Utilizing environmental information to reduce recruitment uncertainty in the Alaska sablefish stock assessment

S. Kalei Shotwell[1]*, Dana H. Hanselman[1], and David G. Foley[2]

[1]AFSC, Ted Stevens Marine Research Institute, Juneau, AK; [2]SWFSC, Environmental Research Division, Pacific Grove, CA

Alaska sablefish (*Anoplopoma fimbria*) are a fast-growing, highly valuable commercial groundfish species in the North Pacific. Relatively little is known about their early life history. Spawning takes place at depth in early spring and larvae swim to the surface, developing offshore. Juveniles drift inshore in late summer to overwinter and begin offshore movement the following summer. Sablefish are assessed as a single population in an age-structured model and do not fully recruit to the fishery or survey until four to five years of age. Therefore, information to estimate recent recruitment is sparse and highly variable. Additionally, recruitment appears to be more related to the environment than to spawning biomass. Our objectives are to evaluate the various sources of early life history data and explore integration of several environmental time series within the sablefish stock assessment model to reduce the uncertainty of recent recruitment estimates. We collected all available early life history survey data to describe the spatial distribution of larval and juvenile sablefish. A qualitative comparison with model recruitment estimates reveals potential critical spatial pathways during high recruitment years. Following this we considered potential mechanisms influencing recruitment and selected environmental indices representing these mechanisms. We considered large-scale climate indices to high resolution satellite-derived regional time series. Preliminary model comparisons suggest large-scale changes in climate, freshwater, and cross-shelf transport explain some of the recruitment variability of sablefish. Reducing recruitment uncertainty may increase efficiency in harvest decisions, improve geographic catch apportionment, and allow for more reliable future harvest projections.

The relationship between MSY fishing rates (F_{MSY}) and productivity indices

Jason M. Cope[1]*, Wesley S. Patrick[2], and Richard D. Methot, Jr.[3]

[1]NWFSC, Fishery Resource Analysis and Monitoring Division, Seattle, WA; [2]Office of Sustainable Fisheries, Silver Spring, MD; [3]Office of Science and Technology, Seattle, WA

The 2009 revision of the National Standard 1 Guidelines describe a hierarchal approach to prescribing precautionary catch recommendations (i.e. overfishing limit [OFL] ≥ acceptable biological catch [ABC] ≥ annual catch limit). This presentation focuses on the specification of the ABC, which is the scientific recommendation for a level of catch that would prevent overfishing. To do this, it must take into account any scientific knowledge about the stock, and uncertainty in the estimate of OFL (where OFL = $F_{MSY} * B_{current}$). The F_{MSY} is typically based on proxies and incompletely accounts for all biological factors that could influence the true F_{MSY}. It has been proposed that indices of stock productivity, which potentially consider more factors than are directly accounted for in F_{MSY} proxy calculations, could contribute to the scaling of the buffer between OFL and ABC. In extreme data-poor situations, it is possible that a productivity measure could be the sole source of information with which to set ABC relative to historical catch levels. As a first step, we investigated the strength of the relationship between productivity indices and commonly used measures of F_{MSY}. The goal is to determine if productivity measures could serve as a proxy for F_{MSY} in data-poor situations and could provide useful supplementary information for scaling ABC relative to OFL even in more data-rich situations.

Proceedings

11th National Stock Assessment Workshop

Characterization of Scientific Uncertainty in Assessments to Improve Determination of Acceptable Biological Catches (ABCs)

Joint Session of the National Stock and Habitat Assessment Workshops

Incorporating Habitat Information in Stock Assessments

1st National Habitat Assessment Workshop

Moving Towards a National Habitat Science Program

Hosted by the Southeast Fisheries Science Center, Southeast Regional Office, and Office of Science and Technology
St. Petersburg, FL
May 17–20, 2010

Edited by Kristan Blackhart

November 2010
NOAA Technical Memorandum NMFS-F/SPO-112

U.S. Department of Commerce
Gary Locke
Secretary of Commerce

National Oceanic and Atmospheric Administration
Jane Lubchenco, Ph.D.
Administrator of NOAA

National Marine Fisheries Service
Eric C. Schwaab
Assistant Administrator for Fisheries

Copies of this document may be obtained by contacting:

Office of Science and Technology, F/ST
National Marine Fisheries Service, NOAA
1315 East West Highway
Silver Spring, MD 20910

An online version is available at http://www.st.nmfs.noaa.gov/

This publication may be cited as:

Blackhart, K. (ed.) 2010. Proceedings. 11th National Stock Assessment Workshop: Characterization of scientific uncertainty in assessments to improve determination of acceptable biological catches (ABCs); Joint Session of the National Stock and Habitat Assessment Workshops: Incorporating habitat information in stock assessments; and 1st National Habitat Assessment Workshop: Moving towards a national habitat science program. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-112, 153 p.