

Ms. Dorothy Lowman, Chair  
And Members of the Pacific Fishery Management Council  
7700 NE Ambassador Place #200  
Portland OR 97220-1384

RE: Agenda Item H.1.c – Supplemental Public Comment:

**Council Action:** Consider Use of the Atlantis Model for Fishery Impact Evaluation and  
Provide Additional Guidance as Necessary

Dear Ms. Lowman and Council members,

As a “retired” NMFS biologist with a continuing involvement in CPS and ecosystem modeling, I appreciate the Council’s consideration of these comments:

1. I believe that ecosystem modeling will eventually provide considerable context in contributing information necessary to successfully achieve ecosystem-based management of our California Current fisheries. And, when fully mature, these models might even replace single-species models.
2. A major single-species modeling effort for sardine has been launched within the last two years, and I have been heavily involved in this effort. The management of sardine is considerably different from management of groundfish: sardine management relies on simulation models to develop the harvest guidelines used in management and then the stock assessments are used to manage the stock from year to year. In groundfish, simulation models were not used to develop the management harvest guidelines and both the guidelines and year-to-year management rely on the stock assessments.
3. Moving to ecosystem management is essentially an extension of the sardine approach, using far more complicated and data-intensive simulation models to assess the likely affects of different management strategies.

Comments on the recent review of the Atlantis Model. Agenda Item H.1.a, Attachment 1

I note that the Atlantis Technical Team does not include representation from California or the Southwest Fisheries Science Center (SWFSC). Rather, the SWFSC is involved in developing complementary modeling approaches, i.e. investigating CPS and particularly sardine and anchovy via NEMURO-SAN. It will be important for the Council to consider complementary approaches to advance the state of knowledge of the California Current Ecosystem, in light of the population dynamics of coastal pelagic and highly migratory species.

Expansion of ecosystem models to include the Southern California Bight: This expansion is essential before using a model to infer anything about CPS and HMS fisheries.

The review panel noted that the Atlantis and Ecosim models “diverged in modeled responses of micro-zooplankton and copepods, salmon, and sharks.” They also mention that, “Market squid dynamics are not well captured.” Clearly, the expansion of ecosystem modeling to include the Southern California Bight will require considerable effort to ensure that the models are ‘realistic’ before they can be used for even conceptual understanding. It will likely be at least a decade before they can/should be used to determine harvest strategies or year-to-year fishery management. At age 75, I realize that a decade is not all that long.

About 30 years ago I pointed out that a small number of species dominate the biomass of fishes in the California Current and other eastern boundary ecosystems. I am very pleased to see that sardine, anchovy, mackerel, jack mackerel and hake all have individual functional groups in the to-be-revised Atlantis model.

I am also pleased to see that the Southern California Bight is now in the California Current Ecosystem Model. This major divergence from the past will require a significant amount of research and hopefully some input from California and the SWFSC.

The inclusion of area south of Point Conception will require several things not mentioned in the Review of the Atlantis model.

#### Highly Migratory Species:

Previous California Current Ecosystem models have included a functional group named Large Pelagic Predators. This group has included a single species, albacore. This was justifiable in a model ending at Point Conception; however, the expanded Atlantis model needs to include at least two HMS functional groups. Albacore, along with the addition of Bluefin Tuna, both of which migrate into California from the Western Pacific, is one group and the second group should include the tropical HMS species that migrate into the southern half of the California Current from the south. The geographical distributions of these two groups are very different, and the tropical HMS seasonal migrations into U.S. waters is highly temperature-dependent.

#### Squid:

Present ecosystem models divide squid into two functional groups, market squid and jumbo squid. The jumbo squid functional group is a special case. However, the rest of a fairly diverse squid fauna and a relatively unknown biomass do not occur in the models.

The models currently do not handle the market squid functional group very well and, in addition, most users may assume that the market squid group includes all of the other species. Market squid supports a major fishery in Central and Southern California, and the majority of squid species, including those off the Pacific Northwest, are unfished. The model therefore needs a single functional group for market squid and another functional

group that includes all of the unfished species.

Bottom Line

I recommend that the Council fully support the continuing development of ecosystem models for management purposes and that they defer considering use of the Atlantis Model , or others, for fishery impact evaluation until the results of ongoing research and model development are completed, reviewed and approved by the Council's SSC, Management Teams, Advisory Panels, and the Public.



Richard H. Parrish