

i Executive summary

The Workshop on Unavoidable Survey Effort Reduction (WKUSER) reviewed available research, evaluated current practices, and recommended future directions on four key topics: Existing Decision Making Processes, Survey Uncertainty, Index Continuity, and Trade off Evaluation Tools.

Resource surveys are conducted worldwide to measure population trends of economically important marine species and characterize the state of marine ecosystems. Resulting information is used for stock assessments and management recommendations that contribute to sustainable fisheries and ecosystem management. Surveys are expensive and complex to execute and are vulnerable to unexpected reductions in effort expended due to funding shortfalls, vessel unavailability, weather, and other complications that require immediate or strategic actions.

Decision trees and tables were developed under each key topic largely corresponding to different groups of monitoring program actors, and an overarching concept of how the elements need to interact on different time-scales is developed to assist survey managers in decision-making in a variety of conditions and objectives on various time horizons. Together the trees can deliver best practice decision tools and provide assessments of the impact of survey effort reductions on data and advice quality through a series of questions linked to information tables.

Recommendations for best practices and future refinements of process are:

- Monitoring agencies are encouraged to routinely apply the developed approach to conduct survey evaluations. This will facilitate appropriate prioritization of monitoring tasks by examining its relation to objectives by exploring possible methods for gains in survey efficiencies (such as: reducing the number of biological samples, shortening tow duration, increase in catch subsampling while also considering station thinning, excluding areas, reducing survey frequency, or changing survey design).
- Continue further studies on estimation of total survey uncertainty by conducting research into the various subcomponents inherent in survey design and metric calculations, which include sampling design, sampling efficiency, spatial availability, density-dependence, vessel effects, timing, and environmental conditions. The interactions of these uncertainty components require studies to assess total survey uncertainty for appropriate weighting in likelihood-based assessments, provide greater insight into the impact of certain changes, and provide a long term strategy for improved surveys.
- Develop and expand simulation studies and research on model-based capabilities that can be used to define methods for survey effort reduction, aid in estimations of total survey uncertainty, and help with inter-calibration studies.
- Survey groups and assessment groups together should develop quantitative applications that can be used for any survey and assessment combination to determine the impacts of different monitoring strategies in terms of inputs (cost) and outputs (uncertainty). They should include functions to process abundance data, and to incorporate ecosystem data for use in model-based estimation and in process studies, multi-species/multi-objective optimization, and evaluation of trade-offs between different survey and estimation approaches.

Survey managers are recommended to intensify preparation for response to ecosystem changes, which are already underway in many areas. These preparations should include strategies for survey expansions into new areas (or reductions on other areas) to assure continued relevance of survey information to fisheries management and research.

ii Expert group information

Expert group name	Workshop on Unexpected Survey Effort Reduction (WKUSER)
Expert group cycle	Annual
Year cycle started	2020
Reporting year in cycle	1/1
Chair(s)	Dr. Stan Kotwicki, United States
	Dr. Sven Kupschus, Great Britain
	Wayne Palsson, United States
Meeting venue(s) and dates	13-17 January 2020, Seattle, WA, United States, (45 Participants)