



## Monitoring Water Quality in the Apostle Islands

- Lagoons in the low areas between dunes (interdunal) in the Apostle Islands are formed by groundwater, rainfall, and snowmelt.
- All the lagoons were once, and occasionally still are, connected to Lake Superior.
- There are four interdunal lagoons in the Apostles, one each on Outer, Stockton, and Michigan islands, and one at Little Sand Bay on the mainland.
- Interdunal lagoons are important to visitors for fishing, paddling, and other recreational activities, and to frogs and other wildlife as breeding and foraging areas.



### Long-term and Regional Comparisons

Interdunal lagoons are sampled once a month (June-August) as part of an inland lake water quality monitoring program in nine Great Lakes region national parks. A multi-probe instrument is lowered into the water to record temperature, pH, specific conductance, and dissolved oxygen at regular intervals until the probe reaches the bottom. An advanced set of parameters, including the amount of nutrients (phosphorous and nitrogen), are measured by collecting water samples, which are analyzed in the laboratory using standardized techniques. Regular monitoring here and in the other parks helps us describe basic physical and chemical characteristics of inland lakes and to determine the current status of and detect future changes in those lakes. And by sampling the same characteristics in each of the nine parks, we can compare trends across the Great Lakes region.

### What We Are Finding in the Apostle Islands

- All four lagoons are shallow so the temperature of the water near the surface was high during the mid-summer, reaching approximately 30°C (86°F) in all except Little Sand Bay (LSB), which measured 23°C (73°F).
- The three island lagoons differ from the LSB Lagoon primarily in their sources of potential stress. The LSB Lagoon is on the mainland and has a small stream feeding it, so pollutants or sediments from runoff may be a source of stress. The other three lagoons have only minor stream inflows and no development, so primary sources of stress are atmospheric deposition and climate changes.
- Calcium concentrations in the lagoons are not high enough to support the exotic zebra mussel.



*The Great Lakes Inventory and Monitoring Network is a group of nine national parks in Minnesota, Wisconsin, Indiana, and Michigan that share similar management issues. The Great Lakes I&M Program office is in Ashland, Wisconsin. Program staff work with managers at each of the nine parks to develop long-term scientific monitoring programs that help to track the “health” of natural resources and provide information for making management decisions. Visit us online at <http://science.nature.nps.gov/im/units/glkn/>.*