

## **II. SENSE OF PLACE**

### **A. PLYMOUTH HISTORIC RESOURCES PROFILE**

#### **1. Summary**

Plymouth's evolution as a community is recorded in its landscape. Historic settlement patterns – still evident from the town's road network, stone walls, abandoned rail beds, remnants of dams along the Baker and Pemigewasset Rivers and streams, and the clusters of historic buildings that define its downtown and hamlets – establish the broad framework for context sensitive development. A variety of resources are found locally, including historic landscapes, settlements, sites, and structures that mark progressive stages in the town's development, and today remain relatively intact. It's important that these historic resources be preserved for present and future generations. They provide a critical link to the town's past, and they contribute much to Plymouth's historic character and community identity.

The need to identify, record and preserve local history for present and future generations has been an ongoing community effort. Plymouth's founding and early development has been celebrated in centennial, bicentennial and annual Fourth of July day celebrations and has been documented in several historical accounts. One of the most profound measures of Plymouth's commitment to its historic resources dates to its acquisition of the County Courthouse in 1972, its listing on the National Register in 1982 and its renovation for Town Offices in 1996.

In the 2004 Community Attitude Survey, 80% of the respondents favored regulations to protect historic resources and 62% support using tax dollars for purchasing historic properties or easements to protect them. In 1990 the North Country Council conducted a study of Plymouth's historic resources in the areas surrounding Plymouth's downtown. This profile includes information from the 1990 study. It specifically notes historic settlement patterns, sites and structures, presents opportunities and constraints to historic preservation, and offers recommendations to consider.

## 2. Town History and Historic Settlement Patterns

As noted, Plymouth's early town history is documented in town records, in the holdings of the Plymouth Historical Society, and in local histories and maps. Histories housed at the Pease Public Library and Plymouth State University's Lamson Library include:

- *History of Plymouth, NH* by Ezra S. Stearn 1906
- *The 150<sup>th</sup> Anniversary of the Granting of the Charter July 1763-1913*
- *Twenty Decades in Plymouth, NH 1763-1963* by Eva A. Speare 1963
- *Plymouth's First Lady: Eva Augusta Speare 1875-1972* by Audrey Moulton
- *Clothespin/Calendars: Recollection of the Past* by Eunice K. Halfmann 1985
- Numerous articles in the Plymouth Record and Record Citizen by Penny Kleinpeter
- *One Hundred Years of Service: Plymouth Teachers College and Plymouth State College* by Norton Bagley

Highlights of Plymouth's earlier development, summarized from early histories, the 1990 Historic and Cultural Resources Survey, and related documents include the following:

### Native American Period (through late 1600s)

- Occupation of the area by Native Americans predated the arrival of English settlers in the 1700s by more than a century. Near the junction of the Baker and Pemigewasset Rivers was an Abenaki village. Howard Sargent, an archaeologist associated with the New Hampshire Division of Historic Resources (NHDHR), located and investigated two Native American sites in the 1970s. One, NHDHR site number NH19-1 is near the mouth of the Baker River; the other, NH19-2, is near the National Guard Armory. In the early 20<sup>th</sup> century, a survey was conducted in the same area by archaeologist Warren K Morehead. Records as to the location of the artifacts he recovered have not been located. The artifacts recovered by Howard Sargent are in the collection of the Sargent Museum in Manchester.

### Early Historic Period (1700 - 1790)

- White hunters and trappers traveled up the Connecticut River in the late 1600s but it was not until the 18th century that exploratory expeditions occurred in the Plymouth area. During conflicts with Native Americans, colonial forces led by Lieutenant Thomas Baker in 1712 and later Colonel John Lovewell in 1753, used ancient trails and passed east along the route from Haverhill, NH on the Connecticut River to the Pemigewasset River via the Baker River to what is now Plymouth. In his 1712 expedition, Lt. Baker attacked a group of Abenaki camped at the junction of the Baker and Pemigewasset Rivers, killing eight. For his exploits, he was promoted to captain and the river was named after him.
- The rich intervale lands attracted an exploratory party from Hollis, NH in 1762. A charter was procured in July 15, 1763 and white settlement of Plymouth began the same year. Most of the original settlers were from Hollis, with several from Dunstable, Massachusetts, Chester and neighboring towns. The Congregational Church was organized before the settlers had left Hollis and the first minister, Nathan Ward, chosen. The first town meeting was held in July 1766. During the first 10 years of the settling of Plymouth, the following significant structures were built and roads laid out:

- a meetinghouse at the foot of Ward's Hill,
  - a school,
  - a tavern, and
  - the Dartmouth College Road (little more than a wide path.)
- District schoolhouses and cemeteries, many of which remain today, marked areas of concentrated development. The rich intervale soils along the Baker and Pemigewasset Rivers led to the growth of large river valley farms. Hill farms on immediately adjacent land also grew in number.
  - By 1773, there were 345 people in town
  - The power of the numerous rivers and streams in Plymouth was harnessed early to supply lumber and flour to the many outlying hill farms.

### **Revolutionary and Post Revolutionary Periods (1770 - 1830)**

- The first settlers in town constructed log cabins while they built their more proper home according to prevailing architectural tradition. Vernacular dwellings of this period were constructed in the 1-1/2 story Cape Cod form with central chimneys, some with applied Georgian/Federal elements, usually in the entrance. The more prosperous residents built 2-1/2 story homes, both in town and in outlying areas. Farming was still the prevalent occupation.
- By 1790 there were 625 people in town; Grafton County was organized, and more construction had occurred, including:
  - a courthouse where Daniel Webster tried one of his earliest cases,
  - schoolhouses in the outlying districts,
  - a second meetinghouse on Ward's Hill,
  - several stores,
  - the first bridge over the Pemigewasset River,
  - Holmes Plymouth Academy, and
  - the new Webster Tavern.
- During the early 19th century, the road system expanded with the construction of the Mayhew Turnpike, opening of stagecoach lines to the North Country and White Mountains, and the completion of the Franconia Notch Road in 1805. Holmes Plymouth Academy was opened at the location about 200 feet west of the present day Plymouth Historical Society Museum on Court Street.
- Early manufacturing ventures supported the needs of the local population. In time these ventures were turning out commercial products such as deerskin gloves and bricks. Industrial and commercial growth was somewhat limited due to the lack of reliable transportation both into and out of the region.

### **Beginnings of Plymouth's Industrialization Period (1830 - 1865)**

- As waterpower was harnessed for industrial development, Plymouth quickly became a major trade center for the area. Subsistence farming was increased in scale to take advantage of the proximate markets. Throughout this period, sawmills and gristmills increased in numbers until nearly every brook was providing power for some type of small industry.
- Several hamlets grew around these mills; the most notable aside from Plymouth Village was Glove Hollow in the southeastern part of town where a sawmill, tannery and glove factories were located. Another industry that grew in Plymouth during this period was the pottery business where a characteristic “brown ware” was produced. The potteries and brickyards were located west of the town near the Baker River, a major source of clay.
- In addition to the various industries, there was a trend toward agricultural specialization during this **period** as seen in the increased number of dairy herds and flocks of sheep. Farmers were increasingly involved in a cash economy as small commercial and mill villages developed at key stagecoach intersections and waterpower sources.
- Transportation depended upon stagecoaches; improved roads or turnpikes linked a number of villages and determined the dominant commercial centers of the region. Plymouth began to capture many of the tourists who began flocking to the White Mountain area.
- The Boston, Concord and Montreal Railroad, which veered toward the Connecticut River from Plymouth, arrived in 1850 and spurred traveler visits. By 1860 there were many taverns and three hotels, including the famous Pemigewasset House.
- Between 1830 and 1865, outlying hill farms continued to be settled at a steady pace, with settlement uniformly spread across town. Combined with the rapid growth of the glove, pottery and brick making industries, increased demands were placed on municipal and commercial services.
- The first training for teachers in New Hampshire was offered at the Holmes Academy in 1837.
- Large public and commercial buildings began to line the main street as the central business district began to take on its present concentration of structures. Photographic views of c.1860 show downtown Plymouth streets lined with large, wood, Greek revival style commercial buildings. During this period the Congregational Church on the common, the Universalist Church, and the first Town Hall were built.

### **Industrialization and Downtown Development (1865 - 1900)**

- During the last half of the 19th century, commerce and industry began to outstrip agriculture in importance in the local economy. Glove manufacturing continued to grow in Plymouth, with four operating factories at one time. The profitable operations of the glove industries attracted other businesses and the Plymouth downtown began to reach its present density, with new streets, new business blocks and housing.

- The construction of railroads opened Plymouth to outside markets through freight and passenger rail service. The rail service also accelerated the specialization within and commercialization of local agricultural enterprises. The scale of farming enterprises in Plymouth increased during this period, although the number of farms decreased. Farms began to change in appearance as specialized barns were erected, and older barns were renovated according to function.
- The growth of the railroad and steam technology also stimulated the rapid and profitable exploitation of the region's lumber resources. The loss of forests in the North Country was so rapid that the natural resources became nearly exhausted by the beginning of the 20<sup>th</sup> century. On the other hand, thanks to the railroad, the tourist industry was becoming a significant factor in the economy.
- The expansion of industry and commerce encouraged a building boom, supplying housing for workers, various business entrepreneurs and professionals. Neighborhoods of stately residences in the most up-to-date styles housing Plymouth's "upper crust" grew, with their residences filling in vacant land along Main Street, Highland Street and other streets close to the town center. Commercial enterprises also flourished, including a veneer mill, a peg and bobbin mill and the-soon-to-be famous Draper-Maynard Sporting Goods Company with its "Lucky Dog" logo.
- The effect of industrialization on land use during the late 1800s was more compact development. Previous land use dictated by the large land needs of agriculture contrasted with the growth of residential areas located in proximity to industrial and commercial centers. Commercial buildings and housing in these core areas showed an increase in height, as the demand for land increased.
- The agricultural fairs, beginning with the Union Grange Fair, became yearly attractions. The Union Grange Fair evolved into the State Fair and subsequently the Plymouth State Fair. Associated with the fairs was a large area dedicated as a fairground that included a racetrack and a number of exhibit buildings.
- In 1871, the old Holmes Academy building was presented to the State by the Town of Plymouth to establish a state Normal School. Town population and demand for education led to the development of:
  - district schools,
  - additional banks,
  - law firms,
  - musical societies,
  - the Young Ladies Library Association (1873),
  - first library,
  - electric lights and telephones,
  - Plymouth Water Company,
  - the Emily Balch Cottage Hospital, and
  - various fraternal and women's societies.

- Small factories began to be replaced by merchants selling mass-produced goods. This economic condition stimulated increased economic diversity. The service and professional industries multiplied, as did financial and shipping companies. The consequent increase in the number of doctors, lawyers, bankers and other professions was reflected in commercial construction in the Plymouth business district, as noted above.

The Gazetteer of Grafton County of 1887 summarizes Plymouth during this period:

*“Aside from its public buildings, Normal school, many elegant residences, beautifully shaded streets, summer hotels, two weekly papers, and a fine public park, the village has three churches, (Congregational, Methodist, and Universalist), four general stores, two drug stores, hardware store and tin shop, jewelry and music store, two clothing stores, furniture store, two fancy goods and millinery stores, three meat markets, one bakery, a wagon and sleigh shop, two harness shops, several blacksmith shops, an extensive lumber mill, grist mill, marble and granite shops, several tanneries for manufacturing glove stock, several glove and mitten factories, etc. and about twelve hundred inhabitants.”* p. 579-580.

## The Twentieth Century

- By the turn of the century, the lumber and pulp wood supplies had been depleted and the demands of the newly invented newsprint process were more easily filled by the vast reserves of timber in the west. Economic growth during this period slowed and even declined somewhat as the country went through general economic depression and two World Wars. Wide access to the automobile after World War II stimulated the tourist economy.
- Tourism continued at varying rates throughout the twentieth century. The Pemigewasset House continued to operate until 1958. Roadside cottages began to be built when a generation of Americans "took to the road" in the 1940s. Gas stations transformed Plymouth's Main Street. Owners of farms in close proximity to the town transformed their property from pastureland to golf courses. Summer tourists required more sophisticated entertainment, and to meet this demand, the Plymouth Theater was built in 1932. The end of passenger train service in the 1950s led to an increased dependence upon the automobile, and development along present day Tenney Mountain Highway began to proliferate.
- An increased demand on municipal services at the turn of the century led to several institutions increasing their size. Education was in demand by the residents of Plymouth and a high school was developed. Outlying district schools fell into disuse as widely available transportation enabled education to be delivered in a more centralized fashion. Spere Memorial Hospital, presently in an expansion phase, was built after a fire put the Cottage Hospital out of business.

- The State Normal School continued to grow, becoming the Plymouth Normal School in 1938, and in 1968 the name was changed to Plymouth State College of the University System of New Hampshire. In 2003 the name and status of the college was changed to Plymouth State University.
- Fires plagued the town center during the 20th century; Main Street fires early in the century destroyed the Draper-Maynard Company (to be rebuilt as the present brick structure now part of the Plymouth State University campus), and the Kebrick Block, Tufts Block and Howe House. Later in the century the Kidder Block and Methodist Church burned. Today, most of the original wood business blocks have been replaced. A fire in 1993 severely damaged the Rollins Block resulting in a major renovation and improvement including Chase Street Market and Biederman's Deli.
- Agriculture continued to be an important component in Plymouth's economy. However, it became almost exclusively dairy-oriented due to federal milk pricing and marketing support making it more profitable as a specialty. Farms grew in size, some with new gambrel roofed dairy barns. It has been in the last thirty years that the rural character of Plymouth's formerly working agricultural landscape has begun to be altered by large-scale land purchases and subdivisions on former agricultural lands.
- Between the 1930s and 1950s, motor courts and roadside cabins sprang up along highways, as the availability of automobiles enabled more people to travel. Later replaced by motels and, now, condominiums, this roadside architecture is fast disappearing. The change in use represents the evolution of older homes and associated property into uses appropriate to 20<sup>th</sup> century development patterns.
- Since the 1960s there has been much commercial development along major highways just outside the village, especially along Route 3A/25 toward West Plymouth. Outlying open space that was formerly farmland has undergone substantial subdivision (along roads in North Plymouth), but the town itself retains much of its rural character.

### **3. Historic Sites and Structures**

In 1986 Plymouth's Historic District was added to the National Register of Historic Places. Included in the district are:

#### **Plymouth Town Hall**

As noted, the Town Hall is Plymouth's most prominent commitment to the value of historic resources. Built in 1889 as the first County Courthouse, it was owned by Grafton County until 1972 when the town purchased it. It was renovated in 1996 and is now the Town Hall.

#### **Plymouth Historical Society and Museum building**

Relocated three times during its long history, the Plymouth Historical Society and Museum building was one of the original Grafton County Courthouses. Built in 1774, it is one of the oldest buildings in the town and the oldest court building in the state. Daniel Webster tried and lost one of his earliest criminal cases there in 1806. In 1876, the building was relocated and restored at its present site where it served as the first town library under the auspices of the Young Ladies Library Association. It became the home of the Historical Society and Museum after a new library named for Harlan Pease, a Plymouth World War II airman who was lost in combat.

#### **Bulfinch Bandstand**

Francis Bulfinch, grandson of New England's first architect, Charles Bulfinch who designed the Massachusetts State House and Faneuil Hall, built the Bulfinch Bandstand located on the Town Common in 1903 from a design. Over the years, the bandstand has been maintained and renovated when needed but its stately position, as the centerpiece of the Town Common has remained unchanged.

#### **Plymouth Common**

Originally a grassy area that was a bit of an eyesore, steps were taken to improve its appearance in the 1860s. In 1892 the town purchased the plot; a few years later the bandstand was erected. Major improvements occurred in the 1930s when the Plymouth Women's Club and a group of citizens were responsible for the erection of the fountain and the Boy Scout Statue (see below).

#### **The Congregational Church**

The present church was built in 1985. It replaces the original structure that was built in 1836 and burned in 1984.

#### **The "Old Bank Building"**

This brick building that flanks the church on the south side was built in 1885 for the original Pemigewasset Bank. Today various businesses occupy the building.

#### **The United States Post Office**

Built on the site of a previous brick general store in 1936, the Post Office is the fifth building in the historic district. In the lobby is a mural depicting the first post rider of Plymouth.

**Other "Treasures" Within and Around the Historic District:****1. The Boy Scout Statue**

Located on the Plymouth Village Green, the Boy Scout was commissioned by George G. Clark in 1933 and sculpted by George H. Borst, a well-known sculptor from Philadelphia. The idea was to depict the Boy Scout ideal of kindness to animals by pouring water into a basin on the ground for them to drink. It is said to be one of only two Boy Scout statues in the United States. As noted in a town brochure, "Over time, it has not only exemplified the ideals of scouting, it has come to embody the spirit of our community. The Boy Scout is unique to our town and is part of what makes Plymouth special."

**2. The Cannon**

On the lawn of the Town Hall sits a six-pounder British cannon that was captured during in the Battle of Bennington, Vermont in August 1777 - one of the most important engagements in the Revolutionary War. The cannon was one of four captured by soldiers under the command of New Hampshire's General Stark. On the cannon is the British Coat of Arms with a crown and GR, which stands for George Rex (George III, the reigning King of England at the time of the American Revolution).

**3. The "Paul Revere Bells"**

There are three bells in Plymouth that were cast in foundries that had close associations with Paul Revere.

- George Holbrook cast the Congregational Church bell that summons worshipers in 1834 in East Medway, Massachusetts. George Holbrook had been an apprentice at the Revere Foundry and later went into business with Paul Revere III.
- The bell that signaled the opening of the court in what is now the Town Hall has a maker's mark: "Henry N. Cooper and Company from Boston, 1849.No. 317." Joseph Revere, one of Paul Revere's sons, had purchased the Cooper Foundry.
- The clock bell in the tower of Rounds Hall on the campus of Plymouth State University was cast in Boston at the foundry of William Blake and Company. Blake had previously been associated with the Hooper firm that had produced the Town Hall bell.

**4. The Plymouth Section of the New Hampshire Heritage Trail**

Located in the heart of the downtown area is a 5.6-mile loop of the Heritage Trail that extends from the seacoast to the north country. The Plymouth section includes sixteen points of interest, each with a number that corresponds to an explanation in a brochure available at the Town Hall or nearby stores.

**5. Plymouth Cemeteries**

Like most towns in New England, Plymouth has several cemeteries dating back to the 1700s when the town was established. In 1987, each of the cemeteries in town were catalogued, some abandoned cemeteries locations are unknown (see Volume 3 for: *A Status Report of the Plymouth Cemeteries.*) According to the Town of Plymouth 2004 Annual Report, there are nine (9) cemeteries owned by the town.

## 4. Looking Toward the Future

### Current Preservation Resources

Efforts to record and preserve Plymouth's history for future generations have been ongoing, probably since its founding. The responsibilities for collecting and preserving records and artifacts relating to the town's historic development have fallen largely to the town – for town records as required by state law. Those records date to the 1770s and include birth, death, and marriage information.

The Plymouth Historical Society collects historical information that is shared with the community at various functions, weekly news stories, and through a museum maintained by the Society in its home, the old courthouse and original town library. The museum collection includes displays of photographs, samples of the products of the west Plymouth potteries, and other reminders and relics of past days. The society is governed by its officers and a Board of Trustees and is supported by membership dues and fundraising efforts.

The town's interest in preserving local historical resources extends beyond the town's historic sites and structures; it also includes the rural, agrarian landscape that provides their cultural context. At the October 2004 Public Forum, participants expressed concern about losing the town's agrarian landscape. It was noted that important historic features should be inventoried and means for preserving these features identified and implemented. In the 2004 Community Attitude Survey, 80% of the respondents favored regulations to protect historic resources while 62% support using tax dollars for purchasing historic properties or easements to protect them.

In recent decades, the town working with other entities has:

- initiated historic resource education (e.g., *Three Treasures* brochure, *Town Hall* handout, *Heritage Trail Guide* pamphlet);
- shown vision by commissioning the North Country Council in 1990 to study the historic and cultural resources of parts of the town; and
- demonstrated financial commitment to historic resources by renovating and using the Town Hall.
- has acquired 163 acres, the Walter-Newton Natural Area and an easement on 1,100 acres on Plymouth Mountain.

In the first decade of the 21<sup>st</sup> century, it seems that there may be a political will to preserve and enhance the town's rural and cultural heritage and downtown character. Regarding the latter, the establishment of Plymouth Main Street program is seen as one step in that direction (see Appendix A - Historic Resources and Programs for more resources.) Concerning the rural and cultural heritage, it has been suggested that the town through its governance and the Historical Society continue to provide for the protection, preservation, and, when pertinent, the maintenance of historic landmarks as well as the preservation of elements of rural character.

## 5. Planning Considerations

**Goal:** The preservation of Plymouth’s rural character, traditional settlement patterns, historic resources, and cultural heritage.

1. To insure the protection of landmark structures such as the Plymouth Railroad Station/Senior Center downtown, the Rollins Block, Holmes House, Rounds Hall, and the Draper-Maynard Building on the University campus would be their nomination for inclusion in the National Register for Historic Places. Such would expand the existing Historic District.
2. With regard to architectural features outside of the downtown area, undertake a photographic update of the George Clark Collection of photographs of Plymouth houses.
3. Preserve rural elements by designating “scenic roads.” RSA 231:157 provides for such designations. One such road unofficially considered by some as "scenic" is Old Hebron.
4. The further acquisition of easements and the further establishment of Environmental Safety Zones should be considered as protection strategies.
5. Include an historic preservation item in the Capital Improvement Plan; such an indication of town support for future historic preservation opportunities would be an important “match” item in funding proposals.
6. The town and the Historical Society, should embark on a follow-up of the 1990 North Country Council historic resource study which included the following suggestions:
  - a. Complete a survey of historic resources downtown; refer to #'s 1 and 2.
  - b. Survey and map (via GPS) cellar holes and other historical archaeological sites in order to document evidence of early dwellings and other structures.
  - c. Consider establishing overlay districts or zones where viewsapes, scenic roads, and agricultural lands could be protected via easements or tax incentives, refer to 4 and 5.
  - d. Consider enhancing the Plymouth section of the NH Heritage Trail with interpretive identification markers so that trail walkers will not have to rely on a brochure to understand the historical significance.
  - e. Consider extending the present Historic District to include significant historic structures in the downtown area, as noted in #1.
7. The town should create, by means of an ordinance, “a review process” to occur when the demolition involves a building documented to be of historic or architectural significance.
8. Planning Board considerations regarding protecting historic resources:
  - a. Seek an advisory report from the Historical Society Trustees to assist in decisions relating to development in overlay districts or subdivision of land with special qualities or historic/archaeological values. The Trustees could also advise concerning potentially threatened properties.
  - b. Establish a site plan review provision that, in addition to setbacks, creates guidelines for height, mass, and fenestration.
  - c. Investigate a means by which certain criteria must be considered when subdivision could intrude on historic or cultural resources.

- d. Explore the possibility of establishing adaptive re-use provisions as a means of protecting historic buildings in accordance with guidelines provided by the US Department of the Interior.

## Appendix A: Historic Resources and Programs

The **New Hampshire Department of Cultural Resources** was created in 1985 to serve local citizens, preserve New Hampshire's history and culture for future generations, and to recognize and promote cultural resources as an essential element of the state's economic and social well being. The Department includes the New Hampshire Division of Historical Resources – the state's "Historic Preservation Office" – previously established under federal legislation in 1974. Major programs of the Division include:

- **State Register of Historic Places** – including the listing of locally nominated historic sites and structures (at least 50 years old) to provide: public recognition, consideration in the planning of local and state funded projects, special consideration or relief in the application of access, building and safety code regulations, and to qualify for state financial aid for preservation projects.
- **National Register of Historic Places** – national listing of nominated historic districts, sites and structures, also administered in New Hampshire by the Division, which affords limited protection under federally funded projects, tax incentives, and federal financial assistance, when funds are available.
- **Project Review (Section 106)** – a "review and compliance" process, established under Section 106 of the National Historic Preservation Act of 1966, to identify significant historic properties that may be affected by state or federally assisted projects or actions, so that harmful impacts can be avoided or minimized.
- **Barn Preservation Program** – including the New Hampshire Barn Survey Project, information about related grant and tax incentive programs, property tax incentives, historic preservation grants (when available), and barn assessment grants available through the New Hampshire Preservation Alliance.
- **State Conservation & Rescue Archaeology Program (SCRAP)** – a public participation, training and certification program for archaeological research, management and education, administered by the Division's Archaeological Bureau, the intent of which is to increase the rate of site identification and evaluation, reduce the rate of site destruction, recover information from sites to be destroyed, and conduct original research.
- **Historical Marker Program** – administered by the State Historic Marker Review Council, to place historic markers along public rights-of-way that identify historic sites, structures or events, in response to proposals from concerned citizens, an historical society or other local groups.
- **Certified Local Government (CLG) Program** – which includes some requirements for participating municipalities, but at the same time allows local governments to apply, on a matching basis, for preservation funds set-aside exclusively for CLGs.

The **New Hampshire Preservation Alliance**, founded in 1985, is a nonprofit organization dedicated to preserving New Hampshire's scenic and cultural landscapes and historic resources. The Alliance is a source of information, technical assistance, and small grants, including **Project Development Grants** for preservation planning and **Barn Assessment Grants** for the preservation of historic barns and other agricultural outbuildings (note that this program was temporarily suspended as of August 1, 2003).

The **New Hampshire Land and Community Heritage Investment Program (LCHIP)** was established by an act of the legislature in 1999 to conserve and preserve the state's most important natural, cultural and historical resources, in partnership with the state's municipalities and the private sector. LCHIP was initially authorized with a recommended annual funding level of \$12 million dollars. Since January 2001, LCHIP has awarded \$15 million in grants to communities across New Hampshire to help protect nearly 200,000 acres of land, and restore more than 80 historic structures. Unfortunately, in 2003 LCHIP funding ~~for~~ was cut significantly – by 90% – and all funding for historic buildings was eliminated. However, the new administration has proposed increased funding.

The **Conservation (Moose) Plate** program was established in 1998 as a way to supplement existing state conservation and programs with additional funding. The conservation license plate supports the protection of New Hampshire's critical resources, including scenic lands, historic sites, and wildlife habitat. Revenues from the sale of conservation plates are distributed through five state agencies – including grants administered through Division for Historical Resources to support the preservation of a publicly owned historic resource (e.g., a building, site, or landscape), and the preservation and conservation of significant, publicly owned archaeological or historic artifacts that contribute to New Hampshire's cultural heritage. Historic preservation grants under this program are subject to the approvals of the New Hampshire Attorney General's Office, the Governor and the Executive Council.

## B. PLYMOUTH NATURAL HERITAGE

### 1. Summary

- Plymouth has a temperate climate influenced by its topography and general weather patterns with typically long, cold winters and cool summers and about 113 frost-free days.
- Elevations in town range from around 457 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
<b>Annual</b>	<b>42.3</b>	<b>54.3</b>	<b>30.2</b>	<b>43.01</b>	<b>8,431</b>	<b>170</b>

*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 southwestern portion of town drains into the Pemigewasset River, largely via Glove Hollow Brook.
- Elevations in town range from around 457 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 sheets left behind two major types of materials,

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	457 feet
Baker River	480 feet

which 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 Water Resource 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. McCloud (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, soil-based information can and does play an important part of this Natural Resource Inventory - May 2005.

- 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 Natural Resources 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 Natural Resources Map.)
- 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.

<b>Plymouth Agricultural Lands - 1950, 1970 and 2005</b>	
Total Land Area	18,233 Ac.
Total Agricultural Soils	4,552 Ac.
Ag. Soils of Total Land Area	25%
1950 Ag. Land in Use	1,802 Ac.
1970 Ag. Land in Use	1,535 Ac.
2005 Ag. Land in Use	1,356 Ac.
Change in Ag. Land in Use	-25%

*(Source: 1998 Plymouth Master Plan, 2002 Statewide Land Use/Land Cover Assessment, UNH.)*

## 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 Volume 3.) 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 Volume 3). The Natural Resource Inventory - May 2005 - locates the aquifer on the Baker River west of the confluence with the Pemigewasset.

### 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 Water Resources 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).

<b>System</b>	<b>System Type/Description</b>	<b>Population Served</b>	<b>Connections</b>
Calvary 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 then becomes the Merrimack River, which flows 115 miles to 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 Natural Resources 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 Volume 3), 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 the Water Resources 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. Natural Resource Consulting Services (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 a 500-foot Environmentally Sensitive Zone (1988), 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 (NRI – 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 the *Water Resources 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 Volume 3.)
- 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.

Plymouth's Site Plan Review Regulation require soil survey data from the Grafton County Soil Survey 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.

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 and included in the *NRI - May 200.5* (See Volume 3.)
- 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;
  - Guiding growth to priority development areas; and
  - Minimizing the impact of development to preserve the natural landscape.
- (2) Manage and protect Plymouth's natural heritage to preserve clean water, unpolluted air, and native wildlife population and to minimize noise and "dark sky" pollution.
- (3) Prevent degradation of water resources by:
  - Evaluating buffer areas and current zoning setbacks from rivers and streams for adequacy, and consider 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) Encourage large landowners to consider alternatives to development; and develop acquisition/finance 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 refined local land use regulations that should:
- Allow development on slopes of 15 to 25% with standards that minimize site disturbance and prevent erosion and sedimentation of surface waters;
  - Restrain the development of parcels on steep slopes, wetlands, floodplains by mitigating environmental impacts;
  - 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 provisions that more clearly define areas unsuitable for development.

Goal: To protect and enhance Plymouth's visual character and aesthetic resources.
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- (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 natural scenic qualities of these parcels.
- (3) Identify specific scenic or unique areas (e.g., 'viewscales') and determine ways 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.
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- (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 Area