New England Botanical Club – Minutes of the 980th Meeting

13 September 2002 Arthur V. Gilman, Recording Secretary *pro tempore*

The 753rd meeting of the New England Botanical Club, being the 980th since its original organization, met on Friday, September 13, 2002, at the Fairbanks Museum and Planetarium in St. Johnsbury, VT, with about 24 members and guests present. Vice President Arthur Gilman introduced Marcia Spencer-Famous who spoke to the Club on "The Feasibility of Peatland Restoration." Marcia and her husband, Norm Famous, have teamed to study the possibility of restoring raised ombrotrophic peatlands following extraction, or mining, of the peat. This issue has become of special interest because extraction of horticultural and fuel peat using processes that drain and remove peat over large areas simultaneously started in the twentieth century. In North America, most of such activity is in Canada, with only limited extraction in the United States.

Marcia began by reviewing the formation of raised peatlands (raised bogs), stressing that the hydrologic regime of these systems is a result of a peat accumulation process, takes thousands of years to develop, and is an integral part of the resulting ecosystem. Because horticultural peat, which is largely composed of the partially decomposed remains of *Sphagnum*, retains water in large amounts, such systems are similar to saturated sponges with the upper layers above the regional groundwater level. Raised peatlands can range from relatively simple systems to large complexes that are a mosaic of multiple domes, secondary ponds, and a variety of other wetland types, as Marcia amply illustrated with aerial photographs. In addition to *Sphagnum*, raised bogs host a suite of plants adapted to acidic conditions, low nutrient availability and saturated organic soils. Some plants commonly found in raised peatlands include *Rubus chamaemorus*, *Geocaulon lividum*, *Calopogon tuberosus*, and *Eriophorum vaginatum* var. *spissum*.

Production of horticultural peat involves developing a bog by excavating perimeter (primary) ditches, installing cross-drains called field (secondary) ditches, removing vegetation over large areas, and crowning the areas between the field ditches to form mining fields. During the summer each year, the surface is scarified to promote air-drying and the top ¼ to ½ inch of peat is mechanically vacuumed or removed using a milling process. Typically, up to 4 inches of peat is removed per year.

Until the last two decades, in-kind restoration of peatlands abandoned after mining was not a priority. Some areas in Europe and Canada have been utilized for agriculture, growing such crops as carrots, and more recently cranberries (*Vaccinium macrocarpon*) and lingonberries (*Vaccinium vitis-idaea*) experimentally. Abandoned mining fields present a variety of environmental problems that make re-establishment of any wetland vegetative cover, not to say restoration to original community, extremely difficult. High soil acidity, low and/or changed nutrient levels, changes to the soil structure and the hydrologic regime, droughty surface conditions caused by drainage and crowning of the fields alternating with seasonally flooded conditions, wind erosion, water erosion during storm events, hydrophobic surface crusting, and frost heaving all are difficult to overcome.

Investigations into natural recolonization patterns found that plant succession does not follow the pattern of the original bog development. Typical pioneers are cotton grasses (*Eriophorum* spp.) and birches (*Betula* spp.). *Sphagnum* is not typically a pioneer genus on abandoned mined bogs. Under good conditions, bog species such as crowberry (*Empetrum nigrum*), leatherleaf (*Chamaedaphne calyculata*) and other ericads, or larch (*Larix laricina*) colonize eventually, but total cover may not happen for an extended period. The most poorly colonized sites can remain unvegetated for many decades. For example, after 20 years poorer sites may have 5-10% cover, while the sites with better growing conditions may achieve 50-75% cover; the most enriched sites, with a nutrient regime similar to a fen, may even achieve 100% vegetative cover.

To obtain a self-sustaining wetland plant community requires a number of conditions, including soil saturation and nutrient levels compatible with target species. Rewetting is sometimes achieved by blocking drainage ditches, leveling crowned fields, creating berms to retain precipitation on-site, and flooding where possible. Even with site manipulation, sites are often not wet enough to support establishment of *Sphagnum*, or even where ample moisture is present *Sphagnum* may not colonize for several decades. Pioneering cotton grasses typically die after 10-15 years, but their tussocks form moist micro-niches, sometimes aiding the slow return of

Sphagnum. Even under the best conditions, the results are usually not equivalent to the original peatland community. For example, one abandoned extraction area developed a complete cover of leatherleaf (*Chamaedaphne calyculata*), but had no *Sphagnum* established within it. Studies in England of a particular system found that the community established today, 500 years after the initial extraction of peat, was still dissimilar to the original community. Thus, while plant communities can eventually become established on peat extraction sites, restoration to a state equivalent to the original peatland is not likely to be achieved in the short-term, especially if plans for development are not made with restoration principles in mind.

A great deal of research in Europe, Canada, and to a lesser extent, the United States, has been pursued over the past two decades. Investigations into the recolonization of *Sphagnum*, rewetting techniques, soil and hydrologic changes as a result of drainage, among others, has led to a better understanding of the management of mined peatlands and to recommendations for best management practices that will help to direct recolonization of mined peatlands toward a functioning peatland.

September 13, 2002 NEBC Field Trip to Groton State Forest, Groton, Vermont.

Fourteen NEBC members assembled in a light misty rain on Friday, 13 September, at Kettle Pond for a leisurely field trip. Art Gilman introduced the area and pointed out the salient landscape features. Groton State Forest is the largest state-owned parcel in Vermont with nearly 26,000 acres of managed forest lands. The area is underlain by the granitic Knox Mountain pluton, which outcrops in the numerous hills, and the soils are acidic and relatively nutrient-poor, being derived from glacial till of mostly local origin. The various ponds are soft-water ponds with a typical rosulate flora.

Leaving the parking lot, the first item of interest was a severe gall problem noted on the leaflets of *Rhus typhina*; these large (marble-sized) hollow galls were filled with insects that Don Miller tentatively identified as Homoptera (*Aphis*). Further along the trail, the ericaceous shrub community dominant along the shoreline of Kettle Pond included *Kalmia angustifolia*, *Vaccinium myrtilloides*, *Chamaedaphne calyculata*, *Rhododendron groenlandicum* and *Rhododendron maximum*, along with typical associates *Ilex verticillata* and *Nemopanthus mucronatus*, which last was in particularly handsome fruiting condition. The numerous shrubs of *Rhododendron maximum*, here and at other stations in Groton State Forest being disjunct from its main range by approximately 100 miles, were observed in healthy condition despite their location near the eastern, wind-exposed shore of the pond. They bore numerous capsules and had obviously flowered well this year.

The group next crossed Rte. 232 to the old railroad bed, now a popular hiking trail. Underneath a large granite boulder along the side of the trail was a small stand of the uncommon luminous moss, *Schistostega pennata.* Due to drought conditions, the typically reflective protonemal mat could not be observed, but the tiny feather-like fronds were readily observed with a hand lens.

A short hop by car brought the group to Owl's Head, by which time the rain had stopped and the clouds lifted to provide excellent views of Kettle Pond and the southern portions of the Forest. The bald granite knob although highly trampled by hikers and sight-seers nevertheless provided numerous items of botanical interest. *Potentilla tridentata* and *Solidago simplex* ssp. *randii* var. *randii* were evident, and various shadbushes, *Amelanchier* spp., were discussed without reaching consensus. A highlight for many was a small tree of the high-elevation (here at 1900'), *Sorbus decora* with large, orange fruit, and short, blunt leaflets. This was easily compared to an adjacent specimen of *Sorbus americana* with smaller, slightly redder, fruit. A brief search for *Rhododendron canadense*, although known from Owl's Head, failed to reveal this emblem of the Club's official publication.

On the short hike down to the parking lot, Melanie Schori pointed out script lichen, *Graphis scripta*, on bark of several trees and Don Lubin was able to find a small stand of *Diphasiastrum habereri*. At the end of the trip, the skies promptly cleared to bright sunshine as members returned to their cars for the trip to St. Johnsbury for the evening meeting.

September 14, 2002 NEBC Field Trip to Mt. Willard, Crawford, Notch, New Hampshire.
prepared by Steve Ivas

The 13 people who hiked up Mt. Willard in Crawford Notch on the 14th of September 2002 enjoyed a cool, crisp day walking through the mixed hardwood forest. The 1.2 mile, 900-foot elevation gain trail ends at a spectacular cliff that overlooks a U-shaped glacially-carved valley.

Alice Schori, field trip leader, noted that Mt. Willard is granite and contrasts to the higher peaks that are all metamorphic in origin. The mountain is Concord quartz and Monzonite, the upper half of the Conway formation and younger than the surrounding formations.

She also explained that the CCC had rebuilt a carriage road up the mountain preparing it for cars. It was washed away in the Hurricane of 1938; otherwise we might have been sharing the peak with vehicles.

The cliff area is also host to *Paronychia argyocoma* (Michx.) Nutt var. *albimonmtana* Fern., the Silver Whitlow-wort or Silverling, an alpine/subalpine plant. Silverling grows on granitic rock ledges and roots in the thin, gravelly soils of the White Mountains, and as Paul Somers explained, on one island in the Merrimack River of granitic origin. This is one plant that appears to have distributed itself down the watershed! This species is also a good example of conspicuous bracts hiding the flowers. Numbers of colonies were down to six, from previously reported records of 46. This generated a discussion regarding management of the area, because it seemed to be an extremely popular hike for clubs, classes, and family groups that Saturday.

Art Gilman and a separate group inspected the area around Saco Pond (the river's source), which is a location for *Potamogeton confervoides*, an alga-like pondweed.

Don Lubin organized the fern list, which included the following: lady, hay-scented, New York, cinnamon, interrupted, spinulose woodfern, evergreen woodfern, mountain woodfern, long beech fern, and oak fern. Two clubmosses, *Lycopodium hickeyi* and *Huperzia lucidula* (formerly *Lycopodium lucidulum*), shining clubmoss, were also noted.

A highlight was *Buxbaumia aphylla*, termed "bug on a stick moss" for its peculiar arrangement of sporophytes with short, papillose setae, asymmetric capsules (each with a small mouth), and a white, membranous peristome. It appeared to be growing with a fungus.

At one point we saw the maples *Acer rubrum*, *A. pensylvanicum*, and *A.spicatum* (red, striped, and mountain) close together. Goldenrods observed included *Solidago arguta* (sharp) and *S. macrophylla* (large-leaved). *Carex* species included *C. scabrata* (rough), and *C. gynandra* (similar to long-haired). The small flowered woodrush, *Luzula parviflora*, (endangered in MA), a northern boreal species, was also found. Other species include twisted-stalk and hobble-bush, creeping snowberry, and both types of mountain-ash (*Sorbus americana* and *S. decora*).

Thanks to Alice Schori for leading the excursion and escorting the group to a stunning vista, and to Lisa Standley for her graminoid expertise!