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Preliminary Biodiversity Assessment of Yankeetown Pond, Town of Woodstock, Ulster County, New York

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At the request of Erin Moran, I accompanied her on a ca. 2.75 hour canoe and kayak reconnaissance of the central portion of Yankeetown Pond, and also visited the beaver dam at the pond outlet on foot, on the afternoon of 17 July 2019. The objectives of this field trip were to: 1. Observe the pond flora; 2. Assess the habitats for biodiversity; 3. Make recommendations regarding management of the water-lilies; and 4. Make recommendations about the beaver dam and water levels.

Yankeetown Pond was briefly described in reports by Barbour et al. (1995) and Haeckel et al. (2012). The habitat complex is a circumneutral bog lake (CBL; Kiviat and Stevens 2001) with a false bottom of unconsolidated peat, peat rafts (masses of the organic bottom sediment) that float to the water surface, and a mixture of plant species associated with pH-neutral or acidic habitats. Other common features of CBLs are floating peat mats, and a moat around the lake margin; it is unclear if Yankeetown Pond has a moat and mats. CBLs are an unusual habitat complex and commonly support rare plants and animals, making CBLs in general, including Yankeetown Pond, important for biodiversity conservation. However, CBLs have not been studied much. In recent years there has been controversy regarding a large beaver dam at the outlet of Yankeetown Pond that raised the water level, and dense beds of water-lilies that inhibit kayaking and canoeing in summer.

Description of the Pond

Yankeetown Pond, at elevation 257 meters (843 feet) covers approximately 50 hectares (about 120 acres) including the 0.4 ha island. The area is underlain by shale and sandstone bedrock (Fisher et al. 1961) and the surficial material is glacial outwash (Cadwell and Dineen 1987). CBLs are characteristically conditioned by calcareous (calcium-rich) groundwater, and the flora of Yankeetown Pond indicates this although the local geology is not obviously calcareous. A small stream flows from a smaller pond into the eastern end of Yankeetown Pond, and the outlet is at the western end of Yankeetown Pond. Yankeetown Pond is in the Little Beaver Kill drainage basin, a part of the New York City watershed.

I observed superabundant white water-lily (*Nymphaea*) on the pools and channels of Yankeetown Pond, with yellow water-lily (*Nuphar*) and common bladderwort (*Utricularia vulgaris*). Peat rafts (masses of bottom peat that float to the surface in the white water-lily beds) were colonized by mermaidweed (*Proserpinaca palustris*), a dwarf spike-rush (*Eleocharis*), and other plants. More stable masses of peat and hummocks (small raised structures) supported swamp loosestrife (*Decodon verticillatus*), marsh fern (*Thelypteris palustris*), royal fern (*Osmunda regalis*), and many other plants. Additional species, such as threeway sedge (*Dulichium arundinaceum*), were present in the shallowest water. I saw large cranberry (*Vaccinium macrocarpon*) and round-leaved sundew (*Drosera rotundifolia*), both rare in the areas where I paddled. Many other plants species occurred in other habitats within the pond. There were numerous beaver lodges in the pond, mostly inactive-looking, and the lodges supported additional plant species. White pine (*Pinus strobus*) and other trees bordered the shorelines, including trees that had evidently been killed by prolonged high water levels. I did not survey herbaceous plants around the shorelines; at a CBL in Dutchess County (Thompson Pond) the shoreline flora is very diverse. There is little evidence of nonnative weeds, and at

present these do not seem to be a threat to the pond (purple loosestrife [*Lythrum salicaria*] is present but rare in the pond, and seems to be mostly confined to beaver lodges).

Peat rafts were numerous in Yankeetown Pond. Typically, peat rafts rise to the surface in spring or summer, buoyed by gases of decomposition in the white water-lily beds, and sink again in the fall when the water cools. Some peat rafts remain at the surface and develop vegetation of larger plants in subsequent years. Yankeetown Pond has peat rafts with a variable degree of vegetation development. Some CBLs, such as Thompson Pond (Kiviat and Zeising 1976), have floating mats, which are more extensive and stable floating peat structures with highly developed vegetation. I did not see floating mats at Yankeetown Pond, but would expect them to occur in portions of the pond.

The water levels in Yankeetown Pond have been high in recent years due to a large beaver dam at the outlet. Detailed information is not available about how the increased water level may have affected vegetation, other than the presumed effect of killing some of the shoreline trees. Raised water levels in bog lakes can cause floating mats to break up and probably many other changes.

Preliminary Biodiversity Assessment

Yankeetown Pond has potential habitats for many uncommon and rare animals and plants. Among wildlife species that have been found at other Hudson Valley CBLs, I would expect to find spotted turtle (New York Special Concern), musk turtle (Species of Greatest Conservation Need [SGCN]), American black duck (SGCN), Virginia rail (uncommon; found there in a previous survey), common gallinule (regionally-rare), and possibly blue-spotted salamander (Special Concern), northern (eastern) cricket frog (Endangered), king rail (Threatened) and pied-billed grebe (Threatened). Evidently there have been no detailed surveys of the pond's flora and fauna.

Recommendations

Given the general conservation importance of CBLs and their rarity in the Catskills region and Hudson Valley, it would be worthwhile to conduct a full survey of the flora of Yankeetown Pond as well as a bird survey. Diverse plants and wildlife have been documented at Thompson Pond (Busch 1976), a Dutchess County CBL similar in size to Yankeetown Pond. Because of the importance of a CBL to biodiversity, I would discourage the use of herbicides, grass carp, or dredging to manage vegetation in Yankeetown Pond. Phosphorus levels have increased in recent decades at Thompson Pond, which seems to be the cause of greater water-lily and peat raft cover there and of the disappearance of a few plant species adapted to low nutrient levels. Stewardship of CBLs should include any appropriate actions to reduce nutrient inputs to the ponds, including voluntary reduction of fertilizer use and regular maintenance of septic systems.

A "beaver deceiver" or beaver pond leveler can be installed in the beaver dam at the pond outlet to lower the water level. Many designs have been used in beaver ponds; these can be found on the Web. It may take some experimentation with different designs or materials to achieve a solution. I recommend not lowering the water more than 30 cm (one foot) initially to see how this affects the pond and its amenity and biodiversity values, as well as the degree to which this

allays concerns that shorefront homeowners have about flooding of their properties. A leveler will also need to be maintained because of potential damage from ice, beavers, floods, or other factors. Lowering the water level too much may make boating even harder, and could make the pond more invasible by nonnative weeds such as common reed (*Phragmites australis australis*).

A mechanical harvester can be used to remove water-lilies to create lanes for boating and fishing in Yankeetown Pond. This would have less adverse effect on plants and wildlife than harvesting larger areas of water-lilies. The harvesting can take place in early summer (e.g., beginning of July) to avoid the bulk of the bird breeding season. It may be necessary to harvest more than once per season, depending upon how quickly the water-lilies regrow. It is important to avoid removing sediment, including peat rafts, as much as possible. Harvested material should be disposed of in a location where nutrient-rich water will not flow back into the pond (although nutrient [phosphorus and nitrogen] removal will be minor with this harvesting approach, it is beneficial to reduce nutrient stocks in the pond). If desired, harvested material may be composted with other organic materials in a safe, contained location, and the compost used for gardening.

Permits from the New York State Department of Environmental Conservation are needed for pond levelers, other alteration or removal of a beaver dam, or harvesting of aquatic vegetation. Inasmuch as vegetation management is often controversial, prior to and during harvesting it might be appropriate to post signs that say, e.g., “Vegetation management in progress” or “Restoration in progress.”

I discourage routing trails along the shorelines of water bodies or wetlands, because walkers can disturb breeding birds and have other adverse effects. A footpath perpendicular to the shoreline that ends at the shoreline is much less likely to disturb wildlife and plants.

In conclusion, stewardship of Yankeetown Pond is important because it is a rare habitat complex in our region, and it likely supports a number of uncommon and rare plant and wildlife species. Managing the water levels and vegetation could have undesirable consequences for biodiversity, thus a gentle approach is necessary. I believe a beaver deceiver can be used to regulate the water level, and harvesting of water-lilies in lanes can alleviate the current challenge to boating and fishing. Because it is hard to predict effects on a complex natural system, any management should be pursued in increments, with adaptation based on observed effects.

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