



NSF Award OCE-0083625

Biocomplexity: Physical, Biological, and Human Interactions Shaping the Ecosystems of Freshwater Bays and Lagoons

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Program Manager	Phillip R. Taylor OCE DIVISION OF OCEAN SCIENCES GEO DIRECTORATE FOR GEOSCIENCES
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NSF Program	1650 BIOLOGICAL OCEANOGRAPHY
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Abstract

This NSF Biocomplexity Program recognizes that thorough knowledge of ecosystem structure and function must incorporate the external environmental surroundings. The principal theme organizing this research effort is biocomplexity in open ecosystems. The main hypothesis is that the average time water takes to move through an aquatic system is a key variable defining the extent that ecosystems are self-organized or dominated by outside influences. The project team will study distinct and enclosed freshwater bays and lake-level lagoons (embayments) along the New York coast of Lake Ontario including the associated watersheds, wetlands, and human settlements. Lake Ontario embayments are representative of wetland-dominated coastal habitats around much of the Great Lakes and they are of great importance in the region. The embayments provide habitat for most Great Lakes aquatic species, change the quality of water entering the lakes, effect nutrient inputs to the open waters, support highly diverse and productive wetland vegetation, and provide very desirable locations for water-oriented human settlements. The investigators have identified eight study ecosystems that combine extremes of three key factors that will determine water residence time: bay volume, watershed size, and connectedness to Lake Ontario. All data and model simulations will be integrated mathematically to determine the conditions that allow ecosystem self organization or ecosystem property forcing by external factors. While the study is designed to answer fundamental questions about ecosystem control, the research will have major practical value for resolving technical questions about Great Lakes water level regulation. For this reason, a management and policy advisory panel has been organized with representatives of key international, federal, New York State, intergovernmental, and academic organizations. Panel involvement in the research will allow these organizations to understand the details of NSF sponsored research, and it will provide opportunities for them to be early adopters of the results. The education goal for the project is to complete a set of seven doctoral students that conducted their research within our interdisciplinary surroundings while specializing on one of the component fields. Project investigators will promote the themes of the NSF Biocomplexity Program to students through cooperative inter-field advising, cross-disciplinary research involvement, and a team directed graduate-level course in Biocomplexity Theory, Principles, and Research Methods.