Characterizing Pelagic Habitats within U.S. Gulf of Mexico Coastal Waters Using Satellite Derived Data and Machine Learning Algorithms

R. J. Allee , M. Finkbeiner - National Oceanic and Atmospheric Administration

R. W. Gould, Jr. , D. Ko - Naval Research Lab, Ocean Optics Section

D. J. Lary - Joint Center for Earth Systems Technology, UMBC

J. Kurtz - U.S. Environmental Protection Agency, Gulf Ecology Division

C. J. Madden, J. Soule - NatureServe

NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

Data Access and Acquisition:

The Alliance is committed to providing resource managers and Alliance partners access to Gulf-wide data and ecosystem support services system.

3. **When feasible, implement the Coastal and Marine Ecological Classification Standard (CMECS) for data collected in and around the Gulf.**

Objectives

- **Identify and assess water column classifiers for usefulness in delineating pelagic habitats**
- **Assess the utility of satellite remote sensing data and modeling to delineate and classify pelagic habitat types in select areas of the Gulf of Mexico**
- **Assess the utility of self-organizing map technology for delineating coastal habitats**
- **Further develop classification standardization in the Gulf of Mexico**

Satellite Derived Products

- **Satellite salinity maps derived from ocean color**
- **Chlorophyll maps as an indicator of trophic status in the pelagic habitat**
- **Euphotic depth maps to indicate the photic quality of the water**
- **Bottom to surface temperature difference maps through 3D hydrodynamic modeling**

Pelagic Habitat Characterization

- **Upload salinity, bottom to surface temperature differences and frontal probability maps into a GIS**
- **Create data layers for classification using a supervised approach to represent one of 12 pelagic habitat types**
- **Assess trophic status and photic quality data layers to assign habitat conditions**

Self Organizing Maps

- **Inputs include standard normalized water-leaving radiances, sea surface temperature, chlorophyll a concentration, salinity, calcite concentration, particulate organic carbon concentration, euphotic depth**
- **Classify and assess condition of pelagic habitats to train the initial map**
- **Provide SOMs for corresponding seasons for further evaluation.**

Evaluation

- **Comparison of unique product combinations used for classification with Essential Fish Habitat maps and species distributions**
- **Comparison of pelagic maps with SOM output**

Product Dissemination

- **Workshop with local and regional fisheries resource managers to evaluate pelagic characterizations**
- **Release maps for public access through:**
  - NOAA National Coastal Data Development Center's EcoWatch
  - NOAA Coastal Services Center's Digital Coast

Questions?