

MODELLING MOVEMENTS OF PACIFIC BLUEFIN TUNA IN THE CALIFORNIA CURRENT ECOSYSTEM

Boustany, A.M.¹, Block, B.A.², and Halpin, P.¹

At Sea Observation & Laboratory Modeling of Animal Behavior, Thursday, Sept 4th, 1700 hrs

Abstract:

Through the efforts of the Tagging of Pacific Pelagics (TOPP) program, it has been possible to examine the movement patterns and habitat preferences of Pacific bluefin tunas. In the Pacific Ocean, 386 bluefin tuna were implanted with archival tags off the coast of California, USA and Baja California, Mexico between 2002 and 2006. One hundred and ninety-eight fish have been recaptured, providing a total of 48,623 geolocations from tracks up to 1435 days. The large number of fish tracked over multiple years has allowed for the examination of how seasonal and interannual variability of oceanographic parameters influence the movements of bluefin tuna. Movement patterns off the west coast of North America were strongly influenced by seasonal upwelling and the resulting peaks in coastal primary productivity. Seasonal and interannual variation in the locality of these productivity peaks was linked with a corresponding movement in the distribution of tagged fish. Recent advances in state space and Bayesian modelling have allowed researchers to examine animal tracking data while incorporating positional uncertainty, animal movement parameters and environmental preference. Using ecological data derived from tracking studies coupled with physiological information, it has been possible to build predictive habitat models for bluefin tuna in the California Current. By examining how different assumptions regarding movement behavior affect the modelled distribution of organisms, it is possible to gain a greater understanding of the determinants of animal movement.

Contact : Andre M. Boustany, andre.boustany@duke.edu

(1) Nicholas School of the Environment and Earth Sciences, Box 90328, Duke University, Durham, NC 27708

(2) Tuna Research and Conservation Center, Hopkins Marine Station, Oceanview Blvd, Pacific Grove, CA 93950