Abstract for FRA/APN/GLOBEC/PICES Joint Workshop

"Global comparison of sardine, anchovy and other small pelagics – building towards a multi-species model"

NEMURO.FISH - A fish bioenergetics and population dynamics model coupled to a lower trophic level NPZ model: Description, calibration, sensitivity analysis and application to climate research.

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We describe the formulation of a bioenergetics-based population dynamics model of pelagic fish. The model can be dynamically coupled to a lower trophic level (LTL) nutrient-phytoplankton-zooplankton model, or it can be run uncoupled from the LTL model. A general description will be provided followed by specific modifications implemented to represent Pacific herring (*Clupea harengus pallasi*) and Pacific saury (*Cololabis saira*). These include features related to life cycles, recruitment, and spatial dependence to account for behavioral traits such as migrations between spawning and feeding grounds. . Once the model is described we will provide examples of automatic calibration methods to objectively adjust model parameters so that model dynamics approximate temporal patterns in observed data. A Monte Carlo analysis will also be described that enables the determination of the parameters that explain most of the variability in the model solution thereby providing a means to quantify uncertainty in key model parameters. We finish by presenting several applications where the model has been used to examine the impact of climate signals on marine ecosystems and to explore the ways in which climate signals propagate up marine food webs.

In support of this presentation, 4 written documents have provided to meeting participants. These include

A bioenergetics-based population dynamics model of Pacific herring (Clupea harengus pallasi) coupled to a lower trophic level nutrient-phytoplankton-zooplankton model: description, calibration, and sensitivity analysis by Bernard A. Megrey, Kenneth A. Rose, Robert Klumb, Douglas Hay, Francisco E. Werner, Dave L. Eslinger, and S. Lan Smith

Simulated Herring Growth Reponses in the Northeastern Pacific to Historic Temperature and Zooplankton Conditions Generated by the 3-Dimensional NEMURO Nutrient-Phytoplankton-Zooplankton Model by Kenneth A. Rose , Francisco Werner, Bernard A. Megrey, Maki Noguchi Aita, Yasuhiro Yamanaka, and Douglas Hay

A summary of bioenergetics model equations

A summary of NEMURO.FISH data requirements