

1.0 Introduction

The purpose of this inventory was to map and assess the natural heritage elements that are important to the preservation of biological diversity in the Towns of Fayston and Waitsfield. This information will be used to inform town planning decisions, further define the towns' sense of community, and to establish priorities for preserving significant resources.

The scope of the project included the identification, inventory, assessment and ranking of five resource elements: wetlands, vernal pools, upland natural communities, wildlife habitat and connecting lands and rare elements. The inventory process involved three phases: 1) remote landscape analysis; 2) field work and public input; and 3) final ranking and map creation.

The methodology used in mapping and assessing these resources is presented in Appendix 1. The results of the inventory are divided into the five resource areas and presented below.

2.0 Wetlands

The wetlands inventory conducted as part of this survey process revealed the presence of 493 wetlands. This includes wetlands that are considered "potential" wetlands (see Section A in Appendix 1). Due to lack of landowner permission, some of these wetlands still need to be field verified for definitive classification. The total acreage of wetlands in the study area is 979 acres. Prior to this inventory, there were only 119 mapped wetlands in the study area comprising approximately 200 acres (as identified on the National Wetland Inventory maps).

Summary statistics for the wetland natural communities mapped in the study area are provided in Table 1 below. Some of the mapped types, such as the Agricultural Fields, Old Fields and Ponds, are not considered natural communities but were mapped for their potential regulatory status and functioning on the landscape. Other types, such as the Beaver Wetlands, Floodplain Forests, and Shrub Swamp actually consist of multiple natural communities. These multiple communities were lumped into the mapping units shown below because of the difficulty in mapping specific communities on a town-wide scale. Table 2 shows the different natural communities that may be present in the mapping units.



Figure 1. Beaver Meadow (Unit #214)

Table 1. Wetland Communities in Waitsfield and Fayston Summary

Community Type	Number of Sites	Average Acreage	Total Acreage
Agricultural field	35	2.93	102.66
Beaver Wetland	27	0.74	20.09
Erosional River Bluff	1	0.21	0.21
Floodplain Forest	28	3.41	95.41
Hemlock-Hardwood Swamp	4	2.55	10.19
Old Field	52	4.89	254.13
Open Water	6	0.56	3.38
Pond	130	0.42	54.90
Red Maple Black Ash Swamp	4	5.85	23.38
Red Spruce-Hardwood Swamp	1	0.55	0.55
River Cobble Shore	5	0.16	0.82
Rivershore Grassland	14	0.49	6.84
Sedge Meadow	3	0.93	2.80
Seep	29	0.41	12.01
Seepage Forest	28	3.51	98.29
Shallow Emergent Marsh	70	2.12	148.73
Shrub Swamp	42	2.15	86.59
Spruce-Fir-Tamarack	14	4.16	58.30
TOTAL	493	--	979

Table 2. Natural Communities Present in the Wetland Mapping Units

Mapping Unit	Natural Communities
Shrub Swamp	Alder Swamp* Alluvial Shrub Swamp
Red Maple-Black Ash Swamp	Red Maple-Black Ash Seepage Swamp Calcareous Red Maple-Tamarack Swamp Red Maple-Acidic Basin Swamp* Red Maple-Red Spruce Swamp
Beaver Wetland	Shallow Emergent Marsh* Alder Swamp Open Water beaver flooding* Deep Emergent Marsh
Floodplain Forest	Silver Maple-Ostrich Fern Floodplain Forest* Sugar Maple-Ostrich Fern Floodplain Forest

* indicates the most common community found within the mapping unit

As detailed in Section B of Appendix 1, wetlands were considered significant for either the natural community or the functions and values that they perform on the landscape. Table 3 shows the different sites that were considered locally or state significant. Of the 493 wetlands and potential wetlands identified in the study area, a total of 62 were deemed to be locally significant. Thirty-two (32) of these were deemed locally significant because of the functions and values that they perform on the landscape. Thirty (30) were determined to be locally significant for both functions and values and natural

communities. Only three wetlands are considered state significant natural communities. There is currently no state protocol for deeming a wetland state significant based on functions and values alone. The significant wetland sites are described below, grouped according to natural community type. Management recommendations are presented for the particular natural community type discussed. The Wetland Inventory Map is included in the appendix and a summary data table in Appendix 2.

Table 3. Summary of Locally and State Significant Wetlands

Natural Community	Number of Sites	Total Acreage	Locally Significant	State Significant
Floodplain Forest	18	63.5	Y	N
Seep	1	4.5	Y	Y
Wetland Complexes	5	107	Y	N
Red Maple-Black Ash Swamp	1	11.8	Y	Y
Spruce-Fir-Tamarack Swamp	1	13.6	Y	Y
Oxbows (Emergent Marshes)	2	7.5	Y	N
Hemlock Hardwood Swamp	4	10.2	Y	Y (1)

Floodplain Forest Communities

Floodplain forest are perhaps one of the most fragmented and disturbed natural communities in Vermont (and throughout New England). Because they typically occupy flat areas along rivers, have relatively fertile soils and lack stones, they were often the first sites to be converted to agricultural production during colonial settlement of the area. As a result, only a small fraction of floodplain forests remain, many of these existing as thin strips of vegetation between agricultural land and rivers. In addition, because of the ecology of these sites, floodplain forests are highly susceptible to invasion by non-native plant species. The annual or periodic flooding regime often creates areas with disturbed, bare soil. These conditions are conducive to the establishment of a wide variety of non-native invasive plants. Species such as Japanese knotweed (*Polygonum cuspidatum*) often have propagules carried in the floodwaters which can readily colonize a site. Once established, these invasives can be difficult to remove and can degrade the condition of the natural community.

Pristine examples of floodplain forest are therefore quite rare. The floodplain forests found in the study area are typical for the

region in that most are small, fragmented, and colonized by invasive species. Of the floodplain forests seen during the public access survey (along the Mad River Path and by canoe in the Mad River) there are two that appeared to be in relatively good condition: wetland #429 and the southern part of #391 (See attached map for wetland locations). These sites both contain typical structure of floodplain forest with mature trees, little shrub cover and dense herbaceous vegetation. While some invasives such as Japanese knotweed were found on the margins of the community, both sites appear to have areas that are free of invasives and look relatively undisturbed. More detailed field work should be conducted to confirm these preliminary findings.

Despite the poor condition of most of the floodplain forest sites from a natural community perspective, many of these areas are significant for the functions and values that they perform on the landscape. Being positioned along the banks of the Mad River, these sites are typically very good at attenuating and retaining floodwaters. During these flood events, excess nutrients are often deposited in the floodplain forests and sequestered by the forest vegetation, making these sites critical for maintaining water quality. The forested buffer that these sites create along the river binds the soil preventing erosion, and provides shade for the river thereby decreasing water temperatures and increasing the quality of the fish habitat. This forested buffer also acts as a valuable travel corridor for many species of wildlife. Finally because of their location along the river, these sites are often important for recreation, open space and aesthetics. Because of their wide ranging importance on the landscape, floodplain forests are an incredibly valuable wetland resource and most are considered locally significant.

Floodplain Forest Management Recommendations

As mentioned above, floodplain forests are one of the most degraded and fragmented communities in the region. At the same time, they are one of the most highly functioning wetland communities because of their close association with surface waters.

Invasive Species Management: It is recommended that the highest quality examples of this community in the study area (sites #391 and #429), be targeted for invasive species management. For most sites, invasive species control would be a difficult if not impossible task. In the two sites described above, preventing invasives from colonizing the interior of the natural community may be a feasible undertaking and would preserve these sites in a more natural condition.

Floodplain Forest Restoration Projects: It is recommended that floodplain forest restoration projects be initiated with willing landowners. Ideally, these sites would occur adjacent to existing floodplain forest sites creating a more connected network of riparian buffers. Given the wide variety of functions that these sites can perform, the ecological benefits of such restoration projects are many.

Seep Communities

The seepage community is widespread and typically occurs within a forested matrix where ground water surfaces. The surfacing water creates openings in the canopy which harbor wetland vegetation and can provide wildlife habitat. These occurrences are usually small and difficult to map. Most of the seeps that were mapped as part of this inventory were discovered while doing field work. One seep (wetland #694) that was mapped by state personnel in Camel's Hump State Forest is

recognized here as being locally significant because of its size and condition. This is a large seep (4.5 acres) and is relatively undisturbed. Seeps of this size and condition are somewhat rare. Because they are typically small, it is individually difficult to assign importance to a particular seep. Taken collectively, however, they are very important wetlands in terms of wildlife habitat, water quality and erosion control.

Seep Management Recommendations

The biggest threat to these communities is improper forest management and residential development. Encouraging foresters and loggers to avoid seeps (even in winter) can prevent damage to these wetlands. Local regulations protecting these small wetlands can prevent damage to these sites from development.

Wetland Complexes

There are five wetland complexes in the study area that have been determined to be locally significant sites. These are outlined in Table 3 above. These beaver-influenced wetlands generally score high for many functions and values. The diversity of wetland types, often including open water, herbaceous and shrub types makes them highly significant for wildlife habitat. The presence of beaver dams, at least temporarily, can retain sediment and pollutants making them valuable for water quality. The large basins usually associated with these wetland complexes can also attenuate floodwaters. Being located along streams, most beaver wetlands are also important for controlling erosion on the stream banks.

Beaver influenced wetland complexes, strictly speaking, are not natural communities; they are a closely related mosaic of natural communities that occur together as a result of hydrologic changes brought on by beavers. As can be seen in Table 4 below, these complexes can consist of open water areas with Deep Emergent Marshes, Shallow Emergent Marshes, Alder Swamps and, in some cases, forested swamps. The boundaries between these different wetland communities typically fluctuates from year to year based on the activity of the beavers and the yearly precipitation. For this reason, it is useful to map this mosaic of communities together as “Wetland Complexes”.



Figure 2. Scragg Mountain Complex

Table 4. Locally Significant Wetland Complexes

Location	Natural Communities Present	Total Acreage	Significance	Unique ID#
German Flats Beaver Wetland	Shallow Emergent Marsh Spruce-Fir-Tamarack Swamp Open Water	8.0	Functions and Values	316-320
Scragg Mtn Beaver Wetland	Shallow Emergent Marsh	6.4	Functions and Values	510
Phen Basin Wetland	Open Water Sedge Meadow Alder Swamp	9	Functions and Values	680-693, 697-701
Floodwoods Wetland	Shallow Emergent Marsh Red Maple-Black Ash swamp Spruce-Fir-Tamarack Swamp	72	Functions and Values; Natural Communities	373-375, 615-620
Shepard Brook Wetland	Shallow Emergent Marsh	11.8	Functions and Values	604-605, 184

German Flats Beaver Wetland (ID# 316-320)

The German Flats beaver wetland sits along a small tributary of Slide Brook just east of German Flats Road and is surrounded by Northern Hardwood Forest and Hemlock-Northern Hardwood Forest. This site was not visited during this inventory due to lack of landowner permission. This site was assessed from remote sources and from what could be viewed along German Flats Road.

It appears that this wetland complex contains areas of open water, areas of Shallow Emergent Marsh and a small Spruce-Fir-Tamarack Swamp. This site likely functions for erosion control

along the stream, floodwater attenuation, water quality, and provides significant wildlife habitat in the area. This wetland should be field verified for the functions, and type and condition of natural communities present.

Phen Basin Wetland Complex (ID #'s 680-693, 697-701)

The Phen Basin wetland complex occurs on Camel's Hump State Forest and was previously mapped and assessed by state personnel. Like the Scragg Mountain wetland (discussed below), it is an example of a higher elevation beaver wetland complex. It includes areas of open water, Sedge Meadow and Alder Swamps.

It is very well buffered by undisturbed natural communities and surrounded by Lowland Spruce-Fir forests and a state significant Northern Hardwood Forest. It provides a significant amount of wildlife habitat diversity in an area dominated by upland community types.

Scragg Mountain Beaver Wetland Complex (ID#510)

Like the Phen Basin wetlands, the Scragg Mountain wetland complex is an example of a high elevation beaver wetland. This wetland consists of a long, thin basin containing a Shallow Emergent Marsh interspersed with areas of open water. At the time of the site visit during this inventory, there were a series of three beaver dams, the lowest of which was still functioning. The marsh surrounding the open water was colonized by annual herbs typically found in beaver marshes. The most important function of this site is the significant addition to the wildlife habitat diversity of the area. Being located on public property and near a hiking trail, this site is also important for recreation, open space and aesthetics.

Floodwoods Wetland Complex (ID#'s 373-375, 615-620)

The Floodwoods wetland complex is the largest, perhaps most significant wetland complex in the study area. It sits in a large flat area south of Mt. Waitsfield surrounded by Hemlock-Northern Hardwood Forest. This wetland complex consists of open water areas, Shallow Emergent Marsh, a Red Maple-Black Ash Swamp and Spruce-Fir-Tamarack Swamps. Smaller (unmapped) areas of Alder Swamp are also present within some of the conifer swamps and on the margins of the marshes. This wetland complex contains the only state significant wetland

natural communities in the study area: the Red Maple-Black Ash Swamp and Spruce-Fir-Tamarack Swamps.



Figure 3. Floodwoods Wetland Complex

The Red Maple-Black Ash Swamp sits on the margin of the main beaver wetland and appears to be dominated by ground water seepage areas. Hummocks and hollows are common, with the hollows often containing standing water. The canopy is dominated by hardwoods such as red maple (*Acer rubrum*) and black ash (*Fraxinus nigra*) but occasional red spruce (*Picea rubens*) trees are also common. Speckled alder (*Alnus incana*) is common in the shrub layer. The herbaceous layer is dominated by wetland herbs such as sensitive fern (*Onoclea sensibilis*), spotted touch-me-not (*Impatiens capensis*) and cinnamon fern (*Osmunda cinnamomea*). Peat moss (*Sphagnum spp.*) is found in hummocks on the forest floor. This community may have been

influenced by beaver flooding at one time, but appears to be somewhat isolated from the effects currently.

The Spruce-Fir-Tamarack Swamps in this wetland complex, on the other hand, appear to have been greatly influenced by historic and current beaver activity. They consist of a layer of speckled alder and dogwood (*Cornus stolonifera*) shrubs overtopped by scattered red spruce trees. It is likely that the red spruce once formed a more complete canopy but was flooded out by beaver activity. The herbaceous layer is dominated by bluejoint-grass (*Calamagrostis canadensis*), marsh fern (*Thelypteris palustris*), tussock sedge (*Carex stricta*), and cattails (*Typha latifolia*). Hummocks and hollows form a microtopography on the forest floor and standing water is common throughout the swamp.

Both of these forested swamps appear to be in very good condition. There is no sign of logging or other human disturbance. They are well buffered by other wetland communities and by the surrounding upland forests. Their condition, size and landscape context make them state significant natural communities.

This wetland complex as a whole has a wide variety of different habitat types, from open water, to shrubby areas to forested wetlands. This diversity provides a habitat for a wide variety of wildlife species including bear, moose, deer, otter, mink, and a wide array of song birds and raptors. The wildlife habitat coupled with the unique natural communities make this site an ecological gem in the study area.

Shepard Brook Wetland (ID#'s 604-605, 184)

The Shepard Brook wetland complex consists of a few nearby Shallow Emergent Marsh communities on either side of Shepard

Brook in Fayston. There is a fair amount of open water currently present from beaver flooding as well as small inclusions of Alder Swamp and Sedge Meadow. These communities, though generally too small to include on the natural communities map, add to the overall plant and wildlife habitat diversity of the site. This site likely functions to retain any excess nutrient runoff from the adjacent agricultural land, providing water quality protection for Shepard Brook.



Figure 4.
Shepard Brook

Wetland Complexes Management Recommendations

As mentioned above, the identified wetland complexes contain a wide variety of natural communities and wildlife habitats, and are valuable for the many functions that they perform.

100' Buffer Zone: It is recommended that a minimum 100' buffer zone around the wetland margin be maintained in a natural condition. This buffer can help to ensure that the natural communities present retain their undisturbed state and the functions and values that these wetlands perform are maintained.

Logging Restrictions: In the case of the forested swamps, logging should not occur due to the presence of fragile soils. Disturbing the soils in these sites can disrupt local hydrology of the wetland and open the site up to invasion by non-native plant species.

Oxbow Communities (Shallow Emergent Marsh Wetlands)

There are two significant oxbows along the Mad River that harbor Shallow Emergent Marsh communities. One of these sites (#439) was viewed along the River, the other site (# 281) did not receive a field visit. Both of these sites were determined to be locally significant for the functions and values that they perform on the landscape. Depending on the nature and condition of the communities present, they may also be locally significant natural communities. Such a determination, however, can only be made after a more thorough field investigation. What could be seen of site #439 from the river indicated that this site offered valuable wildlife habitat and other functions outlined below.

Sites of oxbows are often located in river and stream valleys near human activity. As such, they are often dredged for ponds, partially filled, drained or otherwise impacted by the

development nearby. Their location near human activity can make them valuable for recreation.

More undisturbed sites can perform a wide array of functions and values. Since oxbows are connected to the river channel during periods of high water, they can be very important in flood water retention and attenuation. They often have a diversity of wetland habitat types within them, including areas of open water, herbaceous vegetation and shrub vegetation. This interspersed of habitat types creates incredibly valuable wildlife habitat in the river valleys. Since they are often near development or agricultural activity, these sites can be extremely important for water quality, often retaining excess nutrients and other pollutants before they reach the surface waters.

Oxbow Management Recommendations

Neither of the two identified oxbow sites received a formal field assessment that is necessary to determine the condition of the natural community and the full functioning of the wetlands. From all available information, however, it appears that these sites perform the functions outlined above. It is recommended that an ecologist visit these sites to confirm these preliminary findings. If these preliminary findings are accurate, a 100' protected buffer around these wetlands is recommended. The 100' buffer is recommended in order to preserve the condition of the community and to ensure that the wetlands remain a functioning part of the landscape. Any invasive species present should be controlled. Trails around these wetlands can be encouraged with landowner permission. Conservation of these sites should also be considered.