

**OPEN SPACE AND
NATURAL RESOURCES ASSESSMENT
ENOSBURGH, VERMONT**

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Prepared for:

*Enosburgh Conservation Commission
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1.0 OBJECTIVES

Arrowwood Environmental, LLC was retained by the Enosburgh Conservation and Planning Commissions to conduct an open space and natural resources inventory for the town of Enosburgh, Vermont.

The inventory project has four primary tasks: 1. agricultural lands inventory and assessment, 2. scenic resources assessment, 3. recreational resources inventory and assessment, and 4. ecologically sensitive resources inventory and assessment. The project was conducted over a twelve-month period, March 2003 through March 2004.

This report documents the findings of Tasks 1 and 4 for the inventory project for the town of Enosburgh. Tasks 2 and 3 were conducted by the Office of Robert White, and the report for these tasks is provided under separate cover.

2.0. GENERAL APPROACH: TASKS 1 AND 4

The purpose of Tasks 1 and 4 is to conduct an agricultural lands and natural resources survey of the town of Enosburgh. This information will be used to further define the town's sense of community, and to establish priorities for preserving or creating zoning provisions to protect significant resources.

The scope of the project includes the identification, inventory and assessment of significant agricultural and ecological resources in the town of Enosburgh. Existing digital and paper databases as well as information gathered from the Planning and Conservation Commissions are used in determining areas of potential significance. These natural areas are evaluated by specific ecological and landscape criteria to determine the significance and value that these areas have to the natural heritage of the town. Management recommendations are given for state or locally significant natural resources.

Field investigations were conducted on parcels for which landowner permission was obtained. Field data was used to more accurately delineate the boundaries of the natural resource areas for the final ArcView shape files, and to broaden the assessment of the identified resources.

Final maps, in the form of ArcView shape files, have been created showing the location and approximate boundaries of productive agricultural lands, wetlands and wildlife habitats in the study area. Assessments have been conducted for all of the identified natural resources and narratives included for significant resources.

3.0 METHODS

The following methods were used to conduct the agricultural lands (Task #1) and natural resources inventory (Task #4).

3.1 Task #1: Agricultural Lands Inventory and Analysis

Primary agricultural soils, as designated by the U.S Natural Resources Conservation Service (NRCS), were identified and mapped. In addition, active farmlands, some of which may not occur in the formally designated primary agricultural areas, are identified utilizing Landuse/Landcover from Landsat Satellite Imagery, and 1990's digital orthophotography. This information provides a clear view of the overall agricultural potential within the community and how much of that potential is currently utilized.

The data layers are presented in a GIS format with a delineated agricultural zone within the town. The agricultural zone generally encompasses productive agricultural lands and primary agricultural soils as mapped by the NRCS. The zone boundary was developed through a cooperative process with the Planning and Conservation Commissions. The Commissions provided local knowledge of active agricultural lands. The agricultural zone is provided as a potential zoning overlay district for regulatory purposes.

Once the agricultural lands and potential overlay district were identified, specific zoning provisions were developed to protect the long-term viability and availability of productive farmland in the town for agricultural use. The recommended options are in keeping with the direction laid out in the Town Plan:

Areas that are used for agriculture are to be protected but uses other than farming, including residential at a low density, may be permitted. Of top concern is the protection of prime agricultural soils. (Town Plan, Chapter 15, Land Use, Stated objective of the Agricultural/Rural Residential District, page 64)

Management recommendations and options are provided for guidelines to minimize 1) the fragmentation of productive farmland, 2) the adverse impacts of development to farming operations, and 3) the adverse visual impacts from development to the scenic qualities of a site.

3.2 Task #4: Natural Resources Inventory and Analysis

The natural resources inventory and analysis is accomplished in two phases, an office review of available databases and a field assessment of select sites. Methodologies associated with the inventory and assessments are discussed below.

3.2.1 Landscape Analysis

A comprehensive review and interpretation of all available digital and paper databases was conducted to identify potentially significant natural areas in the town of Enosburgh. This data review yielded a set of potentially significant natural areas in the town.

The following digital and hardcopy databases were acquired for the study area:

- Natural Resources Conservation Service (NRCS) soil survey maps,
- Vermont Significant Wetlands Inventory (VSWI) maps,

- Landuse/Landcover from Landsat Satellite Imagery,
- U.S. Geological Survey topographic maps,
- Non-Game & Natural Heritage Program (NNHP) database,
- Department of Fish and Wildlife Deer Wintering Habitat maps and Black Bear Habitat maps
- 1990s Orthophotography,
- 1990's Color Infrared Aerial Photography,
- Conservation Lands database, and
- State Land use maps.

The digital databases were incorporated in an ArcView platform (GIS) allowing for analysis of multiple data layers at the study location. Natural resource areas, including wetlands, upland natural communities, and wildlife habitat were preliminarily delineated from the GIS analysis. From the preliminary data, potentially significant resource areas were targeted for field investigation.

Natural resource areas identified through the Landscape Analysis were assessed as wetlands, upland natural communities, and wildlife habitat areas. Resource assessments focused on identifying the extent/boundaries of the natural resource in the landscape, and the value or significance of the resource to the community. In addition to information interpreted from available digital and paper resources, the assessment incorporated data collected from limited field investigation of the study area.

Field investigations of resource areas were restricted to windshield surveys from a car, and assessments for parcels for which landowner permission was obtained. A windshield survey was conducted of the entire study area, resulting in general observations made from the road. Observations from the windshield survey, and field assessments were used to help verify information interpreted from maps and digital orthophotography.

Assessment criteria used for each of the three resource categories (wetlands, upland natural communities, and wildlife habitat) is detailed below.

3.2.2 Wetlands Assessment Criteria

Wetlands identified in the study area were informally delineated. The boundary determinations of the wetland areas were based on interpretation of 1996 orthophotography, 1990's Color Infrared Aerial Photography, NRCS soil survey maps, National Wetland Inventory maps, and field observations when possible. Formal delineations of resource areas were not possible due to limited access. Therefore, boundary lines are meant for planning purposes only.

Two wetland types were identified in the Enosburgh study area: Wetlands and Potential Wetlands. Wetlands were identified from a combination of sources: National Wetland Inventory maps, NRCS soil survey, 1996 orthophotographs, Color Infrared Aerial Photographs, and limited field surveys. These wetlands likely meet the specifications detailed in the Vermont Wetland Rules for Class II and Class III wetland types. In addition to Wetlands, possible wetland areas were also identified and classified as "Potential Wetlands". These areas generally contain hydric soils as mapped by the NRCS soil survey but could not be confirmed as wetland by any other data source. A definitive wetland determination was not possible from the available data sources for the "Potential Wetland" areas. In most cases, a field visit is needed to determine if these sites actually contain a wetland.

Each wetland and potential wetland was also given a natural community name based on the

classification presented in *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (Thompson and Sorenson, 2000).

3.2.3 Upland Natural Communities Assessment Criteria

Identification of significant upland natural communities requires both remote assessment and extensive fieldwork. Remote data sources such as those described above were used to identify areas harboring potentially significant upland natural communities. Field visits were restricted to the sites for which landowner permission was obtained. The inventory of these significant natural communities is therefore limited and it is likely that other sites of local or state significance exist in the town that could not be surveyed.

Community names and classifications are based on *Wetland, Woodland, Wildland: A Guide to the Natural Communities of Vermont* (Thompson and Sorenson, 2000) and on *Natural Communities of New Hampshire: A Guide and Classification* (Sperduto, 2000).

3.2.4 Wildlife Habitat Assessment Criteria

The wildlands in Enosburgh were assessed for their value in providing the typical components of wildlife habitat including: food, water, and cover. Elements of more general wildlife habitat such as forested areas, as well as specific habitat elements that may play more critical roles for certain species, were also evaluated. A total of eighteen different wildlife habitat elements were investigated through the use of paper and digital maps, digital databases, and a windshield survey.

The following criteria were selected for use in evaluating wildlife habitat potential in the resource areas identified:

- Size
- Presence of Streams
- Presence of Class II Wetlands
- Size of Class II Wetlands
- Horizontal Diversity (average for the Unit)
- State Mapped Deer Yard
- Size of State Mapped Deer Yard
- Presence of Ponds
- Hardwood/Softwood Forest Mix
- Core Habitat
- State Mapped Bear Habitat
- Structure/Ledges
- Floodplains

The study area was divided into Wildlife Habitat Units that were un-fragmented by roads (including paved and or well-traveled dirt roads), as these features are often barriers to wildlife movement. Each Unit was thus a patch of varying size, each containing certain habitat elements. These units were delineated based on presence of forested habitat, roads and agricultural land, and were used as a means of simplifying the analysis and discussion of wildlife habitat in the town.

Within each of the Units, existing digital databases were used to identify habitat features that

are directly associated with high wildlife species diversity, certain guilds of similar wildlife, or the presence of certain species. Field evaluations were not conducted for resource areas. A windshield survey was conducted of the town. The discussion of wildlife habitat units includes determinations regarding individual species as well as overall diversity.

4.0 Inventory Results

The resource assessments for agricultural lands and significant wetland, upland natural community and wildlife habitat resources are detailed in this section.

4.1 Agricultural Lands

The town of Enosburgh has significant agricultural potential within the town. The NRCS soil survey indicates that approximately 8,776 acres of primary agricultural soils exist in the town. Landsat Satellite Imagery shows approximately 6,800 acres of active farmland (hay, pasture, row crop, or other agriculture) throughout the town.

The agricultural potential identified through map analysis and orthophoto review corresponds with the developed road network in town, with little potential farmland present in areas distant from the main roads. The main corridors of active farmland occur along Route 105 and the Missisquoi River in the northern part of town; along Perley, Nichols, Horseshoe and Sand Hill Roads in the eastern portion of town; along Boston Post and Grange Hall Roads in the central portion of town; and along Howrigan, Tyler Branch and Route 108 roads in the western portion of town.

An agricultural overlay zone was developed as a result of identification of the major agricultural corridors from available map, photo and database review and discussions with the Conservation Commission. The zone includes areas of active farmland and potentially viable farmland. The agricultural zone encompasses an area of approximately 5,700 acres. See attached Agricultural Lands inventory map for overlay zone boundaries.

Once the agricultural lands and proposed overlay district were identified, specific zoning provisions were developed to protect the long-term viability and availability of productive farmland in the town for agricultural use. A specific agricultural overlay zoning district with recommended zoning restrictions is outlined in Section 6.1 of this report.

4.2 Wetlands

A total of 300 wetland and potential wetland systems have been identified in the town of Enosburgh. The wetlands consist of Class II and Class III wetlands as defined by the State of Vermont Wetland Rules, and possible wetlands (“Potential Wetlands”) based on soils and professional judgment. Wetlands occupy approximately 2,100 acres of the town. There is a diverse array of wetlands in the study area including sixteen different wetland natural community types. The number and extent of wetland communities is presented in the following table.

Table 1: Number and Extent of Wetland Communities in Enosburgh

Natural Community Classification	Number of Occurrences	Average Size (Acres)	Total Size of All Occurrences
Agricultural field	62	8.6	534.1
Alder Swamp	38	8.9	336.3
Cattail Marsh	2	0.5	1.0
Deep Emergent Marsh	1	1.6	1.6
Shallow Emergent Marsh	49	7.5	367.1
Floodplain Forest	12	10.7	128.8
Northern Hardwood Seepage	5	4.2	21.1
Old field	24	5.3	126.3
Open Water	13	8.8	114.9
Pond	46	0.4	16.7
Red Maple-Black Ash Swamp	9	9.5	85.5
Red Spruce-Hardwood Swamp	4	14.5	58.1
River Cobble Shore	2	2.6	5.1
Rivershore Grassland	4	2.9	11.6
Spruce-Fir-Tamarack Swamp	6	19.7	118.3
Vernal Pool	2	0.1	0.3

4.2.1 Sites of Local Significance

The sites that follow were identified from remote sources and then from field visits during the 2003 field season. The Wetland Units described below correspond to the polygon ID's in the ArcView shape file. See attached Resource Map for wetland unit locations. Further inventory work is needed to identify other areas of potential significance in Enosburgh.

Beaver Wetlands Northwest of Bordoville: Northwest of Bordoville there is a series of beaver associated wetlands (wetlands 210-213 on the wetland map). These wetlands appear to be in very good condition, are undisturbed and relatively remote. They are a haven for a wide variety of wildlife and harbor many different natural communities including an Alder Swamp, a Willow Swamp, a small remnant Red Maple-Black Ash Swamp, an Emergent Marsh, and open water beaver ponds. Some flooded areas appear to be well established beaver ponds while others appear to be more recent. The overall mosaic of wetland vegetation, open water, shrub swamp and upland forest creates an area with a high degree of plant diversity. It also creates a series of wetlands that are able to mitigate the floodwaters that come off Leach Hill during high water events. The beaver ponds may also serve the function of filtering out any sediment that may come off the hills. This series of wetland communities is considered locally significant.

Management Recommendations: Since these wetlands are fairly remote and not easily accessed, the threat to them from development is probably minor. Nevertheless, a 100-foot buffer between these wetlands and any development should be considered. Logging around these wetlands should also maintain a 50-foot buffer to minimize the potential disturbance to the wetland soils and to amphibian habitat and corridors.

Northern Hardwood Seepage Forest (Wetland unit #'s 24, 25, 82, 108, and 215 on the wetland map): All of the sites that were visited during this inventory appear to be intermediate

between upland and wetland habitats. They are dominated mostly by upland tree species such as sugar maple and white ash but also contain species typical of more wetland habitats such as red maple and black ash. The herbaceous layer is dominated by wetland vegetation such as sensitive fern, cinnamon fern and dewberry. The soils are usually silt or clay loams and sometimes contain a dense pan that impedes drainage. Like the Mesic Hemlock Northern Hardwood Forest, these sites are not very well documented in the state and are somewhat unique. Relatively large stands such as found here may be uncommon. For this reason, these sites are considered locally significant. There are undoubtedly more of these sites in Enosburgh that have yet to be identified.

Management recommendations: Some of these sites are Class II wetlands and have the protections associated with the Class II wetland status. Other sites, while not mapped wetlands, may contain soils that are unsuitable for development. Limited logging in this natural community will likely not disrupt the natural processes as long as care is taken not to disturb the soils. Disruption of the soils can result in an invasion of non-native, weedy plant species that can choke out native vegetation and decrease the quality of the plant community.

Beaver Meadow Brook Wetlands: There is a series of eight wetlands (unit #s 56-58, 109, 111, 112, 253-254) along Beaver Meadow Brook from its headwaters near the Woodward Neighborhood Road to where the Brook crosses Nichols road in East Enosburgh. This wetland complex is one of the most extensive and important complexes in the town. The different natural communities found in this complex include Emergent Marshes, Alder Swamps, open water beaver ponds, small examples of Sedge Meadows, Adams Pond and a possible conifer swamp. This wide variety of natural communities provides habitat for a great diversity of plants and offers wildlife habitat for species such as mink, otter, great blue heron, beaver, white-tailed deer, black bear, various waterfowl, and many species of turtles and frogs. The mosaic of vegetation and the pattern of water flow also make these wetlands important for control of flood waters, filtering of nutrients and sediment, and controlling erosion along Beaver Brook.

Management Recommendations: As mentioned above, this series of wetlands is important in Enosburgh for the natural communities, plant and wildlife habitat and preserving water quality. As Class II wetlands, these sites are protected with a 50-foot buffer. Given the significance of these wetlands to the town, a 100-foot buffer is recommended. Any activity that would disrupt the local hydrology or has the potential to introduce non-native species should be discouraged.

Hopkins Bridge Wetlands: This series of five wetlands (unit #'s 6-10) sit along the Trout River just south of the Hopkins Bridge. They consist of Emergent Marshes, Willow-Alder Swamps, and a Floodplain Forest. Only wetland unit #'s 8-10 were visited during this inventory. Wetland unit #'s 6 and 7 were not visited due to lack of landowner permission and were therefore assessed remotely. Wetland unit #8 is an extensive shrub swamp that occurs at the confluence of the Trout River and one of its tributaries. This is a broad, flat area that is dominated by willow and speckled alder shrubs. Common herbs include blue-joint grass (*Calamagrostis canadensis*), rice cut-grass (*Leersia oryzoides*), and boneset (*Eupatorium perfoliatum*). The soils are shallow peat (muck) soils over gravel. Standing water is common. There are many standing dead trees and a good mixture of shrub and herbaceous vegetation offering a wide variety of wildlife habitat. This wetland also likely controls floodwaters, absorbs excessive nutrients and sediments and controls erosion along the banks of the tributary. This community appears to be in excellent condition and is likely the largest, best example of this community type in the town. This site is therefore considered locally significant.

From remote assessment, wetland unit #6 appears to be a relatively large Floodplain Forest. This is likely the largest remaining Floodplain Forest within the town of Enosburgh. As such, it could be a valuable part of the natural heritage of the town. While the condition of the community cannot be determined from remote sources, both the size and uniqueness of the community type in the town suggest that this site be considered locally significant.

Management Recommendations: All of the wetlands in this complex are Class II wetlands and therefore are protected with a 50-foot buffer. Given the significance of these communities, a 100-foot buffer is recommended for these wetlands. Any activity that would disrupt the local hydrology or has the potential to introduce or hasten the spread of invasive species should be discouraged.

Wetland unit # 6, should be inventoried and the condition of the community assessed. This is especially important in the case of Floodplain Forests as they are very susceptible to invasion by aggressive non-native plant species. These weedy species can completely choke out the diversity of the native vegetation and degrade the condition of the community. If non-natives have taken hold in this community, it is recommended that a community effort be undertaken to eradicate them or control their spread.

4.3 Resources Surrounding the Growth Centers

Two growth centers, West Enosburg and Enosburg Center are considered here because of the greater potential for development to occur in these areas. While these specific sites did not receive a field visit due to lack of landowner permission, some general comments can be made based on remote assessments.

4.3.1 West Enosburg

The most significant resource around West Enosburg in terms of natural communities and ecological functioning appears to be the vegetated stream corridor along the Tyler Branch. This is a Class II wetland and, in some places, a remnant floodplain forest. In some cases, this forest is only a few trees wide but offers valuable stream corridor habitat for wildlife movement and perhaps a refuge for floodplain vegetation. These stream corridors should be maintained. Where they are especially narrow, a widening of these corridors should be encouraged.

4.3.2 Enosburg Center

There are a couple of wetlands in the vicinity of Enosburg Center that may warrant attention. Lack of landowner permission prevented any field visits to these sites, but remote assessments indicate that wetland unit #s 208 and 138 may be locally significant sites. Wetland unit #274 appears to be a flooded hardwood swamp with two small Alder Swamps (unit #s 209 and 135) on the north end. The extent of flooding or the condition of the remaining community remains unknown. If this is a hardwood swamp, it would likely be the largest in the town of Enosburg.

Wetland unit #138 appears to be a beaver meadow similar to those found in the Beaver Meadow Brook wetlands and the wetlands northwest of Bordoville. This wetland, though, is more isolated and may be closer to potential development. Since this site was not visited, no conclusions about the conditions of the natural community can be drawn. However, given that

beaver influenced wetlands are very common in the state, the importance of this wetland may lie in the functions and values it performs. Remote sources indicate that it may be important in filtering out excessive nutrients from the adjacent agricultural land before they pollute the stream (a tributary of the Tyler Branch). If development does occur in this area, the role that this wetland plays in filtering out nutrients and sediment and controlling flood waters from surrounding developments will likely increase.

4.4 Upland Natural Communities

The remote assessment for identifying significant upland natural communities did not reveal any obvious significant or potentially significant sites. A more thorough inventory for these resources requires more extensive fieldwork. Since the fieldwork for this study was limited to sites for which landowner permission was obtained, this phase of the inventory yielded limited results. It is likely that a more thorough field survey would reveal more sites of local significance.

Mesic Hemlock-Northern Hardwood Forest: This site is located on the Svobodny property and was visited as a possible Hemlock Swamp While moist, the site is actually not wet enough to warrant being typed as a swamp. It is, however, wetter than the typical Hemlock Forest. This community type is somewhat unique in the town and not well documented in the state. Unlike most Hemlock forests in Vermont, this site is relatively flat. Tip-up mounds and hummocks and hollows are common. The herbaceous vegetation includes species indicative of both upland and wetland habitats. This site appears to be in very good condition; it lacks any widespread colonization of invasive species, has not been recently or drastically cut and is undisturbed. Because of its uniqueness and condition, this site is considered locally significant.

Management recommendations: Given the location of this site, the threat from development may be minor. Development could probably occur on the edge of this forest without compromising the interior community. Development that would fragment this forest should be avoided. Severe fragmentation of this forest could lead to a disruption of the natural forces that have shaped this community. It may also have the affect of introducing non-native weedy plant species. Limited logging could also probably occur within this community. Since the soils may be somewhat wet, logging should occur when the soils are frozen and there is adequate snow cover. Leaving part of this community un-logged should be considered, especially since little is known about the classification and development of this type in the state.

4.5 Wildlife Habitat

Eighteen (18) Wildlife Habitat Units have been identified in the Enosburgh study area. These units comprise approximately 38 square miles of the town. The results of the wildlife assessments are summarized in Table 4 in the Attachment. Significant wildlife units are discussed below.

Wildlife Unit #1

Wildlife Unit # 1 is an especially valuable wildlife habitat in Enosburgh. The presence of wild ponds, remote hard mast (American beech) food resources, several deeryards, potential ledge structure for animals such as bobcat and porcupine, numerous streams and wetlands, historic great blue heron rookeries, and large areas of relatively undisturbed “core” forest make this

unit very important wildlife habitat.

Wildlife Unit # 1 may serve as a wildlife “source” area for Units # 2, 5, 7, 13, and 18. Species such as black bear, fisher, bobcat and moose may migrate from “reproductively important” areas such as Unit # 1 to take up home ranges in these smaller units. Recent field investigations by other researchers have revealed the presence of black bear and fisher in the northern half of this Unit. This Unit also likely serves as a “productive” breeding ground for songbirds such as ovenbirds, red-eyed vireos, wood thrush, rose-breasted grosbeak, pileated woodpeckers and other area-sensitive or forest interior birds.

Wildlife Unit #s 3, 4 and 7

Wildlife Unit #s 3, 4, and 7 are large enough (~2000 acres or larger) that wild species are likely to breed in these areas. Predators, moose, deer, and songbirds likely find enough remote lands to have breeding populations here. These areas likely serve as wildlife “source” areas for some species as well. Wildlife Unit # 4 could play an important role similar to Wildlife Unit # 1 but on the western side of Enosburgh.

Wildlife Units #s 4 and 5 extend for considerable distances without fragmentation into neighboring towns. These areas are even more important for Enosburgh’s overall wildlife resources than their size within Enosburgh alone would suggest.

Wildlife Unit #s 7 and 12 on the Missisquoi River and Unit #s 3, 4, and 5 on smaller, but substantial streams are important for fish and their habitat, as well as for floodplains and likely aquatic species such as mink, otter, and muskrat. Osprey and other birds such as the kingfisher also utilize streamside habitats within these Units.

Many of the smaller wildlife habitat units as well as the more Urban and Agricultural areas may serve as wildlife viewing areas where white-tailed deer and red fox are often observed. The single large dead tree in the midst of a hay field may be where most people see the soaring red-tailed hawk or other raptors. The wooded-side of a cornfield in spring can be habitat for a dozen deer or more, while the neighboring early succession aspens or red maples are home to the woodcock.

Overall Wildlife Management Recommendations: In general, the wildlife habitat within the town of Enosburgh exhibits low to moderate fragmentation. Most of the fragmentation present in town is still only nipping at the edges of expansive areas of unbroken forest habitat

To ensure that development activities along the many dirt roads in Enosburgh have as little impact upon wildlife and wildlife movements, as much forest cover in proximity to these dirt roads should be maintained. In addition, some species seem to prefer or require long undeveloped roadside reaches.

Within the town of Enosburgh, key habitats need to be protected in order to maintain the diversity and abundance of wildlife currently present. These key habitats include: beech stands; remote forested and shrubby wetlands; travel corridors for black bear; early successional forests for prey and their predators (like bobcat and fisher); vernal pools and seeps for amphibians; mast stands for deer, bear, and turkey; and ledges, talus areas and large snags for denning bobcats and other wildlife. Important crossing places for amphibians, bear and other wildlife should be identified and, when possible, protected. Many of these crossing places are likely to be ridges and valleys. To maintain the fish habitat in town, riparian

areas should be given appropriate buffers. In streamside areas that are already damaged, restoration activities should be undertaken.

5.0 Resource Maps

Individual ArcView shapefiles were created for the three resource groupings: agricultural lands, wetlands, and wildlife habitats. The GIS platform provides a versatile tool for ongoing analysis of the resource areas. Resource maps are provided in the Attachment. ArcView shapefiles are provided in digital form on the CD-Rom included with this report.

6.0 Regulatory Recommendations

Management recommendations for agricultural lands, wetlands, significant natural areas and features and wildlife habitat are outlined below.

6.1 Agricultural Lands

Two management options are presented to protect the long-term viability and availability of productive farmland in the town for agricultural use. Management recommendations and options provide suggestions for guidelines to minimize 1) the fragmentation of productive farmland, 2) the adverse impacts of development to farming operations, and 3) the adverse visual impacts to the scenic qualities of a site from development.

The options include an Agricultural Overlay District and a Conservation Subdivision Design. Each option is discussed below with sample working provided.

Option #1: Agricultural Overlay District

This option establishes a specific zoning district that references the agricultural overlay zone delineated in this study. Outlined below is sample wording for an agricultural overlay district within which the following specific zoning regulations may be applied.

Agricultural Overlay District (Sample Wording)

Purpose: The purpose of the Agricultural Overlay District (AOD) is to protect the long-term viability and availability of productive farmland in the Town of Enosburgh for agricultural use. The AOD boundaries are presented on the attached Zoning Map.

Permitted Uses:

Agriculture
Forestry
Home Occupation
Agricultural Sales & Service
Bed & Breakfast
Dwelling/Accessory
Home Industry
Recreation/Outdoor

Conditional Uses:

Dwelling/Single Family
Accessory Structure/Use
Adaptive Reuse

Dimensional Standards: As required for the underlying zoning district

District Standards:

1. Where the standards of this overlay district differ from underlying district standards, the more restrictive shall apply.
2. Nonagricultural development in this district-including single family dwellings and other principal structures, accessory structures and parking areas-must be located within a designated building envelope approved by the Board of Adjustment (subject to Conditional Use review). Building envelopes, to the extent feasible, must be sited:
 - a. On the least fertile soils, to avoid primary agricultural soils;
 - b. In existing wooded areas or at field edges, to minimize the fragmentation of productive farmland, adverse impacts to existing farming operations, and adverse visual impacts to the scenic qualities of the site.
3. No more than 50% of land in agricultural production on a parcel, as shown by the Town Overlay Map, may be developed. (This could reference soil survey, alternatively)
4. To minimize the fragmentation of productive farmland, proposed access roads, driveways and utility corridors in this district, to the extent feasible, shall:
 - a. Share rights-of-way
 - b. Avoid crossing open farm fields; and
 - c. Follow existing linear features such as utility corridors, farm roads, field edges, tree lines, stone walls, and/or fence lines.
5. For development subject to conditional use review in this district, the Board of Adjustment may:
 - a. Limit the extent of site clearing and disturbance, including the removal of existing vegetation, for development other than agriculture or forestry;
 - b. Require fencing, screening and/or vegetative buffer zones between nonagricultural development and existing agricultural operations; and/or
 - c. Require the submission of environmental, agricultural or visual impact assessments for board review and approval.Planned residential or planned unit developments are required for all major subdivisions (4 or more lots) in this district.

Option #2: Conservation Subdivision Design

Conservation Subdivision Design (Sample Wording)

Design Process. All subdivisions as required by the Planning Commission shall be designed in accordance with the design process summarized below. Steps shall be followed in the sequence presented and may include the preparation of one or more scaled overlays for each step. This process is intended to ensure compliance with these regulations, and that maximum consideration is given to the identification and protection of primary and secondary conservation areas in subdivision design and the subsequent development of subdivided parcels.

Design process steps are to be followed in order presented, and may include the preparation of one or more scaled overlays for each step, for consideration under preliminary and final subdivision plan review:

Step 1. Identify Conservation Areas. The subdivider shall clearly identify and delineate the boundaries of all primary and secondary conservation areas from maps, orthophotos, and site investigation as needed. Primary conservation areas are to be

excluded from overall density calculations, except for planned residential or planned unit developments. A conservation plan for these areas shall be developed that ensures their preservation to the fullest extent feasible.

Step 2. Identify Potential Development Areas. Potential development areas that exclude primary conservation areas and, to the extent feasible, secondary conservation areas, shall be identified. Maximum development density shall be based on allowed densities for the zoning district(s) in which the subdivision is located, less the area assigned to primary conservation areas. The Planning Commission may allow increased densities of development within designated development areas only for planned residential and planned unit developments.

Step 3. Identify Building Envelopes. Building envelopes, to include all areas to be set aside for buildings and parking areas, shall be identified. The Planning Commission may also require that footprints be identified for all structures or parking facilities to be held in common.

Step 4. Identify Lot Lines (Boundaries). Lot lines shall be laid out to avoid the fragmentation of primary and secondary conservation areas, to incorporate identified building envelopes or footprints, and to meet the requirements of these regulations. Lots shall meet the minimum area and coverage requirements for the zoning district in which they are located, except as modified by the Planning Commission for planned residential or planned unit developments.

Step 5. Identify Connecting Roads, Pedestrian Paths & Utilities. Roads, shared driveways, pedestrian paths, utility lines, and associated rights-of-way or easements shall be laid out to avoid the fragmentation of designated primary and secondary conservation areas, and to connect building lots, and other applicable requirements of these regulations. The Planning Commission also may require that driveways serving individual lots be identified as needed to avoid adverse impacts to designated conservation areas.

(A) **Primary Conservation Areas.** Subdivision boundaries, building envelopes, road rights-of-way and driveways, infrastructure and utility corridors, shall be sited and configured to avoid *any* adverse impacts to primary conservation areas. These areas also shall be excluded from density calculations, except for planned residential or planned unit developments where clustering is proposed. For purposes of these regulations, primary conservation areas shall include all lands within the flood hazard district, **primary agricultural soils**, areas of steep slope (30% or more), and surface waters, wetlands and associated setback areas, as identified from available maps and orthophotos, or through site investigation.

Methods for avoiding adverse impacts include, but may not be limited to the following:

- (1) Building envelopes shall be sited and configured to exclude these areas.
- (2) Lot lines, infrastructure, and roads, driveways and utility corridors shall be located to avoid the parcelization, fragmentation, isolation, or destruction of these areas.
- (3) Roads, driveways and utility corridors, to the extent feasible shall be shared and located to follow existing linear site feature such as existing roads and utility corridors, tree lines, fence lines, stone walls, or field edges, to avoid the fragmentation of primary conservation areas and associated adverse impacts.

(4) Primary Conservation Areas are to be identified and included as designated open space on the subdivision plat. Buffer areas, management plans, conservation easements, restrictions on further subdivision or comparable site protection mechanisms and mitigation measures may be required to ensure the long-term conservation of these areas.

(B) **Secondary Conservation Areas.** Subdivision boundaries, lots, building envelopes, road-rights-of way, driveways, infrastructure and utility corridors shall be sited and configured to avoid, to the extent feasible, any adverse impacts to secondary conservation areas. For the purpose of these regulations, secondary conservation areas shall include critical wildlife habitat and corridors, including but not limited to designated deeryards, bear and moose habitat, natural communities, and endangered, threatened or rare species as designated by the Vermont Nongame and Natural Heritage Program; **primary agricultural soils**; designated water supply source protection areas; areas having slopes of 20% to 30% , designated archaeological or historic sites; and ridgelines and hilltops that are visible from public vantage points; as identified from available maps and Vermont Base Map Orthophotos, and through site investigation.

Methods for avoiding adverse impacts include, but may not be limited to the following:

(1) Building envelopes, to the extent feasible, shall be sited and configured to exclude these areas. In the event that no other land in the parcel to be subdivided is suitable for development, building envelopes shall be designed to minimize encroachments into these areas, and any related adverse impacts.

(2) Lot lines, infrastructure, and roads, driveways and utility corridors shall be located to avoid, to the extent feasible, the parcelization, fragmentation, isolation, or destruction of secondary conservation areas.

(3) Roads, driveways and utility corridors, to the extent feasible shall be shared, and located to follow existing linear site feature such as existing roads and utility corridors, tree lines, fence lines, stone walls, or field edges, to avoid the fragmentation of secondary conservation areas and associated adverse impacts.

(4) Secondary conservation areas are to be identified and included as designated open space on the subdivision plat. Buffer areas, management plans, conservation easements, restrictions on further subdivision or comparable site protection mechanisms and mitigation measures may be required to ensure the long-term conservation of these areas.

6.2 Wetlands

Accompanying this report is a map of the wetlands and potential wetlands in the town of Enosburgh. This map is based on aerial photo interpretation, Orthophotographs, topographic maps, soil survey, and limited field work. This map is more accurate than the Vermont State Wetlands Inventory (VSWI) map. It is therefore recommended that this map be adopted as the town wetland regulatory map in the Town Plan and Subdivision Regulations. If a wetland overlay district is adopted, this wetland map should be used as a basis for that map.

6.3 Significant Natural Areas and Features

Article 1, Sec 100 No 5 of the Enosburgh Subdivision Regulations state that the town's intent is to protect "native vegetation". Language consistent with the rest of the subdivision regulations regarding "Significant Natural Areas and Features" should replace "native vegetation" or be added to this section.

The Subdivision Regulations state that "Subdivision applicants shall take all reasonable measures to protect significant natural areas and features either identified in the Town Plan or by the applicant's Existing Resources and Site Analysis Plan" (Article 4 Sec 401 J). The Town Plan should have a section that clearly states what locations the town considers to be significant natural areas or features. If appropriate, specific development restrictions such as buffer zones may be suggested.

Significant Natural Areas should be defined to include Significant Natural Communities. Based on Thompson and Sorenson (2000), Natural Communities can be defined as follows: "an interacting assemblage of organisms, their physical environment and the natural process that affects them."

6.4 Wildlife Habitat

Wildlife and wildlife habitat need to be defined within the town's regulatory documents. Enosburgh needs to provide it's own definition of wildlife and not rely on State of Vermont definitions such as "necessary wildlife habitat" (Act 250 Landuse Development Law), which at this point only protects the habitats of a few species such as deer and bear.

Zoning Regulations:

Under Article I, Section 103 Definitions add "significant wildlife habitat" utilizing the following definition:

Significant wildlife habitat is habitat that consists of important food, water, cover, space or breeding areas for a species of wildlife during part or all of its yearly range.

Under Article III, Section 306.C: Submittal Requirements: Add "significant wildlife habitat" to list of natural features

Subdivision Regulations:

Wildlife Habitat has to be specifically mentioned and defined in the Regulations. Mention of "wildlife habitat" within the "General Provisions" section rarely protects wildlife or its habitat.

Under Article IV, Planning and Design Standards, Section 400, Overview of Standards, number 5, or a new number, include the terms "avoids significant wildlife habitat".

In Article IV, Section 401, Planning and Design Standards (J) Significant Natural Areas and Features, add the terms "to protect significant wildlife habitat". Alternatively, create a new section for Significant Wildlife Habitat and include measures described in Section 6.4.1 below.

In Article V (Definitions) add “significant wildlife habitat” utilizing the following definition:

Significant wildlife habitat is habitat that consists of important food, water, cover, space or breeding areas for a species of wildlife during part or all of its yearly range.

6.4.1 Important Wildlife Habitats and Protective Measures

1. *Core Habitat:* Non-developed lands such as forest and wetlands at least 300 meters from development should remain undeveloped. Paved roads, houses, and other human developments should be discouraged in areas other than the edge of these habitats (within 100 feet).
2. *Deeryards:* State Mapped and unmapped potential deeryards should be assessed by a qualified wildlife professional for signs of active or recent deer use. Most development should be prohibited within 300 feet of current (activity within 3 years) deeryards.
3. *Bear Habitat:* Stands of American beech trees exhibiting use by black bear should not be clear-cut and development (roads and houses) should be prohibited within approximately 2500 feet. Forested wetlands utilized by black bears should be given a buffer of at least 1000 feet. Ridgelines, stream valleys, and other areas that are used as bear travel corridors should be protected with 1000 buffers as well.
4. *Den Sites:* Denning sites for black bear, bobcat, fisher and/or great blue heron rookeries should be buffered from development activities. The potential negative impacts of inappropriate human activities should be assessed when occurring within 500-1000 feet of these sites.
5. *Streamside Environments:* Floodplain and riparian habitats should be buffered and preserved. For mid-large streams and rivers all development within a few hundred feet should be assessed for potential negative impacts to plant and animal communities, including fish.
6. *Vernal Pools:* Vernal pools should be protected with a 2-tier protective buffer zone. The 1st tier extends 100’ around the vernal pool. No alteration, except selective cutting of trees using forestry AMP’s, should be allowed within the 1st tier. The 2nd tier extends 500 feet from the vernal pool. The 2nd Tier should have only limited development with minimal paved surfaces.
7. *Habitat Fragmentation:* Do not allow fragmentation of existing Wildlife Units. Promote development only along the fringes of the Units, and then only in areas where important wildlife habitats and corridors between Units are not present.
8. *Wetlands:* Maintain at least a 100’ buffer zone around all wetlands except wet meadows. Maintain a 50’ buffer for wet meadow wetlands.

7.0 Conclusions

The Natural Resources Inventory conducted by Arrowwood Environmental for Enosburgh has identified many significant and interesting resources within the town.

The agricultural lands inventory resulted in the creation of a proposed agricultural overlay zone that encompasses both active and potentially viable agricultural lands along the main travel corridors in town. The proposed overlay zone was created through a collaborative process with the Conservation and Planning Commissions. The approximately 5,700 acre zone includes areas of prime agricultural soils and/or actively farmed lands.

Incorporation of an Agricultural Overlay Zone or the implementation of a Conservation Subdivision Design process will protect the long-term viability and availability of these productive farmlands in the town for agricultural use. Management recommendations and options provide suggestions for guidelines to minimize the fragmentation of productive farmland, to minimize the adverse impacts to farming operations, and to minimize the adverse visual impacts to the scenic qualities of a site.

Three hundred wetlands and potential wetlands have been identified in the town of Enosburgh. These include shallow and deep emergent marshes, shrub swamps, hardwood and softwood swamps and floodplain forests. Together, these wetlands represent a wide range of plant and animal habitats. The most significant wetlands in the town are those associated with the beaver floodings near Bordoville, and the floodplain wetlands near Hopkins Bridge. Perhaps the most significant and extensive wetland complex in the town exists along Beaver Meadow Brook between the Woodward Road and East Enosburgh. This wetland provides extensive habitat for a wide array of plants and animals and serves important functions on the landscape.

The wildlife habitat inventory was conducted from remote sources and a limited windshield survey. The remote inventory provides an overview of habitat resources. More in depth analysis can result from detailed field investigations. The town of Enosburgh ranges in elevation from as low as 500 feet in the Village to about 2000 feet in the eastern mountains. The town's forests are a mix of hardwood and conifer tree types typically found at these lower to mid elevations in Vermont. The town's wildest areas are in the southwest and the east where large contiguous forests provide deep forest interior habitat for black bear, fisher, bobcat, moose, hawks, owls and the more edge sensitive songbirds such as the ovenbird.

Deer, red fox, coyote, and raccoons are found and often sighted throughout the town even close to the Village where woodlots remain quite large often several hundred acres in size. Enosburgh's agricultural fields are interspersed throughout and many species such as the wild turkey, woodcock, deer, and field birds such as the bob-o-link can be seen here.

Streams, wild ponds, and wetlands provide much wildlife habitat in Enosburgh. Fish, otter, mink, amphibians, waterfowl, osprey and herons all find living space in the marshes, open water and swamps within Enosburgh.

The town of Enosburgh has a diversity of wildlife habitats including large areas that black bears utilize, and ranging down to the hedgerows that line the towns' agricultural fields. All these open spaces provide habitat for wildlife of one sort or another. How Enosburgh manages growth and development in the future will largely determine the future of the wildlife resources in town.

The attached Resource Maps are primarily based on remote sources (1996 orthophoto interpretation, color infrared photograph interpretation, NRCS soils surveys, etc.), with limited field verification. Therefore, the Resource Maps must be considered a baseline from which

further work can build. These resource maps are an important first step in the inventory process and include some very interesting and important resources. Because of limitations in fieldwork, many more resources likely remain to be documented in the town. This process of adding to and refining the resource maps is an important undertaking that can be carried out by interested towns-people, local naturalists, and knowledgeable landowners. Updating and refining the resource maps will result in the maintenance of this valuable planning tool into the future.