Island Heritage Trust News

IHT Preserves function as outdoor science labs
by Elke Dorr

To the casual visitor, Pine Hill Preserve on Little Deer Isle may serve simply as a high platform from which to enjoy stunning, bird’s-eye views of the surrounding land and sea. However, to Dr. Nishanta Rajakaruna, Professor of Botany at College of the Atlantic in Bar Harbor, the serpentine outcrop of Pine Hill represents an outdoor laboratory, one in which the relationship between an extreme habitat and the unique species it supports can be closely observed and examined. Although serpentine appears throughout the world and has been widely studied, sites in the northeastern corner of the United States have been significantly underexplored, according to Rajakaruna, a deficit the enthusiastic professor has been ameliorating through his ongoing studies at Pine Hill and his subsequent, extensive publications.

Serpentine, the rock found at Pine Hill, is metamorphic; that is, it was formed by exposure to temperature and pressure extremes within the earth’s crust and is distinguished from other rocks, in part, by its high concentration of heavy metals, making it of particular interest to Rajakaruna. For more than six years he has brought his students to Pine Hill as well as to Settlement Quarry, composed primarily of granite, where they have conducted studies about how plants adapt to their habitats. While much of their research has been focused on the relationship of vascular plants, bryophytes (true mosses) and lichens to the fragile environment represented by the two sites, Rajakaruna’s team has also studied the effect of heavy metal content on insects.

In another project, Dr. David Porter, Emeritus Professor of Mycology, University of Georgia, has joined Rajakaruna to conduct a year-long study of how serpentine soils affect fungi. Additionally, a comparative study to examine plant diversity at the two sites was also conducted. Katie Jumper, a student researcher at University of Southern Maine and member of Porter and Rajakaruna’s team, recently presented her findings at the annual meeting of the Mycological Society at Yale University. In her preliminary findings, Jumper noted that this spring the team found “28 terrestrial species on the serpentine site and 25 on the granite.”

For Rajakaruna, such findings reflect the significance of the preserves to his research. Both sites—Pine Hill and Settlement Quarry—are “ideal settings . . . critical to pursuing my research,” he said. That research has produced, with student authors, a number of scientific papers and most recently a book co-edited by Rajakaruna titled, Serpentine: The Evolution and Ecology of a Model System. He emphasized that “plants associated with serpentine soils are not merely biological novelties . . . they also hold great potential as tools for the restoration of metal contaminated sites,” such as former mining sites.

Dr. Amanda Olsen, Assistant Professor in the School of Earth and Climate Sciences, University of Maine, Orono, has also found Pine Hill of significant value to her research. Because serpentine is heavy metal rich and nutrient poor, it presents a particularly attractive environment for her study of chemical weathering, “the process by which water and rock interact, causing elements to be released into the environment.” For Olsen, Pine Hill represents a unique environment, one she characterized as “dramatically, chemically different from most other rocks in Maine,” and offering her a singular look at “water-rock reaction.”

The results of her study suggest that chemical weathering occurs “up to five meters deep, in the bedrock.” Her work, she commented, has thus far culminated in two research papers, one fund grant proposal, and data for another proposal.” Currently, she also has a National Science Foundation grant proposal in the works. Quick to credit the Trust, she noted, “IHT’s access and support has been crucial to our success.”

Plant diversity and adaptation and chemical weathering aren’t the only subjects under the scrutiny of scientists at IHT preserves, however. While many islanders and visitors are aware of the Native American presence at the site around 3,000 years ago that “ended in the mid-to-late 17th century.” Included among the 2,500 to 3,000-year-old artifacts that the group discovered are early pottery as well as animal remains, consisting of “harbor seal, deer, bear, ducks, geese, sculpin, flounder and eel.” Additionally, the team unearthed shell beads, bone tools and spear points, as well as European artifacts that include pipe fragments, glass beads, and an iron spike, dating to the 1600s.

While Cox indicated he had had “relatively low expectations” for the site given its small size, “it turned out to be far more significant and interesting than expected.” He has presented his findings in an article published in Maine Archaeological Society Bulletin: Vol. 49, Spring 2009. Additionally, Cox has assembled an exhibit of the Scott’s Landing findings, available for public viewing at the DIS Historical Society. Clearly, IHT’s preserves figure as more than simply places of recreation or meditation. They also serve to maintain habitats, protect and preserve species as well as enhance our understanding of early island inhabitants and of the natural world. They may even help us ultimately to restore damaged and degraded parts of our planet.

Serpentine outcrop at IHT’s Pine Hill Preserve. Photo by Ann Florence

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