

Vegetative Indicators of Condition, Integrity, and Sustainability of Great Lakes Coastal Wetlands

Investigators and Institutions:

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Project Summary:

Objectives: The major question to be addressed by the master proposal that includes this subproposal is, “what environmental indicators can most efficiently, economically, and effectively measure and monitor the condition, integrity, and long-term sustainability of the Great Lakes coast?”

Specific objectives of this subproposal are to:

- 1) identify vegetative indicators of condition of Great Lakes coastal wetlands that can be measured at a variety of scales,
- 2) develop relationships between environmental stressors and those vegetative indicators, and
- 3) make recommendations about the utility and reliability of vegetative indicators to guide managers toward long-term sustainable development.

It is NOT an objective of this study to inventory Great Lakes coastal wetlands nor identify coastal wetlands worthy of preservation.

Approach: Great Lakes coastal wetlands are subject to both natural and anthropogenic forces that influence their vegetation. In order to reduce the confounding influence of natural differences among coastal wetland types, we will stratify wetlands into four groups based on shoreline geomorphology, and analyze data for those groups independently: open shoreline, unrestricted bay, drowned river mouth, and barrier beach wetlands. We will randomly sample wetlands in the four groups from throughout the Great Lakes, and also collaborate with researchers at the EPA MED in their ongoing studies of wetlands along the southern Lake Superior coast. Within each wetland, plant taxa will be measured in quadrats every 10-20 m along transects perpendicular to the water depth gradient. Field data will be summarized to compute indicators of wetland condition ("state indicators") such as abundance of invasive plants, presence of socially valuable species, and species richness. Interpretation and measurement of aerial photos of the wetlands will also provide landscape-scale state indicators, such as wetland area by type, and habitat adjacent to coastal wetlands. Pressure indicators (stressors) will be derived from remote sensing and existing data sources, and stressor/response relationships will be statistically developed to relate pressure and state indicators.

Expected Benefits: The final product will allow managers to use the indicators to communicate with the public on the condition and integrity of the Great Lakes, to guide development of monitoring programs, to identify areas in need of restoration or conservation, and to provide input on key indicators that need to be incorporated into modeling efforts to predict the future condition and integrity of the Great Lakes basin.