
INCORPORATING ECOLOGICAL, ENVIRONMENTAL, AND CLIMATE CONSIDERATIONS IN STOCK ASSESSMENTS AND ECOSYSTEM-BASED FISHERY MANAGEMENT

JEFFREY POLOVINA

PACIFIC ISLAND FISHERIES SCIENCE CENTER

SUBTHEME: Incorporating ecological, environmental, and climate variability in stock assessment and ecosystem based fishery management

BIO

Dr. Jeffrey Polovina is a biological oceanographer and Chief of the Ecosystem and Oceanography Division (EOD). His research focuses on understanding the spatial and temporal dynamics of marine ecosystems with an emphasis on high tropic levels. Jeff Polovina began his career studying the Hawaiian Islands coral reef ecosystem trophic web where he developed the ecosystem model approach ECOPATH. Over the past several decades, he and the researchers in EOD, have focused on physical biological linkages in marine ecosystems, especially regime shifts and climate impacts. A related area of interest is to understand how large pelagic animals use oceanic habitats. He and colleagues have sent out fleets of turtles, tunas, and sharks equipped with electronic tags and used satellite remotely-sensed oceanographic data to describe the migration paths and foraging “hotspots” of these mobile predators. His current research uses climate and ecosystem models to identify potential climate impacts on marine ecosystems.

While most of his work focuses on the central North Pacific, Dr. Polovina has had 2 Fulbright Senior Research awards for work in Kenya and the Galapagos. Dr. Polovina is also an adjunct faculty in the Oceanography Department at the University of Hawaii and a Senior Fellow at the Joint Institute of Marine and Atmospheric Research (JIMAR) in Hawaii. In 2010 he received the Wooster Award.

ABSTRACT

It has long been recognized that fish populations respond to environmental variation. Thus it is appealing to consider accounting for this variation in stock assessments. Situations where incorporating environmental variables might prove most beneficial and some challenges encountered are discussed. An emerging approach consists of presenting time series of key environmental and ecosystem indicators to augment stock assessments, often called ecosystem considerations chapters. This approach incorporates both environmental and ecosystem changes but often can be more qualitative than quantitative. Ecosystem

models offer the potential to contribute in a number of ways including quantifying ecosystem changes, projecting climate impacts, estimating multispecies MSY, and serving as a framework for management strategy evaluations and to evaluate indicators and tipping points. Going forward, the combined use of single species and ecosystem models may hold promise.