North Pacific Fishery Management Council

Simon Kinneen, Chair | David Witherell, Executive Director
1007 W. 3rd Avenue, Suite 400, Anchorage, AK 99501
Phone 907-271-2809 | www.npfmc.org

October 29, 2021

Dr. Robert Foy
Alaska Fisheries Science Center
7600 Sand Point Way N.E. Building 4
Seattle, WA 98115
Via email: robert.foy@noaa.gov

Dear Dr Foy:

On behalf of the Council, I am writing to thank you and your staff for the excellent presentations we received at our recent October 2021 meeting on the various climate initiatives that are underway involving your staff at the Alaska Fisheries Science Center. The Council very much appreciated hearing about progress underway with the NOAA Climate and Fisheries Initiative (CFI), the Regional Action Plans (RAPs) for climate, and also the ACLIM and GOA CLIM projects.

The Council appreciated the opportunity to review and provide comment on these ongoing initiatives, and provides the following general recommendations. First, in finalizing the RAPs and in developing the CFI, the Council requests some additional language be included to connect the output of the various research efforts described to the Council process and management actions. The Council has ongoing initiatives in place, for example through the harvest specifications process and through the Council's Bering Sea Fishery Ecosystem Plan process, which would be a natural venue for linking AFSC research with a fishery management application. Directly identifying that connection between the AFSC research and its application in our process would strengthen the planning process.

Additionally, the Council suggests a more explicit recognition of how the CFI and RAPs will coordinate with other partners, in particular the USFWS. In addition to their trust responsibility for conservation of key ecosystem species such as seabirds and marine mammals, there are other ongoing initiatives at USFWS such as the Landscape Conservation Cooperatives that may be an opportunity for strengthening partnerships with respect to community participation and grassroots engagement.

The Council recognizes the essential nature of these types of research efforts to inform sustainable management in the context of environmental change, and is concerned about securing ongoing funding for the initiatives that have been described. In particular, the Council is writing to the Secretary of Commerce to support funding for these initiatives without reducing funding for existing programs.

The Council appreciates the opportunity to review and provide comment on the various climate research initiatives. The Council's Scientific and Statistical Committee also received these presentations, and the Council endorses the SSC comments and recommendations, which are attached to this letter, and requests that the agency incorporate them especially in the finalization of the RAPs. Thank you as always to you and your staff for your informative presentations and willingness to interact with and respond to the Council's input.

Sincerely,

David Witherell
Executive Director

Enclosure: (1)

SCIENTIFIC AND STATISTICAL COMMITTEE
DRAFT REPORT TO THE
NORTH PACIFIC FISHERY MANAGEMENT COUNCIL
September 30th – Oct 1st & Oct 4 – 6th, 2021

EXCERPT

The SSC met remotely from September 30th – October 1st and October 4 – 6th, 2021.

Members present were:

Sherri Dressel, Co-Chair *Alaska Dept. of Fish and Game*	Anne Hollowed, Co-Chair *NOAA Fisheries – AFSC*	Alison Whitman, Vice Chair *Oregon Dept. of Fish and Wildlife*
Chris Anderson *University of Washington*	Amy Bishop *University of Alaska Fairbanks*	Curry Cunningham *University of Alaska Fairbanks*
Mike Downs *Wislow Research*	Jason Gasper *NOAA Fisheries–Alaska Region*	Dana Hanselman *NOAA Fisheries—AFSC*
Brad Harris *Alaska Pacific University*	George Hunt *University of Washington*	Kathryn Meyer *Washington Dept. of Fish and Wildlife*
Andrew Munro *Alaska Dept. of Fish and Game*	Matt Reimer *University of California, Davis*	Chris Siddon *Alaska Dept. of Fish and Game*
Ian Stewart *Intl. Pacific Halibut Commission*	Patrick Sullivan *Cornell University*	

B4 Alaska Fisheries Science Center Report

NOAA Climate and Fisheries Initiative

The SSC received a presentation from Dr. Anne Hollowed (NOAA-AFSC) about the NOAA CFI. The goal of the CFI is to build a nationwide, operational ocean modeling and decision-support system that addresses four core requirements: (1) operational delivery of ocean forecasts and projections for use by NMFS and others; (2) operational capability to turn ocean forecasts into climate-informed management advice; (3) capacity for continuous validation and innovation through observations and research; and (4) increased capability to use climate-informed advice to reduce risks and increase the resilience of resources and the people that depend on them.

This national effort of sharing, modeling, and infrastructure can both improve NPFMC applications and management, and how the Council and its advisory bodies can share expertise in a bi-directional community of practice. The CFI has been built with input from coastal communities and ensures that communication is a large part of the effort. This effort will develop optimal management portfolios that include climate-enhanced adaptive management (stock assessments); infrastructural improvements; and climate-smart long-term strategies to anticipate interactions, reduce conflict, increase productivity, and support overall dynamic management.

Products of the CFI, including reliable ocean modeling products built on a suite of existing and expanded surveys, will open the door for the NPFMC to be able to look at species-specific, tactical decisions, for climate-enhanced assessments that are not relying on a single season or location (e.g. ocean conditions in spawning areas or season) and can be used to avoid bycatch and protected species interactions. The short-term forecasts will also improve rapid responses for planning and prediction, alerting constituents, allocating emergency aid, triaging impacts, and enabling adaptation. NPFMC already has a number of these applications in the Bering Sea, and the CFI provides the support for development of these tools in the Gulf of Alaska (GOA) and Aleutian Islands (AI).

Initial funding in 2021 is for pilot projects and development of the Arctic Grid, followed by a substantial build phase in 2022 that includes: data portal teams, model teams, Fisheries and Climate Support System (FACSS) Teams, skill assessments, and model design specifications. The SSC was pleased to see this integrated investment in climate-readiness and looks forward to following the progress of the initiative. **The SSC suggests clarifying how these efforts map onto existing Council decision-informing analytic products (e.g., map of information flow).** This would improve public understanding and tracking of products from this initiative.

The SSC is excited to see this level of investment in climate-informing products relevant to management as it will improve linkages between climate change and sustainable management.

Climate Regional Action Plans

The SSC received presentations from Dr. Martin Dorn, Dr. Kalei Shotwell, and Dr. Jim Thorson (NOAA-AFSC) on the draft Regional Action Plans (RAPs), 2022-2024. Public testimony was provided by Lauren Divine (Aleut Community of St. Paul Island) and Heather McCarty (Central Bering Sea Fishermen's Association).

In 2015, the NOAA Fisheries Climate Science Strategy (NCSS) was published as a guide for efforts by NOAA Fisheries to address information needs across seven science objectives that address the Nation's challenges in sustaining and managing large marine ecosystems (LMEs) in the face of a changing climate. RAPs for the Eastern Bering Sea (EBS) and GOA were developed with a focus on monitoring, process studies, and modeling. During the initial implementation of the RAPs, it was envisioned that research on climate change and fisheries would evolve over time and thus periodic updates of the RAPs would be required. Upon completion of the NCSS 5-year review, NOAA Fisheries leadership concluded that an update of the RAPs was both timely and necessary and the GOA RAP (2.0), EBS RAP (2.0) and a new RAP for the Arctic were developed.

The purpose of the RAPs is to identify and describe planned and proposed climate-science research

activities at AFSC during the years 2022-2024. They also highlight new initiatives and projects that require additional funding but could be implemented quickly to build on the portfolio of climate-related research. **The SSC was excited to hear about the ongoing and new research.** Specifics for each RAP will be provided below, but the SSC commends the RAP working groups for each LME for the considerable effort that went into these documents and thoughtful assessment of current needs and knowledge gaps.

Across all three RAPs, there was a strong emphasis on key gaps that derive from a lack of monitoring. While it was made clear that these documents are not intended to task or direct budgets, **the SSC strongly supports prioritizing fisheries independent and dependent surveys, and that these data are consistently collected and enhanced**.

Similarly, the SSC was pleased to see emphasis on new and ongoing studies that focus on nutritional ecology and trophic interactions for fish. All three RAPs highlighted a need for predator-prey information to understand mechanistic linkages, and **the SSC supports the efforts to stabilize funding for laboratory studies and efforts exploring the impacts of climate change on food habits, bioenergetics, foraging and energetic quality.** The SSC looks forward to seeing how these can improve understanding and predictive capabilities for thermal thresholds, and predator prey interactions (e.g., in the GOA for the Atlantis and ECOPATH models).

The importance of both the monitoring data and interaction information is critical for investigating and identifying impacts of climate change and ecosystem tipping points. Many of these projects are only feasible under the Scenario 2 (increased) funding.

All three RAPs provided a balanced portfolio of research projects across five categories: Monitoring, Management Oriented Synthesis, Socioeconomics, Process Studies, and Marine Mammals. While the SSC recognizes that NOAA is not the agency tasked with managing seabirds, the SSC recommended that the RAPs provide some information on inter-agency collaborations and efforts that feed into ecosystem-based approaches for sustaining and managing the LMEs in light of climate change (e.g., seabird productivity and diet, ESRs). The SSC was also pleased to see international and inter-survey calibration efforts (e.g., DFO and NWFSC) for species that cross international borders

Specific focus was placed on envisioning a collaborative research environment with Alaska Native communities in each of the RAPs. The new AFSC Tribal Research Coordinator will assist this process, with the goals of strengthening working relationships and partnerships to promote sharing information, supporting data collection, developing collaborative research projects, and identifying mutual priorities to co-produce research. **The SSC is supportive of these efforts and stresses the need for NOAA, the Council (e.g., through its relevant committees and task forces), and related agencies to coordinate, thereby allowing for an efficient use of resources in communities for co-generation of knowledge, cooperation, and research.**

Finally, similar to the CFI, the **SSC suggests the RAPs consider including and clarifying how these existing and proposed new projects and efforts map onto existing Council decision-informing analytical products (e.g., map of information flow).** This will assist in clarity for public understanding of how information flows from various sources, documents, and efforts into decision-making processes.

Eastern Bering Sea Regional Action Plan

The EBS RAP 2.0 updates 51 current and new (started after 2016) climate research activities likely to occur in the next 3 years and provides an evaluation of remaining key scientific gaps. This list is not the full scope of climate research conducted in the EBS but represents NOAA's contribution to scientific research relevant to the NCSS through projects that receive federal funding or engage federally-funded researchers. The RAP as a whole highlights many areas of advancement and improvement of the EBS climate-ready strategy.

Of the existing activities, the majority are focused under the research themes of Monitoring, Management Oriented Synthesis, and Socioeconomics, with additional activities classified as Process Studies and Marine Mammals. Most new projects were integrated and based on a foundation of ecosystem-based management (EMB) and thus fell under the Management Oriented Synthesis category.

Five projects were highlighted as important for including ecosystem advice in tactical decision making and included ESPs, Risk Tables, FEP Task Force Teams, Human Integrated Ecosystem Based Fisheries Management (HI-EBFM), and the Fisheries Integrated Modeling System (FIMS). From the Process studies category, it was highlighted by the CPT that new projects focusing on shifting spatial distributions will be key (e.g., tagging, collaboration with Russia)**.** The potential predictive nature of the framework laid out by the RAP is particularly exciting.

Twenty-five key gaps still remain—with the majority falling into the monitoring category. Given the strong emphasis on integrated research, the authors found it difficult to prioritize across projects but did note that three main foci emerged: Infrastructure, Decision Support Pathways, and New Technology that would accelerate progress towards a fully integrated climate portfolio in the region. Highlighting a few gaps:

- Ship time and increased survey frequency was a recurring theme for both fisheries and protected species like marine mammals (e.g., cetaceans haven't been surveyed in the Bering Sea since 2006). Increased survey effort is needed to address the distinct lack of data on phytoplankton bloom timing, seasonality, and phytoplankton and zooplankton species composition (measurements are strongly linked to overall fisheries production), impacts of climate change on habitat use and prey resource distribution, and spatial and temporal gaps in coverage. Improving coverage and adding novel biogeochemical sampling will also require development of new tools and technology.

- Another key gap was understanding human community adaptations and non-market values of the Bering Sea ecosystem, but funding is limited. Additionally, there is a need for improved communication of risks of climate change to fishing dependent communities (KGMOS 2). The SSC is excited about the diverse tactics highlighted for addressing the gap with understanding human community adaptations and non-market values of the BS ecosystem and the addition of the AFSC's new Tribal Research Coordinator to assist in facilitating two-way dialogue, with initial focus on the northern Bering Sea (NBS) (see note about coordination above).

The SSC appreciates the SMART metrics of progress as this allows for more accountability and transparency of how these activities will be achieved. However, the "T—Timebound" component

was inconsistently applied across metrics (e.g., at least one workshop on climate-related community priorities in a western Alaska community, and with fisheries stakeholders, but did not indicate a target completion date). This could be improved in future drafts.

The CPT also highlighted, and the **SSC agrees, that it would be helpful in the text to note where research or key gaps are specific to groundfish or crab, or both**.

Four national initiatives were advanced in FY22 that can address these needs, including CFI, NOAA Fisheries Survey Infrastructure, PMEL Expansion of Moored Observatories in the NBS, and PMEL funding request to OAR for eDNA Moorings and Shipboard Measurements. Full funding of these projects would provide for key surveys for the NBS and climate decision support for fishery-dependent communities and managers by growing teams that provide flexible responses to challenging monitoring needs. Under Scenario 1, these initiatives are not funded and the authors project that slope surveys will be discontinued or infrequent, juvenile fish surveys will be biennial or severely reduced, and near coastal regions will not be surveyed. Some programs will continue on temporary funding (ACLIM, MAPP, MOM6, eDNA research), but data and sample processing may be slowed. If the initiatives are funded (Scenario 2) many of the key gaps will be addressed, though some programs (e.g., food habits long-term data program, marine mammal monitoring and assessments, and euphausiid dynamics) will still be limited.

Arctic Regional Action Plan

At present, the NPFMC Arctic Fishery Management Plan (2009) prohibits commercial fishing (excluding salmon and halibut) until sufficient information is available to support the sustainable management of a commercial fishery. This is the first RAP for the Beaufort and Chukchi Seas. The report details several previous and on-going research programs in the high Arctic including large-scale integrated surveys (RUSALCA, DBO, AEis, AIES) that may serve as baselines for assessing future changes, and several marine mammal surveys that look at abundance, migration, and trophic interactions.

Several studies were highlighted including focused sampling in the Beaufort Sea that found snow crab were associated with cold, high salinity water offshore of the shelf break (Logerwell et al. 2011), and results from uncrewed surface vehicle surveys of the Chukchi shelf that showed age-0 gadids are advected to the Chukchi shelf from the northern Bering Sea and then advected farther north after a period of growth (Levine et al. 2021). Several projects focused on predator-prey interactions (e.g., examining the trophic role of ice seals in the Chukchi and Beaufort Seas that aim to estimate prey requirements and seasonal/spatially explicit consumption). There was also emphasis on spatial distributions and movement ecology (e.g., northward distribution shifts including developing survey designs for large-bodied fishes and crabs).

The Arctic RAP identified 11 on-going and expanded research activities that are important for ecosystem monitoring, synthesis and management responses in the US Beaufort and Chukchi Seas. The targeted portfolio spans trophic levels and human components of the ecosystem and would occur from 2022-24. Table 1 in the report details each of these activities, the research type and NCFSS objectives it meets. Priorities were fairly evenly distributed across all five research types (Monitoring, Process Research, Marine Mammals, Management-Oriented Synthesis, and Socio-economics).

The authors suggested development of a LK/TK/S Taskforce for the Arctic Region as one potential pathway for improving communication. It was also a goal to refresh the Arctic ESR to regularly communicate Arctic science to the NPFMC. **The SSC is supportive of the development of a LK/TK/S Taskforce but suggests coordination with existing NOAA efforts and relevant Council entities (see comment above).**

The CPT acknowledged and the SSC supports the efforts of the Arctic RAP authors and look forward to additional climate related research and synthesis to improve our understanding of snow crab dynamics and predictive capabilities in light of dramatic snow crab declines in 2021.

Gulf of Alaska Regional Action Plan

The most notable progress from the initial GOA RAP 1.0 was that AFSC and UW received funding for robust modeling efforts in the GOA. Based on the ACLIM project, this multi-model approach includes an ECOPATH model, multispecies models, and an Atlantis ecosystem model for the GOA. It will include fleet dynamics, a marine mammal project looking at heatwave impacts on SSLs, a sociological study of adaptive capacity in fishing communities, and coupled regional economic models for southwest Alaska. This RAP will be conducted over three years, 2022-2024. **The SSC is very supportive of this effort and looks forward to seeing these models incorporated into the Council process.**

The targeted portfolio spans trophic levels and human components of the ecosystem and would occur from 2022-2024. Some other highlighted projects in the GOA RAP 2.0 included: development of new methodologies for efficient and rapid assessment of key metrics (fish condition, relative abundance) to reduce lags in use in fisheries management (monitoring); experimental studies on the effects of increasing temperature and ocean acidification (process-oriented research); climate vulnerability analysis for the GOA (management-oriented synthesis); heatwave impacts on SSLs (marine mammals); and a coupled fleet-community-adaptation model (socio-economic). The RAP team identified a number of projects that would fill key gaps and are important for addressing NCSS objectives but require additional funding (detailed in Executive Summary and Table 5.1).

As with the EBS, the GOA RAP utilized SMART metrics for tracking progress; the SSC appreciates this approach but suggests authors ensure that metrics have clear timeframes identified where appropriate.