Annex 15

SEMINAR REPORT: PACIFIC OCEAN ECOSYSTEM AND TUNA DYNAMICS

13th Meeting of the
INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Busan, Korea
17-22 July 2013

Z.G. Kim convened a seminar at ISC13 focusing on Pacific Ocean ecosystem and tuna dynamics (*ISC/13/ANNEX/15*), including a better way to provide scientific advice to managers and fishers through various types of analysis with figures and tables. About 30 local participants from fisheries research institutes and universities attended the seminar. Summaries of each presentation follow.

Prof. C.I. Zhang presented *Ecosystem-based assessment and management for sustainable fisheries*. He introduced an ecosystem-based fisheries assessment approaches and integrated fisheries risk analysis method for ecosystems (IFRAME). In recent years, concern has grown over how ecosystems are being affected by fishing. A comprehensive ecosystem-based approach is required to holistically assess and manage fisheries resources by considering ecological interactions of target species with predators and prey species, interaction between fishes and their habitats, and the effect of fishing on these processes. IFRAME is used to evaluate the performance of management strategies relative to the goals of an ecosystem approach to management under different scenarios. From a practical standpoint, the ecosystem-based fisheries assessment approach is very appealing for its ability to incorporate a large number of quantitative data. Yet, even this approach should be further refined, sensitivity analyses conducted, the forecasting version of this approach further developed, and future applications tested in other ecosystems.

Several questions were addressed to the presenter by attendees. Among these were inquiries regarding whether single-species and ecosystem-based analyses would be expected to yield comparable predictions r future projections. (Zhang --- best thing would be to reduce F by 25%). A second was an inquiry into which of the various aspects of changes in the oceanic environment (e.g., acidification, warming, altered prey distributions) might be likely to exert the strongest effect(s). A third question addressed the use of data in EBFA. Specifically, when confronted with the need (or opportunity) to use data from many sources with different levels of uncertainty, how should risk scores be developed? The response was that if data are deemed uncertain, the risk level in the 2-tier EBFA information system should be raised.

Dr. J.H. Lee presented *Ecosystem-based risk assessment of the Korean offshore large purse seine fishery under changing climate*. The warming trend is associated with changes in spatial

distribution of some pelagic fish stock such as chub mackerel and tunas in Korean waters. Using IFRAME, the impacts of climate change were evaluated by projecting distributional ranges and stock status of chub mackerel and the Korean offshore large purse seine fishery in Korean waters. There was discussion on uncertainty regarding data used in the IFRAME model.

Dr. Y. Ishida presented *Outline of 2013 NRIFSF workshop on biological reference points for fisheries management under environmental changes*. The workshop was intended to identify target reference points and limit reference points, and introduced the application of biological reference points (BRPs) for Japanese fisheries management and WCPFC. There are various kinds of BRPs and their performance can be evaluated by management strategy evaluation (MSE). Environmental changes such as regime shifts affect many fish stocks including tuna species.

A question raised the issue of whether "regime" indicators would be comprehensible to fishermen and therefore useful. The speaker acknowledged that it remains uncertain as to whether explanations would prove comprehensible or even if the regime concept would be explicable.

A final point raised by an attendee was that the usual statistical methods employed to standardize CPUE, generalized linear models (GLM's) or generalized additive models (GAM's), ordinarily include environmental parameters as explanatory variables. This implies that suitable and well-understood analytical techniques are available for use in this context.

Dr. T. Nishida presented *Visualization of scientific advice and information: Bridging concrete images from scientists to managers and industry*. He proposed how to transfer scientific advice to non-scientists such as fishery managers and the fishing industry more effectively. It was highlighted that it is important to understand information in an easy way, and visualization (not too simple, but not too dramatized) is a very good method for that. And it is expected that by using this method, managers can produce effective management strategies and the industry can follow them smoothly.

Dr. W.D. Yoon presented *Jellyfish blooms and fisheries damages in Korean waters*. He explained the reason why jellyfish blooms have occurred, especially in Korean waters in recent years. It was suggested that jellyfish blooms together with overfishing might be one of the causes of changes in ecosystem structure.

Discussion

The ISC Chair thanked Z.G. Kim for organizing an insightful seminar and the four presenters for contributing. Dr. Kim thanked the National Research Institute of Far Sea Fisheries of Japan for sending Dr. Y. Ishida and T. Nishida as presenters to this seminar. There was a request regarding the availability of the presentations for distribution among the Members, and Dr. Kim contacted the presenters and all but one of the presentations is available.