/or evaluate integrated management across archipelagic and pelagic scales
- PF4.7** Continue ongoing diet analyses to track the composition of prey communities, including any changes to these communities over time
- PF4.8** Improved regional modeling on Hawaiian Islands - an effort to develop regionally downscaled circulation models (including basic biogeochemical and plankton fields) will offer 3-dimensional estimates of ocean conditions at about 4-6-km spatial resolution (through FY27). There is a need to prioritize oceanographic metrics or indices relevant to fisheries to translate that output into products useful for climate-informed management decisions

PF5 Mitigation of depredation and development of deterrents to reduce incidental interactions in U.S. Pacific Island fisheries

Previous work supported by the Council identified species responsible for shark depredation events in the Marianas and similar studies and tracking projects have been conducted in Hawaii. Marianas fishermen regularly complain of high shark depredation events during troll fishing trips. Data collected from the Guam creel survey program in 2017 indicated that 40% of pelagic fishing trips surveyed reported shark interactions that included either stealing bait or depredation of the catch. However, depredation is not limited to sharks and non-longline fisheries. Longline fisheries also suffer unknown, but significant economic losses from false killer whales, protected shark species, and species such as cookie-cutter sharks that degrade market quality of tuna landed. The need to address depredation has shifted to developing mitigation strategies.

Information Gap: Using limited information on the dynamics of shark interactions with U.S. Pacific Island fisheries (including longline and non-longline fisheries), there is a need to develop mitigation technologies and strategies to reduce interactions.

Associated Research Priorities

- PF5.1** Estimates of total fishery-wide depredation and economic loss due to cookie cutter shark depredation in longline fisheries

- PF5.2** Evaluation of measures intended for protected species mitigation in longline fisheries that may affect depredation from other species (i.e., wire leader prohibition, gear characteristics)
- PF5.3** Cost and opportunity loss estimation from depredation events in longline fisheries
- PF5.4** Gear and operational characteristics or modifications to reduce the impact of shark species involved in depredation events (noting validated species from existing studies)
- PF5.5** Cross-Marianas tagging network to monitor shark species responsible for depredation and estimate population and residency

