

Isle Royale National Park

This project was initiated in June 1982. Four watershed/lake ecosystems are under study: two on Isle Royale and two on the Upper Peninsula of Michigan. The two on Isle Royale are similar in character except for glacial till composition and water chemistry, and are representative of systems in this national park. These watersheds are dominated by boreal forest. Research shows that the two Isle Royale lakes are not directly sensitive to anthropic acidification. The Upper Peninsula sites are sensitive to present levels of acid inputs. They differ from the Isle Royale sites in geological substrate, and are forested with northern hardwoods.

Routine meteorological data are collected on all sites. Stream discharge into and from the lakes is measured. Periodic baseline measurements are made every 5 years on each site. These include: plant biomass and biomass components, forest litter, soils, and plant community composition. The lakes are sampled seasonally at multiple depths and at multiple stations. Temperature, light, and chemical profiles are determined, and primary productivity and chlorophyll *a* measured. Color, pH, alkalinity, specific conductance, macro ions, total nitrogen, and trace metals are determined on most lake and streamwater samples. Research projects include analysis of lake sediment cores; precipitation modification by forest canopy, litter layer, and soil in both vegetation types; nitrogen budgets as affected by *Alnus* (alder) and beaver activity; forest soil anion mobility; and snowpack nutrient accumulation and ionic movements. Most sample analyses and data processing are conducted at Michigan Technological University.

In 1985, a four-year study of lake primary productivity and chlorophyll was ended. The results are considered valuable in themselves, especially in this region, but recent research has found that this kind of study is not a good indicator of ecosystem change, certainly over periods of less than 10 years. NAPAP-related research is presently focusing on the following topics:

snowpack ionic loading and dynamics in a small first-order watershed (underway for seven years, probably one of the longest intensive snow quality/ionic movement records in the nation—paper submitted); sulfate anion mobility in boreal and northern hardwood forests (papers submitted); qualitative relationships among canopy throughfall, soil solution, and lake water chemistry in a very sensitive aquatic ecosystem; completion of a nutrient cycling study in a boreal forested ecosystem; and a study of a gradient of anthropic atmospheric inputs to national parks of the Great Lakes Basin (paper submitted). There will be an attempt next winter to plug data into an existing watershed model for testing.