Title:	The Pelagics Habitat Analysis Module (PHAM): Decision Support Tools for Pelagic Fisheries
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Abstract

PHAM is a project funded by NASA to integrate satellite imagery and circulation models into the management of commercial and threatened pelagic species. Specifically, the project merges data from fishery surveys, and fisheries catch and effort data with satellite imagery and circulation models to define the habitat of each species. This new information on habitat will then be used to inform population distribution and models of population dynamics that are used for management. During the first year of the project, we created two prototype modules. One module, which was developed for the Inter-American Tropical Tuna Commission, is designed to help improve information available to manage the tuna fisheries of the eastern Pacific Ocean. The other module, which was developed for the Coastal Pelagics Division of the Southwest Fishery Science Center, assists management of by-catch of mako, blue, and thresher sharks along the Californian coast. Both modules were built with the EASy marine geographic information system, which provides a 4 dimensional (latitude, longitude, depth, and time) home for integration of the data. The projects currently provide tools for automated downloading and geo-referencing of satellite imagery of sea surface temperature, height, and chlorophyll concentrations; output from JPL's ECCO2 global

circulation model and its ROM California current model; and gridded data from fisheries and fishery surveys. It also provides statistical tools for defining species habitat from these and other types of environmental data. These tools include unbalanced ANOVA, EOF analysis of satellite imagery, and multivariate search routines for fitting fishery data to transforms of the environmental data. Output from the projects consists of dynamic maps of the distribution of the species that are driven by the time series of satellite imagery and output from the circulation models. It also includes relationships between environmental variables and recruitment. During the talk, we will briefly demonstrate features of the software and present the results of our analyses of habitats.
