Unique Wetland Report

Lanesboro Bog

Marshfield, VT

Lanesboro Bog is found at the head of Marshfield Brook, and features numerous wetland types, state significant natural communities, and rare, endangered, threatened, and uncommon species.

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
WETLANDS PROGRAM

May 2, 2024

SITE NAME: Lanesboro Bog Complex

LOCATION: Located in the town of Marshfield, VT, entirely within Groton State Forest. Lanesboro Bog is located east of Marshfield Brook and north of Lanesboro Rd, with State Forest Rd 232 to the east and the old railroad bed to the west.

SITE DESCRIPTION: There are several types of wetlands located within the Lanesboro Basin; including a mosaic of woodland seeps, beaver influenced wetlands, vernal pools, hardwood forests, swamps, and many bog and fen types. The surroundings are primarily forested upland.

EXISTING LAND USE TYPE(S): Undeveloped, Forestry, Parks/Rec/Trail

MAP:

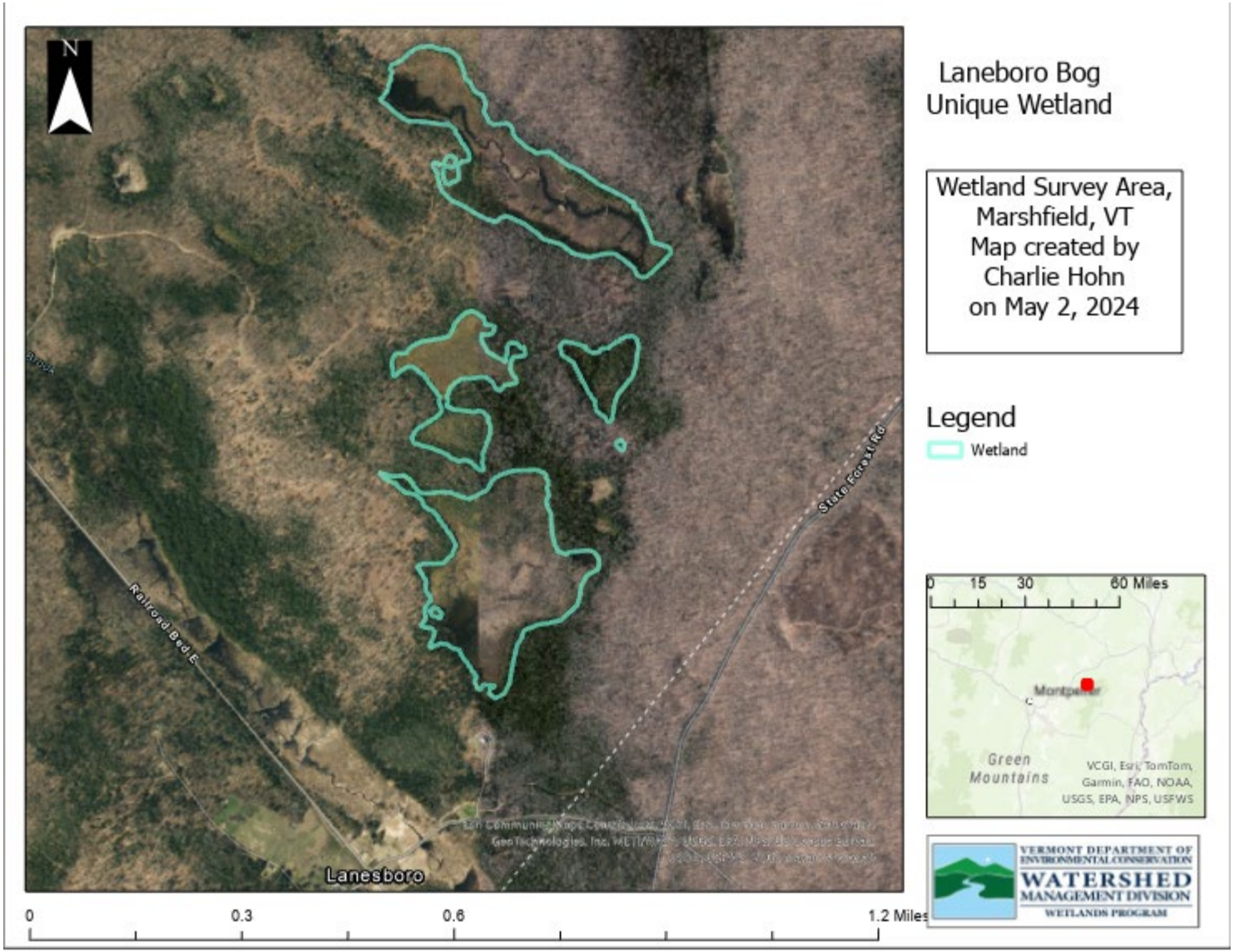

Figure 1: Unique Wetland survey area in white. The 2017 plot location is at 44.313558, -72.307232.

CURRENT CLASSIFICATION: This wetland is currently classified as Class II. The wetland is mapped on the Vermont Significant Wetlands Inventory (VSWI), and it meets the following Class II categories listed in Section 4.6 of the Vermont Wetland Rules: The wetland contains dense, persistent non-woody vegetation and a prevalence of woody vegetation; is adjacent to a stream; and is over 2,500 sq ft in size. The wetland has a vernal pool the provides amphibian breeding habitat. The wetland contains a species that appears in the Vermont Natural Heritage Inventory (VNHI) databases as rare, threatened, endangered, or uncommon and portions of the wetland are mapped as an exemplary natural community.

DESCRIPTION:

The wetlands within Lanesboro Basin total over 100 acres. The large beaver complex wetlands at the base of Marshfield Mountain are home to a Poor Fen, as well as Beaver Wetland, Sedge Meadow, a beaver pond, Black Spruce Woodland Bog, and a softwood swamp. These wetlands are located on a terrace below the steep slopes of Marshfield Mountain and are connected to a perennial stream entering and exiting this wetland complex. To the south of this large wetland are multiple other areas of wetland including another Poor Fen, an Intermediate Fen, a Tamarack Bog, a Black Spruce Woodland Bog, a Spruce-Fir Tamarack Swamp, a Vernal Pool, a Woodland Seep, a Black Spruce Swamp, a Dwarf Shrub Bog, a Shallow Emergent Marsh, and a Hemlock-Balm Fir-Black Ash Seepage Swamp.

Table 1: Estimated cover of natural communities and other important cover types in the wetland.

Natural Community/ Vegetation Cover Type	Acres	Percent
Poor Fen	20.0	28.0%
Black Spruce Woodland Bog	14.9	20.8%
Spruce-Fir-Tamarack Swamp	9.0	12.5%
Other Forested Wetland	7.6	10.6%
Intermediate Fen	5.8	8.1%
Black Spruce Swamp	5.6	7.8%
Dwarf Shrub Bog	3.1	4.3%
Open Water	2.8	4.0%
Beaver Wetlands	2.0	2.8%
Sedge Meadow	0.6	0.9%
Hemlock-Balsam Fir-Black Ash Seepage Swamp	0.2	0.2%
Vernal Pool	0.1	0.1%

HYDROLOGY:
The wetlands in the Lanesboro Basin are within a small watershed. The topography and hydrology are complex, and some areas are fed by perennial and intermittent streams while others are primarily fed by precipitation or groundwater input. This hydrologic diversity contributes to the biological diversity at the site. Duration of flooding and saturation spans the whole wetland gamut, from perennially inundated areas along beaver flowages, to seasonally saturated areas in some of the seepage swamps.

SURROUNDING LAND USE:
Surrounding land use is primarily a mix between forestry and recreational use, with a few small farms and rural homes to the south.

RELATION OF WETLAND TO OTHER NEARBY WETLANDS:
The wetland is within the Groton Forest habitat block. Many other wetlands in the area have been surveyed, with the most common types being beaver wetlands and softwood swamps. These other wetlands contribute to Lanesboro Bog in that animal species and plant propagules travel between them adding to overall habitat value.

CUMULATIVE IMPACTS TO THE WETLAND:
The area around the wetland experiences logging and dispersed recreational use, with effects appearing minor. Logging appears to have been mostly outside a 50-foot buffer.

BUFFER ZONE:
The buffer around the wetlands within the basin are primarily over 160 feet wide and forested, with occasional interruptions from logging and skid roads. Surrounding soils include Cabot silt loam, 0 to 8 percent slopes, extremely bouldery; Rifle muck, 0 to 2 percent slopes, ponded; Peacham mucky peat, 0 to 8 percent slopes, extremely bouldery; and Markey and Wonsqueak mucks, 0 to 2 percent slopes, ponded (20).

FUNCTIONS AND VALUES:

WATER STORAGE FOR FLOOD WATER AND STORM RUNOFF
Wetlands can provide temporary storage of floodwater and storm runoff.

Steep slopes adjacent to the north end indicate large volumes of runoff reach the wetland; the large size of the Lanesboro Bog and other associated Lanesboro basin wetlands provide physical space for floodwater expansion and retention. Dense and persistent emergent vegetation along the stream retains and holds surface waters while decreasing flow velocities downstream.

SURFACE AND GROUND WATER PROTECTION

Wetlands can make a significant contribution to the protection or enhancement of the quality of surface or of ground waters.

Lanesboro Bog and the associated Lanesboro Basin wetlands make an important contribution to the protection and enhancement of surface and ground water quality. The wetlands' position on a granite bench with the presence of seeps and springs indicate the wetlands in Lanesboro Basin are in a headwaters area and likely recharge a drinking water source. The high amount of microtopography and dense persistent vegetation provides a filter between slow-moving water and sediments, nutrients, and/or toxins.

FISH HABITAT

Wetlands that are used for spawning by northern pike or that are important for providing fish habitat are significant wetlands. Provide a sentence or two of fish habitat indicators present in specific wetland being evaluated. Cite relevant EO reports.

The northern wetland in this complex includes a wide beaver flowage that drains into Marshfield Brook, providing potential fish habitat. Many of the wetlands also have perennial outflow that likely drain out cold water during the summer and improve fish habitat downstream. The immediate watershed is not considered brook trout habitat by the Eastern Brook Trout Joint Venture (21)

WILDLIFE HABITAT

Wetlands are significant for this function if they provide habitat to one or more of the different wildlife guilds, including waterfowl, songbirds, shorebirds, reptiles, amphibians, water-dependent mammals, and large mammals. In addition, the physiognomic structure of a wetland can also be used as an indicator for the diversity of wildlife habitat present.

Lanesboro Bog and associated basin wetlands make a significant contribution to wildlife habitat. The wetlands adjacent to the streams and ponds are good habitat for muskrat, otter, and mink. Moose are likely to use the beaver wetlands and softwood swamps. The wetlands support more than one active beaver dam and lodge. These wetlands also provide good habitat for vernal pool reliant species, such as wood frogs. The complex is already being managed by the Agency of Natural Resources for wildlife and habitat conservation and is home to a diversity of wildlife habitats.

EXEMPLARY NATURAL COMMUNITIES

Wetlands identified as high quality or rare examples of one of Vermont's recognized natural community types make an important contribution to Vermont's natural heritage.

According to the Vermont Natural Heritage Inventory, there are many state significant natural communities amongst the wetlands in Lanesboro Bog and surrounding area including: Black Spruce Swamp (2), Black Spruce Woodland Bog (3), Dwarf Shrub Bog (4), Intermediate Fen (5), Poor Fen (6, 7),

and Spruce-Fir-Tamarack Swamp (9). All of these wetland types are S2 rare rank except for Spruce-Fir-Tamarack Swamp with a rank of S3 (uncommon). See Figure 1 below. Many upland natural communities such as Northern Hardwood Forest (8) are also considered exemplary natural communities.

State Rank: these ranks indicate the relative rarity of natural community types and are assigned by the Vermont Nongame and Natural Heritage Program
S1: very rare in the state, generally with fewer than five high quality occurrences
S2: rare in the state, occurring at a small number of sites or occupying a small total area in the state
S3: high quality examples are uncommon in the state, but not rare; the community is restricted in distribution for reasons of climate, geology, soils, or other physical factors, or many examples have been severely altered
S4: widespread in the state, but the number of high quality examples is low or the total acreage occupied by the community type is relatively small
S5: common and widespread in the state, with high quality examples easily found

Figure 2: Description of state ranking system (22).

RARE, THREATENED, OR ENDANGERED SPECIES

Wetlands that contain rare, threatened, or endangered species of plants or animals are significant wetlands.

Lanesboro Bog and associated basin wetlands make a significant contribution to RTE species with two RTE species and six uncommon (S3) species (10-18). Specific species are not listed for purposes of species protection.

EDUCATION AND RESEARCH IN NATURAL SCIENCES

Wetlands can provide valuable resources for education or scientific research. Provide a sentence or two of education and research in natural sciences opportunities and/or access points.

These wetlands occur on public land and have been tracked and sampled by Natural Heritage Inventory and the Wetlands Program. As peatlands with important wildlife use including dynamic beaver activity, they are valuable study sites. However, they are otherwise not well known and not easy to access.

RECREATIONAL VALUE AND ECONOMIC BENEFITS

Wetlands can provide substantial recreational values or economic benefits. Provide a sentence or two of recreational or economic benefit opportunities and/or access points. Can be similar to above.

These wetlands are on public land and open for hunting and nature observation, but they are not accessible by any established road or trail, so are only utilized in a dispersed recreation setting.

EROSION CONTROL THROUGH BINDING AND STABILIZING SOIL

Wetlands located where erosive forces are present – typically along a stream, river, pond, or lake shorelines – can provide significant erosion control.

The northern wetland has persistent vegetation along an established stream channel and provides this function.

OTHER WETLAND QUALITIES

The exceptional or irreplaceable characteristics of the wetland include the following:

REPRESENTATIVE EXAMPLE

This wetland complex includes peaty, beaver-influenced wetlands in all stages of beaver succession, including Beaver Wetland, Dwarf Shrub Bog, Intermediate Fen, Poor Fen, Black Spruce Woodland Bog, Black Spruce Swamp, and Spruce-Fir-Tamarack Swamp (2-9). As a large, mostly intact landscape, the full suite of beaver succession is present here, leading to excellent representation of all of these natural community types as well as the opportunity for them to continue to experience natural succession over time as beavers come and go from the landscape.

RARE COMMUNITY TYPE

Several rare (S2) natural communities occur here in state significant manifestations including Black Spruce Swamp, Black Spruce Woodland Bog, Poor Fen, and Intermediate Fen. This area of habitat is a southern example of a boreal landscape more common to the north in the Nulhegan Basin and beyond into Canada.

COMMUNITY ASSEMBLAGE/WETLAND COMPLEX

This wetland complex is large, with many wetland types as described above. Beaver ponds and streams are also present.

LANDSCAPE ASSOCIATION

This is one of the larger and more significant wetland complexes in the important Groton Forest habitat block, which is a core habitat area within the Northern Vermont Piedmont biophysical region (24). It is in the upper Winooski River watershed and provides water-related functions for a large distance downstream.

RARE, THREATENED, OR ENDANGERED SPECIES HABITAT

Two rare species (10, 11) have been recorded here as well as six uncommon species (12, 14-18). Given the remote nature of the site, it is likely further survey would find additional species as well.

UNDISTURBED CONDITION

Six Vermont Rapid Assessment Method (VRAM) assessments were conducted on wetlands in the Lanesboro Bog area. Total scores ranged from 64 in a small outlying pocket wetland, to 93 and 97 in the two large bog areas (1). Generally, scores over 85 represent reference-level wetland condition and function. Condition-related metrics scored 100% in these two largest wetlands, with function-related

metrics scoring very high in the northernmost wetland (1). Together these scores indicate reference condition in many but not all of the VRAM survey areas. The Coefficient of Conservatism (CoC) is a metric that uses plant species composition to discern wetland condition. A full species list was not collected in 2022, but in 2017 a species list in the Poor Fen scored 5.9 (1). Based on Wetlands Program and Natural Heritage Inventory data, this is a relatively low score for a Poor Fen, apparently because beaver-related natural disturbance led to the presence of more disturbance-tolerant plants. However, it is a very high score overall for a wetland in Vermont, and given the observed beaver disturbance this score still indicates a lack of human disturbance

INTACT LANDSCAPE

The wetland occurs in the Groton State Forest habitat block, a large area of intact forest, wetland, and lakes crossed by one paved road and a few small dirt roads and trails. There is unbroken connection between this wetland and features such as Marshfield Brook, Marshfield Mountain, and Turtlehead Pond with the large Kettle Pond habitat area separated from this site by just one small dirt road.

CONNECTIVITY

This wetland is in an area of core habitat, and also is part of a broad corridor heading north and south from the Steam Mill Brook and Woodbury Mountain areas to the north and the Orange Highlands area to the south.

ATTACHMENTS:

2022 Lanesboro Bog Site Report. Vermont Wetlands Program.

References

(1) Vermont Wetlands Program. 2022 Lanesboro Bog Site Report. October 27, 2022. Internal Report. Accessed 1/10/2024.
(2) Vermont Heritage Inventory Element Occurrence 8568. Accessed 1/10/2024.
(3) Vermont Heritage Inventory Element Occurrence 7059. Accessed 1/10/2024.
(4) Vermont Heritage Inventory Element Occurrence 1306. Accessed 1/10/2024.
(5) Vermont Heritage Inventory Element Occurrence 32476. Accessed 1/10/2024.
(6) Vermont Heritage Inventory Element Occurrence 7054. Accessed 1/10/2024.
(7) Vermont Heritage Inventory Element Occurrence 32477. Accessed 1/10/2024.
(8) Vermont Heritage Inventory Element Occurrence 1641. Accessed 1/10/2024.
(9) Vermont Heritage Inventory Element Occurrence 8569. Accessed 1/10/2024.
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(11) Vermont Heritage Inventory Element Occurrence 10979. Accessed 1/10/2024.
(12) Vermont Heritage Inventory Source Feature14074. Accessed 1/10/2024.
(13) Vermont Heritage Inventory Source Feature 17379. Accessed 1/10/2024.
(14) Vermont Heritage Inventory Source Feature 17094. Accessed 1/10/2024.
(15) Vermont Heritage Inventory Source Feature 17379. Accessed 1/10/2024.
(16) Vermont Heritage Inventory Source Feature 17592. Accessed 1/10/2024.
(17) Vermont Heritage Inventory Source Feature 22860. Accessed 1/10/2024.
(18) Vermont Heritage Inventory Source Feature 25287. Accessed 1/10/2024.
(19) iNaturalist – Lanesboro Bog. Accessed 1/10/2024.
(20) Natural Resources Conservation Service. Web Soil Survey. Accessed 1/10/2024.
(21) Eastern Brook Trout Joint Venture – Native Eastern Brook Trout Population Status, September 2015. Accessed 2/2/2024.
(22) NatureServe Biotics Help Page. Accessed 1/24/2024.
(23) Vermont Wetland Bioassessment Database.
(24) *Wetland, Woodland, Wildland*. Elizabeth H. Thompson, Eric R. Sorenson, Robert J. Zaino. Published 2019.

SITE NAME: Lanesboro Bog Wetlands
LOCATION: West of Route 232 in Marshfield, north of Lanesboro Road, and south of Marshfield Mountain in an area of surficial glacial features.
SURVEY DATE: 10/27/2023

OVERVIEW:
The Lanesboro Bog wetland complex occurs on an irregular terrace of surficial glacial depressions south of Marshfield Mountain. The substrate is acidic leading to an abundance of peat-forming wetlands. Poor Fen, Intermediate Fen, and Black Spruce Woodland Bog all occur amidst acidic beaver wetlands, with areas of more mature forested wetland also present, including Black Spruce Swamp and Spruce-Fir-Tamarack Swamp. Open water is locally present behind beaver dams, with emergent marshes such as Sedge Meadow in areas more recently flooded by beavers. A review of historic air photos shows a dynamic history of beaver activity and subsequent regrowth of vegetation, with areas cycling between open water, bog, and softwood swamp depending on beaver activity. The adjacent upland forests are primarily Northern Hardwood Forest, Red Spruce-Northern Hardwood Forest, and Lowland Spruce-Fir Forest.

SPECIES DIVERSITY:
As with many acidic peatlands, vascular plant diversity is fairly low, but the survey time was also after the growing season had ended, so full vegetation plots could not be sampled. 48 taxa were observed during the field visit, including 43 plant species. The large southern wetland has black spruce (*Picea mariana*), tamarack (*Larix laricina*), and balsam fir (*Abies balsamea*) on the edges, with leatherleaf (*Chamaedaphne calyculata*) and hairy-fruited sedge (*Carex lasiocarpa*) among the abundant species in the open fen mat. Pitcher-plant (*Sarracenia purpurea*), speckled alder (Alnus incana), meadowsweet (*Spiraea alba*), steeplebush (*Spiraea tomentosa*), tawny cotton-grass (*Eriophorum virginicum*), rattlesnake grass (*Glyceria canadensis*), and multiple *Sphagnum* moss species also occur here. The natural communities here have an excellent representation of acidic and circumneutral peatland, with Dwarf Shrub Bog, Poor Fen, Intermediate Fen, Black Spruce Woodland Bog, Black Spruce Swamp, Spruce-Fir-Tamarack Swamp, and peaty beaver meadow all present. In the central wetlands there is higher conifer cover, with tamarack and black spruce occurring in woodland bog and swamp settings. The northern wetland has a more pronounced beaver flowage than the other wetlands, and while it also supports Poor Fen and Black Spruce Woodland Bog, it has higher cover of sweet gale (*Myrica gale*) as well as areas of Sedge Meadow with sedges (*Carex* spp.) and Canada bluejoint (*Calamagrostis canadensis*). The edges of this wetland support a broad mix of softwood species including black spruce, Balsam-fir, tamarack, white pine (*Pinus strobus*), red spruce (*Picea rubens*), and northern white cedar (*Thuja occidentalis*).

SOILS:
The soil was not surveyed in detail during this visit, but past surveys found deep peat and muck in the southern wetland.

HYDROLOGY:
Most of the wetlands in this area occur on a high terrace, with little to no in the way of stream or groundwater input. Small streams flow from one wetland to another, with some seepage on the steeper eastern slope. Beaver ponds hold water and the streams emerging from them are often more substantial. However, broadly, all of the wetlands except for the northernmost wetland are primarily fed by precipitation. The northernmost wetland also has a small perennial stream flowing in from its eastern end that meanders through the wetland as an open beaver flowage.
While peatlands are generally thought of as persistent, slowly changing features, 1962 air photos indicate that the southern wetland is dynamic. At that time the majority of the southern wetland was a beaver pond with open water. There was only a small area of open peatland at the north end. The central wetlands were primarily softwood swamp, with little or no open peatland. Interestingly, the northern wetland appears very similar to its current state in 1962.

FUNCTIONS AND VALUES PRESENT:

☒Water Storage for Flood Water and Storm Runoff
☒Surface and Ground Water Protection
☐Fish Habitat
☒Wildlife Habitat
☒Exemplary Natural Communities
☒Rare, Threatened or Endangered Species
☐Recreational
☐Education
☐Open Space
☒Erosion Control through Binding and Stabilizing the Soil

ANTHROPOGENIC DISTURBANCE:
There is very little in the way of human-caused disturbance in these wetlands. Past logging has occurred in the upland buffer, as well as in some of the wetlands that have mature forested areas. However, the current impact is low. There was some minor hydrologic disturbance from past logging in one small seepy area, but the larger peatlands showed no signs of such impact. No invasive species were observed in the wetland complex, and they are set within a large habitat block which buffers them from outside impacts.

BIOCRITERIA ANALYSIS:
VRAM, the Vermont Rapid Assessment Method, is a method of rapidly assessing both condition and function of a wetland. The larger wetlands to the south (Lanesboro Bog) and north (Marshfield Mountain Fen) each scored very high – 93 and 97 respectfully. Both scored 100% for condition points; Marshfield Mountain Fen scored higher for function because of its open water flowage adding additional function and value. Lanesboro Upper Bog, the smaller bog between the two larger wetlands, scored a bit lower at 85, still an excellent score. This wetland has a bit less diversity in terms of habitat features and has some minor impacts due to past logging. Lanesboro Softwood Swamp, a small wetland to its east, scored 73, with slightly more logging impact and a lack of state significant natural communities or rare species. Lanesboro Vernal Pool just to its south scored 70, with the lower score largely being due to its smaller size

and lack of state significant natural communities or special status species. The lowest scoring site, Lanesboro Pocket Wetland, in the southeast of the area, scored lower at 64 due to its small size, lack of state significant features, and logging disturbance including hydrologic disturbance from a logging road.

The Coefficient of Conservation *(*CoC*)* is a metric that uses the presence and abundance of plant species to evaluate wetland status. During the 2022 site visit it was too late in the year to collect plant data and calculate a CoC, but in 2017 a species list was collected for the Poor Fen in Lanesboro Bog. The score of 5.9 was close to the average score for a Poor Fen – it was slightly lower, but probably due to natural beaver disturbance. Overall, the species composition and environmental correlates are normal for a Poor Fen in a naturally dynamic beaver-influenced environment.

Site	VRAM Score
Lanesboro Bog	93
Marshfield Mountain Fen	97
Lanesboro Upper Bog	85
Lanesboro Softwood Swamp	73
Lanesboro Vernal Pool	70
Lanesboro Pocket Wetland	64

MANAGEMENT RECOMMENDATIONS:
These wetlands are in excellent condition, and no actions need to be taken to restore them. Logging in the wetland would be best avoided, but it isn't likely to be a concern since there is not any marketable timber in these wetlands anyway. If logging occurs in the area, a 50-foot buffer would protect them from its impacts. In some areas, such as the steeper western side adjacent to the open peatland, a larger buffer could be helpful. These wetlands are also an ideal location for the study of natural succession, peat formation, and beaver activity.

Photos:

Figure 1: Southern Wetland - Poor Fen in the foreground and Black Spruce Swamp beyond.

Figure 2: A view of the southern wetland with leatherleaf and graminoids in the foreground and a high diversity of softwood species on the wetland edge in the background.

MAP: VRAM assessment areas for Lanesboro Bog wetlands