

NATURAL FEATURES INVENTORY for SCRAG MOUNTAIN LANDS IN WAITSFIELD, VERMONT



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Executive Summary

During the field season of 2007, Arrowwood Environmental was retained by the Waitsfield Conservation Commission to conduct a natural communities inventory on the town-owned lands known as the Scrag Mountain Lands (SML). The original Scrag Mountain parcel of approximately 360 acres has been owned by the town of Waitsfield since 1992. The town acquired three adjoining parcels in December 2006 increasing the town-owned lands to 625 acres. All 625 acres were included in the natural communities inventory described herein.

This inventory generally follows the methodology outlined in the Natural Heritage Element Inventory and Assessment for Waitsfield and Fayston Vermont (Arrowwood, 2007). A remote mapping of natural community types was followed by field work and a subsequent revision of the map. Field work was conducted during the late summer and fall of 2007.

The following report summarizes the findings of the inventory with regards to upland and wetland natural communities and wildlife habitat presence on the SML. A total of 37 occurrences of 5 different upland natural communities were mapped and described. A total of 33 occurrences of 6 different wetland communities were mapped and described. The wildlife habitat present within these communities is discussed for a wide variety of species.

This report is accompanied by a resource map which shows the location and extent of the identified natural communities. A digital version of this report and map as well as digital shapefiles of the map data is included on the attached CD.

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Section 1. Introduction

During the field season of 2007, Arrowwood Environmental was retained by the Waitsfield Conservation Commission to conduct a natural communities inventory on the town-owned lands known as the Scrag Mountain Lands (SML). The original Scrag Mountain parcel of approximately 360 acres has been owned by the town of Waitsfield since 1992. The town acquired three adjoining parcels in December 2006 increasing the town-owned lands to 625 acres. All 625 acres were included in the natural communities inventory described herein.

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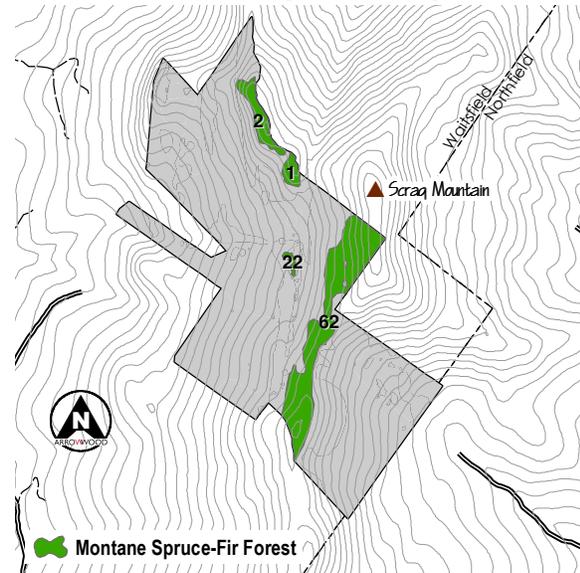
Section 2. Upland Natural Community Profiles

A total of 37 occurrences of 5 different upland natural communities were mapped and described. These communities are described in detail below.

2.1 Montane Spruce-Fir Forest

The Montane Spruce-Fir Forests in Vermont typically occupy the higher elevations of the Green Mountains. They are characterized by dense growths of red spruce and balsam fir mixed with hardwoods such as paper birch and mountain ash. There are four separate occurrences of this community on

the Scrag Mountain Lands. The largest occurrence sits along the Scrag Mountain



ridgeline (site # 62), while three smaller occurrences sit on steep ridges and knolls to the west of Scrag Mountain. These forests occur on steep, shallow silt loam soils such as Stratton and Glebe soil types. Bedrock is close to the surface as evidenced by the frequent rock outcroppings found throughout these forests. The shallow, fairly nutrient poor soils along with the colder temperatures of the high elevation often limit growth of the trees in these communities. This can be seen especially on the very steep areas where wind throw disturbance is common.



Figure 1. A Montane Spruce-Fir Forest community along the Scrag Mountain Ridgeline

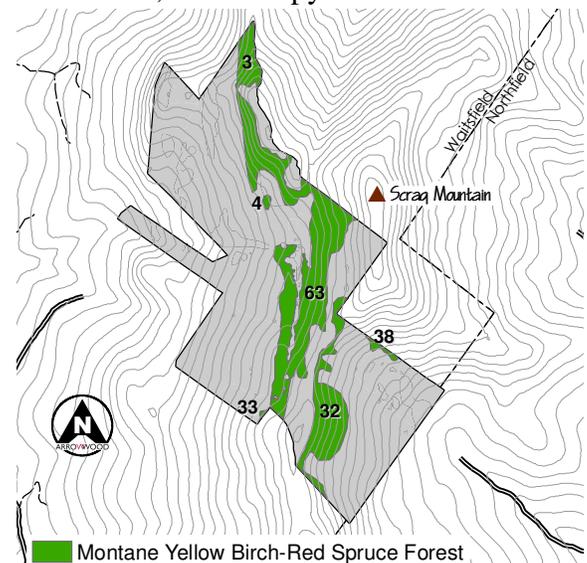
With the exception of site # 22 these sites are not easily accessed, at least not by hiking trails. Because of the nature of this community and their relative remoteness on the Scrag Mountain Lands, these sites have a real wilderness feel to them. Most of these communities in Vermont were historically logged. While these examples were also likely logged in the past, they appear to have been free from major human disturbance since that time. The canopy is dominated by balsam fir and red spruce. Paper birch and mountain ash are relatively uncommon. The herbaceous layer is fairly sparse but dominated by mountain wood fern (*Dryopteris campyloptera*), rock polypody (*Polypodium virginianum*), shining clubmoss (*Lycopodium lucidulum*) and wood sorrel (*Oxalis acetosella*).

Most of these sites have a varied microtopography. Rock and ledge outcrops as well as steep and undulating topography create a diversity of micro-habitats and make for interesting (i.e. difficult) hiking. The underlying topography of the ridges is relatively flat. This, coupled with the very shallow soils has created areas where the forest floor is dominated by feathermoss (*Pleurozium schreberii*). Some rock outcrops, on the other hand, are constantly wet from seeps, fog and precipitation. These localized areas are dominated by Sphagnum moss.

The northern part of site #2 appears to get some foot traffic. There is a rock promontory on the northern end with extensive views of the Mad River Valley. This area appears to be accessed from a foot path originating on private property to the east of the Scrag Mountain Lands.

2.2 Montane Yellow Birch-Red Spruce Forest

There are 6 examples of the Montane Yellow Birch-Red Spruce Forest on the Scrag Mountain Lands. These comprise approximately 117 acres. This community type is intermediate between the higher elevation Montane Spruce-Fir Forest and the Northern Hardwood Forests that sit at the lower and mid-elevation ranges. On the Scrag Mountain Lands, it occurs in the elevation zone between the two communities from 2300 feet and 2650 feet. Site # 63 is characterized by very steep slopes with frequent ledge, cliff and bedrock outcrops. This coupled with the steep slopes and shallow soils result in vegetation similar to more montane types. Some areas in these occurrences contain very steep and rugged terrain. The bedrock outcrops and small ledge sites make travel very difficult. In some areas, tree canopy is reduced to below



60% and trees are stunted, with average diameter at breast height (DBH) around 10 inches. The bedrock is colonized by red-stemmed moss and reindeer lichen (*Cladonia spp.* and *Cladonia spp.*). Soils are thin loams over bedrock and barely hold the trees, making fallen trees and coarse woody debris common. In other areas, rock has broken away from the bedrock creating small boulder and talus fields colonized by scattered trees. Both the bedrock dominated

woodland and the talus woodland areas occur as small patches within this community type. While these are recognized as separate community types in Vermont, none found were large enough to map out as separate communities. They are therefore included within the larger mapped type of Montane Yellow Birch-Red Spruce Forest.

In all occurrences of this type on the Scrag Mountain Lands, the vegetation in this community is dominated by a mixture of hardwoods and conifers. Red spruce and balsam fir comprise the conifer component. On the higher elevational limits of this type, yellow and white birch can be the only hardwoods. More commonly, however, these share dominance with beech, red and sugar maple and, less commonly, white ash and black cherry. Mountain maple, moosewood and the canopy species make up a moderate shrub layer. The dominate herbs in this community include wood ferns (*Dryopteris spp.*), whorled aster (*Aster acuminatus*), and rock polypody (*Polypodium virginianum*). Natural disturbance, typically wind throw, is common in areas that are particularly steep or have shallow soils. White birch and mountain maple tend to dominate these areas where disturbance is frequent or recent.

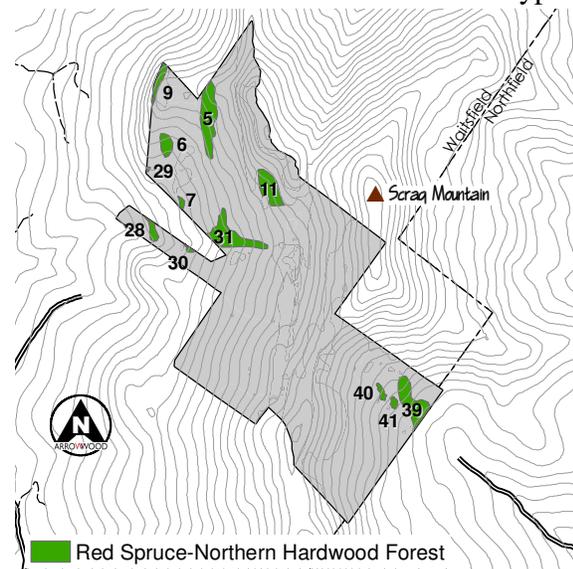
2.3 Red Spruce-Northern Hardwood Forests

The Red Spruce-Northern Hardwood Forest is a mixed hardwood-deciduous forest type that occurs at lower elevations than the montane types. On the Scrag Mountain Lands, there appear to be two different variations of this lower elevation mixed type.



Figure 2. Steep slopes and shallow soils create habitat for the Red Spruce Northern Hardwood forest community.

The first variation has much in common with the montane forest types found on the Scrag Mountain Lands. Some of the same ecological factors that shape the montane types, also give rise to Red Spruce-Northern Hardwood Forests, albeit at lower elevations. Generally sitting below 2300 feet, these sites can usually be topographically defined because they occur on the steep slopes, knolls and lower elevation ridges that occur on the Scrag Mountain Lands. Like the montane types,



these sites have shallow, nutrient poor soils where red spruce thrives. Though the tree canopy is usually dominated by conifers, the lower elevation and pockets of deeper soils result in a mixture of hardwoods also present. These include red and sugar

maples, beech, and, to a lesser extent white ash and black cherry. The shrub layer consists of any of the canopy species as well as moosewood (*Acer pensylvanica*). The herbaceous layer is moderate to sparse and dominated by bluebead lily (*Clintonia borealis*), star flower (*Trientalis borealis*), wood sorrel (*Oxalis acetosella*) and wood ferns (*Dryopteris spp.*). In some cases, especially at moderate to high elevations, this type can grade into the Montane Yellow Birch-Spruce Fir Forest. Site # 11, for example, is intermediate between these two types.

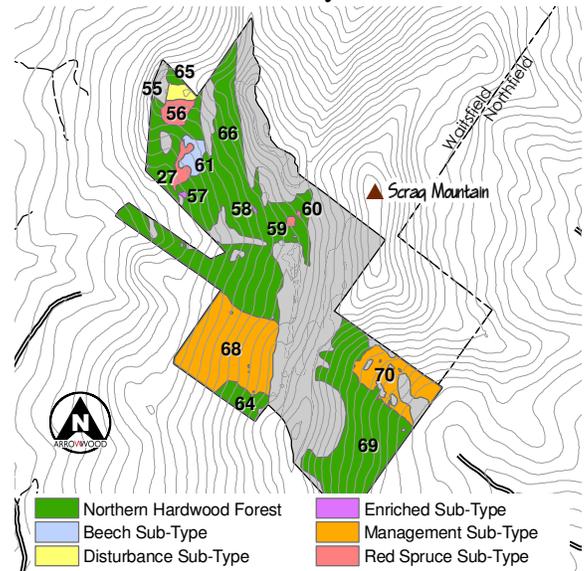
The second variation has closer affinities with the Northern Hardwood Forest that dominates the lower elevations of the Scrag Mountain Lands. These occurrences, such as site # 31, are not as topographically defined as the above mentioned variation. Instead, they occur along stream valleys and intermixed with the Northern Hardwood Forests. The presence of red spruce is usually indicative of shallower, more nutrient poor soils or soils that contain a hard pan. Many of these areas are vegetatively similar to the northern hardwood forest with the exception of the presence of spruce in the tree canopy, sub-canopy and/or shrub layers. These sites add to the diversity of the landscape by breaking up the monotony of the Northern Hardwood Forest. In many cases, these two types grade into each other. The distribution and abundance of each has largely been driven by forest management practices (see discussion under Northern Hardwood Forests below).

2.4 Northern Hardwood Forests

The Northern hardwood forest is the most common and widespread natural community type in Vermont. It is considered a “matrix”

natural community because it often occurs as a background to smaller “patch” type communities. It is dominated by hardwood tree species such as sugar maple, red maple, beech, white ash, black cherry, and white and yellow birch. The species that are dominant in any given area is the result of a complex interplay between soils, elevation, geology, moisture, topography and management history. The examples of this community that are present on the Scrag Mountain lands represent a wide range of these different conditions.

In order to illustrate some of the variation in the northern hardwood forests on the Scrag Mountain Lands, sub-types of this community are shown on the attached map. These sub-types themselves may be somewhat generalized with indistinct boundaries, but represent large expressions of some of this variability.



The standard northern hardwood forest present on the Scrag Mountain Lands is dominated by a mixture of sugar maple, beech, yellow birch and, to a lesser extent white ash. Moosewood, hobble bush (*Viburnum alnifolium*), as well as the canopy species make up the sapling and shrub layers. The herbaceous layer is dominated by common herbs such as wild

sarsaparilla (*Aralia nudicaulis*), intermediate wood fern (*Dryopteris intermedia*), and whorled aster (*Aster acuminatus*). A wide variety of other species may be locally common or abundant. These forests vary in their age structure largely depending on previous forest management. Most of the forests of this type in the study area are even-aged stands with moderate sapling and shrub cover.

2.4.1 Enriched Sub-Type

A common variation of the standard northern hardwood forest encompasses areas that are slightly enriched. The Rich Northern Hardwood forest is a community type that occurs in areas of highly enriched soils and bedrock. This enrichment leads to a surprising diversity of herbaceous species including many of the common spring wildflowers: Trout lily (*Erythronium americanum*), spring beauties (*Claytonia spp.*), Dutchmen's breeches (*Dicentra spp.*), blue cohosh (*Caulophyllum thalictroides*) and jack-in-the-pulpit (*Arisaema triphyllum*). This enrichment also leads to healthy, fast growth of the trees. White ash, black cherry, and sugar maple tend to dominate these sites while the other hardwood species tend to be less abundant. Along the spine of the Green Mountains, however, most northern hardwood forest only show slight signs of enrichment. This is due to the lack of calcium-rich bedrock in the schist dominated Green Mountains. Slightly rich sites in these areas are often the result of shallow bedrock with minor enrichment or of colluvial processes (i.e. nutrients moving down slope). These sites typically develop into areas that exhibit only some of the diversity and vigor of the true Rich Northern Hardwood forests. For this reason, they are considered an "enriched" variant of the northern hardwood forest (termed the Sugar Maple-White Ash-Jack-

in-the-pulpit Northern Hardwood Forest). As the name suggests, Jack-in-the-pulpit is an indicative herbaceous species. Maidenhair fern (*Adiantum pedatum*), blue cohosh and sessile-leaved bellwort (*Uvularia sessifolia*) are also common indicators.

These slightly enriched northern hardwood forests occur in many small patches throughout the Scrag Mountain Lands. Many of these patches are too small to map out of the matrix northern hardwood forest. Two of the larger examples, however, have been mapped out and are shown on the attached map. As mentioned above, the boundaries of these sites are very broad. The boundaries on the map usually represent a very wide transitional zone between the type and sub-type.



Figure 3. Slight enriched Northern Hardwood Forests often contain maidenhair fern in the understory.

2.4.2 Beech Sub-Type

Another sub-type illustrated on the attached map is the Beech sub-type. This sub-type does not represent a natural community distinction. Rather, this sub-type was developed based on the importance of this species to wildlife. Most of the standard hardwood forests on the Scrag Mountain Lands include beech as a component. Typically, beech comprises approximately 20-30% of the canopy cover or basal area. While no extensive beech stands were found, the areas shown on the report map show sites that contain greater than average concentrations of beech, typically greater than 30%. There were no areas found during the inventory that would be considered a “Beech Stand” (areas with greater than 60% canopy cover of beech). For further discussion of beech on the Scrag Mountain Lands, refer to Section 5.4.

2.4.3 Red Spruce Sub-Type

The Red Spruce Sub-Type represents areas of northern hardwood forest that have a significant component of red spruce in the understory. Because the canopy is currently dominated by hardwoods, these areas are considered Northern Hardwood community types. It is likely that red spruce was a more common canopy dominant in many localized areas of the Northern Hardwood Forests in the past. Forest management (especially in sugar bushes) has historically favored hardwoods over conifers such as red spruce. Spruce, however, can often be seen returning as shrubs saplings to these sites. Such areas will eventually return to mixed types like the Red Spruce-Northern Hardwood type.

2.4.4 Management Sub-Types

Figure 4. White birch and red spruce regeneration in management sub-type #68.

There are two areas that have been classified as “Management Sub-Types”. These are forests that are similar to the surrounding matrix Northern Hardwood Forests but, because of forest management, currently have a different forest structure or composition. Both of these sub-types are described below.

Site #68 is a large area best classified as Northern Hardwood Forest, though many areas may develop into Red Spruce-Northern Hardwood forest over time. The canopy is dominated almost exclusively by white birch with an occasional red spruce adding variation. The trees are young; average DBH is 10”-12” and canopy height is 30-40’. The understory is strikingly open in many places. Moosewood, sugar maple, beech, hobble bush and red spruce make up the shrub and sapling layers. The herbaceous layer is dominated by hay-scented fern (*Dennstaedtia punctilobula*) and intermediate wood fern. Localized areas of very dense spruce shrubs can also be found within this community.



The composition of the vegetation present at this site is largely the result of a clear cut in the 1940s. White birch is known to be a primary colonizing species of areas that have been disturbed by either natural or human caused factors, especially at higher elevations. As a result of the cutting, white birch has flourished in this area, in many places to the temporary exclusion of other species. The dominance of this species creates beautiful extensive birch stands that are uncommon in this part of Vermont. As with many pioneering species, however, white birch is short lived. This coupled with some areas of shallow soils have resulted in some localized blow-down areas. These fallen and bent white birch trees litter the ground making foot travel difficult.

On the east side of the Scrag Mountain ridgeline is an area of another, more recent logging operation. This area (site # 70) comprises 23 acres on the Scrag Mountain Lands and was logged in the year 2000. This site is mapped as a sub-type of the Northern Hardwood Forest. This appears to be a shelter wood cut; all but a few of the canopy trees have been removed. These clumps of canopy trees should provide additional seed source to aid in regeneration of the Northern Hardwood stand. In addition to the dense growth of raspberries (*Rubus spp.*), there is significant regeneration taking place at this site in the form of small (less than 12' tall) beech, yellow birch and sugar maple. Much of the site is seepy including a fairly large Shallow Emergent Marsh on a wide bench where multiple drainages converge. (See Section 3.5). There is a lot of moose browse in this clearing, which is typical for these habitats.

This site offers a fair amount of landscape diversity to the Scrag Mountain Lands. It provides wildlife habitat in the form of browse for moose and white-tailed deer,

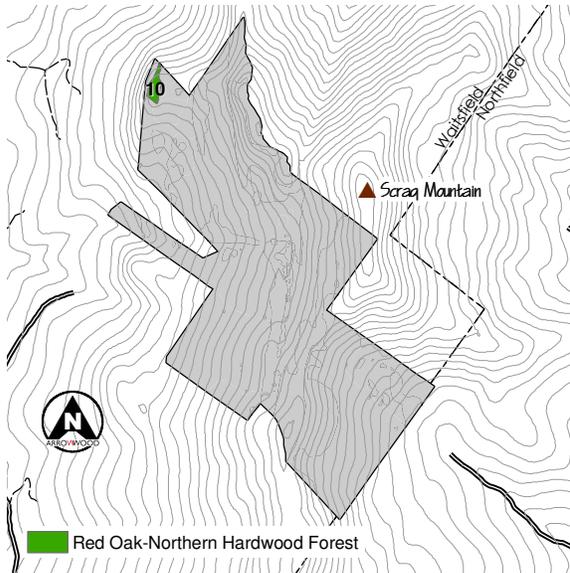
cover for many small mammals as well as soft mast for birds and black bear. As mentioned in Section 5.5, this type of habitat is suitable for two High Priority Species of Greatest Conservation Need (SGCN): the Canada Warbler and the Rufous-sided Towhee.

2.4.5 Disturbance Sub-Type

On the summit of a small knoll in the north western corner of the Scrag Mountain Lands there is a Northern Hardwood forest that shows signs of significant disturbance. This disturbance, likely the ice storm event in 1998, broke the tops off of many canopy trees and created openings in the forest canopy. The bedrock on this summit is close to the surface and the soils are relatively shallow, creating drier conditions. This results in a forest that is different than the surrounding hardwood forests. While the species composition is similar, the structure of the forest is different. This site is dominated by the typical hardwood species but the tree height is much shorter and the canopy is more open, 40-70%. Moosewood, red maple and black cherry dominate the extensive woody understory. Disturbance-loving species such as raspberries (*Rubus idaeus*) and fringed bindweed (*Polygonum cilinode*) are also abundant.

2.5 Red Oak-Northern Hardwood Forest

Adjacent to the above described disturbed forest is a small example of a Mesic Red Oak-Northern Hardwood Forest. This site sits on the western slopes and summit of this knoll and is characterized by the presence of red oak (*Quercus rubra*) in the canopy mixed with other hardwoods. The composition and structure of the forest is similar to the adjacent forest described above. White ash and black cherry share



dominance with red oak. Regeneration of all the canopy species is evident in the sub-canopy and shrub layers. Raspberries, intermediate fern, rock polypody and fringed bindweed dominate the understory. The red oaks are likely able to compete at this site because of the shallow, droughty soils. This community type is not very common in the Green Mountains and although this example is small it is considered locally significant. Its significance is enhanced by the role that this site plays in providing valuable mast for wildlife (see Section 5.4).

Section 3: Wetland Natural Community Profiles

A total of 33 occurrences of 6 different wetland communities were mapped and described.

3.1. Seeps and Northern Hardwood Seepage Forests

A Seep wetland is a wetland that is characterized by the presence of an upwelling of ground water. These small wet areas typically occur within a forested matrix and often form the headwaters of

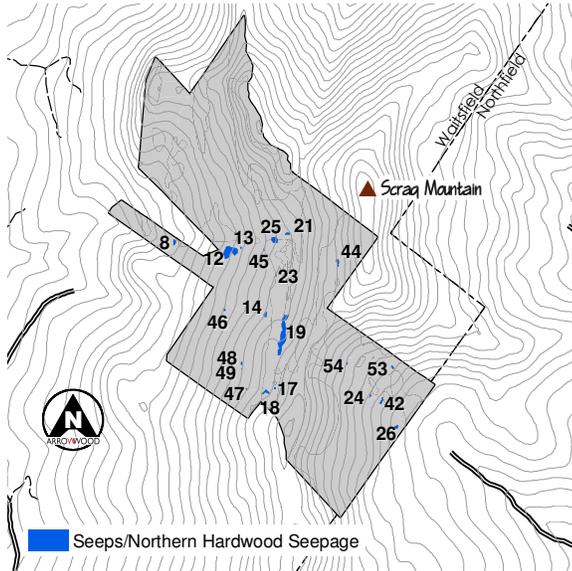
small drainages or along the borders of streams. As is typical for a mountainous terrain in this region, the Scrag Mountain Lands are peppered with many, small seepages. There are more occurrences of Seeps on the SML than any other community type. Because of their small size, however, they only comprise a fraction of the acreage. The report map shows the location of these seeps. The nature of this community makes it difficult to map remotely, all of the sites mapped during this inventory were found during field investigation. It is likely that there are other small seeps that exist on the SML that were not discovered during the field investigation.

The seep communities found on the SML are typically dominated by wetland grasses, sedges and herbs. Slender manna grass (*Glyceria melicaria*), rough sedge (*Carex scabrata*), spotted touch-me-not (*Impatiens capensis*), wood nettle (*Laportea canadensis*), drooping sedge (*Carex gynandra*), rough goldenrod (*Solidago rugosa*) and sensitive fern (*Onoclea sensibilis*) are common components of this community. In some cases, northern hardwood trees are found scattered throughout a seep community. These sites are mapped as a Northern Hardwood Seepage Forest to distinguish it from the herbaceous dominated type.



Figure 5. Small seep communities like this are common throughout the Scrag Mountain Lands.

One large seep found in the SML worthy of note is site # 19. This is the largest seep in the study area and sits in the narrow gully between two ridges. It forms the headwaters of the drainage that feeds the beaver wetland and is part of that relatively large wetland complex.



As mentioned above, Seeps are areas of groundwater discharge. Depending on the amount of groundwater input and the slope, the soils that develop in these wet conditions can be mucky organic soils or rocky mineral soils. The rocky mineral soils usually have an organic material component and are typically found on sites that are sloped. Flatter seepage areas can have fairly deep organic soils.

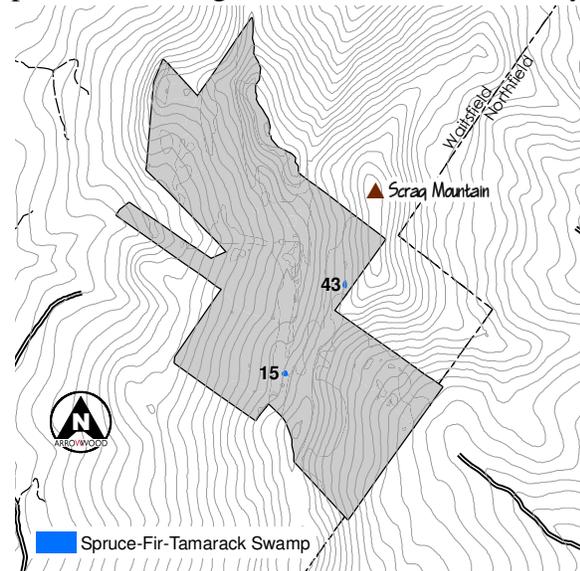
The groundwater upwelling not only drives the development of the soils and the vegetation in these communities, it also creates unique conditions on the landscape in terms of functions and values. Because ground water does not freeze, these sites often remain “open” during the winter. Small areas of open water in an otherwise frozen landscape provide valuable water sources for a wide variety of wildlife. In addition, since these areas receive the (relatively) warm groundwater input, they are often the first areas to green-up in the

spring. If these sites harbor specific plant species such as spotted touch-me-not or drooping sedge, they can be critical food sources for species such as black bear.

In addition to wildlife habitat, Seepages also provide surface waters with a source of clean, cold fresh water. This cold, clean water is essential for many of the benthic organisms in the mountain streams. Also, if these seeps remain vegetated (i.e. are not disturbed), they can inhibit erosion and decrease sedimentation of the streams below them.

3.2 Spruce-Fir-Tamarack Swamps

There are only two occurrences of the Spruce-Fir-Tamarack swamps wetland community type on the SML. Both of these swamps are very small wetlands that occupy high elevation benches and have much in common with Seepage wetlands. Like the Seeps, they are sites of groundwater discharge. Because of their topographic position on larger benches, however, they



have developed a treed canopy and vegetation similar to the larger, low elevation examples of this type. These sites are dominated by a balsam fir and red spruce canopy with varying amounts of yellow

birch. Because the canopy is fairly sparse (25-40% cover), a shrub layer comprised of the canopy species is well developed. The herbaceous layer is dominated by cinnamon fern (*Osmunda cinnamomea*), drooping sedge (*Carex gynandra*), and three-seeded sedge (*Carex trisperma*). In some cases, there is a component of peat moss (*Sphagnum spp.*) that covers the forest floor.



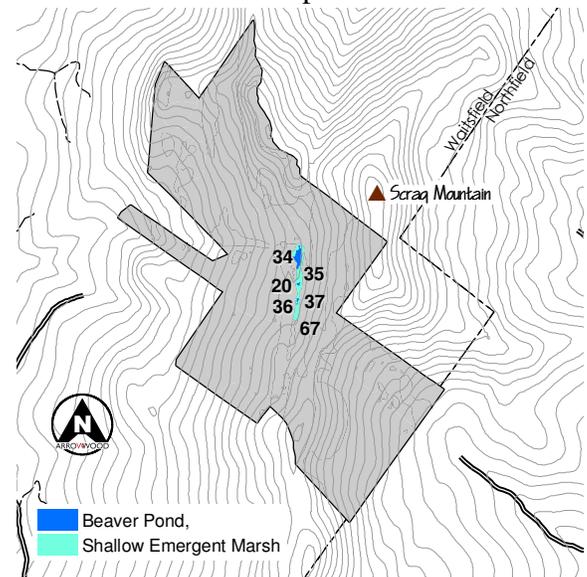
Figure 6. A small Spruce-Fir Tamarack Swamp with a ground cover of *Sphagnum* moss.

Because these sites are so similar to Seepage wetlands, they perform many of the same functions and values discussed above. In addition, both of the occurrences of this community on the SML were bisected by well established moose trails. Moose browse, tracks and, in one case a wallow, were discovered as well.

3.3 Scrag Mountain Beaver Wetland

The Scrag Mountain Beaver Wetland includes two community types: the Beaver Pond and the Shallow Emergent Marsh. These closely associated communities form

the largest and most significant wetland on the SML. It plays a prominent role on the landscape in terms of wildlife habitat, wetland functioning and overall landscape diversity. It consists of a series of 5 open water beaver pond areas. Some of these open water “ponds” consist merely of shallow mud holes that may completely dry up during periods of little precipitation. Others, including the main beaver pond, are well established water bodies that host fish populations. In the main beaver pond, there is scattered deep water vegetation and a fair amount of underwater structure composed of boulders and tree stumps.



The areas surrounding the open water ponds are mapped as a Shallow Emergent Marsh. These areas are colonized by herbs and shrubs typical of exposed beaver floodings such as meadow sweet (*Spiraea alba*), drooping sedge (*Carex gynandra*), common rush (*Juncus effuses*), St. John’s wort (*Hypericum spp.*) and goldenrods (*Solidago spp.*). This community also offers habitat for a wide variety of other plant species.

Together, these wetland communities offer a wide variety of critical habitat features for wildlife such as exposed mud flats, large standing dead trees, ground water seeps, open water ponds, and shrubby wetland

vegetation. Species such as moose, white-tailed deer, black bear, brook trout, eastern newts, leopard frogs, painted turtles, as well as a wide variety of song birds and birds of prey rely on the habitats of this wetland complex for all or part of their life cycle.



Figure 7. A wildlife tree, or snag, remains standing above the Scrag Mountain beaver meadow complex.

Like many beaver influenced wetlands, beaver activity at this site fluctuates as local beaver populations fluctuate and the food resource at the site changes over time. This will cause the actual boundaries of the communities within the wetland complex to vary considerably. In addition, beavers will often move up and down a drainage and create new dams and ponds. This has happened just north of the large beaver wetland in the vicinity of the hiking trail. A small area (site # 21) has been flooded by beavers. This is normally not a cause for concern, but the presence of the hiking trail in this area has created some erosion issues. The hiking trail appears to have slightly altered the natural course of the drainage

present. This has disrupted the small wetlands in the area as well as eroded the hiking trail. Corrective measures should be taken by either re-routing the hiking trail or implementing erosion control practices. While this is the most serious case of erosion along the hiking trail, there are other, minor erosion issues along the trail that should be addressed as well.

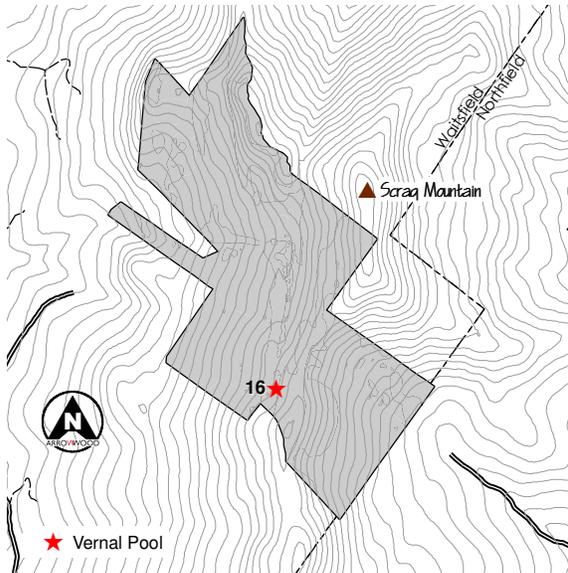
3.4 Vernal Pool

Vernal Pools are temporary, fishless, woodland pools that retain water for part of the year (typically the spring) and then dry up during the late summer and autumn. They can be vegetated or completely lack vegetation. They are unique natural communities in that they are defined not by vegetation but by the wildlife that use them. These are very specific habitats that have a whole suite of species that have evolved around their annual wet-dry cycle. Species such as spotted salamanders, Jefferson salamanders, wood frogs, and a wide variety of invertebrates have come to rely on these habitats for successful reproduction.



Figure 8. A small vernal pool on a high elevation bench.

The one vernal pool found on the SML has much in common with Seepage wetlands. It was mapped as a vernal pool because of the presence of vernal pool indicator species. Since this pool was visited during the fall,

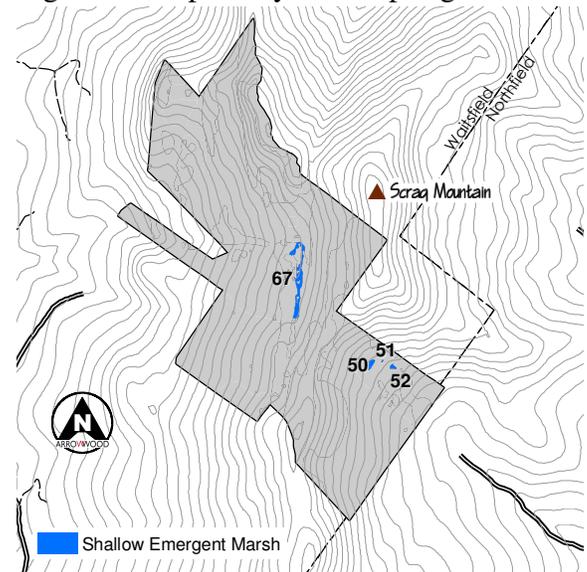


the presence of breeding amphibians could not be confirmed. Field work during the spring breeding season should be conducted to document the use (or lack thereof) of amphibians.

3.5 Shallow Emergent Marsh

Aside from the marsh in the beaver wetland, there are three other Shallow Emergent Marshes that occur on the SML. These sit on a wide bench on the east side of the ridgeline (Sites # 50-52). The largest of these (Site #50) is the site where a number of drainages from the slopes above converge and spread out on this relatively flat bench. This, combined with groundwater seepage make this the “wettest” wetland in the study area apart from the beaver ponds. Areas of standing water are common throughout this wetland and fairly deep, mucky soils have developed. The vegetation is dominated by graminoids and forbs such as manna grass (*Glyceria spp.*), common rush, bulrush (*Scirpus spp.*), drooping sedge, cinnamon fern, and sensitive fern. In the wetter areas, the vegetation is restricted to drier hummocks. Given the amount of water on this site, it is somewhat surprising that beavers have not yet moved into the wetland and flooded the area.

The other two marshes in this area are similar to Site # 50 but smaller. They also share many features with Seep communities. Though small, these wetlands provides a fair amount of landscape diversity to the east side of the SML. They likely provide habitat for a wide variety of song birds and raptors as well as reptiles and amphibians. White-tailed deer, moose and black bear likely forage on the succulent wetland vegetation, especially in the spring.



Unfortunately, parts of these wetlands have been altered by the recent logging operation. Skidder trails appear to have altered the local hydrology. This occurs when a skidder makes ruts in the soft wetland soils. Water flowing out of the wetland often gets diverted into these ruts, carving a new channel and abandoning the natural channel. This has ramifications for all three of these marshes and the drainages below them. If the drainage follows logging roads instead of the natural channel, it can bypass wetlands or flood other areas not previously flooded. Much of the hydrology of this slope has been affect by the logging roads.

Section 4. Significant Natural Communities and Wetlands

Local and Statewide factors are considered when determining the regional significance of wetland and upland natural communities for sites on the SML. Determination of significance for natural communities follows the methodology of the Vermont Non-Game and Natural Heritage Program and is explained in the Natural Heritage Inventory and Assessment for Waitsfield and Fayston, Vermont (Arrowwood, 2007). Significance

for wetlands is based on functions and values analysis; methodology for this process can also be found in that report.

Table 1 lists the sites on the SML that were determined to be significant for natural communities or wetland functions and values. When considering management for these sites, it is important not propose actions that would have an undue, adverse impact on the nature of these sites.

Table 1. Significant Upland and Wetland Natural Communities on the SML

Site #	Total Acres on SML	Natural Community	Comments	Locally Significant	State Significant
20, 34-37, 67	4	Beaver Pond and Emergent Marsh	High elevation beaver wetland complex, significant for wildlife habitat	Y	N
3,4,32, 33, 38, 63	117	Montane Yellow Birch-Red Spruce Forest	High elevation mixed forest just below ridgeline	Y	Y
27, 55-61 64-70	348	Northern Hardwood Forest	Small part of large hardwood forest, extends north to Palmer Hill and south into Northfield and Warren	Y	Y
10	2.5	Red Oak-Northern Hardwood Forest	Small community with oak on shallow soils, significant for wildlife and natural community	Y	N
5-7, 9, 11, 28-31	24.5	Red Spruce-Northern Hardwood Forest	Series of sites on ridges and steep slopes. Communities in good condition.	Y	Y
16	0.06	Vernal Pool	Nice Vernal Pool on high elevation bench, use by amphibians needs verification	Y	N

Section 5. Wildlife

5.1 Wildlife corridors and core areas

When considering wildlife of the SML, it is often necessary to look beyond the borders of the town-owned lands and assess the surrounding landscape. Since many large mammals move great distances during their seasonal movements, the surrounding forest, fields and wetlands have a large impact on the species diversity and abundance of

wildlife on the SML. The SML sits in the middle of a large forested, road-less area identified in the Natural Heritage Inventory and Assessment for Waitsfield and Fayston, Vermont (Arrowwood, 2007) as CHU #19. This habitat unit is approximately 4145 acres in size and includes areas in Waitsfield, Northfield and Warren. It contains 1043 acres of contiguous habitat and 702 acres of core habitat (300 feet from major roads or human structures). It contains riparian areas, deer wintering habitat, bear wetlands, amphibian habitat,

streams, early successional areas, ledges and vernal pools. Most of these habitat features are present on the SML. This diverse array of features creates vital habitat for a wide variety of wildlife, many of which require large, road-less forested areas. While not all wildlife can be included in this analysis, some of the major species are briefly discussed below. For a more detailed discussion on the contiguous habitat units and core areas, please refer to the Natural Heritage Inventory and Assessment for Waitsfield and Fayston, Vermont (Arrowwood, 2007).

5.2 *Moose*

Moose occur throughout the Scrag Mountain region and rely on mixed conifer and deciduous woods interspersed with



Figure 9. This moose trail through a small Spruce-Fir-Tamarack Swamp has filled with water.

clearings, wetlands and openings. Moose sign (browse, scat, scraps, rubs etc.) were observed throughout the SML. Sign was concentrated, however, in two particular areas: the clear cut on the eastern side of the ridgeline (Site # 70) and on the higher elevation benches on the western side of the ridgeline.

It is well known that moose prefer young browse often found in recent and regenerating clearcuts. They also prefer the succulent vegetation found in wetlands. On a small scale, both of these habitat features are present on the east side of the ridge with the Shallow Emergent Marshes (Sites #50-53) and the cutover area (Site #70). This site offers an abundance of young maple and birch regeneration which the moose likely utilize year-round. They also rely on conifer browse, especially during the winter months. This browse they find higher on the mountain in the montane forest types. Like humans, moose prefer to conserve energy and often find the easiest way to move across the landscape. The benches on the west side of the ridge are the most efficient way to move north and south in this area and are the sites of virtual moose highways. One of the reasons for moving across the landscape is to access different habitat types depending on the needs of the animal. The areas along these benches offer upland conifer browse as well as numerous small seeps and conifer swamps.

5.3 *White-Tailed Deer*

White-Tailed deer are a common component of the Vermont landscape. They occur throughout the state but prefer areas with a mixture of forest and clearings. Unlike moose, deer prefer edge habitats and are not as common in high elevation montane forests. For this reason, deer sign was not nearly as abundant as moose sign on the SML. Sporadic sign was noted on the

western side of the ridge primarily in the large Northern Hardwood Forest (Site # 66). It likely that deer use these lower elevation forests for browse as they move through the landscape. No deer wintering habitat (conifer dominated forests) was documented on the SML.

The area of the greatest concentration of deer sign was noted in the cutover area on the east side of the ridgeline (Site # 70). Dense browse, especially of raspberries, is abundant at this site.

5.4 Black Bear

Numerous signs of black bear, including scat, tracks and climbed trees, were seen scattered throughout the SML during the field inventory. Much of the information about black bear on the landscape is inferred from the presence and condition of key habitat features such as hard mast (nut bearing tree) stands, “bear” wetlands, denning sites and soft mast (fruit bearing tree) stands. In the northern Green Mountains, the main hard mast producing tree is American beech. The abundance of beech within Northern Hardwood Forests on the SML was documented while conducting the natural resource inventory. In general, beech is present in much of the Northern Hardwood Forests but only around 20% cover or less. The few areas that beech exceeded 20% cover are mapped as Beech Sub-types (see Section 2.4.2). In some cases, beech is more abundant in the sub-canopy and shrub layers. In these areas, the site will likely have a greater abundance of beech in the future.

Black Bear use of hard mast producing trees is often quantified by the scars that they leave on the bark of the trees when climbed or by bear “nests” that they make in the canopy. Based on the scar tissue from the

tree, the scars can be classified as either recent or historic. Only limited scarring of beech was seen during the field inventory and almost all of it was historic (generally more than 3-4 years old). This occurred on scattered beech trees in beech sub-type site #61 and in a few places on the eastern side of the ridge in site #69. The only recent scarring observed was on red oak trees in the Red Oak-Northern Hardwood Forest (site #10). Though uncommon in this area, oak mast is frequently utilized by bear in southern Vermont. When bears climb mast trees, they frequently position themselves in the crown and break off branches from which to eat the nuts. The branches are then left in a tangled pile in the center of the crown looking like huge nests. Though bear “nests” have been observed in the past on the eastern side of the ridgeline (Laferriere,, 2007), none of these trees were observed during the field inventory. It is possible that the nests fell or these trees were removed during the logging operation.

Bear sign was also seen around the Scrag Mountain Beaver Wetland complex. It is likely that bears use this wetland as a source of forage for the sedges, grasses and soft mast that grow there. They also likely use this wetland as a water source and to prey on the other small mammals that are drawn to its banks. In addition to this wetland, bear also likely use the scattered seeps on the western side of the ridgeline for the sedge and forb browse. The clear cut area on the eastern side of the ridgeline (Site # 70) also offers wetland vegetation browse in Shallow Emergent Marshes as well as a soft mast crop of raspberries and blackberries.

5.5 Miscellaneous Wildlife

A wide variety of other wildlife use the SML for all or part of their life cycles and warrant brief mention here.

Porcupine are typically found in conifer forests that offer an abundant food base. They also prefer ledge and rock areas for creating den sites. These are especially valuable if there is browse nearby. These requirements are met in the montane forests above the beaver pond wetlands. This area offers many good denning sites in the rocky ledge and talus areas as well as abundant browse. At least two den sites with extensive sign of feeding were noted during the inventory and it is likely that there are more in the area.

With an abundance of porcupine, one can often infer the presence of the fisher. These elusive weasels prefer large tracts of conifer and mixed forests with an abundant prey base, including porcupine, red squirrel, and snowshoe hare. Though no fisher were seen during the inventory, the SML offer appropriate habitat and it is very likely that fisher use this area.

Another predator that likely inhabits the SML is the bobcat. These secretive animals prefer large tracts of forest, especially areas with dense softwood understory. They also utilize ledge habitats for denning and stalking. They prey on snowshoe hare, squirrels, and other small mammals. Once again, though no bobcat sign was found during the inventory, it is likely that these animals use the SML.

5.6 Species of Greatest Conservation Need (SGCN)

In November 2005, the Vermont Fish and Wildlife Service in conjunction with scientists in the state released a report entitled the Wildlife Action Plan (2005). This plan prioritized wildlife species that required conservation action in the state and outlined steps that should be taken to ensure those species survival. It was beyond the scope of this inventory to survey the SML for each of the priority species listed in the Wildlife Action Plan. It is possible, however, to determine the likelihood of their presence based on habitat requirements and known locations of these species. Table 2 below lists each of the High Priority species listed in the Wildlife Action Plan that possibly occur on the SML. When making management decisions regarding the future of the SML, the town may consider managing the habitat for the benefit of one or more of these high priority species. For more information regarding these species and their management, refer to the Wildlife Action Plan (2005).

Table 2. High Priority Species of Greatest Conservation Need Potentially Occurring on the Scrag Mountain Lands (SML)

Species	Habitat	Potential Habitat on SML	Management Recommendations
Long tailed Shrew (<i>Sorex dispar</i>)	Cold, coniferous forests along streams and rocky slopes. Loose, moss covered rocks are important.	Montane forest types and Red-Spruce Northern Hardwood Forests. Cliffs and talus areas above beaver wetland.	Avoid new trail construction or logging activity in areas of potential habitat (especially areas with loose rocks and undercut stream banks)
Pygmy Shrew (<i>Sorex hoyi</i>)	Damp hardwood and mixed forests. Moist sites preferred, especially near wetlands and water sources	Areas where upland forests adjoin wetlands and streams.	Avoid trail construction around water sources.
Woodland Vole (<i>Microtus pinetorum</i>)	Wide range of habitats from deciduous forests to fields and grasslands. Moist, well drained soils with ample leaf litter.	Northern Hardwood Forests	Avoid widespread disruption of leaf litter in hardwood forests
Rock Vole (<i>Microtus chrotorrhinus</i>)	High elevation coniferous forests with loose rocks and boulders, especially near streams. Often found with long-tailed shrew.	Montane forest types and Red-Spruce Northern Hardwood Forests. Cliffs and talus areas above beaver wetland.	Avoid new trail construction or logging activity in areas of potential habitat (especially areas with loose rocks and ledges near streams)
Rufous-sided Towhee (<i>Pipilo erythrophthalmus</i>)	Dense, brushy habitats such as forest edges, recent clearcuts, power lines and early successional areas.	Recently logged area (Site #70) on eastern side of ridge.	Work with adjoining landowners, state, and consulting forester to maintain early successional habitat in the area. Audubon Vt. can provide information on recommended management practices.
Canada Warbler (<i>Wilsonia canadensis</i>)	A wide range of forest types, mostly mid-elevation in Green Mountains, prefers early successional habitats like clearcuts.	Many of the mid-elevation forests and the recently logged area (Site #70) on eastern side of ridge.	

Section 6. Conclusions

The 625 acres of the Scrag Mountain Lands offer a surprising amount of diversity of natural communities and wildlife habitats. With 11 different natural communities, ranging from beaver wetlands to montane forests, this mosaic of interrelated communities is unusual in such a high elevation environment. These natural communities host a wide variety of wildlife habitats from pond shores to rocky ledges and early successional soft mast stands.

Black bear, moose, white-tailed deer, bobcat, fisher, porcupine as well as a wide variety of raptors, song birds and small mammals use this diversity of habitats on the Scrag Mountain Lands for all or part of their life cycle. With proper land management, this valuable conserved land will continue to provide recreational opportunities as well as vital plant and wildlife habitat for generations to come.

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