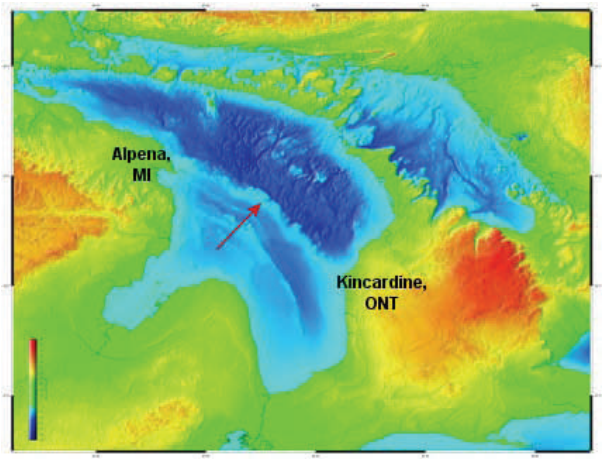
Noble Odyssey Foundation **PROJECT BULLETIN** *August 26, 2005*

NOF Begins Underwater Exploration of the Huron Ridge

During July and August the Great Lakes Division of Sea Cadets, supported by the Noble Odyssey Foundation, began a long-term investigation of a massive geological formation lying beneath the waters of Lake Huron. Called the Mid-Huron Ridge, it is a submerged rampart of limestone that extends for about 100 miles between Alpena, Michigan and Kincardine, Ontario. The feature is little known except to scientists and offshore fishermen. Even less known, the Huron Ridge in prehistoric times formed a land bridge across the lake when water levels were as much as 400 ft. lower than at present. During this time, groundwater, seeping downhill through porous bedrock, leached channels and cavities in the limestone.



The Huron Ridge formation in Lake Huron (NOAA image).

Sinkholes and Springs

In some places the land over cavities collapsed, creating sinkholes. Groundwater emerged as flowing springs in coastal sinkholes and at other low-lying points along the ancient Lake Huron shore. Even after the lake refilled, some flows continued up to the present. Today these underwater sinkholes and springs may provide fascinating insights to ancient features of geology, biology, and perhaps even human pre-history.

Middle Island Sinkhole

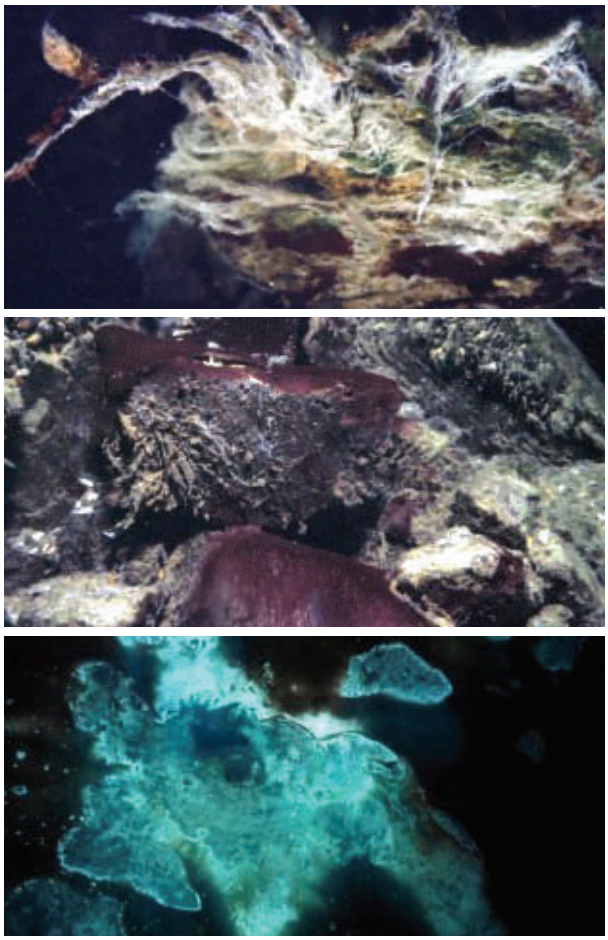
We began our investigation of the Huron Ridge near Middle Island, a few miles northeast of Alpena, MI. There. a large sinkhole lies just off the island's shore. Our divers soon located two underwater springs that flow actively from the base of the sinkhole's steep walls at a depth of about 70 ft. The spring water proved to be cold, almost devoid of oxygen, and rich in minerals such as sulfur and iron. Because of its higher density the discharge spreads across the floor of the sinkhole, forming a distinct layer. Most interesting, however, are the lush colonies of microorganisms that flourish only in the cold discharge layer. These colonies take several forms, from white hairy growths, to purplish mats, to pale networks of fibers growing on the rocks or sandy bottom.

Aerial photo of Middle Island sinkhole (T. Black).

NOF divers prepare to explore the sinkhole (L. Clyburn).

Diver at the edge of the Middle Island sinkhole (L. Clyburn).

Huron Ridge Exploration (continued)



Microbial colonies: hairy growths (top), purple mats, and fiber networks around a discharge hole (S. Nelson).

On this occasion much organic debris from the colonies was suspended in the strong current. The divers noticed many small fish apparently feeding on this material. Occasional dead fish on the bottom within the discharge layer suggested that they had accidentally suffocated in the oxygen-poor water. If such underwater springs are common, they may represent an important local source of productivity in the lake ecosystem.

Microbial Communities

Our partners in the Middle Island study are scientists at the Annis Water Resources Institute at Grand Valley State University. They had earlier investigated a deeper sinkhole in the same area, finding similar looking colonies of microbes

AWRI scientist, Scott Kendall, demonstrates a water quality probe to Sea Cadets on board the Pride of Michigan.

around an underwater spring there. Currently AWRI staff are investigating the identity of the organisms we collected at the Middle Island sinkhole. They suspect that these microbes include photosynthetic, chemosynthetic and heterotrophic bacteria similar to those found in some caves and around hydrothermal (hot water) vents in the deep sea.. One common feature of these microbial environments is the mineral-rich and poorly-oxygenated water. Scientists agree that such microbes are among the most primitive and adaptable organisms on earth. Further investigations of the Middle Island springs and their fascinating life forms are planned for 2006.

Purple filaments of a photosynthetic bacterium From the Middle Island sinkhole springs (AWRI).

Noble Odyssey Foundation
9000 Gale Road
White Lake, MI 48386
Tel (248) 666-9359, Fax (248) 666-5229
www.nobleodyssey.org