The EBM Toolbox: The Tools Behind Dynamic Ocean Management

By Daniel Dunn

Editor's note: The goal of The EBM Toolbox is to promote awareness of tools for facilitating EBM and MSP processes. It is brought to you by the EBM Tools Network (www.ebmtools.org), a voluntary alliance of tool users, developers, and training providers.

Dynamic ocean management aims to move toward real-time management of marine resources so they are managed at scales more closely aligned with their variability and use. This approach to management is still in its infancy, and few end-to-end tools exist to support its application in any given field. Tools used for dynamic ocean management to date have focused on: 1) reducing the time required to collect and upload data and transmit management products and 2) automating data processing and model development to allow for rapid updating of management products. Some examples of tools currently being used in shipping and fishing applications are below.

Data collection and data upload

The tools used for data collection and upload depend largely on the industry attempting to employ dynamic management. Information on shipping traffic is conveyed in near real time by automatic identification systems (AIS). To allow near real-time capture and uploading of fisheries data, fishermen and managers have turned to mobile apps such as Digital Deck, eCatch, mFisheries, Deckhand, and iAngler. [*Editor's Notes: Read more about how these apps work in the EBM Toolbox column "From Paper to Digital - The Mobile App Revolution in Fisheries" (MEAM 7:3 Dec13-Jan15;* https://meam.openchannels.org/node/5310*).*]

Data processing

Dynamic management products such as habitat maps are developed during data processing through the use of geographic information systems (GIS) and/or custom automated analyses. Examples of custom automated analyses include habitat models used in the Eastern Australian longline tuna fishery and gridded heatmaps of bycatch used in the US East Coast scallop fishery. However, some online data warehouses (e.g., iOBIS.org, OBIS-SEAMAP, wildlifetracking.org, Movebank, OzTrack, and seabirdtracking.org) have begun to offer value-added products that include data ingestion from satellite and cell phone tags, filtering, sampling of oceanographic variables, and track mapping. These products can then be developed into full dynamic management products using other tools such as Marine Geospatial Ecology Tools (MGET). MGET can generate gridded heatmaps for grid-based closures, habitat suitability maps, and move-on rules that temporarily close part of a fishery when a catch or bycatch threshold is reached.

Data delivery and implementation

The primary mechanism for delivered dynamic management products to users is email or daily updates to a website. For example,Turtlewatch provides a daily map of sea surface temperatures with an outline of the area corresponding to higher probability of interaction with loggerhead sea turtles. Mobile apps have also been developed to deliver content and aid implementation of dynamic management measures. WhaleAlert and eCatch are examples of frequently used apps that deliver real-time information to the shipping and fishing industries to help avoid unwanted interactions.

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