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 (*Spahgnum 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 interspersion 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.

Hemlock-Hardwood Swamp Communities

Hemlock-Hardwood Swamps within the Green Mountains usually occur as small wetland communities in saddles or benches in areas with variable topography and shallow bedrock. There are currently four of these sites mapped in the study area; three are considered to be locally significant (wetland #s 608, 609, 621) and one is considered to be state significant (wetland #627). The first three occur on or near the town-owned land near Irasville (the Waldron parcel). Only one of these sites was visited (wetland #621) due to lack of landowner permission for the others. Given the topography of the area, there may be more of these small swamps in this vicinity. These swamps are dominated by a mixture of hemlock (*Tsuga canadensis*) and red maple. Scattered shrubs of red spruce, hemlock and red maple are found over a dense cover of herbaceous plants dominated by sensitive fern and cinnamon fern. Standing water is common in the hollows of the varied microtopography. Though small, the swamp visited was in very good condition and showed no signs of human disturbance or invasive plant colonization.

The state significant Hemlock-Hardwood Swamp (wetland #627) is located southeast of the above mentioned swamps in Camel's Hump State Forest. This swamp is approximately 7 acres and sits in the saddle just north of Kew Hill. The vegetation is similar to that described above. Standing water is common in the hollows and the soils are composed of very deep organic peats. The swamp appears to be in very good condition. There is a hiking trail which runs near the swamp, but does not affect the condition of the community. This is a C-ranked example of this community type (See Appendix 1, Section F for discussion of ranking).

These examples of the Hemlock-Hardwood Swamp appear to be good examples of a community that is relatively uncommon in the heart of the Green Mountains. The most significant function that these swamps perform is that of wildlife habitat. These wetlands offer habitat and food for a wide variety of species including deer, moose, bear, spotted salamanders, wood frogs, green frogs, and possibly the uncommon four-toed salamander.

Hemlock Swamp Management Recommendations

The hemlock swamps identified in the study area are generally well buffered by surrounding upland forest in their current condition. Development in or near these sites does not appear to be a threat.

100' Buffer Zone: A minimum 100' buffer zone should be maintained around these swamps from any development.
Logging Restrictions: It is recommended that logging not occur within the swamp or within a 50' buffer of the swamp edge.

3.0 Vernal Pools

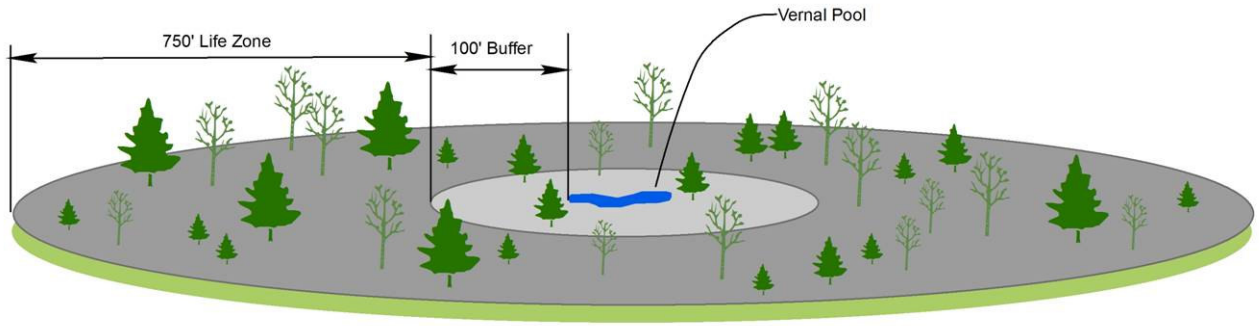
Vernal pools are seasonal wetlands that typically contain water during the wet spring months but become dry as the summer progresses. These isolated wetlands typically occur under a forest canopy, lack fish, and provide habitat to a wide variety of wildlife.

A total of 15 potential vernal pool locations were identified during the remote inventory. This includes two pools that were identified during the public meeting, two pools from the mapping of state land and one pool from the State of Vermont Department of Environmental Conservation's bio-assessment study of pools throughout Vermont. During the course of the field work, 7

potential pools were added to this list. The final map (provided in the appendix) shows the presence of 22 vernal pools in the study area. All but 2 of these pools (those identified during the town meeting) received a field visit to confirm their presence.

As can be seen from the vernal pool data summary table in Appendix 2 and attribute table information in Appendix 3, each pool that was visited received a state and local significance assessment. This ranking is based on the faunal number and diversity that a particular pool supports as well as the hydroperiod of the pool (See Appendix 1, Section B for discussion of methodology). The hydroperiod is an important measure of the reliability of a particular pool for animals that require long development stages for successful reproduction. The pools that were ranked as High for local significance were also considered to be state significant. While the "Low" and "Moderate" pools are likely not as reliable and diverse as the high ranking pools, they should still be considered locally significant. As such, each of the ranked vernal pools is included in the following section on management recommendations.

Figure 5. Vernal Pool Buffer Zones



Vernal Pool Management Recommendations

As can be seen on the attached map and Figure 5 below, there are two buffer areas around each vernal pool. These buffer distances are based on the work of Semlitsch (1998), Calhoun and Klemens (2002), Calhoun and deMayandier (2004). The first buffer distance is 100' in diameter and is important because the density of amphibians within this area is very high both during the spring breeding period and the fall juvenile dispersal period. The nature of the forest immediately around the vernal pool has a tangible affect on the nature of the pool itself. Shading from surrounding trees can drastically prolong the hydroperiod of a pool. In addition, leaf litter that enters the pool from the surrounding trees forms the basis for the food chain in the vernal pool ecosystem.

The condition of the forest in this 100' buffer zone is therefore strongly linked to the condition of the vernal pool itself. For this reason, it is recommended that the vernal pool envelope be managed in a way that will not interfere with the functioning of the vernal pool. This includes maintaining a complete forested cover within this envelope. Light thinning of forest trees is, in most cases, acceptable but should come no closer than 25' to the pool's edge. Since many amphibians require a dense leaf litter on

the forest floor with un-compacted soils, logging should occur when the soils are frozen and there is adequate snow cover. The creation of ruts in this area can often disrupt the hydrology of the nearby vernal pool. Development and other barriers to amphibian movement should be avoided within this buffer zone.

The next buffer shown on the attached map is calculated at 750' from the vernal pool habitat. This is termed the "amphibian life zone" or the "critical terrestrial habitat". As we have seen, amphibians that breed in vernal pools spend most of their adult lives in the forests surrounding their natal pools. These amphibians require a forest with dense leaf litter, decomposing woody debris, un-compacted soils, and adequate canopy cover. If logging is to occur in this area, it should occur in the winter when the ground in frozen and there is adequate snow cover. Ruts that occur in the life zone can fill with water and create population sinks as amphibians lay eggs in the ruts and never reach the more reliable vernal pool. Compaction of the soil can also result in direct loss of habitat for mole salamanders.

Calhoun and Klemens (2002) recommend maintaining 75% forested cover within this life zone to retain adequate habitat for forest dwelling amphibians.

4.0 Upland Natural Communities

A preliminary map of upland natural communities was created as part of the inventory process; see Appendix 1, Section C for methodology. Table 5 shows the summary statistics of the upland natural communities mapped in the study area. As can be seen from Table 5 above there are 271 occurrences of 13 different natural communities comprising a total of 33,862 acres. All of these types, with the exception of the Plantations, are considered to be natural communities according to Thompson and Sorenson (2000). Due to difficulties associated with mapping communities on a town-wide scale, the total number of acres presented above should be considered an approximate number. Small patches of forest were generally not mapped while some of the larger forests may contain open fields and residential development. The upland natural community map (included in the appendix) should be considered a preliminary map. The sites that were deemed to be significant were mapped more accurately based on field work and remote sensing. In all cases, however, boundary lines represent gradual transitions between natural communities and should not be considered discrete margins of the community. A detailed data summary table is provided in Appendix 2.

State and Locally Significant Upland Natural Communities

The methodology for determining state significance is based on the Vermont NonGame and Natural Heritage guidelines and is detailed in Section C of Appendix 1. Seventy-one (71) different occurrences of locally and state significant upland communities were discovered during the course of the field work. Each of these occurrences is briefly described below, and summarized in Table 6. For the most part, these determinations are based on field work conducted as part of this inventory. For the larger matrix forests (especially those on state land) information from the state ecologist was used in the assessments. For most of the larger communities, assessments were made only on a portion of the community for which landowner permission was obtained.

Table 5. Upland Natural Community Summary Data

Community Type	Number of Occurrences	Average Acreage	Total Acreage
Boreal Outcrop	3	3.93	11.78
Hemlock Forest	17	109.05	1853.85
Hemlock-Northern Hardwood Forest	66	107.30	7081.79
Hemlock-Red Spruce Forest	11	7.33	80.65
Lowland Spruce-Fir Forest	12	27.43	329.11
Montane Spruce-Fir Forest	24	80.07	1921.79
Montane Yellow Birch-Red Spruce Forest	28	114.03	3192.86
Montane Yellow Birch-Sugar Maple-Red Spruce Forest	1	39.24	39.24
Northern Hardwood Forest	43	291.10	12517.51
Plantation	9	27.48	247.30
Red Oak-Northern Hardwood Forest	1	9.39	9.39
Red Spruce-Northern Hardwood Forest	36	164.83	5934.01
Rich Northern Hardwood Forest	14	21.56	301.87
TOTAL	271	--	33862

Table 6. Summary of Locally and State Significant Upland Natural Forest Communities

Natural Community	# of Sites	Total Acres	Locally Significant	State Significant
Montane Spruce-Fir	13	1769	Yes	Yes
Montane Yellow Birch Red Spruce	27	3050	Yes	Yes
Montane Yellow Birch Sugar Maple Red Spruce	1	39	Yes	Yes
Northern Hardwood	13	7838	Yes	Yes
Hemlock Northern Hardwood	8	292	No	Yes
Hemlock Forests	4	1140	Yes	Yes
Rich Northern Hardwood	1	99	Yes	Yes
Red Spruce-Northern Hardwood	3	14	Yes	Yes
Red Oak-Northern Hardwood	1	9	No	Yes

Montane Spruce-Fir Forests

The Montane Spruce-Fir forest is a high elevation, conifer dominated forest that is common on the peaks of the green mountains. These forests are dominated by Red Spruce (*Picea rubens*), balsam fir (*Abies balsamea*), and paper birch (*Betula papyerifera*). Mountain ash (*Sorbus spp*.) and mountain maple (*Acer spicatum*) are common in the shrub layer. The herbaceous layer is typically dominated by boreal herbs such as bunchberry (*Cornus canadensis*), Canada lily (*Maiathemum canadense*) and goldthread (*Coptis groenlandica*). These communities are characterized by steep slopes, shallow soils and frequent outcroppings of bedrock.

There are two occurrences of this forest that were considered state significant within the study area. This first occurrence includes polygon #s 2-3, 711-714, and 749 and encompasses a long ridge line from the Lincoln Gap in the south up to the Huntington Gap to the north. Because this is part of a state-wide mapping effort, much of this state significant occurrence sits outside of the study area.

The second significant occurrence of this type includes the montane forest north of the Huntington Gap up to Burnt Rock Mountain (#s 716, 719, 721, and 18). The portion of this occurrence within the study area is the southern end of a large forest that runs north to Camel's Hump.

Both of these large forests (together comprising over 1700 acres within the study area alone) are a significant feature in the landscape of the Green Mountains. Because of their size and relative remoteness, large-scale ecological processes are able to occur with only limited (or no) human interference.

These sites were not visited during the field work of this inventory. The condition of the community for these sites is based on field work done in Camel's Hump state forest and elsewhere.

Montane Yellow Birch-Red Spruce Forest

This type occurs as a transitional community between the Montane Spruce-Fir Forests at higher elevations and the Northern Hardwood Forests at lower elevations. The vegetation is typically intermediate between the two types with montane species intergrading with hardwood species.

There are three occurrences of this type within the study area that are considered state significant. The first one includes the sub-montane forests around Scragg Mountain in the southeastern part of the study area. The other occurrences flank the Montane Spruce-Fir Forests along the spine of the Green Mountains along the western part of the study area.

These sub-montane forest can be fairly remote sites with little human disturbance. Large scale ecological processes generally drive these communities. Like the montane forest, they also include areas outside of the study area.

These sites were considered to be state significant because of their size, the relatively undisturbed nature of the community and the quality of the landscape. None of these sites were visited during this inventory. The determination of significance is taken from field visits from state personnel in Camel's Hump State Forest and elsewhere.

Northern Hardwood Forests

The Northern Hardwood forest is a matrix natural community that occurs throughout the state. It can be found in large tracts and occur as a "background" natural community. Three occurrences of this community in the study area were found to be significant examples of this type.

Figure 6. Northern Hardwood Forest (#177)

The largest example of this community in the study area (and the region) is in Fayston and starts at the Appalachian Gap Road and runs north to the Camel's Hump area. This large forest consists of 5600 acres within the study area and approximately four times that outside of the study area. This community is considered to be a state significant example of this type.

The second largest northern hardwood forest in the study area is also a state significant occurrence. This forest is in the eastern

part of Waitsfield but continues into Northfield, Warren and Roxbury. It consists of 1600 acres within the study area and twice that amount outside of the study area.

The third example, a locally significant forest, is situated in the valley between Mt. Waitsfield and Bald Mountain and runs north into Moretown (# 158-9). This forest appears to be in very nice condition, contains localized areas of enrichment and is well buffered by surrounding natural communities. Within the study area, this forest is approximately 540 acres.

Hemlock-Northern Hardwood Forests

There are two examples of Hemlock-Northern Hardwood Forests in the study area that are considered to be locally significant. One occurs as a series of small patches on knolls and steep slopes around Deer Brook and French Brook in Fayston (#s 125, 135-7, 722-3, and 732). The other occurrence is a larger contiguous forest south of the Center Fayston Road (#176). Both of these occurrences appear to be in very nice condition and represent the best examples of this community type that was seen in the study area.

Hemlock Forests

Unlike the above mentioned communities, the Hemlock Forests are not matrix forests. Rather, they typically occur in patches on the landscape surrounded by matrix forest blocks. The largest and most significant Hemlock Forest visited during this inventory sits partially on the Waitsfield town property (Waldron parcel). Only the northern part (on town owned land) of this community was visited. This site appears to be in very good condition and displays a wide variety of topographic and ecologic conditions. Its condition and size make it a state significant example of a Hemlock Forest. This ranking, coupled with the presence of wildlife habitat features, vernal pools and wetlands make this area an ecological gem in the study area.

Figure 7. Hemlock Forest (#52)

Two other very nice Hemlock forests can be found on either side of Number Nine Road in Fayston (#s 149 and 150). While surrounded by roads and rural development, these sites contain some very nice forest habitat in good condition. They occur in a typical Hemlock forest setting: on slopes and along the banks of high-order streams. These two sites are considered locally significant for their condition and size.

Rich Northern Hardwood Forest

In the Central Green Mountains, Rich Northern Hardwood Forests usually occur as small patches of forest surrounded by typical Northern Hardwood forests. As part of mapping of

Camel's Hump State Forest, the state mapped and assessed a large, nearly 100 acre stand of Rich Northern Hardwood Forest (#643). This site is unusual for this area in its large size and undisturbed nature. This site was not visited as part of this inventory.

Figure 8. Rich Hardwood Forest (#177)

Red Spruce-Northern Hardwood Forest

One occurrence of this type was identified in the study area as being state significant. This occurrence exists as a series of three small sites on the ridges and knolls on the slope south of Deer Brook in Fayston (#105-6, and 138). Like the Hemlock-Northern Hardwood Forests nearby, these sites appear to be in very good condition and are well buffered by the surrounding natural communities.

Red Oak-Northern Hardwood Forest

Only one example of this type was discovered during the field inventory. This site sits on a relatively steep slope with shallow soils north of Bragg Hill Road (#158). Occasional bedrock outcrops create canopy openings which add to the plant diversity of the site and make it reminiscent of much larger oak forests or woodlands in southern Vermont. Though small, this site contains some nice large scattered red oak trees which are uncommon in the study area.

Figure 9. Red Oak-Northern Hardwood Forest (#177)

Management Recommendations for Significant Upland Communities

Many of the natural communities described above occur as "matrix" communities on the landscape. This means that they can occur as very large examples that often form the background natural communities on the landscape. Therefore, in order for a particular site to be considered state significant it must represent some of the best examples in the state. The site must be a very large un-fragmented example, be in overall good condition (lack of exotics/invasives or other major, human-caused disturbance) and be well buffered by other undisturbed natural communities.

Because of the large size of these communities, the management recommendations for maintaining their integrity are very different than those for smaller patch communities (see below). With matrix communities it is not an individual acre or parcel that is as important as the entire forest as a whole. Maintaining the integrity of these communities is more a matter of maintaining the un-fragmented nature of the community and limiting human encroachment into the interior of these sites. For this reason, infringement by residential development on the edges of these communities is not a cause for concern as much as the development of large fragmenting features into the heart of the community.

Unlike many wetland communities or smaller patch communities, matrix and larger patch communities tend to be more ecologically resilient. Active forest management including a wide variety of forestry practices generally does not threaten the ecological integrity of these sites. Many of these practices can mimic natural disturbance regimes and provide valuable wildlife habitat. Nearly all manners of recreation can be a part of the overall management plan for these sites.

The recommended management for patch communities (such as Hemlock Forests and Rich Northern Hardwood Forests) is similar to that presented above for the matrix communities. It differs primarily in the matter of scale. Large fragmenting developments that cut across or reach into the center of these sites should be discouraged. Some degree of encroachment around the margins of these sites is tolerable as long as it does not impact or degrade a significant section (>20%) of the community. If some impact to these communities is inevitable, development that is clustered near the edges are preferable to those that are scattered over a wider area.

Because they are generally smaller than patch communities, active forest management can have greater impact on the overall condition rank of patch communities. Whereas in matrix communities, an area of clear-cut may not affect the overall rank of the community, patch communities may be significantly affected by these cuts. If logging is to occur in these significant patch communities, selective logging is generally recommended over small clear-cuts.

5.0 Rare, Threatened and Endangered Species

Historical locations of rare plants and animals in the towns of Waitsfield and Fayston were obtained from the Vermont Non-Game and Natural Heritage Program (NNHP). Sites found within the study area were targeted for a field visit to determine the current status of the population in question. In addition, areas containing potential habitat for these species were targeted for a field visit to determine if other populations of these species exist.

There are currently no known rare species occurrences within the study area. Field visits to likely habitats were conducted as part