9. NATURAL RESOURCES

Among the most fundamental elements of a Town Plan is a description of natural resources. If we seek to protect our natural resources and provide a high quality of life for the citizens of Essex, we must develop a Town Plan based on the capabilities of the land. This section provides an overview of Essex's natural features. Included are descriptions of the Town's topography and slope, geology, soils, water resources, farm and forestlands, and natural areas.

9.1 Topography and Slope

Topography refers to the shape of the land, its ups and downs, hills, ridges and plateaus. Slope refers to the gradient or steepness of the land. In a community context, these features impose a natural order on the land that, in turn, influences the pattern of existing and future land use.

Table 9-1
MAJOR TOPOGRAPHIC FEATURES

Feature	Elevation in Feet
Cilley Hill/Sawmill Road	1330
Brigham Hill	1032
Saxon Hill	807
Bixby Hill	666
Winooski River at 68 Acres area	170

Source: 2006 Essex Town Plan

Essex has an extremely varied topography. The flood plains of the Winooski River, and Browns River and Alder Brook represent the flat areas of Town, while the outflow of Alder Brook has predominantly steep slopes in excess of 20 percent. The northeast quadrant of Town is marked by high rolling hills with a few areas of severe slope, as is the northwest portion of Town around Brigham Hill. Topography is expressed as elevation – the height of land above sea level. Elevations within Essex range from 170 feet in the southwestern part of the Town to 1330 feet in the northeastern corner of the Town. Major topographic features in Essex are listed in Table 9-1 above and are visible on Map 12, *Contours*.

The percent of slope is determined from the number of feet of vertical rise over 100 feet of horizontal distance. Slope conditions determine the feasibility of land use, the steeper the slope, the greater the restraints upon building in a particular area. Map 14, *Slope*, has grouped the degree of slope in Essex into three categories. Generally slopes of 0 to 3 percent are suitable for almost all types of construction but may require drainage improvements; 3 to 10 percent are most desirable for construction since they provide a minimum of restrictions; 10 to 15 percent are suitable for low density housing on large lots with some consideration for erosion control and runoff; 15 to 20 percent is where construction becomes very costly and erosion and runoff problems are likely – these slopes are unsuitable for most on-site sewage disposal systems, therefore development should

be discouraged; and more than 20 percent is where all construction should be avoided because of the likelihood of environmental damage.

9.2 Geology

Geology, the study of the earth's crust, is the basis of all else in the landscape. The underlying strata determine the topography, soil types, availability of water, vegetation and to some extent, a community's economic base if it is valuable for commercial extraction. The Town of Essex is composed of land forms and soils molded and deposited by glaciers that traversed the area and the ancient lakes and seas that covered the low lands of the Town. Geologic materials consist of two categories: bedrock and surficial materials.

Bedrock – Essex is underlain by a variety of rock types, but these are dominated by a mixture of lightly metamorphosed rocks originally sedimentary in nature (Refer to Map 15, *Bedrock Geology*). Principal among them are quartzite, slate, schist, dolomite and limestone marble. The rocks date from the Early Cambrian to the Early Ordovician eras. In approximately the eastern two-thirds of the Town, the rocks are of the Underhill Formation, primarily schist and slates. To the west (roughly west of VT Route 2A) the rocks are dolomite and limestone.

Metamorphic rock is, as a general rule, hard and stable. According to the Vermont State Geological Survey, there are no known mineral deposits in Essex, but the rock, sand, and gravel are all capable of being mined/quarried. Thus, the Town should plan for and be better prepared to regulate such activity.

The only noteworthy feature regarding bedrock in Essex is the existence of two thrust faults running southeast to northwest through the southwestern quadrant of Town, near Lost Nation and Colchester Roads. There is no recorded mention of movement along these faults so seismic danger is minimal. Below the fault, however, is a deep layer of very porous carbonate which allows ready movement of water and facilitates the aquifer recharge process. At present, this porous layer of carbonate is protected by the upper impervious plate and/or a substantial layer of surficial material.

Surficial Materials – In much of Essex, bedrock is buried by unconsolidated materials directly or indirectly related to the Ice Age glacier. In the uplands, generally above 500-600 feet in elevation, glacial till predominates; whereas below this level there are extensive areas of sand and gravel formed in ancient lakes in the area. In many places, the sands and gravel are underlain by clays and/or till. Gravel deposits are located in some places at the 500-600 foot level, generally at the base of hills. According to a map prepared in 1961 by the Vermont Department of Highways, noteworthy sand and gravel deposits in the Town of Essex include:

1. Northern part of Osgood Hill Road
2. Weed Road and Sleepy Hollow Road
3. Intersection of Brigham Hill Road and Brigham Hill Lane
4. Northern part of Alder Brook
5. Intersection of Lamore and Lost Nation Roads
6. VT Route 2A corridor south
7. Southeastern quadrant of the Town of Essex

It should be noted that some of these deposits are located in environmentally sensitive areas.

9.3 Soils

All soils in the Town of Essex have been mapped and typed by the U.S. Department of Agriculture Natural Resources Conservation Service (formerly Soil Conservation Service). Soil types indicate the physical capability of the land to handle development and the resource production potential of the land. Unfavorable soil types for development typically contain the following properties: excessive slopes, shallow depth to bedrock, wet soils, unstable soils, and erodible soils. Map 13, *Soils*, shows where certain general soil associations predominate. The soils in association groups 8 and 9 are level, deep and well-drained and are well suited or have slight limitations for on-site septic disposal. The soil association groups 4, 5, 6, 7, 13, 14, and 15 have generally severe limitations due to the unfavorable characteristics described above which inhibit the absorption of septic effluent. This map shows only the general soils pattern for Essex. More detailed information is available from the soil survey maps and interpretations from the Natural Resource Conservation Service report.

9.4 Groundwater

Groundwater is water below the earth's surface which has come from precipitation that does not evaporate or run off the land and which infiltrates into the soil and bedrock to recharge the supply. Information about the quality and supply of groundwater is important to decisions regarding site evaluation for development. It is also critical that the Town have a means of monitoring those factors for the purpose of protection from contamination and depletion. Currently, the information available to the Town is limited and efforts should be undertaken to map those areas having high groundwater potential in order to ensure their protection.

9.5 Surface Waters

Surface waters include rivers and brooks, lakes and ponds, areas subject to flooding and wetlands. These water resources are important from a range of perspectives, including public health and safety, recreation, wildlife diversity, visual sensitivity, and environmental quality. Water resources are distributed throughout the Town, and influence the distribution and conservation of many open land resources. These areas are included on Map 16, *Water Resources*, and were considered in the Town's "Open Lands Study" prepared in 1989. Among other regulated techniques, buffers regularly should be used to help protect surface waters from undue adverse land development.

In 2008, the Essex Zoning Regulations were amended to include requirements for the protection of surface waters and wetlands. The buffer requirements are intended to retain and protect heavily vegetated areas of native species that border streams, lakes, ponds and wetlands in Essex in order to reduce impacts from flooding and stormwater run-off, to prevent soil erosion, to protect wildlife, fish habitat and ecological diversity, and maintain water quality. The buffer requirements specify that buffers along streams must be at least 50 feet in width. Shoreland buffer zones must be at least 100 feet in width, and wetland buffers zones must be at least 100 feet for Class I wetlands and 50 feet for Class II wetlands.

Rivers and Brooks – The Town of Essex is drained by three watersheds – the Winooski and Lamoille River Basins and a small area drained by Indian Brook and Sunderland Brook, which drain directly to Lake Champlain. The Browns River and Abbey Brook drain the northeast section of the Town and flow into the Lamoille River, while Alder Brook drains into the Winooski River. The

Vermont Agency of Natural Resources established a water quality classification system which specifies (1) water quality goals to be attained where actual water quality is lower than the standard or (2) the minimum standard to be maintained where actual water quality is higher. Virtually all of the waterways in Essex have been classified as Class B, suitable for drinking with filtration and disinfection; irrigation and other agricultural uses; swimming and recreation. The exceptions are two waterways classified as A2: A tributary of the Alder Brook between Founders Road and Butternut Court, and a tributary in the Pinewood area that includes the reservoir at Valley View Road[1]. The Winooski River is classified as Class B, with special Management Zones immediately below the IBM treatment plant and the Tri-Town treatment plant in Essex Junction.

Flood Hazard Areas and Floodways – A Flood Hazard Area (a.k.a. 100 year floodplain) has a one percent probability of flooding in any given year. A floodway is the channel of a river or other water course and the adjacent land area that must be reserved to discharge the 100-year floods without accumulatively increasing the water surface elevation more than one foot and is the most hazardous section of a flood hazard area. Both of these areas have been identified on the Flood Insurance Rate Maps prepared by the Federal Insurance Administration and approved in 2010. The Zoning Regulations were updated in 2010 to reflect new requirements by FEMA in the flood hazard area. These areas include the Winooski River, Alder Brook, Browns River, and Indian Brook. The Town has also established a Floodplain zone (C2) along all of the Town waterways not included in the federal mapping. The C2 zone requires a minimum setback from all stream banks and prohibits development within that setback.

9.6 Natural Heritage Element Inventory and Assessment for the Town of Essex, Vermont

In 2007 Arrowwood Environmental performed a Natural Heritage Element Inventory and Assessment in conjunction with the 2008 Essex Open Space Plan. The Inventory and Assessment is incorporated in the 2011 Town Plan by reference. It included the following tasks: 1) an inventory and mapping of critical habitat features and corridors; 2) an update of the 1991 natural communities map; 3) an update of the wetlands resource map; and 4) a remote inventory and mapping of vernal pool locations. Updates to Town Plan maps 16 and 17 have been made to reflect this work by Arrowwood Environmental.

Wetlands – Wetlands can generally be defined as areas that are inundated by surface or ground water with a frequency sufficient to support significant vegetation or aquatic life that depend on saturated or seasonally saturated soil conditions for growth and reproduction. The U.S. Department of the Interior has prepared a National Wetlands Inventory by mapping all wetlands one acre or more in size.

The wetlands appearing in the inventory, and as updated by Arrowwood Environmental are shown on Map 16. The state has stringent Wetland Rules to determine which areas are wetlands, but they are not included on the maps at present.

There are 430 wetlands comprising 3,081 acres in the Town of Essex. The number, type, and size of the wetlands mapped in Essex are presented in Table 9-2. A total of 34 wetlands in Essex were considered either locally or state significant for either functions and values, natural communities or

[1] The Vermont Department of Environmental Conservation has proposed that this waterway be reclassified to Class B, but that proposal has not yet been approved.

both of these functions. These wetlands are contained within the wetland complexes summarized in Table 9-3. The Natural Heritage Elemental Inventory and Assessment recommends management objectives for each of the Town's significant wetland communities which should be incorporated into the Zoning and Subdivision regulations.

Table 9-2
WETLAND COMMUNITIES MAPPED IN ESSEX

Community Type	Number of Sites	Average Acreage	Total Acreage
Agricultural Field	38	26.0	989.7
Alder Swamp	40	7.4	294.9
Beaver Wetland	26	5.0	129.9
Cattail Marsh	8	3.1	24.6
Deep Broadleaf Marsh	2	5.2	10.3
Floodplain Forest	17	8.6	145.5
Hemlock Swamp	1	2.5	2.5
Northern Hardwood Seepage Forest	9	2.6	23.7
Old Field	38	7.0	266.4
Open Water	13	3.1	40.4
Pond	80	0.4	35.1
Red Maple-Black Ash Swamp	23	14.3	329.6
Red Spruce-Hardwood Swamp	5	29.3	146.6
Seep	2	0.6	1.1
Shallow Emergent Marsh	123	4.8	591.5
Spruce-Fir-Tamarack Swamp	5	9.9	49.7
Total	**430**	**--**	**3081**

Source: Natural Heritage Element Inventory and Assessment, 2007

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 19 vernal pools were identified during the remote inventory and field work. Most of them are located east of Indian Brook or scattered throughout the forests in the northeast corner of Town.

Arrowwood Environmental suggested specific buffer zones and management recommendations for the vernal pools mapped in the fields. Regulations including these buffer zones should be adopted by the Town.

Table 9-3 NATURAL COMMUNITIES PRESENT IN THE WETLAND MAPPING UNITS	
Alder 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 Broadleaf Marsh
Forestplain Forest	Silver Maple-Ostrich Fern Floodplain Forest* Sugar Maple-Ostrich Fern Floodplain
Red Spruce-Hardwood Swamp	Red maple-Northern White Cedar Swam Hemlock-Hardwood Swamp Red spruce-Hardwood Swamp
Source: Natural Heritage Element Inventory and Assessment, 2007 * Indicates that most common community found within the mapping unit	

9.7 Agricultural Lands

The decline in farm activity both in Essex and in Chittenden County was described in previous Essex Town Plans. Certainly, the number of traditional dairy farms serving as the landowner's primary source of income decreased. Yet farming activities remain visible in Essex, and the variety of activities likely has increased.

Table 9-2 documents the continued presence of farming in Essex. After reaching a low of 5 farms in 1989, the number of farms participating in the Town of Essex Farm Contract Program has increased to 9. Additional agricultural parcels are not included under the Essex Farm Contract but are enrolled in the Vermont Land Use Program. In the early 1990s there were 26 farm parcels on the Town's grand list. Notably, by 2007 only seven parcels, totaling 1.312 acres were listed as "farm" parcels – and none were located in the Agricultural-Residential Zoning District, over the same period, however, the number of parcels enrolled in the Town's Farm Tax Stabilization Program increased from five in 1989 to nine in 2007. Enrolled farm acreage currently totals 2,143 acres.

Very few examples remain of dairy farms with fields, cows and barns all located on a home site in Essex. One relatively large dairy farm is in operation on Chapin Road and two or three smaller farms also are located in the Town. Several large agricultural fields in Essex are used to support dairy farms located in neighboring communities including Jericho, Williston, Westford and Fairfax.

The remaining Essex participants in either the Vermont Land Use Program or the Essex Farm Contract contain a wide variety of agricultural activities – raising beef cattle, an apple orchard, a fruit and vegetable farm, two Christmas tree farms, and a pumpkin patch. Horses, sheep and other farm animals can be found on numerous smaller parcels throughout the rural portions of Essex.

The 1989 "Essex Open Lands Study" inventoried the Town's most important open land resources. The study conducted a Land Evaluation and Site Assessment (LESA) of 53 farm parcels on the basis of the productivity of their soils and such attributes as size, character, location and current use.

Though direct comparisons are difficult, given boundary and ownership changes, of the 53 parcels identified, at least 24 (45 percent) have since been subdivided and, according to current grand list information, all but six (89 percent) have been developed or at least partially converted to other mostly residential uses. Of the 53 parcels evaluated in 1989, 20 were identified a "prime" farmland, comprising around 2,000 acres (70 percent in floodplains). As then anticipated, farmland was taken out of production for the construction of the Circumferential Highway (I-289), and for two large residential subdivisions.

The 2001 Essex Rural Lands Study addressed some of the same issues as the more comprehensive 1989 study. Recommended actions included an update of natural resource inventories which was done in conjunction with the 2007 Natural Heritage Inventory and Assessment, a survey of small farming operations, continued zoning restrictions on development in the floodplain (these restrictions were estimated to protect about 70 percent of the prime farmland identified by the 1989 Essex Open Lands Study), and expanded use of the Significant Features Resource Map in subdivision review.

By other measures, Essex still has a significant amount of land in production in the Browns River Valley and along the Winooski River. A 2000 parcel-based assessment of land use in Chittenden County, conducted by the Chittenden County Regional Planning Commission, identified more than 60 parcels in the Town that still supported some agricultural function or activity. Most of these are included in the Town's grand list as larger Residential (R2) or "miscellaneous" parcels – a listing category that includes undefined or transitional open land.

A recent University of Vermont analysis of enhanced 2001 satellite (Landstat) imagery identified approximately 4,600 acres of farmland remaining in the Town, comprising roughly 17 percent of the Town's total area.

Farmland conversion reflects, in part, ongoing changes in the local farm economy – many of which were identified in the 1989 study. By 2007, there were only two dairy farms left in the Town. On the other hand, USDA Agricultural Census data suggests that there are a growing number of smaller, more diverse farming operations in the area – such as Mazza's Vegetable Farms and the Chapin Orchard – that market and sell their products locally through direct sales, farm stands, farmers markets and Community Supported Agriculture.

9.8 Forest Lands

More than 12,500 acres in Essex are forested. The Open Lands Study prioritized and identified significant forestland as contiguous tracts of wooded land having the potential for forest management due to the productivity of the soils, the species mix, the size of the overall tract and presence of large (50+ acres) properties and managed wood lots. Property files and resource maps of the Town were reviewed by the Conservation Committee and foresters with first hand experience in the forest resources of the Town. The significant areas identified in the forestland inventory are shown on Map 17 and include the following:

1. Upper Indian Brook Valley and Brigham Hill
2. Osgood Hill
3. Bixby Hill
4. Saxon Hill
5. Lower Alder Brook Valley

The total area in Essex identified as prime forestland is approximately 8,300 acres. The above-mentioned areas were considered for commercial harvesting potential and for multiple use values (environmental and recreational). For a specific description of the forest cover type and significance, please refer to the Essex Open Lands Study. The 1989 Open Lands Study should be updated to assess the number of designated acres which no longer meet the definition of prime forestland set forth in 1989.

Upland Natural Communities – The 2007 Natural Heritage Element Inventory Analysis updated the existing data on the two upland natural communities tracked by the state Non-Game and Natural Heritage Program (NNHP). These are Sunderland Headwater woods and the Vermont Sandplain site. The Sunderland Headwater Woods is a seven acre, dry sandplain forest near the headwaters of the Sunderland Brook which as seen little disturbance. The Vermont Sandplain, comprised of pitch pine and white pine trees mixed with black and red oak, is now three acres in size, down from five acres, due to development. The 2007 Natural Heritage Element Inventory analysis suggested management recommendations for these significant upland communities which should be incorporated into the regulations.

The Town should consider setting guidelines for the harvesting of wood by individuals or commercial entities, as the cost of fossil fuels rise.

9.9 Natural and Fragile Areas

Natural and fragile areas are defined as "areas of land or water that are unusual and/or have significant plant or animal species or geological or similar features of scientific, ecological, or educational interest" (1988 Natural Areas component of the Vermont Recreation Plan). Essex has several features meeting this definition including unique forest cover types, wildlife habitats, rare plant communities and an esker. Map 17 shows these areas. Sources for this information include inventories maintained by the state, the 1973 Quality Environment Plan, the 1989 Open Lands Study, the 1989 Natural Resources Inventory, the 1986 Municipal Development Plan, the 2007 Natural Heritage Element Inventory and Assessment, and the 2008 Open Space Plan.

Chapter 7, *Parks and Recreation*, includes an inventory of significant natural areas in Essex that have long been considered worthy of protection.

9.10 Wildlife Habitat

Wildlife habitat in the Town of Essex is an ever-changing mosaic, as humans and wildlife continually adjust and readjust to each other's presence. The landscape constantly changes as active agricultural lands go fallow and as humans increasingly settle in Essex.

The Essex urban core is largely concentrated in the southern portion of Essex, which for wildlife presents highly fragmented and isolated backyard, woodlot, wetland and streamside environments marked by a strong human presence. Southern Essex is home to species of wildlife that can live in this fragmented environment where roads, houses, industries, people and their pets are found. Here white-tailed deer, red fox, skunk and raccoons can be found. The northern parts of Essex, where the landscape is dominated by forests with both broad-leaved deciduous and needle-leaved evergreen trees, provide habitat for a rich diversity of wildlife including waterfowl, herons, hawks, coyote, moose and mammals such as snakes, mink, fox, and muskrat.

The 2007 Natural Heritage Element Inventory and Analysis provides a detailed description and mapping of the Town's wildlife habitat elements, as well as a discussion of the larger Contiguous Habitat Units (CHU), which serve as the starting unit of measures and description. The management recommendations for the wildlife habitat should be incorporated into the zoning and subdivisions regulations.

9.11 Land Capability Summary

The preceding information is on various Town Plan maps, which show the capability of land areas to accommodate development based on slope (Map 14), wetlands and floodplains (Map 16) and suitability for on-site sewage disposal (Map 13).

9.12 Goals, Objectives and Strategies

Goal 9.1: Gather and regularly update information on areas that are suitable for generating renewable energy.

Goal 9.2: Update, augment and regularly maintain existing information and studies on the Town's significant natural resources, and implement the recommendations of those studies.

Objective 9.2.1: Update existing natural resources information drawing from the recommendation in the 2008 Open Space Plan.

Strategy 9.2.1.1: Prepare a Natural Resources Plan for the Town drawing from the recommendations in the 2008 Essex Open Space Plan. In addition to developing up-to-date information on significant farm and forest land use in Essex, the Natural Resource Plan should include new information on air quality, watersheds and water quality, wildlife, including aquatic species, rare and endangered species, and exotic/invasive species.

Strategy 9.2.1.2: Coordinate with the state Natural Resources Agency and the Chittenden County Regional Planning Commission to ensure the Town has the most recent natural resources mapping data.

Strategy 9.2.1.3: Refine local natural resources information, considering the natural resource values to be protected within the sewer service area, the resource values in the rural portions of the Town, and resources that are common to both areas. For example, new natural resources inventories and management plans should be developed on street trees in the sewer service areas and on forest land in the rural and undeveloped areas of the Town.

Strategy 9.2.1.4: Apply to state and federal agencies for planning and implementation loans/grants to acquire and update the Town's natural resource data.

Objective 9.2.2: As a priority task for updating natural resources information, the Town shall conduct studies to improve understanding of the existing water quality conditions in the Town and propose recommendations for improving the Town's water quality management.

Strategy 9.2.2.1: The Community Development Office in conjunction with the Department of Public Works and the Conservation Committee should initiate water quality improvement studies in the Town. The Town will coordinate with the appropriate

state/regional agencies and any university departments. This work shall be coordinated with implementation of the Town's Stormwater Management Plan for improving the quality of impaired waterways.

Strategy 9.2.2.2: Collect baseline data on the water quality of the major water bodies in Essex.

Strategy 9.2.2.3: Prepare a GIS-based watershed map of the Town and perform an analysis of the watersheds to better understand how existing and proposed land uses will affect water quality, including information on the percentage of impervious surfaces in each watershed.

Objective 9.2.3: The Town shall regularly consolidate its natural, renewable, and cultural resource data in an updated Significant Features Map and shall use the map to guide the design and review of public and private projects.

Strategy 9.2.3.1: Continue to use the Significant Features Map in the review of subdivisions and site plans to identify important natural and cultural features to be protected.

Strategy 9.2.3.2: Adopt development review standards to assist applicants in reducing the impact of new development on the Town's significant features, including renewable energy resources, scenic resources, water quality, and air quality, and incorporate the guidelines into the zoning and subdivision regulations.

Strategy 9.2.3.3: The Town shall consider any impacts on significant features in its capital facilities planning and preparation of future plans or zoning district changes.

Strategy 9.2.3.4: The Planning Commission shall review and recommend changes to the Significant Features Map.

Objective 9.2.4: Undertake a study to establish air quality goals/objectives for the Town and explore the implementation of simple methods of air quality improvement such as eliminating idling vehicles at schools, improving traffic signal timing, etc.

Goal 9.3: Engage townspeople in protecting natural resources and encourage the management of open lands for farming, forestry, recreation and conservation.

Objective 9.3.1: Establish a land preservation program to help ensure that critical natural and scenic resources are preserved for future generations and that sufficient open lands are preserved to meet the active and passive recreation needs of the community.

Strategy 9.3.1.1: Establish a land acquisition and preservation program.

Strategy 9.3.1.2: Raise funds and implement a land preservation program, addressing the following issues:

- Establishing a land preservation fund through the property tax mechanisms;
- Potential for establishing a land trust in Essex or with neighboring towns;
- Amending assessment practices and broadening tax stabilization provisions for owners of open lands;
- Acquiring easements for conservation and trail rights-of-way;
- Studying transfer of development rights as well as programs granting developers incentives for preserving land outside the sewer core; and

- Reviewing Town policies for any adverse, indirect effects on open land protection.

Strategy 9.3.1.3: Identify priority locations for land preservation based on the goals and objectives of this Town Plan. Priorities should include sites with large contiguous acreage, lands adjacent to already conserved land, renewable energy resources, watersheds/waterways, especially floodplains, and contiguous corridors for recreation and wildlife.

Strategy 9.3.1.4: Pursue the purchase of lands or development rights immediately outside the sewer core where the land has potential to meet the Town's active and passive recreational needs, and where the establishment of recreational facilities will help to create a green-belt around the developed portions of the Town.

Strategy 9.3.1.5: Prepare a plan for managing acquired lands, including funding, for every acquisition proposal.

Strategy 9.3.1.6: Promote public awareness of recreation/conservation resources in the Town that are underutilized. If necessary, improve access with parking and signage.

Objective 9.3.2: Provide townspeople with information about environmentally sound management of land and ways individuals can assist in protecting natural resources.

Strategy 9.3.2.1: Obtain brochures, videos, and books prepared by the Vermont Agency of Natural Resources and other state and non-profit organizations addressing actions people can take to improve the environment and make the information readily available at the library and Town offices. Topics of information could include forest management, the current use program, barn restoration programs, landscaping for wildlife habitat, household chemical disposal, and responsible trail use, etc. Information on up-coming events, staff and committee member contacts and ways to volunteer, should also be provided.

Strategy 9.3.2.2: Work with the Community Development Department staff to develop an information packet that can be given to new homeowners or people applying for a zoning permit, septic permit or through water bills and other points of contact with the Town, addressing natural resource issues pertinent to their project.

Strategy 9.3.2.3: Develop a hand-out for rural landowners informing them of local and regional professional resources available for assisting them in managing their land, including but not limited to: the County Forester, the Vermont Land Trust, the Chittenden County Conservation District, etc.

Strategy 9.3.2.4: Write a conservation column for the local newspaper addressing conservation issues and/or a quarterly newsletter addressing current conservation issues.

Strategy 9.3.2.5: Create a conservation link on the Town websiteand use it to present the best of the information collected under the strategies above. Additionally, all digital data pertaining to land use and natural resources shall be made available to the public in a user-friendly format on the Town of Essex website. Data shall meet the compliance criteria set forth by the ADA.

Strategy 9.3.2.6: Solicit residents for ad-hoc committees to work on issues/problems identified by the Selectboard, Planning Commission or Conservation Committee.

Committees should be formed not only when revising the Town Plan but also at times when significant natural resource issues face the Town.

Strategy 9.3.2.7: Encourage partnerships between volunteer groups and the Town to promote and organize the maintenance of trails and conservation areas.

Objective 9.3.3: Model environmentally sound practices for the community.

Strategy 9.3.3.1: Perform an environmental audit to identify local government practices that can be improved to reduce environmental impacts and long-term costs.

Strategy 9.3.3.2: Establish a policy for purchasing recycled paper products to join state and federal agencies working to create a stable market for recycled products.

Strategy 9.3.3.3: Examine Town road maintenance practices and implement any necessary changes to ensure that water quality impacts from road maintenance are minimized.

Goal 9.4: Increase access to and opportunities for public enjoyment of the Town's natural resources while respecting the rights and concerns of private property owners.

Objective 9.4.1: Increase the Town's efforts to educate the public about the benefits of trail systems and the responsibilities of trail users.

Strategy 9.4.1.1: Publish results of trail inventories produced by the Trails Committee and make the trails information available to townspeople. Include information about trail etiquette, in regards to protecting the environment and showing respect for public and private property and schools.

Strategy 9.4.1.2: Work with local trails, environmental and recreational organizations to lead guided walks, horseback or snowmobile trips, etc. and to organize trail maintenance days.

Strategy 9.4.1.3: Develop the Town trail system in a way that connects one trail to another, creating a seamless system through town. Both urban and rural types of trails should be provided and should respect residents' desires to have both motorized and non-motorized access to the Town's natural resources.

Objective 9.4.2: Assist landowners in understanding their rights, protections and obligations in regards to public access and preservation of natural resources, and encourage private landowners to keep land open and accessible to the public.

Strategy 9.4.2.1: Use all the outreach and education methods discussed above to instill in the general public an appreciation for the public access (including views) to land that many private landowners provide for public enjoyment, along with their responsibilities while using this access.

Strategy 9.4.2.2: Provide workshops and other opportunities for landowners to learn about and discuss natural resource protection, farm and forest management, renewable energy generation, public access, land preservation, estate planning, etc. Work with experts from local environmental organizations, land trusts, etc. on developing the workshops.

Strategy 9.4.2.3: Ensure that landowners who host trails used by the public are recognized by the Town and have their private property concerns (e.g. maintenance, liability and vandalism) addressed. The Town should seek ways to support the landowners in keeping the trails open to the public.

Goal 9.5: Create specific development review standards that will allow appropriate development to occur while protecting the Town's significant resources.

Objective 9.5.1: Continue the use of zoning, subdivision and health regulations to restrict development in unsuitable areas.

Strategy 9.5.1.1: Restrict or prohibit development on slopes greater than 15 percent and those areas affected by seasonal flooding or unstable soils.

Strategy 9.5.1.2: Carefully consider the density of development in locations with shallow soils and areas, which have a high or seasonally high water table.

Strategy 9.5.1.3: Continue to require proof, at development review hearings, that sufficient water and sewer capacity exists for development in accordance with Town and state guidelines.

Strategy 9.5.1.4: Require retention of vegetation or effective re-vegetation of areas vulnerable to erosion.

Strategy 9.5.1.5: Prohibit development in aquifer protection areas and near surface waters having the potential to introduce contaminants into the water supply.

Strategy 9.5.1.6: The Town should explore the ability of the Regional Planning Commission and/or other regional, state, and local entities to coordinate a joint public/private study to determine the location of the thrust fault lines in order to establish scientific findings regarding how those properties may be developed.

Strategy 9.5.1.7: Revise zoning bylaws to prevent visible development on ridgelines

Objective 9.5.2: Develop new stormwater treatment standards in the zoning and subdivision regulations and the Public Works specifications. Standards shall be flexible but comprehensive and designed to improve water quality in impaired waters and to minimize non-point source water pollution from new development in the Town.

Strategy 9.5.2.1: Minimize impervious areas in developments by encouraging shared parking and driveways for adjacent uses and by reducing the lengths and widths of new roads where feasible.

Strategy 9.5.2.2: Revise parking requirements to allow the use of pervious pavement, especially for peak parking needs, overflow, and special event parking.

Strategy 9.5.2.3: Increase canopy cover in areas with large amounts of impervious surface. Increase awareness of proper tree planting and maintenance methods to ensure that trees grow to maturity, where the largest benefits are derived.

Strategy 9.5.2.4: Where soil conditions allow, encourage the use of infiltration of stormwater, particularly from rooftops.

Strategy 9.5.2.5: Encourage the disconnection of roof drains from the stormwater drainage system.

Strategy 9.5.2.6: Discourage the plowing of snow into wetlands and streams.

Strategy 9.5.2.7: Encourage the use of rain barrels, as well as the capture of grey water – wastewater drained from sinks, tubs, showers, dishwashers, clothes washers, and other non-toilet sources – and promote its use by commercial and residential users alike.

Strategy 9.5.2.8: Develop and adopt stormwater management regulations that require new development and redevelopment in the Town to comply with applicable state Stormwater Management Rules. It may be appropriate to encourage higher impervious coverage ratios coupled with structural stormwater treatment measures in higher density growth area inside the sewer core.

Strategy 9.5.2.9: Encourage the use of best management practices to minimize erosion and sediment transport from construction sites and agricultural lands within the Town.

Strategy 9.5.2.10: Train Town staff and commissions to understand and apply best management practices in the development review process for water quality protection and preservation of other natural resources.

Strategy 9.5.2.11: In the C2 District, revise zoning requirements to include better consideration for conservation buffers/setbacks/easements.

Objective 9.5.3: Incorporate into the development review process recognition that natural resource values to be protected may differ inside and outside the sewer service area. Denser development is desirable within the sewer service area whereas low densities and rural patterns of development are to be preserved outside the sewer service area. Formulas for determining density should be revised according to the location of the project in the Town and the land capabilities of each individual site.

Strategy 9.5.3.1: Revise the Zoning and Subdivision Regulations to more specifically define the Town's significant resources inside and outside the sewer core. PUD requirements shall be refined to recognize the different goals of development in the urban/suburban and rural areas.

Strategy 9.5.3.2: Revise the Zoning Bylaws to allow the Town to grant density bonuses on sites inside the sewer core where development constraints are few, and to establish flexible development standards, where appropriate, for development projects that preserve significant natural resources.

Strategy 9.5.3.3: Revise the zoning and subdivision regulations to encourage flexible development standards, outside of the sewer core where significant natural resources are protected and options for rural land uses are maintained. Discourage the use of density bonuses in rural areas unless significant land preservation takes place.

Objective 9.5.4: Revise the Town's application process for development review to more clearly obtain compliance with the Town's goals for natural and cultural resource protection.

Strategy 9.5.4.1: Prepare information sheets for applicants that clearly explain the Town's natural resource protection goals and methods for mitigating the impacts of development.

Strategy 9.5.4.2: Adopt an application form for development review that requires applicants to explain how pertinent natural resource concerns will be addressed.

Strategy 9.5.4.3: Reinforce current efforts to negotiate the deeding of lands for conservation or easements to significant natural resources including the expansion of a trail network, as part of the development review process.

Strategy 9.5.4.4: Revise zoning, subdivision and public works regulations to create a system of incentives for preserving natural and cultural resources.

Strategy 9.5.4.5: Establish management plans for open space areas conserved through regulatory measures or acquisition to ensure that the natural resource values of the sites are retained.

Objective 9.5.5: Incorporate the natural resources management recommendation contained in the 2007 Natural Heritage Element Inventory and Analysis (NHEIA) into the zoning and subdivision regulations.

Strategy 9.5.5.1: Establish specific protection standards and buffer zones around vernal pools as depicted in the NHEIA.

Strategy 9.5.5.2: Conserve the significant upland communities as described in the NHEIA by developing conservation easements, purchasing development rights, and working with land owners on management plans or other proactive conservation efforts. Specific protective standards should be incorporated into the zoning and subdivision regulations.

Strategy 9.5.5.3: Incorporate into the zoning and subdivision regulations the management recommendations included in the NHEIA for the following wetlands in Essex: Browns River swamp, Lost Nation swamp, Winooski Oxbow wetlands, Saxon Hill swamp, Essex Center swamp, Westford swamp, Indian Brook wetlands, Alder Brook wetlands, and 68 Acres wetland. Specific protection standards should also be incorporated into the regulations.

Strategy 9.5.5.4: Incorporate into the zoning and subdivision regulations the management recommendations included in the NHEIA for all the Contiguous Habitat Units (CHU), including those with "core" habitat units and the smaller CHUs important to providing movement corridors. Specific protection standards should also be incorporated into the regulations.