

Research Projects

2005 - 06

Pictured Rocks National Lakeshore
National Park Service
U.S. Department of the Interior



Aquatic Investigations

Coaster brook trout are a life form of native brook trout that spends part of its life in tributary streams and part in coastal areas of large lakes like Lake Superior. As adults they look different from stream-dwelling brook trout and were sought by anglers for their large size, attractive scale markings, and taste. Populations took a precipitous decline due largely to over-harvesting but also to predation by sea lamprey; competition from



introduced, non-native salmon; and the sedimentation of gravelly spawning habitat. Graduate students from Dr. Jill Leonard's lab at Northern Michigan University are conducting research in three streams at

Pictured Rocks National Lakeshore (PRNL) to track movements of electronically tagged brook trout and non-native steelhead and investigate the extent of competition for habitat and spawning beds. The fisheries researchers periodically electroshock streams with backpack units to assess survival and size class structure of these species. Researchers have found that resident, wild brook trout also travel from stream to stream along the Lake Superior shoreline, so genetic analyses are being conducted to determine their heritage, since brook trout with origins in Québec, Pennsylvania, New York, and Maryland have been stocked in streams in the area since 1904. For additional information on this and the following aquatic investigations, please contact Lora Loope, Aquatic Ecologist, Science and Natural Resources at 906-387-2650 or via e-mail at: lora_loope@nps.gov.

The Aquatics Monitoring Program continues. Protocols consistent with those of national parks throughout the Great Lakes region are being implemented this year for long-term monitoring of six inland lakes at PRNL. The purpose of this program is to establish baseline data on select physical, chemical, and biological parameters within inland waters of the Lakeshore, and is designed to detect long-term changes in the environment. In addition, staff will regularly monitor aquatic habitats for



the presence of non-native species like zebra mussels and purple loosestrife. Populations of the non-native spiny water flea, known to be present in Beaver Lake since 1997 and in Grand Sable Lake since 2002, will be

monitored. Major streams at PRNL are monitored for fluctuations in discharge, or flow.

Pictured Rocks National Lakeshore cooperates with the U.S. Fish and Wildlife Service's Sea Lamprey Control Program to estimate the population of this non-native sea lamprey. Spawning adult populations in the Miners River are estimated using a mark/recapture method. Sea Lamprey Control staff from the Fish and Wildlife Service



estimate larval populations of sea lamprey in select streams using backpack shocking units.

Inventories of butterflies and skippers (Lepidoptera) as well as dragonflies and damselflies (Odonata) continue throughout PRNL for the third year. The park works with insect specialists at the Museum of Zoology of The University of Michigan who have established Michigan Odonata Survey to document a species occurrence and range distribution database for this group of insects. PRNL also receives support from specialists at Michigan State University in the accurate identification of butterfly, skipper, and moth specimens.

Vegetation Investigations

Exotic Plant Management will continue during the 2005 field season. Pictured Rocks National Lakeshore staff, in cooperation with staff and volunteers from The Nature Conservancy, will remove invasive exotic plants from Sand Point in Munising and Coast Guard Point in Grand Marais. An exotic plant management team, which serves 9 Great Lakes National Park units, will spend one week removing invasive exotic plants in the Grand Sable Dunes. The objectives of this effort include restoration of native habitat and protection of threatened and endangered plant species. Efforts at Pictured Rocks NL are focused on the Grand Sable Dunes. The dunes contain several large infestations of invasive non-native plants which are spreading and altering native plant communities. These populations, as well as communities of rare and endangered native plant species, have been mapped using GPS technology. This information is being used to guide control efforts and model the occurrence and possible spread of non-native plants. A total of 370,500 exotic plants were removed from the dunes from 2001-2004. For more information on this project and the following vegetation investigations, please contact Bruce Leutscher, Biologist, Science and Natural Resources at 906-387-2680 or via e-mail at: bruce_leutscher@nps.gov.

Lakeshore biologists will conduct Stream Mapping during the 2005 field season. Survey grade Geographical Positioning System (GPS) technology will be used to map stream courses that are not represented in the lakeshore's Geographical Information System (GIS) database. Accurate stream location data is important for lakeshore planning and scientific investigations. One immediate benefit will be increased accuracy in spatial modeling for plant and animal habitat.

A Campground Impact Study will begin in 2005. Lakeshore staff will survey vegetation composition and structure, down woody debris, and soil compaction associated with backcountry campgrounds. This study will attempt to discern the severity and spatial extent of impact from campgrounds to vegetation surrounding campsites by comparing data with control sites not impacted by continued human disturbance. Staff will

also survey for invasive non-native plants to determine if problem species are being carried in by campers and if exotic plant control efforts need to be initiated.

The University of Wisconsin will use established forest inventory plots at PRNL to conduct a study to determine which Forest Inventory and Monitoring protocols are most effective and efficient for monitoring vegetation in Great Lakes national parks. The project proposes to compare several sampling methods that differ in their



emphasis and thus sensitivity for detecting various kinds of ecological change. Measurements at each plot include indicators for forest health, forest structure, tree growth, overall vegetative

biodiversity, downed woody materials, and abiotic parameters such as soil type. Long-term data will track changes in the forest, provide early detection of threats to forest health, and provide valuable information related to management of Lakeshore resources.

Researchers from Michigan Technological University will sample for Emerald Ash Borer (EAB), an exotic forest pest, during 2005. Trap trees will be established near Hurricane River campground to attract EAB for purposes of detecting presence of the insect which kills ash trees. The EAB has killed millions of ash tree in the lower peninsula of Michigan, and threatens all of Michigan's estimated 700 million ash trees. The insect is moved when people transport infested wood from one area to another. Michigan agencies are cooperating to contain this insect and protect Michigan's forests.

Wildlife Investigations

A Black Bear Ecology Project will continue during May 2005 by PRNL biological staff. The intent of this project is to determine black bear movements, activity patterns, and habitat use in relation to human activity at the Lakeshore. Biologists intend to determine whether bears avoid, select, or are indifferent to areas heavily used by people. Black bears will be captured in standard culvert-style live traps during June-July. Select bears will be immobilized and receive a radio transmitter. These transmitters send a unique signal that biologists can receive to determine their location. Locations will be plotted using a geographic information system and used to determine home range, preferred habitats, and survival rates. For more information on this project or the following wildlife projects, please contact Jerry Belant, Supervisory Biologist, Science and Natural Resources at 906-387-4818 or via e-mail at: jerry_belant@nps.gov.

Additionally, PRNL biologists will be conducting a study to estimate the number of black bears that reside in PRNL. Currently population estimation methods employed in the Upper Peninsula are effective at a larger spatial resolution and are unsuitable at the lakeshore. A hair snare consisting of a single strand of barbed wire attached to 3-4 trees 50 cm above ground will be placed in each 640-acre section of the lakeshore. Snares will be lured with fish oil and anise oil to attract bears. Hair samples will be obtained from barbs snaring hairs as bears enter the sites and will be collected every 2 weeks. Hair samples will be submitted to a genetics laboratory to determine individual identification of bears that enter snare sites. Using information obtained from DNA and mark-recapture techniques, we will be able to obtain

the first population estimate of black bears in the lakeshore.

White-tailed deer populations have increased markedly throughout much of the Midwest. Areas with overabundant deer herds have experienced changes in plant species composition and loss of plant diversity. Consequently, lakeshore scientists are collaborating with biologists from Apostle Islands National Lakeshore, Sleeping Bear Dunes National Lakeshore, National Park Service Great Lakes Inventory and Monitoring Network, and the U.S. Department of Agriculture's National Wildlife Research Center to develop a non-invasive technique to obtain tissue samples suitable for genetic analysis from white-tailed deer. Initial trials using 2 types of hair snares with semi-captive and free-ranging deer have been successful. Once finalized, this technique will be useful for monitoring trends in white-tailed deer abundance, estimating populations, and determining genetic origin.

A Forest Carnivore Monitoring Project will be conducted this spring. Lakeshore biological staff have modified or developed non-invasive techniques for assessing distribution and activity levels in various habitats for fishers and



martens. Although we know these species occur within Pictured Rocks, no detailed information on their distribution or ecology exists. At least two types of hair snares will be evaluated to deter-

mine their efficacy in detecting their presence and suitability for DNA analyses. Some live capture and radio telemetry work will also be conducted, emphasizing American martens and fishers to assist in verifying these techniques. Radio telemetry locations will also be used to further determine habitat preferences of these species, particularly in relation to timber harvest.

Atmospherically deposited mercury contamination is a significant concern in many lakes, rivers, and reservoirs throughout the Great Lakes region. PRNL experiences adverse impacts of mercury pollution, primarily as fish consumption advisories. Lakeshore biologists are collaborating with staff from Voyageurs National Park and the Great Lakes and Northern Forests Cooperative Ecosystem Studies Unit in a pilot study to determine the role of beaver-created impoundments on methylmercury (MeHg) cycling in two northern forested systems in the Great Lakes region. Mercury production in beaver impoundments of various ages will be measured, and cycling of MeHg through terrestrial/semi-aquatic forest habitats will be measured. Water, sediment, plant, and animal tissues will be collected and analyzed for mercury concentrations to determine pathways of MeHg through food webs associated with beaver ponds. This information will also be useful for estimating the contribution of beaver ponds to total MeHg production and cycling at larger scales.

