

X. Natural Resources



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“In the wilderness is the preservation of the world”

-- Henry David Thoreau

“Whether we and our politicians know it or not, Nature is party to all our deals and decisions, and she has more votes, a longer memory, and a sterner sense of justice than we do”

-- Wendell Berry

A practical understanding of the guiding philosophy of the above quotes is important in planning a community’s health, vibrancy, and long term sustainability. The natural resources within a community offer necessary materials for industry, commerce, agriculture, recreation, and human habitation. However, without responsible stewardship and planning these resources can be degraded and exhausted.

Balancing both economic development and natural resource management requires cooperation and planning among multiple parties in order to achieve community-wide consensus. To avoid the costs associated with resource degradation and depletion, municipalities create and implement land use regulations to promote resource protection and best management practices. These regulations typically address a wide variety of environmental concerns, such as erosion, flooding and wetlands, groundwater and wildlife habitat protection.

Many communities within the SNHPC region are addressing conservation in a proactive manner by setting forth strategies for aquifer protection to open space preservation. Raymond has been active in many types of conservation efforts. The Town of Raymond has created a Conservation Overlay District (Zone G) designed to protect the ecological functions and values as well as public health, safety and welfare of the community’s lakes, ponds, river systems, wetlands and steep slopes. The Town of Raymond has also adopted Conservation Development zoning regulations for the purpose of protecting open space and preserving scenic views and other natural site features as part of the land development process.

This Natural Resources study identifies the Town of Raymond’s natural resource values and goals and provides the community an update of current natural resources planning practices as well as a brief inventory of the Town’s significant natural resources.

Also included is a summary of citizen-based Open Space/Recreation Topic Group Report and the results of the UNH Master Plan Survey as related to natural resources.

UNH Survey Results

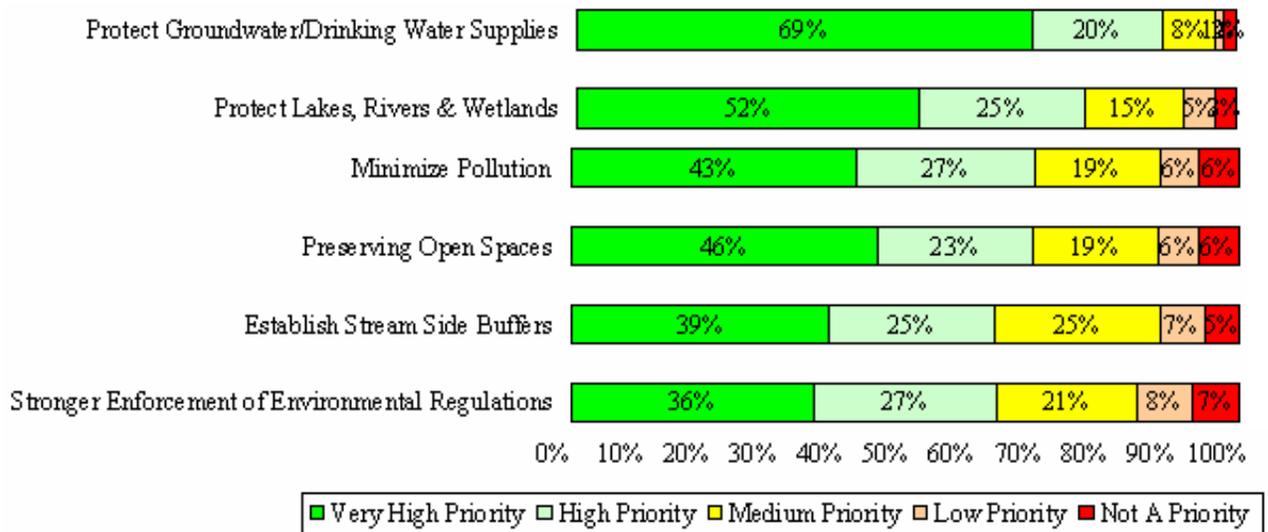
Between September and October 2007, the University of New Hampshire Survey Center conducted a community-wide master plan survey of the perceptions, interests and attitudes of residents about the Town of Raymond and future planning initiatives for Raymond.

A total of 4,580 surveys were delivered to all Raymond postal patrons in the “On the Common” newsletter on September 14, 2007. In addition, a reminder (post card) was mailed on October 4, 2007.

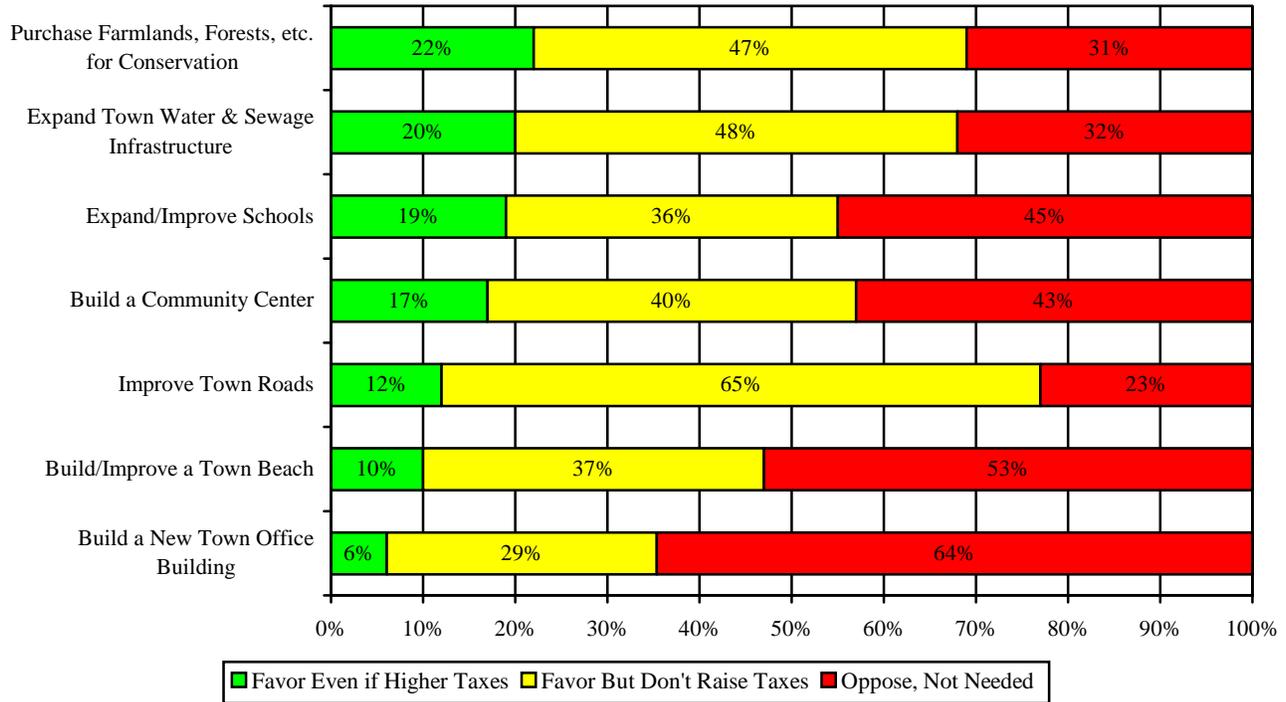
A total of 409 Raymond residents responded to the survey representing a response rate of nine percent. The following responses were received to Questions 1 (i, j, k, l, p, and s), 6 and 7 regarding Raymond’s natural resources. An Executive Summary of the Master Plan Survey and a copy of the survey questionnaire are contained within the Appendix of this plan.

Natural Resources Questions

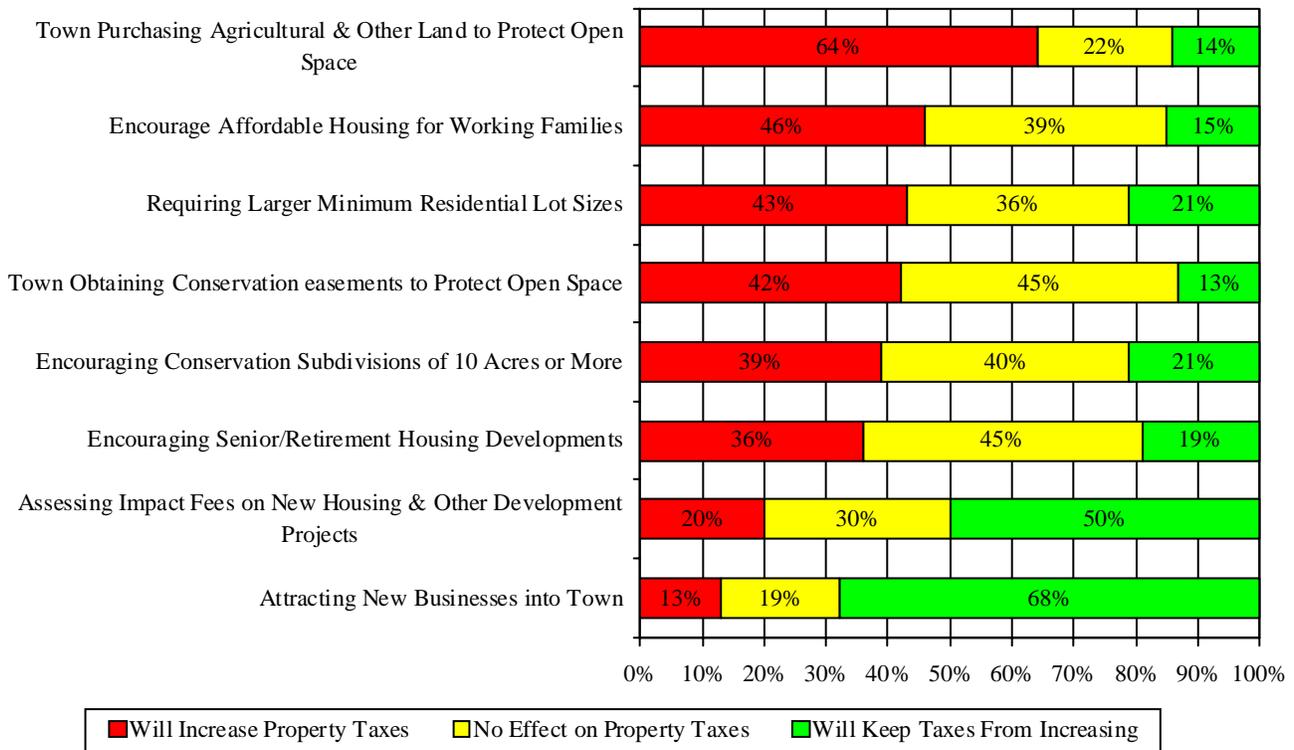
Question 1 (i, j, k, l, p and s): Please indicate how high a priority you place on each of the possible goals/activities for Raymond:



Question 6: Please indicate if you favor or oppose the following activities in Raymond and if so, are you willing to pay higher property taxes for them?



Question 7: What impact do you believe the following planning strategies would have on your property taxes?



Overall Summary of Results

The survey results indicate that a clear majority of the respondents consider protecting groundwater and drinking water supplies (69 percent); protecting lakes, rivers and wetlands (52 percent); preserving open space (46 percent); minimizing pollution (43 percent); establishing streamside buffers (39 percent); and stronger enforcement of environmental regulations (36 percent) as a **very high priority** in Raymond. At the other end of the scale, only a handful (between 5 and 8 percent) of the respondents considered these goals/activities as a low a priority for Raymond.

When asked the question what impact the Town of Raymond's obtaining conservation easements to protect open space would have on your property taxes; there was a general split in the results with 42 percent of the respondents indicating that they felt this action would increase property taxes while 45 percent felt it would not effect taxes and 13 percent believed it would keep taxes from increasing. Also in response to a similar question regarding whether purchasing agricultural and other land to protect open space would increase taxes, a clear majority (64 percent) of the respondents believed this action would increase property taxes; 22 percent believed it would not; and 14 percent felt it would have no impact.

Similarly, in response to the question whether you favor the Town of Raymond purchasing farmland and forests and other lands for conservation and if so are you willing to pay more property taxes for that action, 22 percent of the respondents favored Raymond conducting this activity even with higher property taxes while 47 percent favored it provided it did not raise property taxes, and 31 percent opposed this action.

Lastly, there appeared to be another split between those survey respondents that believed encouraging conservation subdivisions of 10 acres or more would increase property taxes (39 percent) as opposed to those that believed it would not (45 percent). The Raymond Planning Board allows conservation subdivisions primarily to allow greater flexibility in lot sizes and lot placement in exchange for open space and the protection of important natural and cultural resources on a site. The conservation subdivision approach also supplements the Conservation Commission efforts to protect whole parcels through outright purchase, conservation easement or other legal arrangements. These efforts have been a priority of the Planning Board and Conservation Commission for a number of years, and the survey results clearly demonstrate that residents are committed to conservation efforts in Raymond.

Overall, it can be concluded that the survey results demonstrate a clear majority of residents in Raymond support town efforts at protecting natural resources within community. However, while many of these same residents are supportive of these actions as well as the need to acquire conservation easements, protect open space or purchase farmlands and forests, this support is conditional such that these actions do not result in increased property taxes.

Summary of Topic Group Report: Open Space/Recreation

In addition to the UNH master plan survey results, the following report and recommendations were identified by town residents participating on the Open Space/Recreation Topic Group. This report has been reviewed and updated by the Raymond Planning Board.

Define Open Space Areas for Recreation and Preservation

Suggested goals of this Topic Group taken from the Community Vision Workshop Priority Actions list include:

- 1) Defining open spaces, including wildlife corridors and unfragmented land.
- 2) Identifying strategically planned acquisitions for education (town/school), recreation and green spaces
- 3) Consider balanced business and residential growth while encouraging open land and protected waterways

Results of the Town-wide Survey 2007, relating to Open Space, were discussed. Respondents indicated that it is a high or very high priority to have open space, streamside buffers, protected lakes/rivers/wetlands, and protected ground/drinking water. Nearly one-fourth of the respondents favored purchasing farmlands and forests, even if taxes are impacted. Nearly one-half of the respondents favored acquiring the lands if there is no tax impact.

Our group reviewed maps depicting high value conservation lands in town both privately owned and town owned. The Town of Raymond owns the following open space and forested properties: Flint Hill/Norris Farms; Cammett Recreation Area; Riverside Park; Dearborn Estate, Cassier Town Forest; Cassier Estate and the Colonial Drive location. Privately owned properties include along Fordway Brook and approximately 1100 acres along Cilley Road.

Given the major floods during the past 2 years, it was suggested that a zoning ordinance might be developed to prevent rebuilding beyond footprints or land swapping to prevent rebuilding within flood zones.

We reviewed the current Chapter 5 Open Space and Recreation - Goals and Objectives only to unanimously agree that the detail information needs to be updated, however, the directive of the goals and objectives in the chapter still remain the same.

The group identified the following additional priorities for the Town of Raymond:

- Continue to protect the Town's identified open space and forested properties and define areas for preservation with green space and wildlife corridor connections.

- Protect drinking water sources and systems including aquifers, water tables, river edges, prime wetlands and wells, both public and private.
- Help reduce global warming by maintaining forests with active Forestry Management Plans.
- Give consideration to the Pooled Wetland Mitigation Plan before development impacts wetlands to mitigate flooding and maximize resources/options available to the Town.
- Enhance and restore wetlands and widen buffer zones to alleviate flooding.
- Implement the Open Space Plan from May 2003.

1) What have been the Town's expenditures for acquisition of green, protected space over the past 5-7 years? What funding mechanisms might be available?

- 2009 - Robinson Hill - 56 acres purchased for \$225,000 plus expenses.
- 2009 - Bond Property - 56 acres purchased for \$75,000
- 2000 - Riverside Park - 45 acres purchased for \$74,000.
- 1998 - Cassier Town Forest - 370 acres purchased for \$160,000
- 1993 - Dearborn - 305 acres, acquired land via land swaps at a market value of \$398,000
- 1992 - Flint Hill - 215 acres acquired for \$1.00 due to non-payment of taxes

As of 2009, the Conservation Commission Fund receives a percentage of the current use penalty money otherwise known as the Land Use Change Tax. The Raymond Conservation Commission Funds can be used for acquisitions of land, protective easements or purchasing the development rights.

Topics of discussion that should be acted upon were: planned purchases of land with continuous green linked spaces, aquifers, playing fields and a place for recreational community center with use for schools and families.

Also discussed were purchasing conservation easements, updates on the wastewater treatment facility and old tannery site, and the possibility of contacting large landowners to encourage land protection methods.

2) What types of outdoor recreation areas and parks exist in Raymond?

Outdoor recreation activities such as Outdoor Theater, Earth Day celebrations, hiking trails, mountain biking, horseback riding, hunting, snowshoeing, x-country skiing, snow mobiling exists on one or more of the following properties Riverside Park, Dearborn, Cassier Town Forest, Norris Farms/Flint Hill, Colonial Drive and Cilley Road properties. There is a desire for trails that would allow ATV's a place to ride safely and a new skate board park for the kids.

Organized team sports recreation areas include:

Welch Field area:

- 1 Tee Ball Field
- 2 Softball fields and 1 Baseball field (Fields used by Raymond School District through a Use Agreement, Town of Raymond and Raymond Youth Athletic Association, also serves as a football field)
- 1 NOR-ROCK football field

Cammett Recreation Area:

- 2 Little League Baseball Fields
- 1 Softball Field (also serves as a soccer field)
- 1 Regulation Soccer Field (another field is currently under construction)
- 1 6 v 6 Soccer Field

Lamprey River Elementary School: NO FIELDS

Iber Holmes Gove Middle School:

- 1 Softball Field
- 1 Baseball Field
- 2 6 v 6 Soccer Fields
- 1 Little League Baseball Field
- 1 lighted Soccer Field
- 2 lighted rubberized asphalt tennis courts
- 1 lighted basketball court
- 1 lighted 400 meter stone dust track

A. Geology

The Town of Raymond lies within the physiographic province known as New England and Eastern New York Upland; characterized by hills and low mountains underlain by schist, granite and gneiss. Many of the hills in Raymond are either drumlins or bedrock ridges dating back more than two million years to the beginning of the ice age. Some of the low, mountains such as Saddleback and Pawtuckaway, generally have a thin mantle of soil material over bedrock, especially on the upper slopes. Glacial outwash consisting of sand and gravel can also be found in some of the major stream valleys within the town.



**Entrance to Raymond High School Revealing
Bedrock Outcrops**

Inland areas also have many ponds and lakes which are fed by numerous small streams. The Exeter and Lamprey Rivers in Raymond drain most of these areas eventually emptying into the Great Bay Estuary.

Although much of Raymond's topography reflects bedrock geology, there are some areas that conform to deep surface deposits that formed during glacial periods many millions of years ago. Generally, there are four major geologic features that affect Raymond's topography.

- 1 Bedrock outcrops – which are composed of metamorphic rocks. Bedrock or ledge outcrops usually pose a constraint to development, primarily where septic systems or foundations are required. Blasting may be necessary for structural foundations and footings.
- 2 Unstratified drift or glacial till – composed of an unsorted mix of sand, silt, clay, gravel and boulders that overlies much of the bedrock in Raymond. These glacial deposits may limit percolation for proper sitting of septic systems and do not generally hold sizable supplies of groundwater.
- 3 Stratified drift – composed of fine sands and gravel. The majority of these deposits are generally associated with river valleys and shorelines. In Raymond significant deposits of stratified drift can be found within the North Branch/Lamprey River Valley and the Exeter River Valley.

The deposits associated with the Lamprey River expand laterally through much of the downtown and village area of Raymond. These deposits may provide suitable sources for drinking water supplies and sand and gravel deposits. Raymond's municipal water supply is drawn from these stratified drift deposits and there are a number of gravel pits associated with these deposits both in the Lamprey and Exeter River areas.

- 4 Swamp Deposits – these occur in low, poorly drained areas along the watercourses in Raymond. They typically contain high water tables and may have water ponded at the surface. The town's wetland resources are usually associated with these deposits and are contained within the hydric soil group.

The surficial geology of Raymond is displayed on Map 15. This map shows the location and pattern of various alluvial, glacial till and palustrine rocks in Raymond.

Surficial Geology

TOWN OF RAYMOND

- Town Boundaries
- Parcel Boundaries
- Brooks and Rivers
- Lakes and Reservoirs
- Road Systems**
 - Highways
 - State Routes
 - Town, Local, and Private Roads
- Surficial Geology***
 - Alluvial
 - Anthropogenic
 - Glacial Till
 - Glaciofluvial
 - Glaciolacustrine
 - Glaciolacustrine and Glaciofluvial
 - Glaciomarine
 - Palustrine

* Surficial Geology for the southern part of the Town of Raymond is in Draft form and may be revised in the future based on new data.

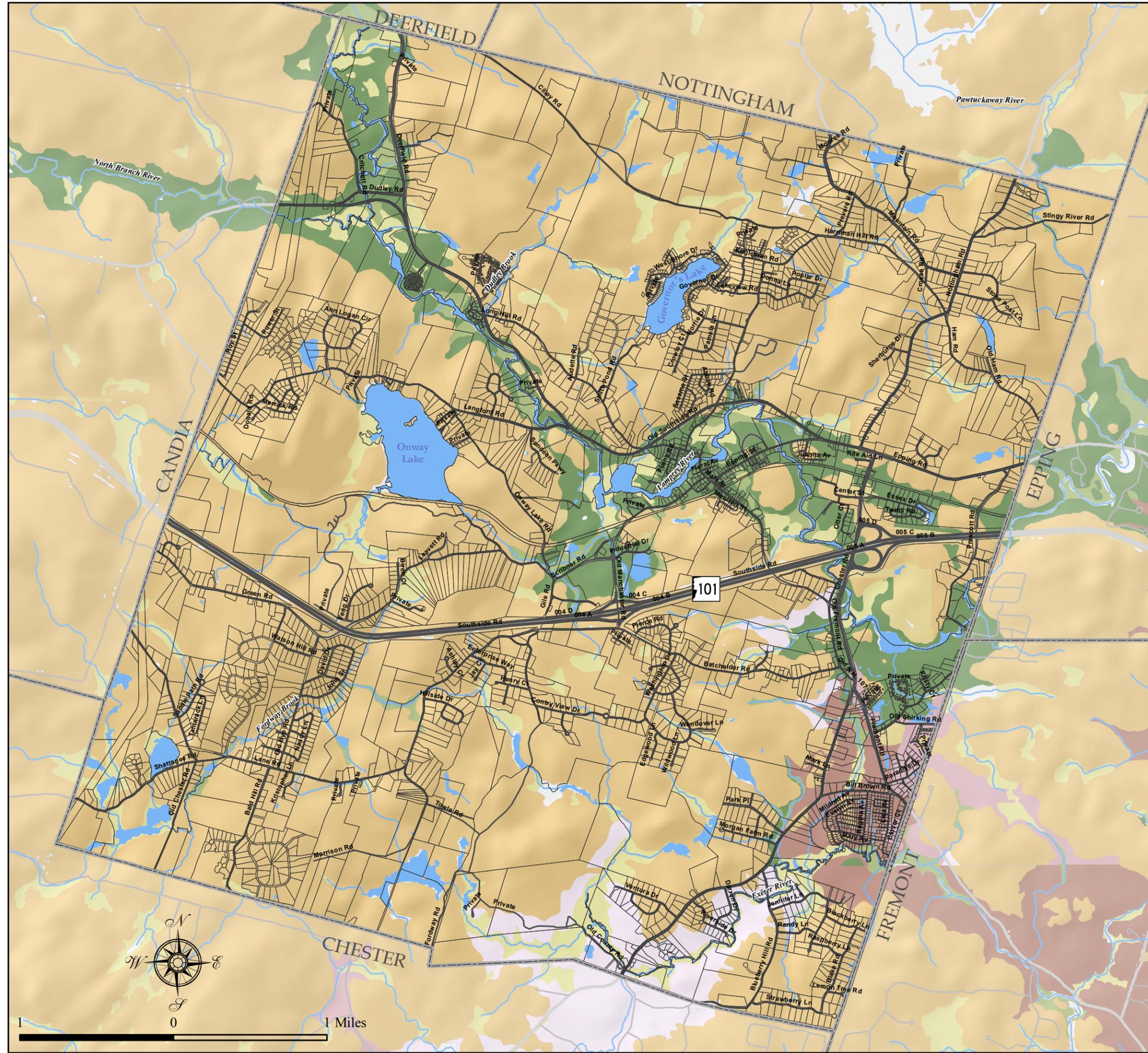
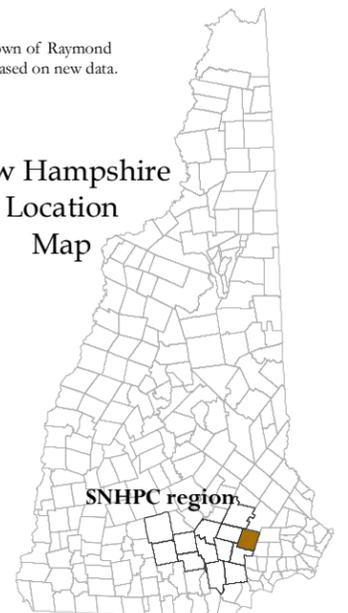
Data Sources:
NH GRANIT Digital Data (1:24,000)
NH Department of Transportation
NH Department of Environmental Services
Town of Raymond
SNHPC

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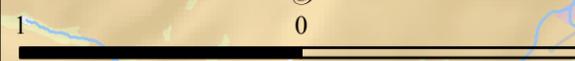
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GIS Service SNHPC 2007.
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New Hampshire
Location
Map



1 Miles



B. Earth Products Usage

In 1989, the state revised RSA 674:2, Master Plan Purpose and Description, to require that each municipal master plan identify known sources of sand and gravel to meet future needs. Some of Raymond’s most probable sources are shown on Map 16. Currently, there are a total of 6 locations where excavation permits have been issued for sand and gravel operations in the Town of Raymond. Table 71 lists those sites where the permits exist. The locations of these sites are shown as “mining” sites on the Existing Land Use Map and the Primary Sand and Gravel Deposits Map 16.

**Table 71
Excavation Permits
Town of Raymond, NH**

Map	Lot	Grantee	Land Area in Acres	Status
10	3	Aggregate Industries	271.5	Active
10	4	Aggregate Industries	40	Active
22	15	Waldoborough, LLC	2.5	Active
22	47	Hard Rock Development, LLC	12.84	Active
37	10	Raymond Sand and Gravel, LLC	6.88	Active
38	34	Candia South Branch Brook, LLC	18.38	Active
Total			352.1 Acres	

Source: Town of Raymond

Sand and gravel suitable for commercial use with minimal processing are assessed on the following properties: gradation of grain sizes, thickness of the deposit, and content of rock fragments. A soil rated by the Natural Resources Conservation District (NRCS) as a “probable” source of sand and/or gravel has a layer of clean sand or gravel or a layer of sand or gravel that is no more than 12 percent silty fines. The layer must be at least three feet deep and contain no more than 50 percent by weight of large stones. Each soil is evaluated to a depth of five or six feet. Soils not meeting these standards are rated as improbable sources. Coarse fragments of soft bedrock, such as shale or siltstone, are not considered useful.



Town Salt Shed

Primary Sand and Gravel Deposits

TOWN OF RAYMOND

-  Town Boundaries
-  Parcel Boundaries
- Road Systems**
 -  Highways
 -  State Routes
 -  Town, Local, and Private Roads
-  Brooks and Rivers
-  Lakes and Reservoirs
-  Sand: 847.00 acres
-  Sand and Gravel: 2531.14 acres
- Sand and Gravel Sites Status**
 -  Active
 -  Inactive

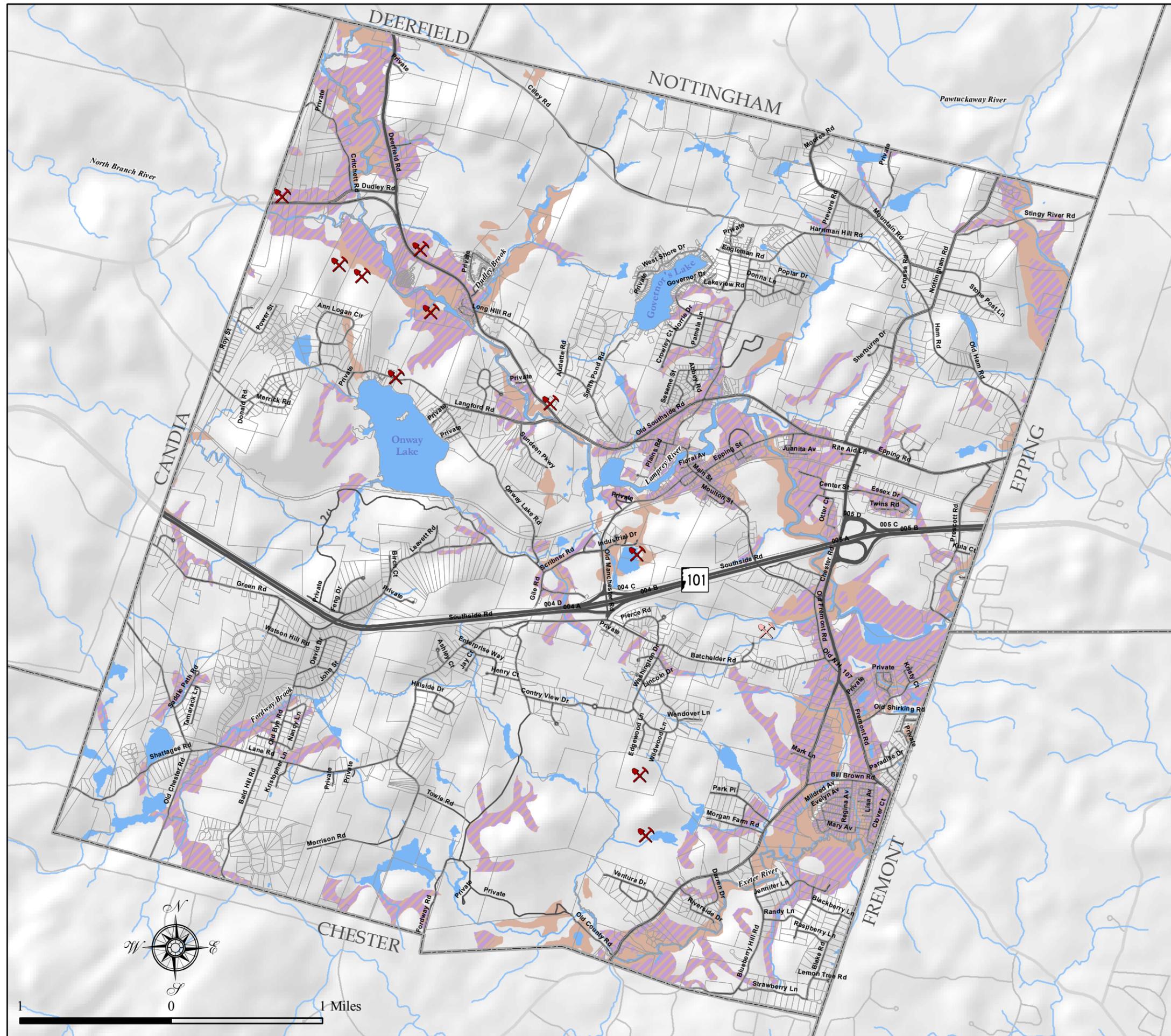
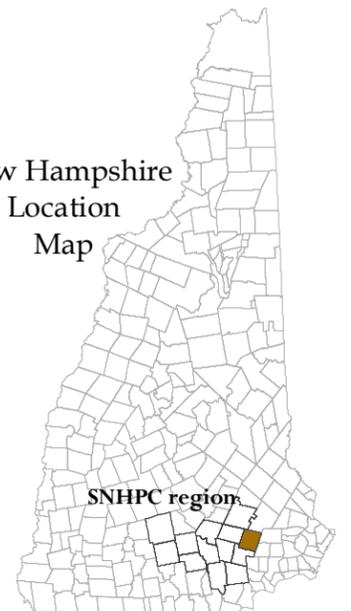
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New Hampshire
Location
Map



1 Miles

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The NRCS has identified approximately 847 acres in the Town of Raymond as probable sources of sand and approximately 2,531 acres as probable sand and gravel sources. Because many of these sites are located close to river courses and near or above stratified drift aquifers, digging to the water table and careless disposal of oil, fuel, filters and containers should be forbidden, and careful, thoughtful site restoration practices should be implemented.

Suggested below are recommendations for improving the Town of Raymond's excavation approvals:

- 1 Determine the status of existing excavations with respect to statutory requirements of RSA 155-E.
- 2 Employ the erosion and sedimentation control provisions of the Town's subdivision regulations during sand and gravel excavation permit applications.
- 3 Continue to require reclamation plans of all new gravel permit applications and existing permits as applicable.
- 4 Evaluate the adequacy of current earth removal regulations and update and amend said regulations as needed.
- 5 Project where future excavations should or should not occur.
- 6 Produce an accurate estimate of the material remaining and the likely date of exhaustion of the non-renewable resources given the current rate of excavation.
- 7 Calculate the Town's future need for sand and gravel to maintain the infrastructure of the Town and determine how best to supply this need.
- 8 Limit excavation or require extra safeguards when in close proximity to water resources and environmentally sensitive areas.
- 9 Any excavation that takes place within Raymond's Groundwater Protection District, excavation equipment should use biodegradable fuels and fluids.

C. Topography

For planning and development purposes, topography is concerned mainly with the slope or steepness of the land and is expressed as a percentage representing the relationship of horizontal and vertical distance between two points, or the rise over the run. Steep slopes within the SNHPC region are considered to be areas having a slope of 15 percent or greater. In areas of steep slopes, the soil layer is thinner than normal, and absorption levels are reduced, allowing for a higher concentration of surface water runoff. As the slope of the land increases, the greater the damage from land degrading processes, such as erosion and flooding due to snow melt.

Another common danger relates to the inadequate development of these areas. If proper care is not taken when building in relation to the slope of the land, then costly environmental and also human consequences can result.

Much of Raymond is gently rolling land forming gradual ridges and lower wetland valleys. Elevations in the Town of Raymond range from a low of 151 ft. to a high of 625 ft at Dumpling Hill.⁷² Many areas with steep slopes, greater than 15 percent, are generally associated with hilly topography. Land areas with 25 percent or greater slope should generally be left as open space and not developed within the community.

These areas are suitable for such uses as conservation lands or watershed protection. Slopes of 15 to 25 percent are less threatening to development, however these areas are still steep enough where development should be carefully planned, and if possible, should not be developed. The most ideal development option is on slopes of less than 15 percent.

Generally, high density commercial and industrial activities should be limited to slopes of less than 10 percent. Truly ideal locations for any development are slopes of zero to three percent, however these areas are usually found near bodies of water, which present additional problems.



Lamprey River

Map 17 shows the geographic extent and location of steep slopes (greater than 15 percent) within the Town of Raymond. This map was originally created as part of the SNHPC's Regional Comprehensive Plan, adopted in November 2006.

⁷² Elevation data is based upon a USGS DEM GIS Layer for the Town of Raymond

Steep Slopes

TOWN OF RAYMOND

 Town Boundaries

 Parcel Boundaries

Road Systems

 Highways

 State Routes

 Town, Local, and Private Roads

 Brooks and Rivers

 Lakes and Reservoirs

Percent Slope

 15% - 25%

 26% - 35%

 36% - 60%

Data Sources:
NH GRANIT Digital Data (1:24,000)
NH Department of Transportation
Town of Raymond
SNHPC

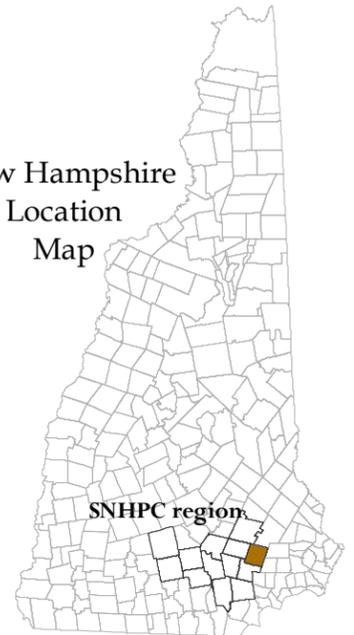
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New Hampshire
Location
Map

SNHPC region



1 Miles

1

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