

Answers to Information requested by the GAO to the NPFMC June 2021

Fisheries Management & Climate Change

- [General information on your council's organization and coordination with regional commissions and NMFS.](#)

The NPFMC has 11 voting council members, including 7 appointed by the Secretary of Commerce (5 Alaska, 2 WA), and the principle state official for fisheries from the states of Alaska, Washington, and Oregon, and the regional director of the NMFS Alaska Region. We also have active, but non-voting members from the USFWS, the USCG, the Pacific States Marine Fisheries Commission, and the State Department.

The Council has a Secretariat staff of 15, consisting of 6 administrative staff and 9 analytical staff. The staff is responsible for administering the finances, holding the meetings, and preparing the analytical documents used as a basis for decision-making and as required by the National Environmental Policy Act, the Magnuson Stevens Act, and various other laws and executive orders. We have another staff person in our office, an employee of the Pacific States Marine Fisheries Commission, who provides database management, data analysis, and data summaries that are used by Council staff in the regulatory analyses.

The Council has two critically important advisory committees (the Fishing Industry Advisory Panel – aka Advisory Panel or AP – and the Scientific and Statistical Committee – aka SSC), as well as Plan Teams composed of fishery scientist to compile and review stock assessments and provide preliminary recommendations to the SSC. There are also a dozen or so standing committees composed of stakeholders to provide recommendations on important long-term issues (e.g., the Halibut and Sablefish IFQ Committee, the Ecosystem Committee, the Enforcement Committee, the Fishery Monitoring and Advisory Committee, etc.), and occasionally an ad hoc committee to provide recommendation on a particular one-time topic (e.g., the Cook Inlet Salmon Committee).

In brief, the Council closely coordinates with the NMFS Alaska Regional Office staff and with the Alaska Fisheries Science Center (AFSC). Council staff work with their counterparts at the regional office, particularly with personnel in the sustainable fisheries division, to jointly prepare analytical documents that evaluate environmental, economic, and social impacts of proposed regulatory changes. Scientists at the AFSC may also contribute scientific information to an analysis when applicable. The AFSC scientists play a critical role in collecting fishery independent data, preparing stock assessments, providing synthesized ecosystem information, and providing scientific information and peer review on the Council's various plan teams, taskforces, and on the scientific and statistical committee (SSC).

The Council also works closely with the International Halibut Commission on halibut fishery management and halibut bycatch controls, and with the Alaska Department of Fish and Game on management of the BSAI crab fishery, the scallop fishery, and on groundfish fisheries for stocks that occur in both state and federal waters (e.g., Pacific cod, pollock, some rockfish species).

- [Information on your council's role in developing and implementing NMFS climate science regional action plans.](#)

The Director of the AFSC (Dr. Bob Foy) provides regular reports to the Council on the NMFS initiatives and research related to the climate science regional action plans. The Council provided feedback to the AFSC on the development of the plan as well as in the implementation of the different initiatives. Dr. Foy's presentation to the Council last week on climate informed science for management, and development of updates to the regional action plans can be found here: <https://meetings.npfmc.org/CommentReview/DownloadFile?p=7bcd5672-82d8-49d5-aab2-4800fc27b8ff.pdf&fileName=PPT%20B5%20AFSC%20Update.pdf>

- [Overview of fisheries climate adaptation efforts in your region including climate information provided by NMFS.](#)

The Council and the NOAA Alaska Fishery Science Center have already enacted a number of procedures, research and monitoring activities, and management actions to make our fisheries more resilient to climate change. Each year, scientists from the Science Center working with cooperating agencies, produce an Ecosystem Status Report for each major fishery management region, which provides status and trend information for ecosystem components and ecosystem-level attributes, with indicators of current ecosystem conditions and an assessment of how fish stocks might respond to these conditions. The Council and its advisory bodies review the Ecosystem Status Report, and adjust annual catch limits and targets should the information indicate additional caution is warranted. The Ecosystem Status Report information is also used in environmental assessments that evaluate proposed changes to fishery regulations. All of the information used to produce the Ecosystem Status Report requires continued major investments in scientific research surveys and analysis.

- [Assistance NMFS provides councils and commission on using fisheries climate information.](#)

In cooperation with the NOAA Alaska Fishery Science Center, the Council is further evaluating how to make fisheries and protected resources more resilient to climate change, including changes in management and conservation measures, and improvements in science, monitoring, and cooperative research. We approved a Bering Sea Fishery Ecosystem Plan in 2018 and one of the first significant efforts under that plan is our Action Module for Climate Change. The goal of the Climate Change Module is "to facilitate the Council's work toward climate-ready fisheries management that helps ensure both short-term and long-term resilience for the coupled social-ecological system of the Bering Sea." As a first step to achieve this goal, the Council established a Climate Change Taskforce, consisting of federal and non-federal scientists (including social science, biological, ecological and marine mammal specialists), fishing representatives, tribal organizations, NGOs, and research organization representatives, to collect input from a diverse group of stakeholders and develop tools to make fisheries more resilient to climate change. The Climate Change Taskforce workplan spans the next five years, and builds a process for operational delivery of climate-informed and ecosystem-based management decision support tools for the management of living marine resources in the Bering Sea. We believe that this process and workplan could provide a model for other regions in addressing emergent climate change impacts and planning for fisheries.

The Climate Change Taskforce aims to build a three-step process (i.e., collect, synthesize, communicate) to operationalize the delivery of climate change information to the Council

including summarizing climate change information, tools, and providing recommendations to improve fisheries resiliency to climate change in all aspects of our management process. Through the course of the 5-year work plan, the Climate Change Taskforce will also create a regular process for the synthesis and delivery of management strategy evaluations of measures that can: a) help preserve livelihoods, economies, health and well-being across fisheries and dependent coastal communities; b) support near- and long-term adaptation to climate change; and c) ensure the continued productivity and sustainability of the Bering Sea system.

An overview of the climate change task force workplan can be found here:

<https://meetings.npfmc.org/CommentReview/DownloadFile?p=c490194b-f4e2-4446-85fc-57d20148d440.pdf&fileName=PPT%20D3%20CCTF%20May%20FEP%20Overview%202021.pdf>

- [Extent climate information produced by NMFS is used in fisheries management in your region, including specific examples from fisheries management plans your council has developed.](#)

A summary of this information (as well as our FMP resiliency to climate change) is being compiled by the Climate Change Task Force. Additionally, a compilation of the Council's Climate readiness synthesis will be produced by the Fall of 2021. Some examples of climate information provided by NMFS and used currently in Council decision-making include temperature dependent catchability estimates in the BSAI Yellowfin sole stock assessment, considerations of future management implications based on loss of sea ice and movement of various fish stocks northward as well as implications of loss of sea ice on northern crab stocks. Information on marine heat waves in the Gulf of Alaska and the resulting implications to the GOA cod stock population decline were critical to helping decision makers set specifications in the 2019-20 assessment cycles. Work on the Alaska Climate Integrated Modeling project (ACLIM) is just beginning to be considered in conjunction with the Council process to help inform future scenarios of climate change impacts on fish populations. See: <https://www.fisheries.noaa.gov/alaska/ecosystems/alaska-climate-integrated-modeling-project>

Over the life span of the Climate Change Task Force, a more defined process for operational delivery of climate change information to inform management will be developed.

- [Perspectives on barriers, if any, to preparing and adapting fisheries management to the impacts of climate change in your region.](#)

Fish populations, including important fishery resources with the highest biomass, are expanding into the northern Bering Sea and the high Arctic as a direct response to climate change. These regions are under surveyed and will require our focus as climate change continues and gets more pronounced in the Alaska region. As the resource expands, the Council also needs data from our international partners to better understand how climate change is affecting our cross-boundary stocks (e.g., Alaska pollock). There is also the need for increased focus on expanded at-sea fisheries and ecosystem surveys to support management approaches that consider climate change, so vulnerabilities can be identified and addressed. Examples of climate-based vulnerabilities include monitoring the ecosystems services that support key commercial fisheries. For example, environmental monitoring and modeling revealed that the recent marine heatwaves in the Gulf of Alaska drastically reduced the forage base available to Pacific cod, a vitally important fishery resource in Alaska. Additionally, we now understand that the loss of sea ice can greatly impact the distribution and production of Pacific cod and Alaska pollock. These examples illustrate the

importance of continued support for scientific surveys, environmental monitoring and modeling to understand, mitigate, and anticipate the impacts of climate change.

We appreciate that NOAA and the Alaska Fisheries Science Center is collaborating with the Council on our effort to improve and provide climate resilient fisheries management. Continued scientific, financial, and management support from NOAA will be necessary to advance this work. One of the most crucial aspects of continued climate resiliency that NOAA can directly provide is long-term, consistent funding and support for the multiple fisheries and ecosystem surveys that form the fundamental basis of fisheries management in the North Pacific.

Overfishing

- [General information on the role your fisheries council plays in preventing overfishing and rebuilding overfished stocks.](#)

The Council has 6 fishery management plans (FMPs) - the Bering Sea and Aleutian Islands (BSAI) Groundfish FMP, the Gulf of Alaska (GOA) Groundfish FMP, the Arctic FMP, and three FMPs that provide for joint management with the State of Alaska: the BSAI Crab FMP, the Alaska Scallops FMP, the Alaska Salmon FMP. The Arctic FMP is unique in that it prohibits all fishing until such a time in the future when sufficient data are available to allow harvest and environmental impacts are fully understood. The Alaska Salmon FMP provides for full delegation of management to the State of Alaska, but serves to prohibit salmon fisheries in the EEZ except in a few designated areas.

The Council has established very conservative harvest limits for all FMP stocks. Strict annual catch limits for every target fishery have proven an effective management tool for achieving sustainable fisheries. In the North Pacific, a rigorous process in place for over 40 years ensures that annual quotas are set at conservative, sustainable levels for each of our managed stocks.

Three reference points are used for management of groundfish, crab, and scallop fisheries in the North Pacific. The overfishing level (OFL) is the catch limit which should never be exceeded. It is based on the fishing mortality rate associated with producing the maximum sustainable yield on a continuing basis. The acceptable biological catch (ABC) is the annual catch limit, and is set lower than the OFL. The buffer between these reference points allows for scientific uncertainty in single species stock assessments and ecosystem considerations, and operational management of the fishery. The total allowable catch (TAC) is the target catch level that incorporates economic considerations and management uncertainty. The fishery management plans prescribe that TAC may equal but never exceed ABC, such that $TAC \leq ABC < OFL$.

For groundfish, the sum of TACs for all groundfish stocks must also remain within the optimum yield range defined in the FMP. In the BSAI, the upper limit is 2 million mt, which can be constraining. TAC may be set lower than ABC for a variety of reasons, such as to remain under the 2 million mt optimum yield limit; to increase a rebuilding rate or address other conservation issues; to limit incidental bycatch; or to account for state water removals. Fisheries are managed in-season to achieve the TACs without exceeding the ABC or OFL. All catch taken in directed fisheries or caught incidentally in other fisheries, whether retained or discarded, accrues towards the TAC.

The catch limits are specified annually through a public scientific process. The annual process of determining OFL and ABC specifications begins with the assignment of each stock to one of six

“tiers” based on the availability of information about that stock. For groundfish, Stocks in Tier 1 have the most information, and those in Tier 6, the least. Application of a control rule for each tier prescribes the resulting OFL and maximum ABC for each stock. For many groundfish stocks FABC is set at F40%. F40% is the fishing mortality rate at which the spawning biomass per recruit is reduced to 40% of its value in the equivalent unfished stock. The control rules for Tiers 1-3 also provide for better chances of rebuilding, because if a stock falls below target biomass level, rates for computing ABC and OFL are reduced.

The annual catch limits are established as follows, with groundfish as an example. Scientists at the NMFS AFSC prepare an assessment of the status of each stock (or stock complex), and include alternate model simulations and tier assignments to arrive at recommendations for OFLs and ABCs. To prevent localized depletion, ABCs and TACs for many stocks are further subdivided into different regulatory areas based upon relative abundance in each area. The Groundfish Plan Teams review the assessments and compile them into Stock Assessment and Fishery Evaluation (SAFE) reports, develop their own OFL and ABC recommendations (which may differ from the stock assessment author), and present this information to the Council and its Scientific and Statistical Committee (SSC) and Advisory Panel (AP). The SSC is responsible for setting the Council’s OFLs and ABCs, using the SAFE reports and Plan Team recommendations. The SSC retains the flexibility to adjust ABC values downward from the control rule, based on factors such as multispecies interactions, ecosystem considerations, and additional scientific uncertainty. The Council then sets the TAC levels at or below the ABC levels, incorporating recommendations from the Advisory Panel and stakeholders. The public has an opportunity to provide input at each step in the process. The process is described here: <https://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/AFSCsafeReviewProcess.pdf>

The groundfish, crab, and scallop SAFE reports, which includes all stock assessments produced each year, are always publicly available here: <https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/> Annual ecosystem status reports and economic status reports are also prepared and reviewed by the Council as part of the specification process.

Due to the conservative harvest policies and close monitoring of the fisheries, nearly all North Pacific fisheries are certified as sustainable by the Marine Stewardship Council and the Responsible Fisheries Management Certification Program. Even with the Councils precautionary management approach, over 2,200,000 metric tons of groundfish are harvested annual in the North Pacific, worth approximately \$2.5 billion first wholesale. Fish harvests off Alaska annually account for about 60% of the total U.S. catch, and are critical to ensuring food security for the nation. These fisheries support over 90,000 jobs and provide economic opportunities in coastal communities that are particularly vulnerable to the effects of climate change.

- [Information on the number of fish stocks overseen by your council and the stock assessments that have been conducted on them.](#)

All groundfish, crab, and scallop stocks managed under federal FMPS undergo regular stock assessments, with the periodicity dependent upon an assessment prioritization plan, as agreed to the Council and its SSC and Plan Teams. High value fisheries (pollock, Pacific cod, sablefish, yellowfin sole, rock sole, etc.) are assessed based either annually or biennially, depending on abundance survey frequency (and thus data availability). Stocks with consistently low catches relative to harvest limits and no ongoing management concerns (e.g., GOA shallow water rockfish) are assessed at a reduced frequency, but not less than once every 4 years.

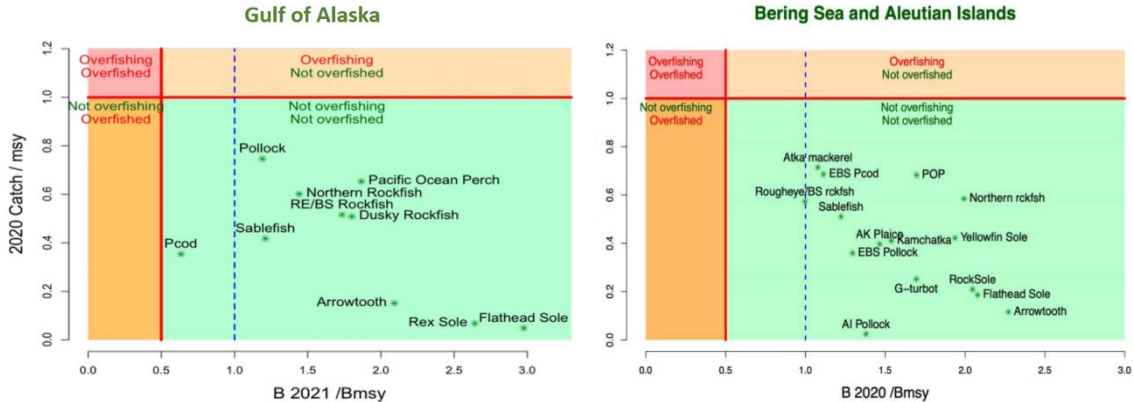
Stocks are managed as individual species (e.g., pollock) or as a stock complex of biologically similar stocks frequently caught together (e.g., shallow water flatfish). The number of stocks and stock complexes, and the total number of species covered, and assessments by agency, are listed below by FMP:

- BSAI Groundfish FMP: 21 stocks/complexes covering 100 species – NMFS assessments.
- GOA Groundfish FMP: 23 stocks/complexes covering 102 species – NMFS assessments.
- BSAI Crab FMP: 10 stocks, 5 species – NMFS/ADF&G assessments.
- Alaska Scallops FMP: 1 stock, 6 species – ADF&G assessments with SSC review.
- Alaska Salmon FMP: numerous stocks and complexes; 5 species – ADF&G only.
- Arctic FMP: 3 stocks, 3 species – NMFS assessment (done at time of FMP development).

- Information on the number of stocks experiencing overfishing or in overfished status overseen by your council.

No stocks managed under Federal FMPs are experiencing overfishing – or have experienced any overfishing since the MSA was enacted in 1976. Overfishing is prevented by the establishment conservative harvest limits through our harvest control rules, combined with closely observed and monitored fisheries.

No groundfish, salmon, or scallop stocks are overfished. The abundance of groundfish stocks is high, and most stocks are well above the abundance levels that produce maximum sustainable yield. In the past 40 plus years, no groundfish stocks have been overfished or have been subject to overfishing.



There are currently two crab stocks (Pribilof Island Blue King Crab and St. Matthew Island Blue King Crab) that are considered ‘overfished’ and under rebuilding plans. In both cases, scientists agree that the low stock status of these stocks was not due to fishing, but rather poor recruitment resulting from unfavorable environmental conditions. For example, the Pribilof stock has been closed to directed fishing and has been fully protected from incidental mortality and habitat impacts by 5,700 nm² area closed to trawling and fishing with pot gear since the 1990s. Nevertheless, the stock continues to decline. Similarly, the adjacent St. Matthew blue king crab stock is currently overfished and protected with an area closure. Again, even with very conservative harvest rates, the stock fluctuates widely with recruitment and natural mortality events.

- **Information on the stock rebuilding plans overseen by your council.**

The Pribilof Islands blue king crab (PIBKC) stock was declared overfished on September 23, 2002. The Council developed a rebuilding plan as Amendment 17 to the BSAI Crab FMP, and implemented in 2004. Based on the best available information on the biology of the stock and environmental conditions, NMFS estimated that the time period to rebuild the stock would exceed 10 years. The rebuilding plan was further revised when it became clear it was not being rebuilt according to schedule. As such, nearly all bycatch of PRBKC was eliminated by including pot gear in the Pribilof Island Habitat Conservation Zone area closed to all trawling. This was done through Amendment 43 to BSAI Crab FMP and Amendment 103 to BSAI Groundfish FMP, and was implemented on January 1, 2015.

The PIBKC rebuilding plan utilizes the conservative harvest strategy developed by ADF&G and adopted by the Alaska Board of Fisheries, should the stock ever recover enough to actually allow a fishery. Habitat is thoroughly protected from fishing impacts by the existing Pribilof Islands Habitat Conservation Zone, which prohibits trawling and halibut and groundfish pot fishing and encompasses the majority of PIBKC habitat. This closure also effectively makes the amount of bycatch of blue king crab in groundfish fisheries is a negligible proportion of the total population abundance. On an annual basis, ADF&G also closes specific State statistical areas where Pribilof Island blue king crabs are known to occur during the Bristol Bay red king crab, snow crab, and Tanner crab fisheries to minimize blue king crab bycatch in those fisheries.

Nearly 20 years has passed since the stock was declared ‘overfished’. Even with nearly zero fishing mortality on this stock, the population continues to decline. It is not clear that this stock will ever rebuild, at least under existing environmental conditions.

The St. Matthew blue king crab (SMBKC) stock was declared overfished on October 22, 2018, and a rebuilding plan was developed as FMP Amendment 50 by the Council and approved by NMFS in October 2020. The projected time for rebuilding, taking into account the biology of the species and current environmental conditions, is 25.5 years. Through this FMP, the State of Alaska is delegated management of the SMBKC fishery the State sets preseason TACs and GHLS, and season or area closures when the TAC or GHLS is reached. The State of Alaska’s SMBKC harvest strategy is provided in the Alaska Administrative Code at 5 AAC 34.917 and that strategy applies during rebuilding. The State harvest strategy is more conservative than the FMP’s control rule parameters for SMBKC because, under the harvest strategy, directed fishing is prohibited at or below a larger biomass level than under the F_{OFL} control rule.

The SMBKC stock has been in a low productivity phase since 1996 and population recovery will be greatly influenced by future environmental conditions. Despite existing protections and frequent fishery closures, the stock has remained in this low productivity phase.

- **Challenges, if any, faced by your council in preventing overfishing and rebuilding stocks.**

From our perspective, maintaining the standardized fishery-independent bottom trawl and hydroacoustic surveys is critical to prevent overfishing, particularly in the face of environmental change. These surveys serve as our fundamental data source to support groundfish stock assessments and ecosystem assessments, and are the most critical responsibility of the AFSC to meet its mission of monitoring the health and sustainability of living marine resources and their habitat.

Funding constraints have prevented the AFSC from completing the full complement of survey stations normally sampled in the past. Costs to run the surveys are increasing, yet the AFSC funding has not increased. As a result, the AFSC has had to cut back on scientific staff and the amount of research it can do, including continuing the full survey efforts.

The cancellation of surveys in 2020 due to Covid-19 provides an example of the effects of missing just one year of survey data. The Council's SSC noted that loss of the 2020 surveys will increase uncertainty in stock status and projections and may necessitate larger buffers between overfishing limits (OFLs) and acceptable biological catches (ABCs), which translates into reduced catch limits to reduce the potential for overfishing. Not having even one year of survey data may substantially increase uncertainty, particularly for the following stocks: Bristol Bay red king crab, EBS snow crab, EBS pollock, EBS Pacific cod, AI Pacific cod, BSAI Atka mackerel, BSAI blackspotted/rougheye rockfish, and BSAI Greenland turbot. These are primary species in the North Pacific, encompassing valuable crab stocks sensitive to changing environmental conditions and variable in abundance and biomass, and groundfish species that comprise more than 82% of the total allowable catches of groundfish in the BSAI in 2020. Rapidly changing distributions and populations in recent years, particularly for Alaska pollock and Pacific cod, increases the importance of the baseline survey efforts.

As noted by Dr. Foy in his recent presentation to the Council, we need more science to adapt to climate change, not less. **If the U.S. wants to provide national food security through sustainable fisheries and maintain viable coastal communities off Alaska, it must invest in the science and management necessary to understand and adapt to climate change.**