Predictive Spatial Analysis of Marine Mammal Habitats

Conservation
CS-1390

Background:

At the present time, there are no analytical tools with which to predict the distribution of marine mammals at spatial and temporal scales of relevance to U.S. Navy training exercises. The Navy must be able to conduct such exercises to maintain readiness, while avoiding situations that may cause adverse effects to marine mammals. The analytical framework to be developed will facilitate more appropriate modeling approaches for the scales required to support the marine mammal forecasting needs of the Navy.

Objective:

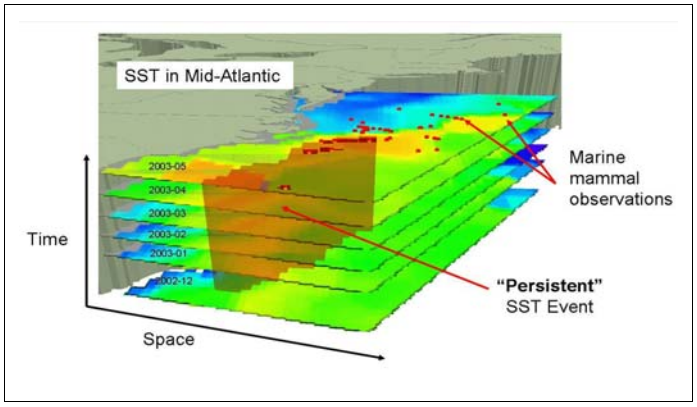
The objectives of this project are to: (1) develop and test the robustness of existing and novel spatio-temporal models of marine mammal distribution, as predicted by physical conditions of the marine environment; (2) design a novel, hierarchical framework for analyzing marine mammal distributions across annual, seasonal and synoptic timeframes; and (3) assemble a spatial decision support system that allows Navy users to analyze model outputs and ancillary oceanographic data across multiple forecasting timescales.

Process/Technology Description:

Spatially explicit statistical techniques will be used to determine how features of the physical habitat influence the distribution of marine mammals. A subset of both traditional and novel statistical model approaches will be evaluated to determine which are most robust in understanding marine mammal habitats under different oceanographic conditions and data limitations. The tests will be structured by the spatial and temporal constraints of the observational and environmental data, the taxonomic group of marine mammals evaluated, and the geographic regions assessed. These approaches provide a flexible framework for spatio-temporal data, which is highly appropriate for modeling multi-scale and multi-temporal ecological processes. An analytical toolbox will be developed for the compilation and analysis of relevant habitat/mammal survey data that synthesizes statistical model results into products describing the predicted distribution of cetaceans.

Expected Benefits:

The Spatial Decision Support System will provide the Navy with state-of-the-art tools to predict the distribution of marine mammals from readily measurable environmental parameters. This will allow the Navy to develop and implement improved mitigation procedures to protect marine mammals without compromising realistic training exercises. (Anticipated Project Completion - 2007)



The analytical framework will allow antecedent oceanographic conditions (e.g., sea surface temperature) to be used more accurately in predicting potential marine mammal habitat.

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