North Pacific Fishery Management Council

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D7 GOA Groundfish Survey Design (SSC only)

February 2023 Council Meeting

Action Memo

Council Staff:	Dr Diana Stram
Other Presenters:	Dr Zach Oyafuso, AFSC; Dr. Lewis Barnett, AFSC; Dr. Stan Kotwicki, AFSC
Action Required:	SSC Review of Proposed Survey Adjustments

GOA Groundfish Survey Optimization Proposal

The SSC will review and provide feedback to the agency on a new survey design for the GOA groundfish survey. AFSC scientists will provide a report to the SSC and be available for questions.

The AFSC will be transitioning to a new survey design with implementation planned for the GOA Groundfish 2025 survey. AFSC scientists employed simulation models to evaluate the performance of stratified random survey designs in the Gulf of Alaska (GOA) bottom trawl groundfish survey using alternative stratifications and sampling effort allocations relative to the status quo stratified random sampling design across a range of total sampling effort scenarios (corresponding to 1, 2, or 3 survey boats). A NOAA Tech memo and an ICES publication describing the approach and simulation results are attached to the eAgenda. The GOA Groundfish Plan Team received updates on these efforts in 2020 and 2021 and the minutes from these reviews are attached to the eAgenda. The AFSC is now in the process of preparing for new surveys with respect to the logistics, effort allocation, and building database infrastructure. The authors are looking for general comments from the SSC about the new approach and feedback on the transition process from the SSC.

In the new approach, a genetic algorithm was used to optimize the placement of stratum boundaries (defined by depth and longitude) over the simulated data with a multivariate optimal allocation algorithm. Performance metrics of bias, precision, and uncertainty of precision were computed across repeated simulations of both the status quo survey design and proposed modified designs using independent draws with observation error. To determine how the spatial scale of optimization may produce the most precise and accurate abundance estimates at the scale required for informing management decisions, optimization was conducted at two spatial scales: across the entire GOA and a finer scale within each of five GOA NMFS management areas. In general, newly optimized survey designs at both spatial scales produced abundance estimates with similar precision to the status quo survey, yet also increased the accuracy of abundance estimates and both precision and accuracy of their associated variances by reducing biases present for some species relative to the status quo approach. Overall, the proposed optimal survey effort allocation indicated that higher sampling rates in the western and central GOA and lower sampling rates in southeast GOA helped achieve precision targets across species. The proposed optimized survey is expected to be practically feasible given that the distance between stations and total expected cruise duration is similar to the status quo. The proposed design is expected to improve the accuracy of abundance indices and their variances for many species while requiring similar survey resources to the status quo GOA groundfish bottom trawl survey design.