

PLYMOUTH NATURAL HERITAGE

October 4, 2005

1. Summary

- Plymouth has a temperate climate influenced by topography and general weather patterns - long, cold winters and cool summers of about 113 frost-free days.
- Elevations in town range from around 440 feet above mean sea level on the Pemigewasset River at the Plymouth, Bridgewater and Ashland town lines, to 2,193 feet on Plymouth Mountain.
- Although there are many small pockets of sand and gravel, there are no deposits large enough to support new commercially viable operations.
- Plymouth has approximately 4,552 acres of farmland designated as prime farmland, important statewide or locally important.
- Though located in the upper Merrimack River watershed system, Plymouth is locally part of the Pemigewasset-Baker River watershed. Most surface water in Plymouth eventually drains into one of these two rivers.
- Environmentally sensitive areas serve important ecological functions and/or may pose significant development constraints. Sensitive areas include steep slopes in excess of 25% grade, floodplains, wetlands, and critical wildlife habitat.
- Nearly a quarter of the land area in Plymouth contains steep slopes (25% or more). Development of steep slope areas can result in accelerated runoff, soil erosion, and potential environmental hazards.
- Flooding is the single greatest natural hazard experienced in New Hampshire. Plymouth has a dozen locations that are known as repetitive flood hazard areas. These areas are moderately vulnerable areas that are likely to flood regularly.
- Between 9 and 12% of Plymouth's land area is wetlands. Wetlands reduce flooding, retain storm water runoff, recharge and filter water, support vegetation, provide valuable wildlife habitat, and add to the beauty of Plymouth's landscape.

Plymouth's natural heritage is rich in history, beauty and variety. The natural environment is largely defined by historic settlement patterns and land use. It continues to contribute to the town's character and the quality of life of its residents. The ability of the land to absorb people and their land uses vary considerably. While some lands are better suited to intense development, other areas of town have unique features that call for limited development or outright preservation. Natural resources have not always been managed for sustainability, resulting in environmental degradation. Fortunately many of Plymouth's most significant natural features retain much of their environmental and ecological integrity.

This profile summarizes these natural features and references more detailed studies commissioned in recent years by local public officials. It is divided into a half dozen sections that include: climate, topography and drainage, earth resources, soils, water resources and environmentally sensitive areas. Finally, planning considerations are presented.

2. Climate

The local climate affects water supplies, dominant vegetation types, the local growing season, energy demand (for heating and air conditioning), renewable energy supplies (e.g., solar, wind, and hydro power), building and road construction and maintenance, and air quality. Monthly averages over a 30-year period, as reported for New Hampshire, are presented below:

Month	Air Temperature (°F)			Precipitation (inches)	Heating/Cooling Degree Days	
	Mean	Maximum	Minimum		HDDs	CDDs
January	15.8	27.2	4.3	3.14	1,525	0
February	18.3	30.5	6.0	3.02	1,308	0
March	29.2	40.4	17.9	3.22	1,110	0
April	41.1	52.9	29.3	3.35	717	0
May	52.7	66.5	38.9	3.98	381	0
June	61.8	75.0	48.5	3.61	121	25
July	66.7	80.1	53.4	3.88	32	84
August	64.4	77.6	51.2	3.89	80	61
September	55.8	68.8	42.9	3.12	285	9
October	45.4	58.0	32.6	3.71	608	0
November	34.6	44.1	25.1	4.27	912	0
December	21.4	30.8	11.8	3.82	1,352	0
Annual	42.3	54.3	30.2	43.01	8,431	170

Source: Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), Environmental Satellite and Data Information Service, National Climatic Center, Asheville, North Carolina. Climatology of the U.S. No. 81: Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1961-1990 (New Hampshire). January 1992.

- The Plymouth area has a temperate climate, influenced by general weather patterns and local topography. Northwesterly winds are prevalent, bringing cold dry air during the winter months, and cool dry air in the summer. Stronger southerly winds occur during July and August, contributing to summer heat and humidity. Storm events are often associated with winds from the east. Thunderstorms are most common during the summer months.
- Winters are long and cold, with temperatures averaging below freezing during winter months, and January and February extremes that drop well below 0°F (-10 to -25°F.) Snowfall averages around 90 inches per year. However, seasonal snowfalls often vary widely from the average.
- Very hot summer weather (>90°F) is infrequent, though hot weather is common (70 to 80°F.) The local growing season or period of days free of freezing temperatures averages 113 days and usually runs from the end of May to mid-September; but freezes have occurred as late as June, and as early as August.
- Precipitation is generally distributed evenly throughout the year, with slightly higher monthly averages during spring and fall months. Droughts are infrequent, but can be severe – a 2002 drought was one of the severest on record, resulting in the declaration of a statewide drought emergency.

Climate Change. Global climatic change – the warming of the earth’s atmosphere due to the emission of “greenhouse gases” such as carbon dioxide – may have local impacts. The burning of fossil fuels (e.g., from motor vehicles, furnaces) in particular releases large amounts of carbon dioxide into the atmosphere.

- It is estimated from New Hampshire climatic records that annual average summer temperatures in southern New Hampshire have increased by 1.6°F, and winter temperatures by 3.2°F, since 1895. New Hampshire’s annual temperatures have increased at twice the national rate (U.S. Global Change Research Program, New England Regional Assessment 2002).
- Climate change may significantly affect the state’s, and the region’s, environment and economy (US Global Change Research Program):
 - Higher temperatures will result in more extreme weather events, including more frequent storms, flooding and droughts – which will affect surface and groundwater supplies, fisheries and infrastructure. Sea levels are expected to rise along the coast.
 - Impacts to human health will result from deteriorating air quality; increases in extreme weather events and heat related deaths, and the influx of disease carrying species.
 - The composition of New Hampshire’s forests will change, including the loss of such species as beech, hemlock, and sugar maple – affecting the resource-based economy, the fall foliage season, and wildlife populations.

3. Topography and Drainage

The lay of the land – topography – strongly influences the location and potential environmental impacts of development. Historically, roads and rail lines followed natural grades, avoiding the steepest and most poorly drained areas. Development, which once clustered in areas accessible by road and rail, now often extends into more remote areas.

Physiographic Region:	Northern New England Uplands
Ecoregion:	Upper New England-Northern Piedmont
Major Drainage Basins:	Lower Baker River (northwestern half of town) Pemigewasset (eastern half of town)
Total Area:	28.5 sq. mi. (18,240 acres)
Land Area:	28.2 sq. mi. (18,048 acres)
Water Area:	0.3 sq. mi. (192 acres)

- Plymouth lies within the southern portion of the Northern New England Uplands region. The local topography is mountainous – a product of the weathering of underlying bedrock and glacial activity.
- The drainage divide between the Lower Baker and Pemigewasset watersheds runs roughly along a line from 2 o'clock to 6 o'clock through town, from the northeast corner to due south. Land in the northwestern half drains to the Lower Baker River, which ultimately flows into the Pemigewasset River. The western portion of town drains into the Pemigewasset River, largely via Glove Hollow Brook.
- Elevations in town range from around 440 feet above mean sea level on the Pemigewasset River at the Plymouth, Bridgewater and Ashland town lines, to 2,193 feet on Plymouth Mountain. Rivers, streams, floodplains, ponds and wetlands occupy many of the town's low-lying areas.
- Most of the bedrock beneath Plymouth is considered to be a gray quartzite riddled with varying layers of mica dating from the Devonian period of the Paleozoic era (about 350 million years). No commercial bedrock or mineral deposits have been identified.
- Based on historic records, seismic activity statewide is common, but there have been few earthquakes strong enough to cause real damage. It is recommended by the state, however, that public buildings, infrastructure and utilities be sited, designed and constructed to minimize the possibility of earthquake damage.
- Much of the town's surficial geology is deposits composed of unconsolidated, loose assortments of rock fragments left behind by the advance and retreat of glaciers of 14,000 to 10,000 years ago. The withdrawing ice shields - tills and outwash deposits, left behind two

Plymouth Mountain	2,193 feet
Pike Hill	1,575 feet
Hoyt Hill	1,165 feet
Texas Hill	1,002 feet
Mount Tim	959 feet
Airport	525 feet
Main Street	510 feet
Loon Lake	489 feet
Pemigewasset River	480 feet
Baker River	480 feet

major types of materials. These serve as groundwater aquifers, sources of sand and gravel, and the parent material for most local soils.

- According to the *Natural Resource Inventory - May 2005*, approximately 6.3 square miles (4,010 acres) or 22% of town is underlain with stratified-drift and till aquifers. These are located mostly along the Baker and Pemigewasset River floodplain, but also found in other areas in town (see Map _____).

4. Earth Resources (Sand and Gravel)

Sources of construction materials (e.g., sand and gravel deposits) are an important resource – as existing and potential aquifers, and for construction and road maintenance material. Sand and gravel extraction, if not properly managed, can adversely affect ground and surface water quality and supplies, local vegetative cover and wildlife habitat, local roads, and neighboring properties. At one time there was a specific statutory requirement that municipalities identify known sources of construction materials (e.g., sand and gravel deposits) in the master plan. Although this law no longer exists, such deposits are still important.

- There are many small pockets of construction material in numerous locations throughout town but no deposits that are large enough to support a commercially viable operation except those in operation now or in the past.
- Sand and gravel exist in various quantities within the floodplains of the Baker and Pemigewasset Rivers but excavation is impractical due to their proximity to water and the adverse environmental impacts that excavation may cause.
- The one site permitted under RSA 155-E in Plymouth is located on the south side of Fairgrounds Roads halfway to the Baker River. This is an area of Windsor soil and the excavation area contains an estimated 10,000 cubic yards of sand.
- There are also several old excavation sites in Plymouth, which have been previously used, and their remaining quantity is unknown. These sites are:
 1. Carpenter (“Carpenter Pit”) - Fairgrounds Road - road fill
 2. Ahern (“Telfer Pit”) - Route 3 - gravel
 3. McLoud (Sorel property) - Fairgrounds Road - gravel
 4. Blackey - Fairgrounds Road - road fill
 5. Jacques - Route 3 - sand

5. Soils

Soil scientists at the Natural Resource Conservation Service have collected information about Plymouth soils. They have created a map showing where all the different soils are located within the community. Such a soil map, and related soil-based information, provides a wealth of technical data about the capability of land. This data allows evaluation of all local soils so that its potential can be assessed for future use.

The soils map (and related information) indicates where wetland soils and agricultural lands are most likely located, where soils having severe limitations for commercial and residential buildings are located, and where steep slopes exist. Thus, because a soil layer underlies most activities on Plymouth's surface, soils-based information can and does play an important part of this natural resource inventory.

- The Village Water and Sewer District provides and maintains a central sewer system that makes on-site septic systems unnecessary in the higher density areas of town where the District's high and low pressure and gravity fed lines are located. However, on-site systems must be used outside the Village Water and Sewer District.
- On-site systems rely primarily on favorable soil characteristics to absorb and purify liquid domestic and similar waste to prevent health hazards and water pollution. Residential and commercial growth outside the Village Water and Sewer District will only accelerate the demand placed upon soils to accommodate development.
- In addition to septic system suitability, soils data may be use as a planning tool to avoid adverse consequences of development such as erosion, sedimentation of streams, pollution of groundwater supplies, increased flood hazard, and associated losses in property values. Soils data may also be used to make informed choices about which areas have the capacity to support higher densities of development.
- Prime and statewide agricultural soils are identified for protection in the *Natural Resource Inventory - May 2005*.
- Current subdivision regulations, but not zoning regulations, include limited provisions for storm water management, sediment and erosion control to contain flooding and soil erosion.

Agricultural Soils

Plymouth, as recently as 1979, had 17 active farms (including full-time and part-time farms). As noted in the *Natural Resource Inventory - May 2005*, almost 25 percent of all land in Plymouth contains agricultural soils suitable for growing crops. Most of these agricultural soils are located in relatively dry and level sections of town having good access to frontage on local and state roads (see Map ____.)

- There are approximately 2,409 acres of USDA classified prime farmland found in Plymouth with 884 acres of farmland of statewide importance. Another 1,259 acres of farmland have been classified as locally important (see Map ___.)

Plymouth Agricultural Lands - 1950, 1970 and 2005 (numbers need to be verified)	
Total Land Area	17,196 Ac.
Total Agricultural Soils	3,388 Ac.
Ag. Soils of Total Land Area	19.7%
1950 Ag. Land in Use	1,802 Ac.
1970 Ag. Land in Use	1,535 Ac.
2005 Ag. Land in Use	
Change in Ag. Land in Use	-15%
Loss of Ag. Land to Devel.	50%

(Source: 1998 Plymouth Master Plan)

- Actions that put high quality farmland in irreversible uses should be allowed only if those actions are clearly in the public interest of current and future generations.

6. Water Resources

The state of New Hampshire has declared that all ground and surface waters of the state are public resources that are to be conserved, protected and managed for the public good. It is recommended in state statutes (RSA 4-C:22, RSA 674:2) that municipalities include a local water resource management and protection plan (local water plan) in their master plan, to be implemented through local ordinances and conservation programs. Two such management plans have been prepared and are adopted herein: *Baker River Watershed Management Plan June 2003* and the *Pemigewasset River Corridor Management Plan 2001* (see Appendix __.) In addition to watershed plans, the Plymouth Village Water & Sewer District has prepared a *Source Water Protection Plan October 2001* to protect the quality of Plymouth's drinking water by identifying and managing potential sources of contamination and threatening activities that occur within the source protection area (see Appendix __.)

Groundwater

Groundwater aquifers include fractured bedrock and unconsolidated glacial (sand and gravel) deposits. Development within aquifer recharge areas, and sand and gravel extraction that reduces groundwater filtration, can adversely affect groundwater supplies and result in groundwater contamination.

- As noted in the recently completed *Natural Resource Inventory - May 2005*, approximately 6.3 square miles (4,010 acres) or 22.2% of the town is underlain with stratified-drift and till aquifers (see Map __.) These are found largely along the Pemigewasset and Baker River floodplain, but also found in other areas of town. These areas have been identified as significant hydrolic features and sensitive areas where development should be constrained.
- Most, if not all, Plymouth residents and businesses get their drinking water from groundwater sources. Groundwater levels town-wide are generally sufficient to supply individual wells.

Well Data	Total Depth (ft.)	Depth to Bedrock (ft.)	Total Discharge (gals./min.)
Minimum	120	32	1.75
Maximum	807	197	100
Mean	424	47	13.8
Median	405	30	8

Source: NH Department of Environmental Services 2005 (50% of 96 domestic wells)

- Water provided for residents within the Village Water & Sewer District comes from two gravel pack wells located on 16 acres of land the district owns in the "V" formed by the confluence of the Baker and Pemigewasset Rivers. There are also a few sand and gravel aquifers that supply public water systems. As noted in the *Source Water Protection Plan 2001*, these aquifers must be protected from contamination.

- The state regulates major groundwater withdrawals to prevent adverse impacts to surrounding water resources, including rivers, streams, wetlands, and neighboring wells, and also groundwater withdrawals that supply community water systems. It also regulates discharges to groundwater to prevent groundwater contamination.
- Potential groundwater contamination sources include landfills, septic systems, cemeteries, transportation corridors (e.g., hazardous material spills), fertilizers and pesticides, animal waste, above and underground fuel tanks, junkyards, auto shops, and manufacturing facilities.
- There are currently nine active public water supplies (PWSs) listed by the state, each of which is served by a bedrock well (see following table). A public water supply is defined by the state as “a system that provides water via piping or other constructed conveyances for human consumption to at least 15 service connections, or designed to serve an average of at least 25 people for at least 60 days each year. These are further categorized as: community water systems (e.g., municipal systems), non-transient/non-community systems (e.g., schools, factories), and transient/non-community systems (e.g., restaurants, campgrounds).

System	System Type/Description	Population Served	Connections
Calvery Christian School	Non-Transient, Non-Community, School	112	2
Dunkin Donuts	Transient, Non-Community, Commercial Property	700	1
New East & North Chinese Restaurant	Transient, Non-Community, Commercial Property	25	1
Plymouth Sands Camping Area	Non-Transient, Non-Community, Commercial Property	125	70
Plymouth Village Water & Sewer District	Community	6,300	985
Tenney Brook Condos I	Community	90	36
Tenney Brook Condos II (Eagle's Nest)	Community	190	76
The Italian Farmhouse	Transient, Non-Community, Commercial Property	100	2
Whip O Will Cooperative	Community	165	66

Source: NH Department of Environmental Services.

- Wellhead protection areas (WHPA), that include the surface and subsurface areas around public water supply wells, have been delineated and mapped for the Plymouth Village Water & Sewer District.
- Six high-risk land uses have been identified and should be prohibited within the PVWSD's WHPA. These land uses are hazardous waste disposal facilities, solid waste landfills, outdoor storage of road salt, junkyards, snow dumps, and wastewater or septage lagoon. These prohibited uses do not apply to those facilities that already exist.
- Crystal Springs on Route 3 is an unregulated drinking water source owned by the town, which is heavily used by residents of Plymouth and the surrounding area. Like the PVSWD's WHPA, it would be wise to actively protect this spring to protect public health.

- Municipal land use regulations and health ordinances also may be adopted to further protect aquifer areas and groundwater supplies. Local Water Protection Grants – to delineate WHPAs, inventory potential contamination sources, develop local ordinances, and conduct land surveys prior to acquisition – are available through NHDES.

Surface Waters

Local surface waters include rivers, brooks, and ponds scattered throughout town. These waters support local fisheries, provide important riparian habitat, and have existing and potential value for recreational development and flood management. Where accessible they may also be important for fire protection. The Town of Plymouth is located in the northernmost basin of the Merrimack River watershed. It is bordered on the east by a 5.5 mile stretch of the Pemigewasset River while 5.5 miles of the Baker River flows through the northern section of town in a easterly direction, merging with the Pemigewasset River about 1.25 miles south of the Campton town line.

- There are two lakes or ponds in Plymouth with surface areas over 10 acres: the 119-acre Loon Lake (on the border with Rumney) and a 37-acre unnamed pond along Clay Brook (about 1 mile west-southwest of Plymouth Village.)
- There are also a total of about 60 smaller ponds in Plymouth, most with surface areas of less than 2 acres.
- Though located in the upper Merrimack River basin watershed system, Plymouth is locally part of the Pemigewasset-Baker River watershed. Most surface water in Plymouth eventually drains into one of these two rivers.
- The Pemigewasset River extends about 62 miles from its headwaters north of Plymouth in the White Mountains to where it joins the Winnepesaukee River at Franklin, NH, where it forms the Merrimack River 115 miles from the Atlantic Ocean. The Pemigewasset River enters Plymouth from Campton about 0.2 miles below Livermore Falls. It flows southerly for 5.5 miles before exiting Plymouth at the Ashland/Bridgewater town lines. The Baker River enters the Pemigewasset from the west 1.7 miles south of the Plymouth/Campton town lines.
- The Baker River starts on the north slope of Mount Moosilauke (elevation 4,810) in Benton and Warren. Beginning as a steep mountain stream, the Baker River eventually enters Plymouth from Rumney just north of the West Plymouth traffic circle and slowly meanders east for approximately 5.5 miles to where it joins the Pemigewasset River 1.7 miles south of the Plymouth/Campton town line.
- The Baker and Pemigewasset Rivers share similar characteristics including high flow months during spring snowmelt and low flow months in late summer and early autumn.
- Loon Lake has a surface area of 119 acres - 62 acres in Plymouth and 57 acres in Rumney. This natural lake has a maximum length of 3,365 feet and a mean width of 1,339 feet. The maximum depth is 30 feet and the average depth is 18 feet. The water is colorless with 10-

foot transparency. Loon Lake's bottom is 70 percent clay and 30 percent gravel overlaid with sawdust. It is the only public water in Plymouth under the NH Shoreland Protection Act, which regulates land use within 250 feet of the Lake.

- Plymouth relies largely on state regulations to protect its surface and ground waters. New Hampshire's shoreland protection standards regulate land use within 250 feet of designated surface waters. Towns may promote additional resource protection through their municipal regulations and/or land conservation and management programs.
- Water quality is generally high. However, potential pollution sources include bank erosion, storm water runoff, septic systems, construction sites, junkyards, fertilizers and pesticides, road salt, and other potential point and non-point sources. The state conducts a limited monitoring program to identify impaired waters.
- Plymouth's public waters are legislatively classified as "Class B" waters – good for fisheries, swimming, boating and potable water supplies with treatment – and are therefore managed by the state to support these uses. The discharge of untreated sewage or other wastes into these waters is prohibited under state and federal law.

7. Environmentally Sensitive Areas

Environmentally sensitive areas include areas of town that, in addition to ground and surface water protection areas, serve important ecological functions and/or may pose significant development constraints, and therefore should be considered for protection through local ordinances or land conservation programs. Many of these areas have been identified and mapped in the *Natural Resources Inventory - May 2005 (NRI)*.

Steep Slopes

The development of steep slope areas can result in accelerated runoff and soil erosion, and potential environmental hazards associated with down slope movement.

- Nearly a quarter of the land area in Plymouth contains steep slope (25% or more) in town. These steep slope areas are depicted on Map ___ as sensitive areas that may pose significant development constraints.
- Slopes of 15% to 25%, which may also present limitations for development, make up another quarter of the town's land area.
- Steep slopes are most prominent in the southern part of town. Plymouth Mountain is being managed for conservation, therefore, the upper elevations are not likely to be developed. Ski trails have been developed on the relatively steep portions (15 - 25% slopes) of Tenney Mountain while structures have been sited on the more moderately sloped lands in its lower reaches.
- Plymouth regulations currently do not include steep slope protection and management provisions. However, slopes in excess of 25% constitute undevelopable land and may not be included in density calculations.

Floodplains

According to the Town of Plymouth's *Hazard Mitigation Plan 2005* (see Appendix), flooding is the single greatest natural hazard experienced in New Hampshire.

- Plymouth's 100-year floodplains – those areas likely to be inundated at least once within a 100 year period, or having a 1% chance of flooding in any given year – were first identified and mapped for flood management and insurance purposes in 2001/2002.
- Floodplains are shown on Map ___ as hydrologic features and sensitive areas that may pose significant development constraints.
- There are numerous areas where land is expected to be inundated during 100-year episodes. Loon Lake and its outlet stream leading to the Baker River can expect to sustain flooding; so can portions of Loon Lake, Chaisson and Fairgrounds Roads. Smith Bridge Road can expect flooding as well as portions of the Tenney Mountain Highway. Sanborn Mill Brook along Yeaton Road, Route 3 and Route 3A, significant sections of Clay Brook and Glove Hollow Brook can also experience occasional flooding. There are numerous

locations along the Pemigewasset and Baker Rivers where the river has altered its course over the years resulting in the creation of oxbows.

- The extent of damage caused by any flood depends on the lay of the land flooded, the depth and duration of flooding, the speed, rate of rise, and development in the flood plain. NRCS, in a flood hazard analysis of local rivers, points out that even a 10-year flood on the Pemigewasset River, Baker River, or Sanborn Mill Brook would result in the inundation of some residential, commercial and agricultural properties in Plymouth.
- Plymouth has adopted floodplain ordinances including environmental safety zone, and is currently a member of the National Flood Insurance Program. It also has recently adopted the *Hazard Mitigation Plan 2005*.

Wetlands

Wetlands are a valuable ecological, recreational and education resource. Wetland areas perform a wide range of functions— they reduce flooding, retain storm water runoff and sediment, recharge and filter surface and groundwater, support unique vegetation, provide valuable wildlife habitat, and add to the scenic beauty of the local landscape.

- Wetlands identified by presence of poorly and very poorly drained (hydric) soils are quite extensive and widely scattered throughout the community. In the *Natural Resource Inventory - May 2005*, the total wetland area based on hydric soils was estimated to be around 2,146 acres (about 12% of Plymouth's land area). Wetland areas identified on National Wetlands Inventory (NWI) maps indicate approximately 1,592 acres (or 8.8% of the landmass) of wetlands in Plymouth. These are also depicted on Map __ as protected hydrologic and habitat features that may pose significant development constraints.
- Although excellent tools, according to the *NRI - May 2005*, generally NWI data under represents the size and number of wetlands, and Natural Resource Conservation Services hydric soil data alone over represents the size and number. In 1985, the town contracted with *Natural Resource Consulting Services* of Concord, NH to perform an inventory and assessment of wetland. The results of the work have been included in the *NRI-May 2005* (see Appendix.)
- The federal and New Hampshire state governments recognize the importance of wetlands and have numerous programs regulating their use and protection. Digging or filling any wetland in New Hampshire requires a review process by the state Wetlands Board; and large-scale earth alterations must provide erosion and sedimentation control measures before they can be permitted.
- Plymouth's Subdivision Regulations prevent septic systems from being placed in wetland soils and further requires that wetland soils not be included in calculating minimum lot sizes. The Subdivision Regulations also provide for site-specific erosion and sedimentation control measures which can aid in protecting the integrity of wetlands. However, Plymouth's Site Plan Review Regulation does not require wetland soils (or any soils) to be identified on the application plat.

- Plymouth's zoning ordinance does not include wetlands protection and management provisions. However, wetlands are defined as undevelopable land and may not be included in density calculations.

Critical Wildlife Habitat

Critical wildlife habitat, which is necessary for the survival of one or more wildlife species, includes the habitat of rare, endangered or threatened species and natural communities, other natural areas worth preserving such as riparian and travel corridors, and large, un-fragmented tracts of forested land. Critical wildlife habitat may be lost through the subdivision and conversion of land to other uses, or adversely affected by incompatible development.

- The New Hampshire Natural Heritage Bureau is charged with facilitating the protection of the state’s rare plants and exemplary natural communities. The Bureau inventories species; tracks occurrences based on reported sightings; and interprets natural heritage information for use in local planning. Its current listing for Plymouth includes three threatened plant species and a Wood Turtle sighting.

Table 4 New Hampshire Natural Heritage Inventory Rare Species and Exemplary Natural Communities throughout Plymouth				
Species/Community	State Listing	Importance	# Reported (last 20 years)	
			Town	State
Plants				
Andrews' Gentian (<i>Gentiana andrewsii</i>)	Threatened	Very High	Historical	7
Loesel's Twayblade (<i>Listera loeselii</i>)	Threatened	Very High	Historical	25
Sweet Goldenrod (<i>Solidago odora</i>)	Threatened	Very High	Historical	12
Vertebrates - Reptiles				
Wood Turtle (<i>Glyptemys insculpta</i>)	---	---	Historical	65

Source: NH Natural Heritage Bureau Listings, 6/03.

- No extensive inventory of the town’s biodiversity has been conducted – there are likely other undocumented occurrences of rare plant and animal species in town. There may also be examples of species of “special concern”– including showy species such as pink lady’s slipper, Dutchman’s breeches, pitcher plants, fringed orchids, and flowering dogwood – which are not considered rare, but are vulnerable to over collection.
- Buffered wetlands, lakes and streams, conserved lands, water supply protection areas, and large, un-fragmented forest blocks (500 or more acres) are also identified as habitat features and sensitive areas on maps included in Map ____.
- According to the *NRI - May 2005*, there are less than average dense softwood stands in Plymouth. This suggests that maintaining the existing stands for the benefit of deer, moose and other wildlife populations is very important.
- Riparian corridors need to be identified - where new buffers should be established or where existing ones should be extended and protected. If left in an undisturbed, naturally vegetated state, these areas protect water quality and fisheries, provide riparian habitat, and may serve as wildlife travel corridors.

- Wetland buffers should also be mapped to include the area within 100 feet of a wetland identified from National Wetland Inventory (NWI) maps. These areas also protect water quality, provide important wildlife habitat, and where connected, may serve as wildlife travel corridors.

8. Planning Considerations

Goal: Responsible stewardship and sustainable use of Plymouth's natural resources in a manner that protects and enhances the town's natural environment for the benefit of current and future generations.

- (1) Protect and manage for sustainability the town's natural resources by:
 - Ensuring that the removal of sand, gravel, and other mineral resources does not permanently degrade the landscape, or adversely impact ground or surface waters;
 - Minimizing the loss of productive farm, forest and open land;
 - Limiting growth to priority development areas; and
 - Minimizing the impact of development to preserve the landscape.
- (2) Manage and protect Plymouth's natural heritage to maintain clean water, unpolluted air, and native wildlife population and to minimize noise and "dark sky" pollution.
- (3) Prevent degradation of water resources by:
 - Evaluating current zoning setbacks from rivers and streams for adequacy, and make changes as deemed necessary;
 - Preventing potential adverse impacts to groundwater resources, including depletion and degradation of water quality, from groundwater extraction;
 - Ensuring that development within wellhead protection areas is carefully designed to prevent adverse impacts to groundwater supplies;
 - Requiring proper erosion control measures and storm water management during all development, including road construction and maintenance; and
 - Controlling road salt storage areas and snow dumps to prevent contamination of waters.
- (4) Work with large landowners to identify alternatives to development; and use acquisition methods to protect important natural resources, especially environmentally sensitive areas.
- (5) Support the efforts of local, regional and statewide conservation organizations to protect important properties in town through voluntary programs.
- (6) Work with private conservation organizations to inventory wildlife habitat, including wildlife travel corridors, and to develop strategies for the preservation of that habitat.
- (7) Increase the public's awareness of their role in protecting natural resources and minimizing impacts on the natural environment. Provide information about appropriate water usage, non-point pollution sources (i.e., lawns, storm drains), maintenance of catch basins, waste disposal, invasive plants vs. native species, land protection options and other conservation issues.
- (8) Encourage an integrated natural resource protection strategy that links the most environmentally sensitive areas of town to protect groundwater resources, surface waters, important wildlife habitat, softwood forests, farmland, recreation resource lands, and

greenways through land acquisition/conservation, education, application of "best management practices," and/or "low-impact development" strategies.

- (9) Protect fragile resources and environmentally sensitive areas and reduce environmental hazards through local land use regulations. At a minimum, such regulations shall:
- Allow development on slopes of 15 to 25% only in accordance with strict standards to limit site disturbance and avoid erosion and sedimentation of surface waters;
 - Restrain the creation or the development of parcels that will result in development on steep slopes, wetlands, floodplain and/or natural heritage sites;
 - Require the designation of building envelopes (the area of a parcel where structures may be sited) and clustering of development;
 - Minimize the fragmentation of important agricultural land (including prime and statewide important soils), large softwood forest blocks and critical wildlife habitat;
 - Prevent the emission of excessive light, fumes, dust, odor, smoke and noise from all non-agricultural land uses; and
 - Explore zoning and subdivision regulations that more clearly define areas unsuitable for development.

Goal: To protect and enhance Plymouth's visual character and aesthetic resources.

- (1) Encourage open space development and siting of development away from scenic resources and such physical features as open fields, ridgelines and hillsides.
- (2) Where agricultural lands and open space are developed, enhance and use zoning and subdivision regulations to require subdivision designs that maintain the scenic quality of these parcels.
- (3) Identify specific scenic or unique areas (e.g., 'viewscales') and enact measures to protect these from uses, which may detract from the aesthetic character of the landscape.

Goal: To create a useable inventory of the town's natural resources including: wildlife, vegetation, minerals, soils and waters.

- (1) Obtain, develop or maintain the following maps and corresponding database to catalog the natural assets of Plymouth.
- Soils
 - Slopes
 - Water Resources
 - Conservation Land (Federal, State, Municipal & private easements)
 - Current Use for Agriculture and Forestry
 - Topography
 - Wildlife Habitat and Associated Corridors
 - Environmentally Sensitive Areas