

Fish 505
Assignment 4
Due February 6, 2009

Use of EDOM to explore MPA options for Southern California

EDOM is a visual basic application for calculating equilibrium distributions of fish and fishing effort over a grid of spatial cells, assuming biomass dynamics within each cell can be represented adequately by a delay-difference age-structured model and connection among cells by normally-distributed larval dispersal, movement of fishing effort, and partial occupancy of adjacent cells by fish whose home range is centered in each cell (i.e. home range movement may expose fish from each cell to exploitation in surrounding cells). EDOM is being used extensively by fishers and scientists to compare alternative MPA policies along the California coast, as mandated by California's Marine Life Protection Act (MLPA). This act is the first major legislated requirement for development of a network of MPAs along a large coastal region in North America, and is seen by many as a model for marine protection in general.

Use EDOM program and data files for the Southern California subregion to examine the tradeoff between harvest and existence values for a set of indicator fish species that represent a high proportion of the commercial and sport fishing value from relatively sedentary species in the region (much of the overall fishery value is from migratory species like tunas and squid that are not expected to benefit from MLPA).

How do your assumptions about future fishing efforts (as represented by spatial mean fishing mortality rates F) affect your predictions about whether MPAs will generate net benefits (higher catches, higher net economic value) to fishing interests? How will MPA performance be affected if there is no effective regulation of fishing effort (especially for sport fisheries), so that efforts increase until profits are dissipated (bionomic equilibrium is reached)? In view of your answer to this question, what overall percentage of the area would you recommend be included in MPAs? Would it be better to have many small MPAs or relatively fewer large ones?