STAFF REPORT ON INFLATION REDUCTION ACT FUNDING PROPOSALS

Introduction

At the September Council meeting under Agenda Item H.7 (Fiscal Matters), Executive Director Burden presented an overview of funds made available to regional fishery management councils from the Inflation Reduction Act (IRA). NMFS has agreed to provide each council with an initial $375,000 to support staff and contractor capacity to undertake IRA-eligible Council activities. This will support development of proposals to tap a second $17 million funding tranche that will be distributed to councils through a competitive process. To qualify for funding, proposed actions would need to be complete and implemented – or have implementation imminent – by 2027.

Proposals must be for activities that contribute to:

- Implementation of fishery management measures necessary to advance climate-ready fisheries by improving climate resiliency and responsiveness to climate impacts; and/or
- Development and advancement of climate-related fisheries management planning and implementation efforts in support of underserved communities.

According to NOAA guidance, proposals should:

- Operationalize fish climate vulnerability assessments, or other scientific products (e.g., ecosystem status reports, Integrated Ecosystem Assessments, etc.).
- Operationalize recommendations from climate scenario planning efforts.
- Implement management changes to address climate vulnerability or improve climate resiliency of fisheries, including those that are important to underserved communities.
- Implement measures that increase responsiveness of allocations or other management measures to climate impacts.

With respect to the first bullet, a climate vulnerability assessment (CVA) has been completed for 64 federally managed fish species in the California Current Ecosystem.[1] This was preceded by an assessment focusing on Pacific Coast salmon.[2] A third CVA is underway for marine mammals. These assessments could be consulted to guide Council actions. For the second bullet, the completed Fishery Ecosystem Plan (FEP) Climate and Communities Initiative (CCI) included a scenario planning exercise. The Ad Hoc Ecosystem Workgroup has kept the Council apprised of a task list resulting from that effort (see Agenda Item H.7.b, Supplemental EWG Report 1,

[1] McClure M.M., M.A. Haltuch, E. Willis-Norton, D.D. Huff, E.L. Hazen, L.G. Crozier Lisa G., and coauthors. 2023. Vulnerability to climate change of managed stocks in the California Current large marine ecosystem. *Frontiers in Marine Science* vol. 10. https://www.frontiersin.org/articles/10.3389/fmars.2023.1103767

[2] Crozier L.G., McClure M.M., Beechie T., Bograd S.J., Boughton D.A., and coauthors. 2019. Climate vulnerability assessment for Pacific salmon and steelhead in the California Current Large Marine Ecosystem. PLOS ONE 14(7): e0217711. https://doi.org/10.1371/journal.pone.0217711

September 2023). These tasks could be used in the development of funding proposals linked to future Council activities.

In September, the Executive Director presented a list of ongoing and potential future activities that could be supported through the competitive grants referenced above. This next section builds on that list, presenting brief synopses of candidate activities and the rationale for the IRA-funding eligibility. (No priority is implied by the order in which they are presented.) The Council should review these synopses and identify those that should be developed into full proposals for the IRA grant process.

Potential proposal synopses for Council consideration

Prioritized Fishery Ecosystem Plan Initiatives to support climate-informed fisheries management

FEP initiatives are multi-species or multi-fisheries science and policy processes to help coordinate Council policies across its FMPs and improve understanding and management of California Current Ecosystem resources. In September 2022, the Council prioritized three such initiatives intended to support climate-ready fisheries and climate-resilient fishery management.

First, it has embarked on an initiative to bring ecosystem and climate information into Council management processes. Thus far, two activities have been carried out. Decision points in management processes where the introduction of climate and ecosystem information could be beneficial have been identified for the Council's four fishery management plans. A method for incorporating ecosystem information into the decision on groundfish harvest specifications (catch limits) using a risk assessment framework has been developed and applied on an example basis to two species. Methods for integrating climate and ecosystem information into fishery management processes will be further explored and implemented, as appropriate, through this initiative. This could include the development of tailored products from the suite of indicators presented in the Annual Ecosystem Status Report and climate vulnerability assessments for Council-managed species.

The second priority initiative would support fishing community resilience to the effects of climate change. Under this initiative, the Council would evaluate the resilience of West Coast fishing communities to climate change in relation to Council harvest policies. As a first step, the Council would improve its identification and understanding of vulnerable communities and the fisheries they most depend on. This would support an analysis of how Council actions have affected or may affect these communities, leading to the development of management strategies that would bolster community resilience. This initiative also supports the current emphasis by NOAA and the Council on equity and environmental justice. Climate change will likely most impact marginalized communities, which are less able to adapt to resulting impacts on resources they depend on.

The third priority initiative would explore how management processes could be made more responsive to relatively rapid changes in the status of stocks (in terms of abundance and distribution) as a consequence of climate change. This was a dominant theme emerging from the CCI scenario planning exercise. If climate change presents novel situations that arise rapidly and may be ephemeral, both scope and speed are of the essence. Assessing how the management process could be improved will require an understanding statutory and bureaucratic constraints at

the Federal level. Retrospective or prospective case studies would focus on identifying choke points in the management process. Once those are identified, alternative processes, feasible under statutory constraints, would be developed. One of the tasks identified in the CCI scenario planning effort is germane to this activity:

- All fishery management plans (FMP)-specific advisory subpanels and management teams report to the Council on barriers in the management of their fisheries to addressing the effects of ecological or management surprises and shifting stocks through in-season management actions, and on measures the Council could take to increase management nimbleness pre-season and in-season, while supporting long-term stock and ecosystem integrity.

Groundfish stock definitions

In June 2023, the Council took final action on the first phase in defining stocks for 14 species in its Groundfish FMP and is now starting on a second phase to define stocks and stock complexes for the remaining management unit species. The term stock is defined in the Magnuson-Stevens Fishery Conservation and Management Act (MSA) as "a species, subspecies, geographical grouping, or other category of fish capable of management as a unit" (§3(42)). The MSA requires conservation and management occur at the stock level, in particular with respect to making determinations as to whether the stock is subject to overfishing or overfished, and National Marine Fisheries Service (NMFS) has determined for that reason stock definitions should be incorporated into FMPs. Climate change will affect the distribution, abundance, and availability of managed species with implications for the geographic definition of stock boundaries. The CVA for West Coast federally-managed species (see footnote 1) finds that "[m]ost species (n=46, 72%) we evaluated were judged to have a High or Very High likelihood of effecting a distributional change." Although such changes are likely to occur at rates without an immediate impact on stock management, anticipating such changes when defining stocks should be an important consideration. This could be informed by the "ecoregion" concept as proposed by the International Council for the Exploration of the Sea (ICES) to incorporate a broader range of considerations into stock definitions including anticipated distributional changes.[3] This also connects to a candidate FEP ecosystem initiative not taken up by the Council (and dropped from the Initiatives Appendix in its 2022 revision) entitled *Bio-Geographic Region Identification and Assessment*. This initiative would create a framework for finer-scale fisheries management actions connecting to ecosystem-based management and making linkages with other government policies and processes. Using such approaches in the stock definition effort could help to more effectively integrate biological and socioeconomic considerations in defining geographic boundaries while anticipating geographic shifts in distribution. Socioeconomic and regional considerations would be especially relevant if a stock definition had any fishery allocation implications.

[3] ICES (2020). Definition and rationale for ICES ecoregions. General ICES Advice guidelines. Report. https://doi.org/10.17895/ices.advice.6014

Groundfish fixed gear protected species bycatch mitigation

The Council is currently considering expanded fixed gear marking requirements in the Pacific Coast pot and longline gear sablefish fishery, which would make it easier to attribute entangled gear on marine mammals and sea turtles to specific fisheries, providing baseline information to implement entanglement risk reduction measures in particular fisheries. Climate-driven changes in the migration and distribution of marine mammals and sea turtles could bring new challenges in managing entanglement risk. This is exemplified by humpback whales prey switching and consequently moving inshore where they have become more vulnerable to buoy lines on Dungeness crab pots and other fixed gear. This was especially evidenced during the 2014-2016 marine heatwave. This made krill less available and humpback whales switched to small fish such as anchovy. At the same time upwelling habitat was compressed, concentrating prey closer to shore where crab pots are deployed, resulting in a substantial increase in entanglements.[4] The frequency, size, and duration of marine heatwaves is increasing due to global warming. Thus, efforts to better understand which fisheries are interacting with marine mammal and sea turtle populations is becoming essential to mitigation efforts. Fishery-specific gear marking will facilitate such efforts.

Klamath River and Sacramento River fall Chinook salmon harvest objectives

Because of their unique life history, salmon are particularly vulnerable to climate change, facing both terrestrial impacts to spawning habitat and migration and marine impacts affecting ecosystem productivity and in particular forage availability. The aforementioned CVA (footnote 2) concludes that salmon with regionally distinct life histories, such as fall and winter-run Chinook, are most vulnerable to climate change impacts. Managers are increasingly facing challenges presented by these vulnerabilities.

The salmon FMP establishes conservation objectives for managed stocks, which are tied to reference points identified pursuant to MSA National Standard 1 and specifically maximum sustainable yield (see FMP Table 3-1). These conservation objectives are typically cast in terms of spawning escapement (the number of spawning adults reaching in-river spawning grounds) for the relevant stock or related indicator stock. Both the Klamath River and Sacramento River fall Chinook stocks (KRFC, SRFC) subject to Council management were declared overfished in 2019 when rebuilding plans were put in place. KRFC continues to be overfished; SRFC, although rebuilt, has experienced poor spawning escapement in the last few years leading to the closure of most salmon fisheries south of Cape Falcon in 2023. A recommendation in the rebuilding plans for these stocks was to revisit their conservation objectives, given changes in environmental conditions potentially affecting population dynamics. In June 2023, the Council established two workgroups to embark on this work.

The most immediate environmental change affecting KFRC is the removal of the four lower dams on the Klamath River, expected to be completed in 2024, opening up more spawning habitat made unavailable by the dams and their impoundments. However, in the short term the in-river environment will be dynamic and potentially hostile to spawning, because of the large amount of

4 Santora, J.A., N.J. Mantua, I.D Schroeder, J.C. Field, E.L. Hazen, S.J. Bograd, and coauthors. 2020. Habitat compression and ecosystem shifts as potential links between marine heatwave and record whale entanglements. Nature Communications 11, 536. https://doi.org/10.1038/s41467-019-14215-w

sediment built up behind the dams that will be flushed out over time and reshaping of newly exposed riverine environments. It is expected to take at least a decade for the river system to stabilize. Conservation objectives will thus need to be adaptive as these changes affect population productivity.

SRFC spawning success has been affected by high in-river water temperatures and low flow due to exceptional drought conditions in the Sacramento River drainage. Fortuitously, the just ended water year exhibited record rainfall and snowpack at 237% of average. This precipitation was driven by a series of "atmospheric rivers" in the winter of 2022-2023, in turn facilitated by a very large marine heatwave during this period. This suggests the sort of climatic volatility that is likely to become more common with global warming.

Salmon stock productivity is also affected by ocean conditions. As reported in annual Ecosystem Status Reports, lipid-rich northern copepods and krill are important forage components for many marine species including salmon. Their availability is affected by meso-scale (e.g., ENSO) and long-term climate variability and climate change.

The many factors contributing to salmon stock productivity likely to be affected by climate change will need to be investigated and accounted for in the revision of KRFC and SRFC conservation objectives.

One CCI scenario planning follow-on task is germane to this activity:

- Request that NMFS report to the Council on coordination among its hatchery, habitat, and hydropower policies to buffer Pacific salmon stocks against climate change effects.

This information could feed into evaluating conservation objectives.

Queets spring/summer Chinook rebuilding

In an October 13, 2023, letter to the Council NMFS announced it has determined that Queets River spring/summer Chinook salmon is overfished. Pursuant to the requirements of MSA section 304(e), the Council must prepare and implement a rebuilding plan within two years of the date of this notification letter. In order to meet this deadline, Council actions should be submitted to NMFS within 15 months of this notification to ensure sufficient time for the Secretary to implement the measures, if approved.

As stated earlier in this document, because of their unique life history, salmon are particularly vulnerable to climate change. The status of this stock appears substantially driven by environmental factors, since Council-area fishery impacts to this stock are very low, averaging around 20 fish over the past 10 years. The 10-year average run size for this stock is just over 500 fish, which makes its existence especially vulnerable to altered freshwater and ocean environments caused by climate change. Freshwater habitat, marine environmental conditions, and availability of food sources are all factors that contribute to salmon productivity. These factors will likely all be affected by climate change and will need to be investigated and accounted for as part of a successful rebuilding plan for this stock.

Gear innovation for highly migratory species (HMS) fisheries

The Council is developing an HMS Roadmap, a policy framework to guide responses to changes in HMS fisheries stemming from the need to reduce bycatch while increasing landings of marketable species, particularly swordfish. As part of this effort, it has directed its highly migratory species advisory bodies to plan a workshop to explore alternative fishing practices and gear designs through exempted fishing permits that meet this objective. The Council could expand the scope of this effort to explicitly consider responses to changes in the distribution of target species and bycatch species, specifically sea turtles and marine mammals in support of climate-ready fisheries. One of the CCI follow-up tasks is related to this activity:

- All FMP-specific advisory subpanels and management teams could report to the Council on priorities and processes for review of exempted fishing permit applications and recommendations about how such permits could be deployed to advance climate ready fisheries.

This CCI task is broader in scope than HMS, but outcomes of this HMS Roadmap effort could be used to explore similar approaches under the Council's other three FMPs.

Address climate change impacts to internationally managed species

One of the CCI follow-up tasks is to conduct a workshop to 1) develop recommendations to address adapting to and mitigating for the effects of climate change on fish stocks and fisheries at the international level and 2) identify measures to improve current transboundary coordination to prepare for shifts in the distribution of managed fish stocks.

Of Council-managed species, HMS have the greatest international management dimension, but salmon, Pacific halibut, Pacific hake, and North Pacific albacore are managed through bilateral arrangements with Canada. And Pacific sardine in the West Coast EEZ is distributed in Mexican waters as well, with transboundary management implications, especially as a result of climate change driven range shifts. The two tuna regional fishery management organizations (t-RFMOs) in the Pacific, the Inter-American Tropical Tuna Commission and the Western and Central Pacific Fisheries Commission, have begun to explicitly address climate change effects to managed stocks. For example, at the instigation of the U.S., the WCPFC has added climate change as standing agenda item to all its meetings. This proposal could be expanded to involve the North Pacific and Western Pacific FMCs, RFMO staffs, and NMFS staff leading RFMO delegations to explore the transboundary implications of climate change and develop governance solutions.

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