

## Data Gap Analysis v.1

Prepared for the Social Science Planning Team Meeting

May, 2018

During the November 2017 teleconference, the Social Science Plan Team (SSPT) noted the need for a systematic examination of data and information gaps that have been identified by the NPFMC's Scientific and Statistical Committee (SSC), NPFMC staff, NMFS Alaska Regional Office staff, and the NMFS Alaska Fisheries Science Center. The following data and information gap analysis is intended to focus the SSPT's May 2018 discussion of data gaps in the Council process and to help the SSPT determine its priority areas for filling these gaps. This is the first iteration of what we anticipate will be revised in the future as informed by regular SSPT discussions on the topic. We welcome all feedback to improve and refine this document in the future.

This document is organized around twelve different general types of data that are missing or only partially available for use in NPFMC analyses as identified by the authors from their knowledge and past comments by the SSC. These gaps are discussed specific to different user groups, if applicable. Lastly, for those general types of data that are partially available, we briefly discuss some of the current data sources and their limitations for NPFMC analyses. The twelve general types of data we consider are, in no particular order: 1) Employment data; 2) Cost data; 3) Ownership data; 4) Quota share and quota pound market data; 5) Gaps identified in catch share program reviews; 6) Demographic information; 7) Community, economic, social, and cultural importance of fishing; 8) Community and individual well-being; 9) Subsistence or personal use harvest and sharing; 10) Local and traditional knowledge and their incorporation into science and management; 11) Alternative recreational opportunities; and 12) Seafood inventories.

### **1. Employment data**

There is limited employment data for commercial fishing vessel crew, processing, and charter sector labor. Addressing these three gap areas would provide valuable information for, amongst other things, anticipating and evaluating the impacts of management changes on these sectors at the aggregate and community-level by understanding dependence on specific species/fisheries. The following section briefly describes the data and information that we do have on fisheries employment across these three sectors and provides more detail on the types of data and information that have been identified as necessary to inform the Council process.

#### *1.1 Crew*

The State of Alaska issues commercial fishing permits and crew licenses, required for participating in both State and federal fisheries in Alaska. The Commercial Fishery Entry Commission (CFEC) issues interim-use and limited entry permits for individuals operating fishing gear (i.e., skippers) in federal and state fisheries. Permits are issued by fishery and may

be used in lieu of a commercial crew license to crew in any fishery. CFEC maintains durable identifiers for permit holders and requires reporting of demographic information such as residency and birthdate; limited-entry permits are transferable between individuals, with transfer history for a given permit observable in the registry over time. Permit numbers are recorded with each landing on the fish ticket. As such, these data may be used to track tenure of individual permit holders over time, as well as participation by these individuals (when employed as gear operators) across fisheries and trips.

The ADF&G Commercial Crew License application collects some demographic information on the crewmember including their residency, gender, and birth date. Commercial crew licenses are valid for the calendar year for which they are purchased, and unlike CFEC permits, there is no durable identifier that reliably identifies a given license holder in the license registry over time. The State also does not track in which fishery or on which vessel the crewmember is intending to or did participate. With the exception of limited Economic Data Report (EDR) data collections in which individual crew license numbers are collected and associated with vessels submitting EDRs (discussed further below), this means we fundamentally do not have a way to broadly inform understanding of tenure of individual crew participants within the crew labor pool over time, or to connect the information on crew licenses to actual fishing activities to understand crew participation by fishery. Furthermore, we do not necessarily know whether or not the individual used their crew license, although it is somewhat unlikely that they would buy an expensive license (\$60/year for residents \$277/year for non-residents) without a plan to use it.

Crew size reporting was added to fish tickets with the implementation of eLandings (in 2005/2006 for BSAI crab and 2006 for groundfish); crew size is also reported on at-sea groundfish production reports as far back as 2000. Crew size is included on groundfish fish tickets partially in 2007 and almost completely in 2008 and provides information on the number of crewmembers per vessel on each trip. While that information is recorded by the processor at the time of landing and is not audited in any way, the frequency of observation and large number of data points mitigates data quality limitations to some degree. The crew size field on fish tickets (beginning in 2008) could be used to inform an understanding of total employment at the fishery level in terms of number of crew positions by aggregating crew size per vessel across vessels active within the fishery; however, this measure would be an overestimate of distinct individuals employed if crewmembers move between vessels during a fishing season. We also lack basic information on total crew employment by fishery prior to 2008.

In general, we also do not have information on crew earnings (daily, seasonal, average, as a percent of ex-vessel revenues, etc.), except in fisheries where we have implemented an EDR to collect that type of information (e.g., BSAI crab, Amendment 80, Gulf of Alaska (GOA) Trawl). For these EDR fisheries, AFSC collects information on total crew labor payment, number of individual crew members paid, and total captain labor payment, and collects the commercial crew license number or CFEC gear operator permit for each individual captain or crew member employed during the calendar-year fishery. . We also lack other information that would be

valuable to understanding management impacts and fishery dependence including turnover on vessel and within a fishery, diversification across fisheries as crewmembers or permit holders, and employment outside of fishing.

### *1.2 Processing labor*

Many of the same types of data and information gaps identified for crew members are also pertinent to processing labor, which limits our understanding of management impacts at the community level and dynamic effects of changing fishery conditions. In general, processing labor employment data, including estimates of total employment and some demographic information (residency and gender), is available by region (e.g. Bristol Bay, Southeast AK, etc.) from the Alaska Department of Labor (AK DOL). However, we lack more disaggregated data (e.g., by plant or community) on the number of processing jobs by fishery or processor, information on earnings (including any overtime hours and wages as we have anecdotal evidence that these change with the added temporal stability of landings from catch share programs), and demographic information (residency, age, gender, etc.). Total licensed crew size is available for at-sea operations in the groundfish production reports; regulations specify which types of crew are to be excluded from the count, including workers only on the processing line. The at-sea crew size data are not audited and may be subject to more systematic reporting error than fish ticket crew size reporting, given variation in how “crew” is defined for these operations (e.g., including or excluding processing crew). To be able to fully understand management and other fishery impacts on processing labor, we would also need (and do not have) information on the structure of employment (seasonal, part-time, full-time), attrition or retention rates, income diversification (across fisheries, processors, and outside of fisheries), upward mobility (within a plant, processing company), and income diversification (at the individual and household level). AFSC researchers recently developed a grant proposal to work with AK DOL to get more disaggregated data, which is part of the package of proposals from AFSC that the SSPT will be reviewing at the May 2018 meeting.

### *1.3 Charter sector labor*

Analyses of management and fishery impacts on the charter sector are also limited by similar data and information gaps identified for crew and processing labor. AFSC has conducted several iterations of a cost and earnings study of the charter sector (2012-2014, 2016, and 2018), which provides information on the number of crew and operators employed, trips and seats sold, total labor payments, expenses by category, and total revenue. However, demographic information (such as residency) of charter crew and operators or income diversification (at the individual or household level) is not included in this survey. This information would improve analyses of management impacts as well as allocation discussions.

## **2. Cost data**

Except for fisheries covered by an EDR, there is also a lack of data on costs and cost structure across fisheries and the processing sector. Even EDR data is limited by geographic location of expenditures on inputs like fuel, for example. In general we face a large gap in relating changes in fishing income and costs to geographical location. This limits our understanding of how the fishing and processing sectors respond to changing fishing and management conditions, impacts on fishing communities, how fishery rents are distributed and change with management changes, etc.

### *2.1 Fishing costs*

As noted above, we collect EDRs for BSAI crab (baseline years 1998,2001, 2004 and annually 2005-current), A80 (2008-current), American Fisheries Act (AFA) Pollock (2012-current), and GOA trawl fisheries (2015-current), which vary with respect to scope and detail of costs collected; the A80 EDR form collects annual expenditures for five categories of capital costs and 19 categories of expenses, whereas the A91 EDR submitted by the AFA fleet collects only annual fuel purchase gallons and cost. The Crab ER and GOA Trawl CV EDR form collect a limited set of vessel operating costs: crab vessels report annual expenditures, stratified by crab fishery, for IFQ leasing, crew and captain labor payments, provisions, bait, and fuel costs, while GOA Trawl CV owners report annual expenditures for crew and captain labor, fuel, trawl gear, and salmon/halibut excluder gear (more information on the types of data collected in the EDRs will be provided by AFSC staff during the May 2018 SSPT meeting). For all non-EDR fisheries, we lack critical information on operating costs (labor, materials, energy, services) and fixed costs (overhead, financing costs, administration, sales, etc.), and with the exception of A80 vessels, no information on capital investment (boat, gear, etc.) is currently collected in EDRs or other sources.

### *2.2 Wholesale processing costs*

Limited sets of annual operating costs are collected in EDR forms submitted by BSAI crab processors and shore-based processors in the GOA trawl groundfish fishery. GOA processors report processing-line labor costs (hours and gross wages), stratified by month and housed/non-housed status, water and electrical utility consumption (quantity and cost), also stratified by month, and annual total wage and salary payments to non-processing line employees. CR program processors (including crab buyers that exclusively use custom processing purchased from active plants) report annual operating costs, stratified by crab fishery, for processing line labor (hours and gross wages), raw crab purchases (pounds and costs, also stratified by IFQ type), custom processing costs (pounds and fees, also stratified by product/process code), and IPQ lease costs, as well as annual total payroll (wage and salary) payments to non-processing employees. As noted above, Amendment 80 CPs report more extensive cost data, including capital investment in on-board processing plant and equipment (including cold storage), distinct from expenditures on fishing gear and other vessel-related and general capital purchases, and annual processing-specific operating expenses for processing

labor, freight/shipping, and other sales-related costs, product packaging materials, and raw fish purchases, in addition to fishing-related and general operating/overhead expense items.

Excluding data reported by processors through EDRs, we lack similar types of cost information for the processing sector including labor costs (and overtime), capital investments, operating costs, and fixed costs. The Commercial Operator's Annual Report (COAR) data does include information about processors' raw materials costs. Elsewhere in the U.S., a national processor survey is administered which includes monthly employment information, but this survey is not required for Alaska processors.

### **3. Ownership Data**

Ownership structure in the fishing industry is complex, with individual and corporate owners organized into a hierarchical system with varying degrees of vertical and horizontal integration and affiliation. Capital assets, including vessels, processing plants, and quota shares may be held under common ownership as independent subsidiaries or be closely associated through common management structures, and individual persons or corporate entities can hold equity shares or other controlling interests in multiple entities holding fishery assets. This presents a complex network of financial linkages that direct capital income flows generated from public-trust fishery resources to primary beneficiaries, many of whom cannot be readily and/or unambiguously identified. The three most detailed sets of information currently collected on ownership include Restricted Access Management (RAM) records on catch share program participants, including Quota Share (QS) holding entities and fishing vessel owners, collected and maintained for enforcement of program eligibility and use/ownership caps; USCG vessel documentation system, required for vessels over five net tons; and (3) US Maritime Administration (MARAD) data collected under American Fisheries Act (AFA) by the for enforcement of foreign ownership restrictions on vessels over 100 feet in length. USCG and MARAD data are not presently available in a manner that supports use as an analytical database. RAM requires reporting by all non-individual (i.e., corporate) owners of harvesting or processing quota, including a unique company identification number, company name, unique owner identification, owner name, effective date of share ownership, and share percent owned; for the rationalized BSAI crab fishery, affiliation information is required for all non-individual owners of harvesting or processing quota shares, identifying all individuals with 10% or greater ownership or control. The information collected by RAM is maintained as a registry of current ownership information, regularly reported by owners on an annual basis, and is required to be up-to-date. As such, it does not currently function as a database that can be readily matched to historical data collected through vessel or plant level data collection; ongoing work by AFSC and AKIN to decompose ownership structures in order to identify equity shares in individual vessel and QS assets held by individual persons has yielded some useful results, but the structure, scope and quality of available data limit the application of the approach to statistical estimations.

#### **4. Quota share (QS) and quota pound (QP) market data**

In addition to data gaps associated with identification of vessel, QS, and other capital asset ownership noted above, which limit more complete analyses of the distribution of fishery benefits among capital owners and other stakeholders, data is substantially lacking on the market value of quota assets, in terms of both permanent sale transfer, and particularly in terms of use value of annual quota allocations (quota pounds/QP). Asset values of QS assets at the point of transfer are monitored by RAM through QS transfer applications submitted by buyers and sellers of QS assets, including details regarding identity of both parties, affiliations between parties, and other information sufficient to identify market-rate transactions. Apart from EDR data collection of annual aggregate quota transfer values, little data is available for short term transactions involving QP or PSC in AFA, halibut and sablefish IFQ, or other CS program. The crab EDR forms collect QP transfer data in terms of annual total pounds and cost of IFQ, IPQ and CDQ, by crab fishery and quota class, paid by the vessel or processing entity that sold the quota pounds; data reported is limited to arms-length and/or market-rate QP transfers, but it is not possible to determine the source of QP sold by reporting vessels, or whether QS holders and vessel owners are affiliated; no information is collected from CR program QS/PQS entities on income received by through QP leasing arrangements. The A80 EDR collects both annual revenue and cost data, for sale of A80 program QS and QP (by species) from all A80 vessels and LLP entities, however, the small number of reporting entities limits public reporting of aggregate A80 QS values, and both QS and QP markets are thin.

#### **5. Gaps identified in catch share program reviews**

Numerous data and information gaps have been identified in previous catch share program reviews or by the SSC in response to these reviews. Many of these gaps are discussed in more detail elsewhere in this document, but are highlighted here for additional context.

The halibut and sablefish IFQ fisheries are not subject to an EDR and therefore lack much of the critical information necessary to evaluate the impacts of the IFQ Program on participants and communities and with respect to its programmatic objectives. The 20-year review of the program highlighted many of these critical gaps, including crew data, lease rates (as the percentage of the ex-vessel revenue that goes to the QS holder and to the lessee); the distribution of ex-vessel revenues between QS holders and hired masters; rent accrual to vessel owners, crew, quota shareholders, and processors. Other areas identified in the IFQ review were more research than data gaps, but are noted here for reference including information about gear conflicts; comprehensive Vessel Monitoring System data (to examine gear conflicts, gather information about effort, and improve enforcement; entry opportunities and mechanisms for entry; effects of area-specific regulations; individual diversification; community impacts including ethnographic analyses; variability in violations (at the area or vessel level); effectiveness of the CQE Program; GAF usage.

Similar data and information gaps were noted in the 10 year BSAI crab review, including more detailed information about crew employment, upward mobility of crew/skippers,

accessibility, and community impacts from fisheries policies; rural community and small scale fishers impacts in particular.

## **6. Demographic information**

As noted in the employment data section above, some demographic information is available from crew licenses (but not tied to fisheries) and at a regional level for the processing sector. In addition, a GOA social survey administered by AFSC included demographic information for the trawl fisheries and processing workers. However, we lack comprehensive demographic information by fleet, fishery, and community which would be critical to improving analyses, catch share program reviews, and social impact assessments of management changes. This demographic information would include gender, ethnicity, age, education, marital status, income, residency, etc.

## **7. Community, economic, social, and cultural importance of fishing**

Community-level fishery management impact analysis and catch share program reviews are also limited by a lack of systematic gathering and maintenance of data on various components of fisheries impacts. We do not have comprehensive information on the economic contribution of fisheries to local communities (i.e. relative to other fleets/fisheries, the onshore versus offshore fishing sectors, or other industries) or dependence of the municipality on fish-related taxes or tax diversification. We also do not have information about employment outside of fishing for fisheries participants at the individual or family/household level. This kind of information would provide analysts and the Council with a more in-depth understanding of fisheries dependence at the individual and community level. For example, some fishing vessel owners switch to operating as tenderers, charters, research cruises, whale watching operations, water taxis, sightseeing boats, etc., in response to fisheries changes, but multi-uses of fishing vessels are not tracked.

Alaska's DOL has a Alaska Local and Regional Information database that provides information about resident employment by sector, but this does not include wage information except at an aggregated level. The State of Alaska does provide information on community-level taxes but fisheries specific taxes are often provided at the Borough-or municipality-level, depending on the governance structure of the community. We do not systematically gather information on fishery support business and infrastructure (although AFSC researchers are examining this). AFSC researchers finished collecting employment and cost data via a survey for fisheries in Southwest Alaska Borough/Census areas to get at some of this information, and are developing a multi-regional social accounting matrix model to conduct regional economic analysis. But the survey used for this project was a voluntary and one-time survey.

## **8. Well-being**

The Council has expressed an increasing desire to hear about the broad-scale impacts of management or fishery condition changes. The Ecosystem Status Reports, for instance, include

several well-being indicators for the human dimensions of ecosystem use for the large marine ecosystems off Alaska, and the Council and SSC have asked for an extension of this section. Well-being is generally conceptualized as a state of being which arises when basic needs are met, and a pursuit of goals and overall enjoyment of a satisfactory quality of life are possible, and can be thought of at both an individual and community level. Components of well-being include things like livelihood, access to high quality food, sense of place, family connections, access to nature, sustained fisheries participation, etc.

Generally, beyond livelihood indicators for fisheries use (e.g., revenues, earnings, employment), well-being indicators at the personal level have not been developed. The link between well-being components and fisheries participation is also a critical need with respect to informing the Council process. At the individual level, we do not have information about well-being components directly tied to fisheries participation such as job satisfaction, expectations about future earning power, job security, physical and mental health associated with fishing, access to healthcare, food security, water security, connections to the water/nature, a sense of a fishing culture or personal identity associated with fishing, etc. Informal discussion have revealed concerns about drug use, associated work-related accidents, and limitations on finding local employees for fishing related jobs, however we do not track substance abuse rates or other social ills as descriptors of social conditions in fisheries. AFSC researchers are currently working on an effort to identify well-being components and associated indicators tied to fisheries use for the community of Sitka as part of the Gulf of Alaska Integrated Ecosystem Assessment (IEA) Program. AFSC researchers have also recently developed a grant proposal to work with several communities in exploring community well-being in the North Bering Sea (this is part of the package of proposals from AFSC that the SSPT will be reviewing at the May 2018 meeting).

At the community level, the AFSC's social indicators provide some basic information about the social vulnerability of the communities as a whole (using primarily census data), but are not tied directly to the fishing sectors in the community. As these indicators continue to develop, more attention should be paid toward connecting these with changes in fisheries activities and/or management changes and assessing their validity with other data sources and information available.

## **9. Subsistence or personal use harvest and sharing**

The impacts of fishery management changes and other conditions on subsistence/personal use fisheries participants is another gap that has been highlighted by both the Council and SSC. The Alaska Department of Fish and Game (ADF&G) does track subsistence and personal use fishing and marine mammal use for Alaska residents, but this data gathering process is often subject to funding limitations that make consistent data collection difficult.<sup>1</sup> ADF&G tracks harvests under subsistence halibut registration certificates (SHARC cards) through a voluntary survey that used to be administered annually but is now more intermittent due to funding

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<sup>1</sup> An ADF&G subsistence researcher will give a presentation at the May 2018 SSPT meeting to discuss the subsistence data that is available through the department.



constraints. The total number of SHARC cards issued annually is available through NMFS, which manages subsistence halibut. ADF&G also collects annual harvest information for selected subsistence and personal use fisheries with permit requirements: permit holders are obligated to return information about harvests from these permits before they can receive a permit in the following year. ADF&G's Community Subsistence Information System (CSIS) also provides community-level summaries of subsistence harvest data collected through baseline (i.e., all species) and directed (i.e., resource-specific) survey projects. Information across various subsistence resources, including fish and marine mammals, are provided, including pounds harvested, household usage, and some information on sharing networks. For many communities in Alaska, the representative-year information in the CSIS may be decades old but still represents high quality subsistence harvest information for a point in time. Additional information on subsistence harvest of marine mammals is available from the US Fish and Wildlife Service and the Alaska Beluga Whaling Commission.

In addition to more systematic data about subsistence harvests by species and community, there are several information gaps that could benefit our understanding of subsistence users dependence on resources as well as adaptations to and impacts from changing management and resource conditions. Although there is some place-based information on the following information gaps, we do not have comprehensive information on: subsistence sharing patterns and networks, food security as it relates to subsistence use and the capacity of individuals to access substitute foods (in terms of quality, nutritional content, costs, etc.), the demographics of subsistence and personal use harvesters, and the cultural importance of subsistence activities. Other information like subsistence effort, catch, and distance traveled as well as the interaction of subsistence, commercial, and recreational fishing practices would be valuable for tracking dynamic effects of management changes. Subsistence harvest is directly linked to social capital and cultural sustainability and additional research is required to explore these questions in more depth.

## **10. Local and traditional knowledge and their incorporation into science and management**

Over the last several years, the Council and the SSC have consistently highlighted the need to broaden the pool of information utilized in the Council process to include citizen science, traditional ecological knowledge (TEK), and local ecological knowledge (LEK), shortened here as Local and traditional knowledge (LTK). There is a dedicated session during the May 2018 SSPT meeting to discussing potential sources of this information and how to translate it into the management process. In a recent grant proposal AFSC researchers have addressed the lack of LTK by initiating an LTK working group in partnership with tribal members and other expert resource users (this is part of the package of proposals from AFSC that the SSPT will be reviewing at the May 2018 meeting).

This section is only intended to highlight this as a critical gap area. There are various citizen science projects within NOAA and across the State of Alaska that examine localized or species-specific issues. The Local Environmental Observer (LEO) Network is a popular tool to

gather citizen science observations about anomalous events throughout Alaska and efforts are underway to develop an observation project specific to AFSC research priorities. Descriptions and classifications of observations posted on the LEO Network were included in the 2017 Ecosystem Status Reports for the Eastern Bering Sea and Gulf of Alaska.

Oral history projects also provide an important means of preserving and documenting underutilized knowledge. The University of Alaska Fairbanks' Project Jukebox provides a compendium of audio and video recordings (along with supporting materials) specific to various projects (e.g., about communities, climate change, Bristol Bay fisheries use) that may be relevant to fisheries use in Alaska. Also, NMFS' Voices of the Fisheries Project holds nearly a dozen oral histories from individual fishers in Alaska.

### **11. Alternative recreational opportunities**

In general, there is no comprehensive information on recreational fishing beyond the charter sector at the community-level, including recreational fishing expenditures, catch, and effort. Non-consumptive uses tied to fisheries or fish species (e.g., ecotourism or whale watching) are also not generally included in Council management considerations. Cruise tourism directly impacts subsistence fisheries and cultural sustainability. There have been informal reports of increased cruise and other shipping traffic, disrupting subsistence harvest, and overwhelming small rural communities.

The Alaska Visitor Statistics Program does provide a comprehensive survey of the tourism industry conducted every 5 years that includes demographics of visitors; visitor volume by region, trip purpose, origin; trip purpose and package; length of stay; satisfaction rating, etc. This survey could potentially be utilized to identify the contribution of recreational fishing among a multi-attribute visit to Alaska, if disaggregated information were made available by the State.

### **12. Seafood Inventories (cold storage holdings)**

Prior to 2002, NMFS collected and published cold storage holdings for a variety of fish and shellfish species for more than 50 years. The agency discontinued the collection of these data after December 31, 2002. These reports were intended to be a service to the fishing industry to aid business decisions for purchases, sales, and pricing and also serve as a tool to economic modelers to better understand seafood markets. The inventory and levels of production provide the true supply of a product on the market, which can be combined with consumption and price data to model the relationship between supply, demand, and prices.