



Munising Biological Station

The USGS Great Lakes Science Center is dedicated to providing scientific information for restoring, enhancing managing and protecting living resources and their habitats in the Great Lakes region. The Center is headquartered in Ann Arbor, Michigan, and has biological stations and research vessels located throughout the Great Lakes Basin.



The Station

The Munising Biological Station (MBS) is co-located with Pictured Rocks National Lakeshore in Munising, Michigan along the southeastern shore of Lake Superior. The station conducts ecosystem and community level studies of vegetation, soils and



landforms on USDI and other public lands in northern Michigan and Wisconsin. These studies focus on coastal terrestrial environments, and attempt to connect physical landscape histories with changes in plant communities and individual species populations over various time frames. Studies address broad successional trajectories of vegetation, trends in the fates of rare plant habitats and populations, rates of invasion by invasive plant species and other landscape change. The critical and current need for interdisciplinary study of change in coastal ecosystems stems from (and is facilitated by) recent accomplishments in the determination of lake level histories derived from studies of beach ridge sequences. MBS has used newly-available lake level histories to temporally frame natural habitat dynamics within Great Lakes coastal dunes.

Lake-level-driven changes in coastal dunes have been shown to influence coastal streams, lakes and wetlands as well as dune habitats themselves. Since the biological ramifications of these changes are poorly known, MBS works to place present processes in paleoecological perspective. MBS also works to demonstrate ecosystem change brought on by environmental events not directly observed, but clearly prominent in the earth system's record. Studies of coastal landscape change serve USDI and other managers of coastal public lands by documenting patterns of past change so that managers can place management issues (e.g. facility placement and maintenance, monitoring and management of rare species) in proper context.

Projects

Active projects at MBS include: 1) Holocene history of Great Lakes coastal dunes. This study plan explores the history of broad scale change in soils and dune



morphology in response to lake level change through studies of buried soil layers that crop out within coastal dune fields. Sites include Pictured Rocks and Sleeping Bear Dunes National Lakeshores, the Hiawatha and Huron-Manistee National Forests, and Tahquamenon Falls and Ludington State Parks. 2) Response of coastal vegetation to lake level change along the upper Great Lakes. This study investigates change in plant community structure and composition through a time series reading of permanent transects established along the Great Lakes coasts. 3) Imprints of land use history on wetland pine islands and northern hardwood/hemlock/white pine forests. This project employs land use history and resultant impacts to layer establishment of permanent forest plots in old and second growth pine and hardwood/hemlock forests of Pictured Rocks and Apostle Islands National Lakeshores and the Seney National Wildlife Refuge.

Partners

Primary partners include public land managers in northern Michigan (NPS, USFS, USFWS, MDNR), soil scientists with USDA-NRCS in Marquette, Michigan and collaborators at regional universities (University of Wisconsin-Eau Claire, University of Nebraska, Michigan State University, University of Toledo, Michigan Technological University and Northern Michigan University). Collaboration has brought many tools to investigations of MBS, including ground penetrating radar, wetland and lakebed vibracoring, and optically stimulated luminescence (OSL) dating of sand deposits.