Appendix F

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Maquam Bog

Shad and Metcalfe Islands and Maquam Bog Discussions

Shad and Metcalfe Islands

On June 6, 2005, the Refuge staff met with David Capen and Zoe Richards of the University of Vermont to discuss the management of the great blue heron rookery, cormorants, and floodplain forest habitat on Shad and Metcalfe Islands. The Shad Island heron colony is thought to be at least 60 years old and is the second largest colony in the great lakes region with 500-600 nests at its peak. In 2001 the colony failed with no reproduction and has been rebounding since then with 300 nests in 2004. The Missisquoi NWR colony, along with the Valcour Island colony on the New York side of Lake Champlain near Plattsburgh, are ranked as important based on their size, longevity, quality of habitat, and because they are well-established and stable, compared to more mobile colonies. The Refuge colony is extremely important since it functions as a source for the regional heron population.

Of management concern on Shad and Metcalfe Islands is the increasing population of double-crested cormorants. Cormorants are known to cause habitat destruction around their nest sites, although most of these sites are rocky outcrops with little vegetation. Shad and Metcalfe are forested floodplain and hence are not the same conditions as other cormorant-occupied islands. Cormorants typically occupy predator-free islands. The predator population (particular raccoons) is high on Shad Island, where cormorants have not successfully nested. Perhaps in response to predation pressure, cormorants have shifted some to Metcalfe Island where it is harder for predators to reach and have successfully nested there. Herons appear to fiercely defend their nests from predators such as raccoons.

Great blue herons are used to nesting in mixed colonies so there appears to be no direct negative influence from cormorants. So far the cormorants are not degrading the forested floodplain habitat on Shad Island with sufficient habitat for both herons and cormorants. Herons nest earlier but cormorants are coming back sooner each year. Missisquoi Bay offers excellent fishing, making it an attractive area for cormorants. Given the increasing trend of cormorant numbers, managers are concerned about the impacts of a growing cormorant population on habitat conditions. Cormorants were first spotted on Lake Champlain in 1981 and the current cormorant population on the lake is 4,000, indicating a potential for the population to grow quickly. The State of Vermont is actively keeping nesting cormorants off islands by egg oiling and shooting.

Although no habitat effects on the floodplain forest from cormorants are evident at Missisquoi NWR, this could change if the population increases to several thousand nests. A lot of the places where cormorants are controlled have gulls or other more common species and the visibility is better. At Shad and Metcalfe Islands the cormorants are mixed in with the heron colony in a dense floodplain forest. The soils here are also different and may provide some buffering to the effects of cormorant excrement on vegetation. Even if some cormorants are eliminated other birds may replace them even in the same season.

The expanding cormorant population in Lake Champlain is a regional issue. The Refuge needs to participate in region-wide planning and activities, as cormorant management issues can't be solved in isolation. Cormorants are pushed from one place to another. The Refuge needs to decide on the primary objectives for Shad and Metcalfe Islands (i.e., as a heron colony, floodplain forest). Capen and Richards suggest the Refuge establish a cormorant threshold as a no cormorant policy is too

risky since it would likely cause too much disturbance to herons to maintain that condition. More research and monitoring is needed to understand cormorant population trends and where they are coming from and to track changes in productivity.

Maquam Bog

On July 7, 2005, Refuge staff toured the Maquam Bog with Ian Worley (University of Vermont) and Eric Sorenson (Vermont Natural Heritage Program) to discuss the ecology and management of the bog. The Maquam Bog was designated a Research Natural Area in 1991 because of its size (largest if its kind in Vermont), the large populations of Virginia chain fern (a Vermont endangered plant) and rhodora, and the juxtaposition of this acid-loving community so close to the nutrient-rich Missisquoi River delta. The bog is bordered on the north by Charcoal Creek, on the east by Maquam Creek, on the south by Maquam Bay, and on the west by fields and shrublands along Tabor Road.
The Bog sits in an abandoned channel of the Missisquoi River (Fillon 1970). The shift of the River away (4000 or more years ago) from this area isolated the bog from the sediment supply and led to the accumulation of peat. As peat accumulated over time, the bog rose above the flood levels, favoring acid conditions and the growth of bog vegetation. Strimbeck (1987, 1988) described the bog as having concentric rings of high shrub, low shrub, and shrub sedge vegetation zones. Changes in hydrology and/or climate can cause shifts in the distribution of these zones. The outer rings of the bog still flood every spring when lake levels are high.

Maquam Bog is a diverse peatland complex of regional and national significance. Hummocks and hollows are common throughout the bog. The central part of the bog supports six known species of sphagnum moss and a species of hairy cap moss, along with several species of sedges and scattered pitch pine and red maple and gray birch saplings. More research is needed to understand the physical and ecological conditions that are driving the distribution of all three of these tree species, including the history of fire. Ecologists are concerned about the potential expansion of red maple that might lead to a change in other bog vegetation such as the chain fern. The habitats surrounding the central part of the bog are also unique and varied and include diverse oak uplands underlain by shale.

Before proceeding with any management action in the bog, the Refuge needs to determine the primary objectives for this area – for biodiversity, rare plants, large natural area, or other purposes. Several pieces of information are needed to inform any management decisions. These include data on surface topography and elevations across the bog and the long-term fire history that might come from core samples. The topography and elevations will help understand the seasonal and year-to-year fluctuations in hydrology that in turn affects vegetation. Use of active management, such as prescribed fire, within the bog is logistically difficult given the challenges with access and the lack of any potential firebreak. In the short-term, natural processes will continue to shape the ecology of Maquam Bog.