

Research Priorities including 2017 SSC and Plan Team Recommendations

| Research ID | Title | Description | Council Priority | 2017 SSC Priority | 2017 Plan Team Priority | 2017 Research Status |
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| 144 | District-wide survey for demersal shelf rockfish in Southeast Alaska | Conduct a district-wide survey for demersal shelf rockfish in Southeast Alaska on a biennial or triennial basis. Survey information is becoming extremely dated. | C.O.M. | C.O.M. | GF: Important Crab: -- Scallop: -- | Partially underway |
| 145 | Continuation of State and Federal annual and biennial surveys | Continuation of State and Federal annual and biennial surveys in the GOA, AI, and EBS, including crab pot surveys, is a critical aspect of fishery management off Alaska. It is important to give priority to these surveys, in light of recent federal budgets in which funding may not be sufficient to conduct these surveys. Loss of funding for days at sea for NOAA ships jeopardizes these programs. Budgetary concerns have resulted in cuts to not only days at sea, which increases uncertainty, but also sampling the deepest strata, which threatens the value of trawl surveys as a synoptic ecological survey. These surveys provide baseline distribution, abundance, and life history data that form the foundation for stock assessments and the development of ecosystem approaches to management. Although an ongoing need, these surveys are considered the highest priority research activity, contributing to assessment of commercial groundfish and crab fisheries off Alaska. | C.O.M. | C.O.M. | GF: C.O.M. Crab C.O.M. Scallop: -- | Underway |
| 146 | Improve surveys in untrawlable habitat, particularly for rockfish, Atka mackerel, and sculpins | For groundfish in general, and rockfish and Atka mackerel in particular, continue and expand research on trawlable and untrawlable habitat to improve resource assessment surveys. For example, improved surveys, such as hydro-acoustic surveys, are needed to better assess pelagic rockfish species that are found in untrawlable habitat or are semi-pelagic species such as northern and dusky rockfish. A number of publications specific to untrawlable grounds and rockfish sampling have been published recently, but have not been incorporated directly into routine stock assessment routine survey designs. | Urgent | Urgent | GF: Important Crab: -- Scallop: -- | Underway |
| 147 | Life history research on data poor or non-recovering crab stocks | Why certain stocks have declined and failed to recover as anticipated is a pressing issue (e.g., Pribilof Island blue king crab, Adak red king crab). Research into all life history components, including predation by groundfish on juvenile crab in nearshore areas, is needed to identify population bottlenecks, an aspect that is critically needed to develop and implement rebuilding plans. | Important | Important | GF: -- Crab Important Scallop: -- | Partially underway |
| 148 | Spatial distribution and movement of crabs relative to life history events and fishing | There is a need to characterize the spatial distribution and movement of crab stocks. For example, information is needed to understand the distribution of male/female snow crab at time of mating, a better understanding of spatial stock dynamics and population connectivity for Tanner Crab east and west of 166, and to understand the distribution and movement of golden king crab in the Aleutian Islands in areas historically fished and not fished. There is a need to characterize the spatial distribution of male snow crab at time of mating relative to reproductive output of females in the middle domain of the EBS shelf. Additionally there is a need to investigate spatial stock dynamics and population connectivity for Tanner Crab (2 stocks). | Urgent | Important | GF: -- Crab Urgent Scallop: -- | Partially underway |
| 149 | Improve handling mortality rate estimates for crab | Continue to improve estimate of discarded crab handling mortality rate for crab species. Empirical data exist for snow and Tanner so new handling mortality data are needed for king crab by size, sex, and fishery type with consideration of temperature. This will require improving understanding of the post-release mortality rate of discarded crab from directed and non-directed crab pot fisheries and principal groundfish (trawl, pot, and hook and line) fisheries. The magnitude of post-release mortality is an essential parameter in the determination of the overfishing level used to evaluate overfishing in stock assessment and projection modeling. Current priorities are to assess handling mortality in long-line fisheries and for long term mortality studies. | Important | Important | GF: -- Crab Strategic Scallop: -- | Partially underway |

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| 150 | Maintain the core biological and oceanographic data (e.g., biophysical moorings, stomach data, zooplankton, age 0 surveys, benthic production) necessary to support stock assessments and integrated ecosystem assessments | Maintain the core data and process studies needed to support integrated ecosystem assessments. Core data include inputs for single- or multi-species management strategy evaluations, food web, and coupled biophysical end-to-end ecosystem models (e.g. biophysical moorings, stomach data, zooplankton, age 0 surveys (i.e. BASIS surveys), benthic production). Develop and maintain indices of sea ice formation, sea ice retreat, and timing/extent of the spring bloom for the EBS. For this, maintenance of moorings, especially M-2, is essential. If recent changes in ice cover and temperatures in the Bering Sea persist, these may have profound effects on marine communities. | C.O.M. | C.O.M. | GF: Urgent Crab Important Scallop: -- | Underway |
| 151 | Develop a spatially-explicit model for BSAI pollock | Conduct studies to determine stock structure and potential spatial management for BSAI pollock (e.g., movement). Evaluate interactions of BSAI pollock with those in Russian waters. These studies should lead to a detailed spatial age-structured stock assessment model with at least 3 regions (Russia, NW EBS, SE EBS). | Important | Important | GF: Important Crab: -- Scallop: -- | Underway |
| 153 | Study vertical distribution of Pacific cod to better understand catchability | Research is needed on the vertical distribution of Pacific cod relative to the EBS bottom trawl and comparisons of gear between the EBS and GOA trawl gear. This is because there is controversy about fishery and survey catchability. | Important | Important | GF: Important Crab: -- Scallop: -- | Underway |
| 154 | Pacific cod stock assessment for the Aleutian Islands | Develop an age-structured Pacific cod stock assessment for the Aleutian Islands region. In 2014 the Aleutian Islands and eastern Bering Sea regions were split and have separate ABCs and OFLs. There is need to develop an assessment model for cod in the Aleutians. | Urgent | Urgent | GF: Important Crab: -- Scallop: -- | Underway |
| 155 | Evaluation of salmon PSC mitigation measures | Develop a research program that will facilitate evaluation of salmon (both Chinook and non-Chinook) PSC mitigation measures in the BSAI and GOA. This includes updated estimates of the amounts reasonably necessary for subsistence, timing of runs and openings relative to subsistence requirements, and access to cost data for the commercial pollock and salmon industries so that impacts on profits (not gross revenues) can be calculated. | Urgent | Urgent | GF: Urgent Crab: -- Scallop: -- | Underway |
| 156 | Improve knowledge for salmon PSC impact assessment | Improve the resolution of Chinook and chum salmon genetic stock identification methods (e.g., baseline development, marker development), improve precision of salmon run size estimates in western Alaska, and initiate investigations of biotic and abiotic factors influencing natural mortality rate during ocean migration in the GOA and BSAI. Baseline development is nearing completion, but more work on Cook Inlet chum is needed. | Urgent | Urgent | GF: Urgent Crab: -- Scallop: -- | Underway |
| 157 | Improve methods of monitoring fishery interactions | Develop improved catch monitoring methods of fishery interactions including direct and alternative options (e.g., electronic logbooks, video monitoring), particularly on smaller groundfish, halibut, and commercially guided recreational fishing vessels, including an assessment of feasibility for small vessels. | Urgent | Urgent | GF: Urgent Crab: -- Scallop: -- | Underway |
| 158 | Research ecosystem indicators and their thresholds for inclusion in ecosystem-level management strategy evaluation. | Initiate/continue research on the synthesis of ecosystem indicators, developing and evaluating thresholds for ecosystem indicators, and ecosystem-level management strategy evaluation. | Important | Important | GF: Important Crab Strategic Scallop: -- | Partially underway |

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| 159 | Evaluate interactions between fisheries and pinnipeds | Studies of the interactions between fisheries and protected species, such as Steller sea lions in the Central and Western Aleutian Islands (areas 541, 542, 543), and northern fur seals on the eastern Bering Sea shelf are needed. These studies should be conducted at appropriate spatial and temporal scales with an emphasis on seasonal prey fields, diet, and movement of fisheries and pinnipeds. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | Underway |
| 160 | Assess vital rates of Steller sea lions | Assess vital rates (i.e., reproduction and survival) of Steller sea lions in the western DPS (including Russia) at sufficient frequency to track population dynamics. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | Underway |
| 161 | Assess the health of Stellar sea lions | Assess possible indirect effects of fisheries removals via periodic health assessments, indices of body condition, survival of pups and juveniles, and natality of Steller sea lions in the western DPS. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | Underway |
| 162 | Quantify killer whale predation of Steller sea lions (M) | Quantify killer whale predation of Steller sea lions, particularly in the western and central Aleutian Islands. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | Underway |
| 163 | Conduct routine fish, crab, and oceanographic surveys in the northern Bering Sea and Arctic Ocean | Dynamic ecosystem and environmental changes in the northern Bering Sea and Arctic are occurring. Assessment of the current baseline conditions and trophic interactions is important. This effort should not supplant the regular surveys in the BSAI and GOA, which are of critical importance to science and management. | Urgent | C.O.M. | GF: Important Crab Important Scallop: -- | Partially underway |
| 164 | Effects of trawling on female red king crab and subsequent recruitment | Research is needed on the effects of trawling on the distribution of breeding and ovigerous female red king crab and subsequent recruitment. Relevant studies include 1) assessing the efficacy of the current Red King Crab Savings Area Boundaries, and 2) assessing effects of potential habitat modifications on the distribution of females, particularly in nearshore areas of southwest Bristol Bay, and environmental effects (e.g., trawling overlap in warm vs. cold years), 3) quantification of unobserved mortality (e.g. pelagic trawl gear contacting bottom). Retrospective studies, the identification of larval release locations, and larval advection using Regional Ocean Modeling System would help address this need. | Important | Important | GF: -- Crab Important Scallop: -- | Underway |
| 165 | Conduct routine surveys of subsistence in the northern Bering Sea and Arctic Ocean | Conduct routine surveys of subsistence use of marine resources in the northern Bering Sea and Arctic Ocean. These surveys will become increasingly important under ongoing warming ocean temperatures because range expansions of harvested fishery resources may occur. If range expansions or shifts occur, data will be needed to adjust standard survey time series for availability. | Urgent | C.O.M. | GF: Important Crab Strategic Scallop: -- | Partially underway |
| 166 | Estimate scallop stock abundance | Estimate scallop stock abundance in unsurveyed areas using fishery independent methods including analysis of current camera sled data. | Urgent | Urgent | GF: -- Crab: -- Scallop: Strategic | Partially underway |
| 167 | Alternative approaches to acquire fishery-independent abundance data for for unsurveyed stocks of golden king crab | Explore alternative approaches to acquire fishery-independent abundance data on stock distribution and recruitment of unsurveyed crab stocks (e.g., Aleutian Islands golden king crab, cooperative research efforts with Industry). | Urgent | Urgent | GF: -- Crab Urgent Scallop: -- | Partially underway |

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| 169 | Studies on factors that affect catchability particularly for King and Tanner crab | For groundfish and crabs, studies are needed on factors that affect catchability, as they directly bear on estimates of the stock assessment. Research to refine the estimates of survey catchability, q, used to infer absolute, rather than relative, abundance would substantially improve the quality of management advice. Particular emphasis should be placed on Tanner crab and Red King Crab because of recent trends in stock status, and on fishery and for Aleutian Island golden king crab to improve the stock assessment model. | Important | Important | GF: -- Crab Important Scallop: -- | Underway |
| 170 | Quantitative reproductive index for the surveyed BSAI crab stocks | Advance research towards developing a quantitative reproductive index for BSAI crab stocks. Research on mating, fecundity, fertilization rates, and, for snow and Tanner crab, sperm reserves and biennial spawning, is needed to develop annual indices of fertilized egg production that can be incorporated into the stock assessment process and to model the effects of sex ratios, stock distribution, and environmental change on stock productivity. Priority stocks for study are eastern Bering Sea snow and Tanner crab and Bristol Bay red king crab. | Urgent | Urgent | GF: -- Crab Important Scallop: -- | Underway |
| 171 | Acquire basic life history information (e.g., natural mortality, growth, size at maturity) for data-poor stocks | Basic life history information is needed for stock assessment and management of data-poor stocks, such as scallops, sharks, skates, sculpins, octopus, grenadiers, squid, and blue king crab (Bering Sea), golden king crabs (Aleutian Islands), and red king crab (Norton Sound). Specifically, information is needed on natural mortality, growth rates, size at maturity, and other basic indicators of stock production/productivity. | Urgent | Urgent | GF: Important Crab: -- Scallop: Important | Partially underway |
| 172 | Develop and validate aging methods for crabs. | Develop and validate aging methods for crabs to improve estimates of M for stock assessments. | Urgent | Urgent | GF: -- Crab Important Scallop: -- | Underway |
| 173 | Expand studies to identify stock and management boundaries | To identify and refine stock boundaries and understand source/sink dynamics (e.g., scallop metapopulations). Conduct studies to evaluate all crab stock boundaries relative to management boundaries (e.g., Bristol Bay red king crab, Adak red king crab, Aleutian Island golden king crab, EBS Tanner crab, Pribilof blue king crab). Expanded studies are needed in the areas of genetics, mark-recapture, reproductive biology, larval distribution, and advection. Such boundaries are to be evaluated so that the risks and consequences of management actions are clear. | Urgent | Urgent | GF: -- Crab: -- Scallop: Urgent | Partially underway |
| 174 | Develop spatially explicit stock assessment models | Develop spatially explicit stock assessment models. High priority species for spatially explicit models include: walleye pollock, snow and Tanner crab, Pacific cod, sablefish, yellowfin sole, rock sole, arrowtooth flounder, Pacific ocean perch, black spotted rockfish, rougheye rockfish, and Atka mackerel. | Urgent | Urgent | GF: Important Crab Important Scallop: -- | Partially underway |
| 175 | Develop age-structured models for scallop assessment | Age structured models for scallops are needed to increase understanding of population dynamics and harvestable surpluses. | Strategic | Strategic | GF: -- Crab: -- Scallop: Important | Partially underway |

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| 176 | Refine methods to incorporate uncertainty into harvest strategies for groundfish | Refine P* and decision theoretic methods to incorporate uncertainty into harvest strategies for groundfish for ACL estimation. Continue existing management strategy evaluations at the stock level. | Urgent | Urgent | GF: Important Crab: -- Scallop: -- | Underway |
| 177 | Conduct prospective and retrospective analyses of changes in the spatial and temporal distribution of fishing effort in response to management change | Conduct prospective and retrospective analyses of changes in the spatial and temporal distribution of fishing effort, in response to management actions (e.g., time/area closures, marine reserves, PSC and other bycatch restrictions, co-ops, IFQs, multi-target crab fisheries) and environmental changes. | Strategic | Strategic | GF: Strategic Crab Strategic Scallop: -- | Partially underway |
| 178 | Develop a framework for collection of economic information | Develop a framework for the collection of economic information on commercial, recreational, and charter fishing, as well as fish processing, to meet the requirements of the MSFCMA sections 303(a)(5, 9, 13), 303(b)(6), and 303A. | Urgent | Urgent | GF: Urgent Crab Urgent Scallop: -- | Partially underway |
| 179 | Conduct pre- and post-implementation studies of the benefits and costs, and their distribution, associated with dedicated access privileges | Conduct pre- and post-implementation studies of the benefits and costs, and their distribution, associated with changes in management regimes (e.g., changes in product markets, characteristics of quota share markets, changes in distribution of ownership, changes in crew compensation) as a consequence of the introduction of dedicated access privileges in the halibut/sablefish, AFA pollock, and crab fisheries. Benefits and costs include both economic and social dimensions. | Urgent | Urgent | GF: Urgent Crab Important Scallop: -- | Partially underway |
| 180 | Economic, social, and cultural valuation research on protected species | Economic, social, and cultural valuation research on protected species is needed (i.e., non-market consumptive use, passive use, non-consumptive use). | Important | Important | GF: -- Crab: -- Scallop: -- | Underway |
| 182 | Evaluate current and alternative Council PSC/bycatch reduction initiatives | Analyze the effects of recent Council actions on PSC and bycatch, including the interaction among PSC and bycatch reduction initiatives (e.g., halibut, salmon, crab). Attention should be given to different incentives that have the potential to cost-effectively reduce PSC. | Important | Important | GF: Urgent Crab: -- Scallop: -- | Partially underway |
| 183 | Research the role of habitat in population dynamics and ecosystem processes | Research is needed on the role of habitat in population dynamics and ecosystem processes. Specifically, studies are needed to evaluate how habitat-forming species (e.g., corals) influence life history parameters (e.g., mortality, growth, movement) of FMP species and their preferred prey. Such research will identify key habitats (including essential fish habitat and habitat areas of particular concern), improve the design and management of marine protected areas, and ultimately improve stock assessments and restoration efforts. | Important | Important | GF: Important Crab Strategic Scallop: -- | Partially underway |
| 184 | Evaluate efficacy of habitat closure areas and habitat recovery | Establish a scientific research and monitoring program to understand the degree to which impacts on habitat, benthic infauna, etc., have been reduced within habitat closure areas, and to understand how benthic habitat recovery of key species is occurring (e.g., Red King Crab Savings Area efficacy and Pribilof Island Habitat Conservation Area). (This is an objective of EFH research approach for the Council FMPs). | Important | Important | GF: Strategic Crab Important Scallop: -- | Partially underway |

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| 186 | Collect and maintain zooplankton and meroplankton biomass and community composition time series | Collect and maintain zooplankton and meroplankton biomass and community composition time series in the eastern Bering Sea. Develop, collect and maintain time series of zooplankton biomass and community composition for the GOA, AI, Arctic. | C.O.M. | C.O.M. | GF: Urgent Crab Strategic Scallop: -- | Partially underway |
| 187 | Maintain indicator-based ecosystem assessment for EBS. | Maintain indicator-based ecosystem assessment for EBS. | Important | Important | GF: Urgent Crab: -- Scallop: -- | Underway |
| 188 | Develop indicator-based ecosystem assessments for AI (in progress), GOA, Arctic. | Develop indicator-based ecosystem assessments for AI (in progress), GOA, and the Arctic. | Important | Important | GF: Urgent Crab: -- Scallop: -- | Partially underway |
| 189 | Develop stock-specific ecosystem indicators and incorporate into stock assessments | Develop stock-specific ecosystem indicators and incorporate into stock assessments. (in progress) | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |
| 190 | Collect and maintain time series of ocean pH | Collect and maintain time series of ocean pH in the major water masses off Alaska to improve understanding of ocean acidification and its effects on managed species, upper level predators and lower trophic levels | C.O.M. | C.O.M. | GF: Important Crab C.O.M. Scallop: -- | Partially underway |
| 191 | Assess whether changes in pH and temperature would affect managed species, upper level predators, and lower trophic levels. | Assess whether changes in pH and temperature would affect managed species, upper level predators, and lower trophic levels. Laboratory studies are needed to assess the synergistic effects of ocean acidification and changes in temperature on productivity of marine species. | Strategic | Strategic | GF: Strategic Crab Important Scallop: -- | Partially underway |
| 192 | Collect, analyze, and monitor diet information | Collect, analyze, and monitor diet information (species, biomass, energetics), from seasons in addition to summer, to assess spatial and temporal changes in predator-prey interactions, including marine mammals and seabirds. The diet information should be collected on the appropriate spatial scales for key predators and prey to determine how food webs may be changing in response to shifts in the range of crab and groundfish. | Important | C.O.M. | GF: Important Crab: -- Scallop: -- | Underway |
| 193 | Improve species identification | Improve species identification, by both processors and observers, for priority species within species complexes in catches, to meet requirements of total removals under ACLs. Methods that quantify and correct for misidentifications are desired. | Strategic | Strategic | GF: Important Crab: -- Scallop: -- | Completed |
| 194 | Identification and integration of archived data | Identification and recovery of archived data (e.g., historical agency groundfish and shellfish surveys, and fishery data) should be pursued. Investigate integrating these data into stock and ecosystem assessments. Some archival acoustic data have been cataloged, and most trawl surveys have been included in databases. Some one-time research surveys remain neglected. | Strategic | Strategic | GF: Strategic Crab Strategic Scallop: -- | Partially underway |

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| 196 | Evaluate hybridization of snow and Tanner crabs. | The presence of hybrids complicates the assessment and management of EBS snow and Tanner crab stocks. Genetics research is needed to better understand the abundance of hybrids relative to pure snow and Tanner crabs. Other needed research includes assessing temporal shifts in hybrid crab spatial distribution, the geospatial overlap with snow and Tanner crabs, the directionality of hybrid mating dynamics, and the extent of first generation crosses and backcrosses. To evaluate management implications, a two-species spatial population model should be developed that captures the essential features of the population dynamics, including hybridization. Alternative management approaches should be evaluated. | Strategic | Strategic | GF: -- Crab Important Scallop: -- | Partially underway |
| 197 | Develop methodologies to monitor for new/emerging diseases and/or parasites among exploited species and higher trophic levels | Develop methodologies to monitor for new/emerging diseases and/or parasites among exploited species and higher trophic levels. | Urgent | Urgent | GF: Strategic Crab Strategic Scallop: -- | Partially underway |
| 198 | Initiate and expand non-market valuation research of habitat, ecosystem services, and passive use considerations | Initiate and expand non-market valuation research of habitat, ecosystem services, and passive use considerations. | Strategic | Strategic | GF: Strategic Crab: -- Scallop: -- | No action |
| 200 | Monitor contaminant flux and loads in lower and higher trophic levels, and assess potential for impact on vital rates. | Monitor contaminant flux and loads in lower and higher trophic levels, and assess potential for impact on vital rates. Laboratory studies are needed to assess the effects of oil dispersants on the productivity of marine species. | Strategic | Strategic | GF: Strategic Crab: -- Scallop: -- | No action |
| 202 | Methods for reliable estimation of total removals | Develop methods for reliable estimation of total removals (e.g., surveys, poorly observed fisheries) to meet requirements of total removals under ACLs. Catch Accounting System now provides total removals annually. Improved reporting on some data such as subsistence catches and Pacific cod bait in crab fisheries is needed. Improvements are needed for in-season catch accounting by sex and size for crab in non-directed fisheries with high bycatch or PSC rates, particularly for blue king crab in the Pacific cod pot fishery in the Pribilof Islands. | Urgent | Urgent | GF: Important Crab: -- Scallop: -- | Partially underway |
| 203 | Improve discard mortality rate estimates for scallops | Field and laboratory studies are needed to estimate Alaskan scallop discard mortality by evaluating relationship between capture, release condition and deck time, and subsequent survival. | Urgent | Urgent | GF: -- Crab: -- Scallop: Urgent | Partially underway |
| 204 | Tagging studies of Aleutian Islands Pacific cod and Atka mackerel | Tagging studies of Aleutian Islands Pacific cod, Atka mackerel, Alaska skate, and walleye pollock are needed to create models of short-term movement of fish relative to critical habitat (tagging for Atka mackerel and skates are partly underway). | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |
| 205 | Age determination methods for Pacific cod, Pacific sleeper sharks, and spiny dogfish | Studies are needed to validate and improve age determination methods for Pacific cod, Pacific sleeper sharks, and spiny dogfish. Conventional tagging studies of young of the year and/or one-year old Pacific cod would be useful in this regard (partially underway for cod and dogfish). | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |

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| 206 | Biomass indices and alternate methodologies for lowest tier groundfish species | Develop biomass indices for lowest tier species (Tier 6 for groundfish), such as sharks and octopus. Explore alternative methodologies for Tier 6 stocks such as length-based methods, catchability experiments (e.g., net selectivity), or biomass dynamics models. | Important | Important | GF: Strategic Crab: -- Scallop: -- | Partially underway |
| 207 | Collect and analyze fishery effort and observer data for scallops | Collect and analyze fishery effort and observer data for scallops. Standardize CPUE data to correct for factors contributing to variable CPUE. | Urgent | C.O.M. | GF: -- Crab: -- Scallop: Urgent | Underway |
| 208 | Research on stock- recruit relationships | New information and data are needed that would inform our understanding of the stock- recruit relationship for groundfish, Pacific halibut, and crab to project year-class strength. | Urgent | Urgent | GF: -- Crab Strategic Scallop: -- | Underway |
| 209 | Continue to collect guided angler sector data for the halibut fishery | Continue to collect the guided angler sector data for the halibut fishery. Continue to explore factors that affect angler demand and trip supply. (note the IPHC collects unguided angler sector data) | Important | C.O.M. | GF: Strategic Crab: -- Scallop: -- | Underway |
| 210 | Develop bioeconomic models | Develop bioeconomic models with explicit age- or size-structured population dynamics for BSAI and GOA groundfish fisheries to estimate maximum economic yield and other bioeconomic reference points under uncertainty. | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |
| 211 | Benefits and costs of directed halibut catch and halibut PSC utilization | Research the benefits and costs of directed halibut catch and halibut PSC utilization in different fishing sectors. For halibut and other PSC and bycatch species, conduct research to better identify where regulations restrict the utilization of fish from its most beneficial use and evaluate how changes in existing regulations would affect different sectors and fisheries. | Urgent | Urgent | GF: Urgent Crab: -- Scallop: -- | Underway |
| 212 | Develop methods to estimate sea lion abundance | Develop new methods to estimate sea lion abundance, such as the use of unmanned aerial vehicles which could increase the probability of acquiring abundance estimates in remote areas. | Important | Important | GF: -- Crab: -- Scallop: -- | Underway |
| 213 | Assess the impact of the displacement of the groundfish fleet on Northern fur seals | Assess the impact of the displacement of the groundfish fleet due to Steller sea lion protection measures on the prey availability, foraging ecology diet, movements and vital rates for Northern fur seals. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | Partially underway |
| 214 | Evaluate the impact of seabird bycatch in fisheries on bird populations, and methods to reduce | Assess the extent and impact of seabird bycatch in fisheries on bird populations, and develop methods to reduce seabird bycatch, particularly protected species, such as short-tailed albatross. | Important | Important | GF: -- Crab: -- Scallop: -- | Underway |
| 215 | Determine potential impacts of fishing activities on marine mammals | Determine potential impacts of fishing activities on marine mammals (e.g., state managed gillnet fisheries), and in particular on North Pacific right whales and the Eastern North Pacific blue whales, particularly in identified critical (NPRW) or essential (NPBW) habitat. | Strategic | Strategic | GF: -- Crab: -- Scallop: -- | No action |

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| 216 | Assess whether Bering Sea canyons are habitats of particular concern | Assess whether Bering Sea canyons are habitats of particular concern by assessing the distribution and prevalence of coral and sponge habitat, and comparing marine communities within and above the canyon areas, including a comparison of mid-level and apex predators to neighboring shelf/slope ecosystems. | Important | Important | GF: Strategic Crab: -- Scallop: -- | Partially underway |
| 217 | Impact of fisheries on benthic habitat and trophic interactions | Conduct studies to assess the impact of bottom trawl fisheries on invertebrate abundance and species composition in benthic habitats. This is especially relevant to Bristol Bay red king crab, and also the foraging ecology of walrus (candidate species for listing under ESA), but also bearded seals, and gray whales. | Urgent | Urgent | GF: Important Crab: -- Important Scallop: -- | Underway |
| 218 | Survey capability for forage fish | Develop a long-term survey capability for forage fish (partially underway). The NPRB funded GOA and Bering Sea projects are currently describing the spatial and temporal variability in the structure of forage fish communities and the effect of this variability on predators. This work should be continued and methods for long-term monitoring should be developed. | C.O.M. | C.O.M. | GF: Important Crab: -- Scallop: -- | Partially underway |
| 219 | Monitor skate egg case concentrations every 2 to 3 years using non-invasive research design, such as in situ observation | Skate egg case concentrations should be monitored every 2 to 3 years using non-invasive research design, such as in situ observation. | Important | Important | GF: Strategic Crab: -- Scallop: -- | No action |
| 220 | Research on survey analysis techniques for species that exhibit patchy distributions | Continue research on the design and implementation of appropriate survey analysis techniques, to aid the Council in assessing species (e.g., Pribilof Island king crabs and rockfish) that exhibit patchy distributions and, thus, may not be adequately represented (either over- or under-estimated) in the annual or biennial groundfish surveys. | Important | Important | GF: Important Crab Important Scallop: -- | Underway |
| 221 | Collect maturity scans during fisheries that target spawning fish | Expand existing efforts to collect maturity scans during fisheries that target spawning fish (e.g., pollock). Time series of maturity at age should be collected to facilitate the assessment of the effects of density-dependence and environmental conditions on maturity. Maturity information for pollock and Pacific cod is collected by observers and should be analyzed. Maturity information for rockfish species near Kodiak has been collected recently, both during the fishery and dedicated scientific cruises, and should be analyzed. A dedicated survey to examine spawning sablefish has also been conducted. Efforts to collect maturity data, and then analyze for rockfish and other species should continue. In particular, retrospective studies to identify factors (e.g., fishing, climate, prey quality and quantity) influencing the maturity schedule should be conducted. | Strategic | Strategic | GF: Strategic Crab: -- Scallop: -- | Partially underway |
| 222 | Improve estimates of natural mortality (M) for Pacific cod. | Improve estimates of natural mortality (M) for several stocks, including Pacific cod. | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |
| 223 | Develop and evaluate global climate change models (GCM) or downscaled climate variability scenarios to assess impacts to recruitment, growth, and spatial distributions. | Quantify the effects of historical climate variability and climate change on recruitment, growth, and spatial distribution. Develop standard environmental scenarios (e.g., from GCMs) for present and future variability based on observed patterns. | Strategic | Strategic | GF: Strategic Crab Strategic Scallop: Important | Partially underway |
| 224 | Climate and oceanographic information covering a wider range of seasons | There is a need for climate and oceanographic information that covers a wider range of seasons than is presently available. | Strategic | Strategic | GF: Strategic Crab Strategic Scallop: Strategic | Partially underway |

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| 225 | Development of projection models to evaluate (a) the robustness and resilience of different management strategies under varying environmental and ecological conditions and (b) to forecast seasonal an | There is a need for the development of projection models to evaluate the robustness and resilience of different management strategies under varying environmental and ecological conditions. Projection models are also needed to forecast seasonal and climate related shifts in the spatial distribution and abundance of commercial fish and shellfish. | Strategic | Strategic | GF: Strategic Crab Strategic Scallop: -- | Partially underway |
| 226 | Monitor the economic effects from fishery policy changes on coastal communities. | Monitor the socio-economic effects from fishery policy changes on coastal communities. This includes understanding socio-economic impacts (both direct and indirect) and how the impacts are distributed among communities and economic sectors. | C.O.M. | C.O.M. | GF: C.O.M. Crab Important Scallop: -- | Partially underway |
| 227 | Improve estimation of fishery interactions with non-target groundfish, and prohibited species. | Improve estimation of fishery interactions (including catch) and non-target groundfish (e.g., sharks, skates), and prohibited species. | Urgent | Urgent | GF: Urgent Crab: -- Scallop: -- | Underway |
| 228 | Monitor subsistence harvest (patterns, norms, quantities) in communities affected by Council actions. | Monitor the subsistence harvest patterns, norms and quantities in communities that depend upon resources that may be affected by Council action. | Important | C.O.M. | GF: Important Crab: -- Scallop: -- | Partially underway |
| 229 | Evaluate the effectiveness of setting ABC and OFL levels for data-poor crab stocks | Evaluate the effectiveness (e.g., potential for overharvest or unnecessarily limiting other fisheries) of setting ABC and OFL levels for data-poor stocks (Tiers 4 and 5 for crab). | Urgent | Urgent | GF: -- Crab: Strategic Scallop: -- | Completed |
| 230 | Examine social and economic interactions between coastal communities and commercial and recreational fisheries | Examine social and economic interactions between coastal communities and commercial and recreational fisheries (e.g. subsistence-commercial linkages, adaptations to changes in resource use, economic opportunities for coastal communities). | Important | Important | GF: Important Crab: -- Scallop: -- | Underway |
| 231 | Retrospective analysis of the impact of Chinook salmon PSC avoidance measures on the BSAI pollock fishery | Conduct retrospective analyses to assess the impact of Chinook salmon PSC avoidance measures on the BSAI pollock fishery. Analyses should include an evaluation of the magnitude and distribution of economic effects of salmon avoidance measures for the Bering Sea pollock fishery. In this case, it is important to understand how pollock harvesters have adapted their behavior to avoid bycatch of Chinook and other salmon, under various economic and environmental conditions and incentive mechanisms. | Important | Important | GF: Urgent Crab: -- Scallop: -- | Partially underway |
| 232 | Develop management strategy evaluations that incorporate changing climate and market economic conditions. | Develop management strategy evaluations under differing assumptions regarding climate and economic conditions. Promote the standardization of future scenarios from different models to promote comparability of model outputs. | Urgent | Urgent | GF: Important Crab Important Scallop: -- | Underway |
| 233 | Develop an ongoing database of product inventories | Development of an ongoing database of product inventories (and trade volume and prices) for principal shellfish, groundfish, Pacific halibut, and salmon harvested by U.S. fisheries in the North Pacific and eastern Bering Sea. | Strategic | Strategic | GF: Strategic Crab Strategic Scallop: -- | No action |
| 234 | Analyze current determinants of demand for principal seafood products | Analyze current determinants of ex vessel, wholesale, international, and retail demand for principal seafood products from the GOA and BSAI. | Strategic | Strategic | GF: Strategic Crab Strategic Scallop: -- | Partially underway |
| 235 | Investigate gear modifications and changes in fishing practices to reduce bycatch and PSC | Gear modifications and changes in fishing practices to reduce bycatch and PSC are needed. | Urgent | Urgent | GF: Urgent Crab Urgent Scallop: -- | Partially underway |
| 236 | Conduct studies of sperm whale and killer whale depredation of catch in long-line fisheries and surveys | Studies of sperm and killer whale depredation of catch in long-line fisheries and surveys are needed to improve the quality of long-line abundance estimates. | Important | Important | GF: Important Crab: -- Scallop: -- | Underway |

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| 237 | Improved habitat maps | Improved habitat maps (especially benthic habitats) are required to identify essential fish habitat and distributions of various substrates and habitat types, including habitat-forming biota, infauna, and epifauna in the GOA, BS, and Aleutian Islands. | Important | Important | GF: Strategic Crab Strategic Scallop: -- | Underway |
| 238 | Develop a GIS relational database for habitat, to include a historical time series of the spatial intensity of interactions between commercial fisheries and habitat. | Develop a GIS relational database for habitat, including development of a historical time series of the spatial intensity of interactions between commercial fisheries and habitat. Such time series are needed to evaluate the impacts of changes in fishing effort and type on EFH. | Strategic | Strategic | GF: -- Crab Strategic Scallop: -- | Underway |
| 239 | Assess the extent of the distribution of corals | Assess the extent of the spatial distribution of corals and conduct routine monitoring of these areas. | Urgent | Urgent | GF: Strategic Crab: -- Scallop: -- | Partially underway |
| 240 | Develop a multivariate index of the climate forcing of the Bering Sea shelf | Develop a multivariate index of the climate forcing of the Bering Sea shelf . Three biologically significant avenues for climate index predictions include advection, setup for primary production, and partitioning of habitat with oceanographic fronts and temperature preferences. | Important | Important | GF: Important Crab Important Scallop: -- | Partially underway |
| 241 | Develop bottom and water column temperature database and indices | Develop bottom and water column temperature database and indices for use in EBS, GOA, and AI stock assessments. | Important | Important | GF: Important Crab C.O.M. Scallop: -- | Partially underway |
| 242 | Collect and maintain primary production time series | Collect and maintain primary production time series in the EBS, AI, GOA, and Arctic; particularly in relationship to key climate and oceanographic variables. | Strategic | Strategic | GF: Important Crab Strategic Scallop: -- | Partially underway |
| 244 | Collect and maintain time-series data on the community composition, production and biomass of benthic invertebrate and vertebrate fauna | Collect and maintain time-series data on the community composition, production and biomass of benthic invertebrate and vertebrate fauna. | Strategic | Strategic | GF: Strategic Crab: -- Scallop: -- | Partially underway |
| 245 | Assess the impact of increases in recovering whale populations on lower trophic level energy pathways | Assess the impact of increases in recovering whale populations (e.g., gray, humpback and fin) on lower trophic level energy pathways. | Important | Important | GF: Strategic Crab: -- Scallop: -- | No action |
| 246 | Cooperative research efforts to supplement existing at-sea surveys that provide seasonal, species-specific information on upper trophic levels | Continue and expand cooperative research efforts to supplement existing at-sea surveys that provide seasonal, species-specific information on upper trophic levels (seabirds and marine mammals). Updated surveys to monitor distribution and abundance of seabirds and marine mammals are needed to assess impacts of fisheries on apex predators, improve the usefulness of apex predators as ecosystem indicators, and to improve ecosystem management. | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |
| 247 | Assess the relative importance of non-commercially exploited species to human communities | Assess the relative importance of non-commercially exploited species (invertebrates, fish, marine mammals, and seabirds) to human communities, particularly in Arctic. | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |

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| 248 | Measure and monitor large scale fish composition | Measure and monitor large scale fish composition: evaluate existing data sets (bottom trawl surveys, acoustic trawl surveys, and BASIS surveys) to quantify changes in relative species composition of commercial and non-commercial species, identify and map assemblages, monitor changes in the distribution of assemblages, and understand the spatial importance of predator-prey interactions in response to environmental variability. Additional monitoring may be necessary in the Aleutian Islands, northern Bering Sea, and areas of the Gulf of Alaska. | Strategic | Strategic | GF: Strategic Crab: -- Scallop: -- | Underway |
| 249 | Monitor the movement of Steller sea lions and northern fur seals | Monitor the movement of Steller sea lions and northern fur seals in response to environmental variability to understand the spatial changes of predator-prey interactions. | Urgent | C.O.M. | GF: -- Crab: -- Scallop: -- | Partially underway |
| 250 | Conduct ecosystem structure studies | Studies are needed to evaluate the effects of global warming, ocean acidification, and selective fishing on food webs. For instance, studies are needed to evaluate differential exploitation of some components of the ecosystem (e.g., Pacific cod, pollock, and crab) relative to others (e.g., arrowtooth flounder). | Important | Important | GF: -- Crab: Strategic Scallop: -- | Partially underway |
| 251 | Modeling studies of ecosystem productivity | Modeling studies of ecosystem productivity in different regions (EBS, GOA, and AI). For example, studies could evaluate the appropriateness of the 2 million t OY cap. | Important | Important | GF: Important Crab: Important Scallop: Strategic | Underway |
| 361 | Effects of Ocean Acidification on Scallops | Laboratory studies are needed to understand the mineralization of scallop shells through their life cycle and under current spatial variability and future scenarios of ocean acidification. | Strategic | Strategic | GF: -- Crab: -- Scallop: Urgent | No action |
| 362 | Monitoring potential water quality impacts | Seasonal water quality monitoring in known scallop areas are needed to determine whether conditions are detrimental to scallop growth and survival. | Important | Important | GF: -- Crab: -- Scallop: Important | No action |
| 363 | Area-specific variability in scallop population processes | Investigate area-specific variability in vital population processes including growth, recruitment, natural mortality and movement including mark-recapture tagging studies. Bed-specific growth could be analyzed from archived shells. | Important | Important | GF: -- Crab: -- Scallop: Important | Partially underway |
| 364 | Updated sperm whale stock assessment | Updated sperm whale abundance estimates are needed. Sperm whale depredation interactions with longline fisheries have increased, but little is known about sperm whale populations. Updated population estimates and defined PBR's are needed to effectively respond if a take occurs in the longline fishery. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | No action |
| 365 | Retrospective analysis of the impact of Chinook PSC avoidance measures on communities of western Alaska | Conduct retrospective analysis using qualitative and quantitative methods on salmon dependent communities of western Alaska that may be affected by Chinook salmon PSC avoidance measures in the BSAI. Analysis should evaluate long-term changes in local Chinook abundance and uses, and provide detailed ethnographic work exploring the meaning of salmon to these communities in the context of industrialized offshore fisheries. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | No action |

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| 366 | Continue to investigate time variation and the shape of fishery and survey selectivity models | There is considerable controversy about (1) whether selectivity should be dome-shaped or asymptotic, and (2) whether selectivity should be time-varying by default. Using a dome-shaped curve can create a large increase in biomass which may not be real. Treating selectivity as time-varying increases the number of model parameters greatly, which may lead to confounding among parameters. Better scientific guidance through research studies is needed to address these two problems. | Urgent | Urgent | GF: Important Crab: -- Scallop: -- | Partially underway |
| 367 | Continue to improve stock assessment methodology with respect to uncertainty | Recent studies have made advances in determining effective sample size, effective number of parameters, Bayesian parameterizations, and how to weight datasets in assessments with multiple datasets. Introduce methodology to identify additional sources of uncertainty. GMACS (Generalized Modeling for Alaskan Crab Stocks) is a statistical size-structured population modeling framework. It is designed to be flexible, scalable, and useful for both data-limited and data-rich situations. GMACS is intended to be the primary modeling platform used to conduct assessments of all crab stocks in the Bering Sea. GMACS was first used to provide management advice for Saint Matthews blue king crab in 2016, and work is ongoing for a Bristol Bay red king crab application. Additional functionality is needed for GMACS to be applied to snow and Tanner crab. | Urgent | Urgent | GF: Important Crab Urgent Scallop: Strategic | Underway |
| 368 | Develop a simulation model of Steller sea lion fishery interactions | Management strategy evaluation tools based on coupled bio-physical models with fishing and top trophic level foragers (e.g., Steller sea lions) should be developed to evaluate the performance of different harvest strategies, to inform future management decisions, and to prioritize field studies. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | No action |
| 381 | Effects of changes to the observer program | Evaluate the effects of changes to data collection protocols that occur because of observer restructuring, potential funding limitations and the introduction of electronic monitoring . Ensure that data collected provides a valid representation of the catch and can be compared easily to the previous data collection methods and time series remain intact. | Urgent | Urgent | GF: Urgent Crab: -- Scallop: -- | No action |
| 382 | Investigate in situ methods of tagging species that experience barotrauma | Species with swim bladders experience barotrauma, so that tagging studies result in high mortality and little information. Icelandic and Norwegian scientists have developed in situ methods for tagging, so that these fish never change depth. This could provide precise estimates of movement rates from tagging studies needed for spatial stock assessments. Such a recommendation for walleye pollock is found in a 2011 Report of a Workshop on Spatial Structure and Dynamics of Walleye pollock (AFSC Processed Report 2011-04). | Important | Important | GF: Strategic Crab: -- Scallop: -- | No action |
| 383 | Determine quantitative indicators of spatial structure, particular for walleye pollock and Pacific cod | The next generation of stock assessment models will be spatial age- and length-structured assessment models, in line with the goal of ecosystem-based fishery management. Current distributions of spatial location have been empirically summarized, but methods should be explored to convert these to movement patterns for biological and/or management regions. | Important | Important | GF: Strategic Crab: -- Scallop: -- | Underway |

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| 385 | Study Pacific halibut PSC, bycatch, and discard behavior in fisheries | Continue to explore management actions that reduce the incentives for PSC-, bycatch- and discard-related mortality of Pacific halibut. Evaluation of observer coverage, accuracy, and representativeness of PSC and bycatch estimates should be included. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | Underway |
| 386 | Investigate long term effects of fishing on Pacific halibut | Collect genetic samples for future comparison. | Strategic | Strategic | GF: -- Crab: -- Scallop: -- | Underway |
| 387 | Determine effects of migration on the Pacific halibut population and management | Extend existing analyses of tagging studies to include age-specific components. Continue to evaluate the role of migration in contributing to population dynamics and trends associated with area-specific catch, PSC levels, and downstream effects. | Important | Important | GF: -- Crab: -- Scallop: -- | Underway |
| 388 | Study temporal and spatial patterns in size-at-age of Pacific halibut | Reanalyze historical records of Pacific halibut size-at-age. Requires identifying samples from consistent spatial areas as well as re-ageing of older samples that utilized differing methods for age determination. Relate observed patterns to somatic growth via otolith increment analysis and development of bioenergetics model relating long-term environmental and ecological drivers to halibut size-at-age. Continue to explore the potential role of fishing in observed size-at-age trends via direct or evolutionary pathways and the interaction with size-selective fishing, include these analyses in harvest policy analyses. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | Underway |
| 389 | Investigate ecosystem effects and inter-species interactions of halibut | Investigate potential ecosystem effects and inter-species interactions on Pacific halibut recruitment and size-at-age. Includes integration of existing IPHC and NOAA trawl survey observations of size-at-age, diet, and population distribution and trends for multiple species in the GOA and BS. | Important | Important | GF: Important Crab: -- Scallop: -- | Underway |
| 390 | Assess the population status of harbor seals in the Aleutian Islands and determine factors affecting their population trajectories | Assess the population status of harbor seals in the Aleutian Islands and determine factors affecting their population trajectories | Strategic | Strategic | GF: -- Crab: -- Scallop: -- | No action |
| 431 | Develop tools for analyzing coastal community vulnerability to fisheries management changes | Develop tools for assessing and predicting coastal community vulnerability to fisheries management changes. Assess changes in community vulnerability over time by FMP and individual catch share fishery. | Important | Important | GF: Important Crab: Important Scallop: -- | Underway |
| 451 | Arrowtooth flounder stock structure and movement | Arrowtooth flounder studies to support information related to stock structure and movement for Alaskan flatfish species | Important | Important | GF: Strategic Crab: -- Scallop: -- | Partially underway |
| 452 | Dusky Rockfish and Shortspine Thornyhead genetics research for improved population structure | Genetic research to better study dusky rockfish and shortspine thornyhead population structure. | Important | Important | GF: Important Crab: -- Scallop: -- | No action |
| 453 | Cod density in untrawlable areas in the AI | Evaluation of survey data (including IPHC long line, AFSC long line and NMFS trawl) in comparison with fishery data to better understand the proportion of cod biomass in untrawlable areas of the NMFS trawl survey. | Important | Important | GF: Important Crab: -- Scallop: -- | Underway |

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| 454 | Sculpin natural mortality, seasonal food habits | Research to determine natural mortality for sculpin species in the GOA. Data gaps exist in sculpin species life history characteristics, spatial distribution, and abundance. GOA-specific mortality estimates would be beneficial, rather than using the M derived from BSAI sculpin species. Additionally, the collection of seasonal food habits data would help clarify the role of both large and small sculpin species within the GOA ecosystem | Important | Important | GF: Strategic Crab: -- Scallop: -- | No action |
| 455 | Shark aging, size at maturity, natural mortality | For sharks - data needed on size at maturity, natural mortality, better aging methodology. May be possible to collect age data from large" sleeper sharks that are caught in IPHC surveys. Access to those animals could enhance size and maturity data." | Important | Important | GF: Strategic Crab: -- Scallop: -- | Partially underway |
| 472 | Evaluate causes of variable meat size, undersize meats in scallops | Exploratory tows in the Bering Sea (District Q) and some areas open to harvest around Yakutat (District D) have shown scallops with disproportionately small meats relative to shell height. The cause of this condition as well as potential for recovery is unknown to industry. Additionally, samples from Bering Sea scallops with weak meats were collected and sent to the ADF&G Anchorage Pathology Lab for analysis of any evidence of diseases and/or parasites. The results showed that the scallops were infected with an apicomplexan-like parasite. To further evaluate the geographic extent and infection rates of this parasite, a sampling effort was initiated in July 2015 to collect samples from select locations across the state, from Yakutat to the Bering Sea. | Important | Important | GF: -- Crab: -- Scallop: Important | Partially underway |
| 491 | Assess dependence and impacts of halibut management actions on communities | Quantitatively and qualitatively examine the suite of engagements, dependencies, and vulnerabilities of halibut dependent communities and impacts of halibut management actions. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | No action |
| 492 | Investigate factors underlying fishery responses to halibut PSC caps | There is need to understand the underlying factors through which industry can adjust its behavior and its corresponding halibut encounter rates, in response to potential changes in halibut PSC caps. Investigations under this category could be conducted in combination with evaluations of alternative management actions for halibut PSC under Research Priority 385. | Urgent | Urgent | GF: Urgent Crab: -- Scallop: -- | No action |
| 493 | Examine the relative importance of historical closed areas in the vicinity of the Pribilof Islands as juvenile halibut nursery habitat relative to other regions coast-wide. | Evaluate the biological effects of establishing spatial protections of juvenile halibut from fishing gear on BSAI halibut stock health. | Urgent | Urgent | GF: -- Crab: -- Scallop: -- | No action |
| 494 | Investigate skate egg concentration areas as EFH and HAPC | Skate conservation and skate egg concentration areas remain a priority for EFH and HAPC management and within Council and NMFS research plans. | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |
| 511 | Computerized image analysis of current camera sled data | Assessment of existing database of camsled images is needed to provide scallop counts and sizes, contributing to abundance estimates. Additionally, sediment and habitat type and presence of other organisms can be assessed. | Urgent | Important | GF: -- Crab: -- Scallop: Urgent | Underway |
| 513 | Evaluate extent and importance of parasites in scallop populations | Samples from Bering Sea scallops with weak meats were collected and sent to the ADF&G Anchorage Pathology Lab for analysis of any evidence of diseases and/or parasites. The results showed that the scallops were infected with an apicomplexan-like parasite. To further evaluate the geographic extent and infection rates of this parasite, a sampling effort was initiated in July 2015 to collect samples from select locations across the state, from Yakutat to the Bering Sea. | Important | Important | GF: -- Crab: -- Scallop: Important | Partially underway |

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| 531 | Collect growth data for Bering Sea crab stocks | Collect stock specific growth data for Bering Sea crab stocks that are currently managed using inadequate sample size data. | Urgent | Urgent | GF: -- Crab Urgent Scallop: -- | Partially underway |
| 532 | Natural mortality estimation for crab stocks | Investigate natural mortality for crab stocks, to include responses to environmental variability and predation. Compare to existing natural mortality parameters used in stock assessment modeling. | Important | Important | GF: -- Crab Important Scallop: -- | No action |
| 533 | Explore optimal sampling strategies and geospatial approaches for time series of survey data | The Stock Assessment Improvement Plan seeks to ensure that NMFS conducts its surveys in the most effective and efficient manner possible. Statistical analysis of the optimal number of survey stations needed to accurately assess the status and trends of groundfish and crab stocks is required to achieve this goal. An extension of this activity would be to explore alternative abundance estimation methods. For example exploring Thorson's geostatistical model as an alternative to the designed-based estimates for abundance indices used in stock assessments is a potentially useful analysis. Extensions would include an assessment of whether there are certain life history characteristics or levels of aggregation when geospatial models are used. | Urgent | Urgent | GF: C.O.M. Crab: -- Scallop: -- | Underway |
| 534 | Develop technical interaction model for BSAI MSE | A multi-species management strategy evaluation (MSE) with technical interactions among species is being developed to explore the potential implications of alternative harvest policies as was done for the Programmatic Supplemental Environmental Impact Statement (PSEIS). The approach of using an MSE with technical interactions is useful and unique in that the whole cycle of a fishery system is modeled: true status of several fish stocks in the fishery (Pacific cod, pollock, yellowfin sole, and Pacific halibut) are simulated; data are generated based on the true status of each stock, stock assessments are performed using the generated data; catch limits and bycatch limits are calculated, and the management system and fleet dynamics are mimicked to simulate the decision-making process that occurs when allocating catch limits among stocks within the constraint of the 2 million ton cap. | Urgent | Urgent | GF: Urgent Crab: -- Scallop: -- | Underway |
| 535 | Development and evaluation of data poor and data moderate methods | Several methods are currently in use around the country for setting harvest specifications for data-poor and data-moderate stocks (corresponding, respectively, to Tiers 6 and 4-5 of the BSAI and GOA groundfish harvest control rules), several others are currently under development, and still others could be developed in the future. There is a need to continue development of such methods and to conduct comparative performance tests of the methods. | Urgent | Strategic | GF: Strategic Crab: -- Scallop: -- | Underway |
| 536 | Evaluate incorporation of climate change impacts into stock assessments | Climate change impacts are becoming an increasingly important consideration for long term planning and should be included in projections of exploitable fish stocks and associated ecosystem components. Incorporation of climate-based parameters into fish stock assessments will allow for exploration of harvest scenarios in the context of evolving climate conditions. Research is needed to explore how these parameters can be integrated into fishery stock assessments. | Strategic | Strategic | GF: Strategic Crab: -- Scallop: -- | Underway |
| 537 | Identification of best practices for long term storage of ageing structures. | Archived ageing structures such as otoliths can deteriorate over time unless they are stored in appropriate media. Loss of archived structures reduces the potential for obtaining information through techniques such as micro-chemical analysis. Best practices for long term storage are currently not well established. | Strategic | Strategic | GF: Strategic Crab: -- Scallop: -- | Partially underway |

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| 551 | Estimate scallop survey catchability | Catchability of scallops in the fishery independent survey is needed to generate abundance estimates of scallops. Currently the survey provides only CPUE data. | Urgent | Urgent | GF: -- Crab: -- Scallop: Urgent | No action |
| 552 | Expand statewide scallop survey | The State of Alaska fishery independent dredge survey has been conducted in a limited number of known beds. Expansion of the survey beyond the edges of known beds into previously un-surveyed areas will improve knowledge of bed size and true scallop distribution.. | C.O.M. | C.O.M. | GF: -- Crab: -- Scallop: C.O.M. | Underway |
| 553 | Population structure of scallops | Currently scallop beds are monitored independently. Knowledge of source/sink dynamics and meta-populations processes will improve the ability to manage weathervane scallops at the stock level. | Important | Important | GF: -- Crab: -- Scallop: Important | No action |
| 554 | Molt and mate timing for Norton Sound red king crab | Within the assessment, there are conflicting observations about molt timing in April/May versus August/September. Moreover these observations suggest the potential for biennial mating. These issues could have important consequences on the assessment model. | Important | Important | GF: -- Crab Important Scallop: -- | Partially underway |
| 555 | Herring genetics on overwintering and spawning grounds | A comparison of genetic composition of herring on the overwintering grounds and on the spawning grounds is needed to evaluate population structure. | Important | Important | GF: Important Crab: -- Scallop: -- | Partially underway |