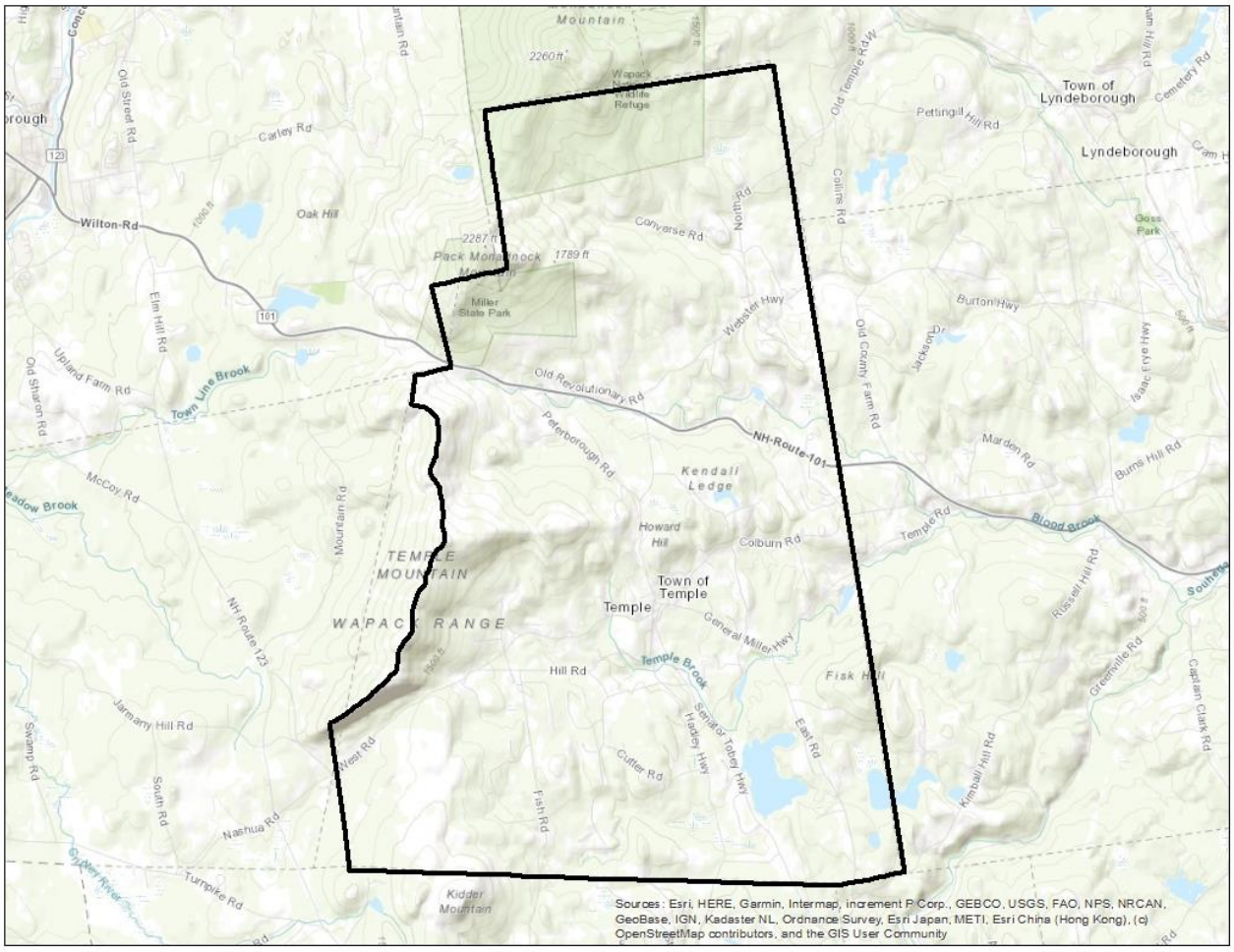
TOWN OF TEMPLE
NATURAL RESOURCES INVENTORY

Prepared for:
Temple Conservation Commission



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April 2023

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INTRODUCTION

Population Growth and Development

New Hampshire's population has been growing at a rate that is twofold that of the other New England states (SPNHF 2005). The population has doubled in the forty years leading up to the turn of the century in 2000, and there was a rise in population of 17.2% between 1990 and 2004 alone (SPNHF 2005). This rate of growth is followed by VT (10.4%), RI (7.7%), ME (7.3%), MA (6.7%), and CT (6.7%).

In 2016, it was estimated that New Hampshire's population will increase 8.8% between 2010 and 2040 (RLS Demographics, Inc. 2016). However, a recent study found that New Hampshire is the fastest growing state in New England and has been for the past three years (Johnson 2020). This rate of growth is also supported by the aforementioned 2005 study when comparing population growth between 1990 and 2004. New Hampshire's development pressure will tax the state's natural resources if not thoughtfully managed.

The bulk of population growth is in the southern half of the state; however, 75% of conservation lands are located in the northern regions. This entrusts towns in the southern half of New Hampshire with the responsibility of managing their natural resources and biological diversity, and establishes citizens as stewards of the land, requiring the use of informed decision making to promote a more sustainable approach to land use planning.

Temple today faces challenges that are familiar to many communities in southern New Hampshire. The rate of residential and commercial development and growth in general has continued to increase, especially over the past three decades. With the increase in technology and information access from better internet infrastructure, remote working has continued to offer the opportunity to relocate to less populated areas such as the Monadnock Region. Larger challenges not widely foreseen a half century ago are now in plain sight, as global climate change and invasive species have become new causes for concern.

With the understanding that development will inevitably occur, Temple is faced with choices about directing growth and open space conservation so that a suitable balance can be achieved. Planning for the protection of open space is a critical and positive step towards solutions to these challenges.

Temple still has large areas of intact wildlife habitat of state-wide significance, extensive natural stream frontage, unique natural communities, and large areas of unfragmented forest. The acquisitions of significant town-owned conservation and recreation lands such as the Temple Town Forest, Kendall Ledge, Weston Conservation Area, and Quinn Memorial Bird Sanctuary, as well as Temple Mountain State Reservation and the numerous other protected properties are cause for optimism. However, the protection of other valuable open space lands will become increasingly important. Time, money, and human resources are limited in the accomplishment of conservation. Making the effort to document and keep track of the natural resources of a town is an effective and forward-thinking step in taking stock of assets and needs relative to which resources are most important to conservation.

Natural Resource Inventory

In order to provide a strong foundation for proactive planning and informed decision making, a Natural Resources Inventory, or NRI, is essential (Stone 2016). An NRI is a description of the natural elements that are tied to geography of a town, a watershed, or larger region. These often include such elements as wetlands, aquifers, ponds, rivers, forests, plants, soils, and wildlife. This information can be created from existing data or from field-based assessments to better reflect the extent of natural resources within a community.

An NRI is not only an important starting point for informing conservation decisions, it is also a core responsibility written into the enabling State legislation allowing for the existence and authority of conservation commissions. This type of project helps to better understand what natural resources are within a town and where they are located. In conjunction with the conservation planning that it can inform, an NRI can also provide a basis for outreach to public, which can result in further support for land conservation.

New Hampshire statute RSA 36-A authorizes Conservation Commissions to create an NRI. Conservation Commissions are established "for the proper utilization and protection of natural resources and for the protection of watershed resources" of the town. RSA 36-A:2 continues to state that "Such commission shall conduct researches into its local land and water areas [and] … keep an index of all open space and natural, aesthetic, or ecological areas within the city or town … with the plan of obtaining information pertinent to the proper utilization of such areas, including lands owned by the state or lands owned by a town or city. It shall keep an index of all marshlands, swamps and all other wetlands in a like manner…"

An NRI can serve as the basis for developing innovative land use planning techniques that can be adopted to help protect various resources, such as water resources, wetlands, wildlife habitats, and biological diversity. Biological diversity, or biodiversity, refers to the variety, variability, and complexity of life in all its forms and includes various ecological processes (for example, nutrient cycling, flooding, fires, wind events, and succession) that have helped to shape species over time.

Biodiversity includes various levels of ecological organization such as individual species and their genes that have evolved over time, as well as the many intricate plant and wildlife populations. It refers to even higher levels of organization including the assemblage of ecological communities[1] and even entire ecosystems, such as wetlands, woodlands, and rivers. Therefore, the concept of biodiversity engenders all levels of biological organization and the interactions of living organisms within their physical environments. At its heart, the understanding of the dynamics of biodiversity can lead to the development of protection strategies, helping to ensure a healthy environment for humans, as well as all other life forms.

An NRI should not be a static record but one that stays current with changes in land use planning, new natural resources data, and climate change. It is a vision that should be based

[1] An ecological community is a group of two or more populations of different species found in the same place. For example, this would include the bird community of the Temple Town Forest.

on the principles of conservation biology and that incorporates the current natural resources of a given area (such as a town, a watershed, or an entire region). Thus, conservation planning ideally strives to incorporate the socio-economic fabric of our world with that of the ecological structure. This effort can help build more sustainable and resilient New Hampshire communities far into the future as a result of implementing comprehensive land use planning that considers both our natural environment and built infrastructure.

Planning for the conservation of natural resources and biodiversity is not a new concept. It has helped in such efforts as the recovery of the American bald eagle; has assisted in building preserves and managing other lands for species of greatest conservation need, as well as our most common species; aided in the identification of biodiversity hot spots; and has helped to identify and protect critical wildlife habitats within our landscape. It has been a center piece for natural resources protection, restoration, and adaptive management for the past four decades.

The need for this type of informed land use planning is becoming more evident with the passing of time. Ecosystems have long been susceptible to long-term degradation from overexploitation and misuse of natural resources. This has led to the loss of critical habitats as a result of sprawling residential and commercial developments. While the past few decades have seen significant development and land conversion, there has been a concomitant rise in conservation planning efforts over the same time period, especially in New Hampshire.

In 2005, the Town of Temple, with the assistance of a graduate student from Antioch University New England, produced an NRI. This report provided some of the basic foundations of an NRI so as to understand the types and locations of various natural resources in Temple. Being nearly 20 years later, the Conservation Commission sought to revise their NRI with updated information as it moves towards producing more detailed natural resources projects to inform community land use planning.

The Town of Temple published its latest Master Plan in 2019, providing a guide for the town's overall character and development. The Nature Resources and Open Space Plan chapters were written in 2003 and 2008, respectively. Protection of natural resources and recreation is a common theme throughout the 2019 Vision Statement. In addition, the Future Land Use chapter was clear about the Town's intent for natural resources protection as described by the goals, policies, and objectives, as well as the plan for Conservation and Preservation as follows:

"The community survey conducted for this Plan showed that conservation and open spaces are very important to the residents of Temple. Preserving critical open space areas is vital to maintaining not only the environmental health of Temple, but also the natural identity, rural character, and recreational opportunities that are so closely connected to the town. Quite a bit of land is already protected in some fashion, either through public or private conservation efforts, or deed restrictions. This Plan recommends continued support of the efforts of the Conservation Commission to preserve and protect significant and sensitive lands and water bodies in Temple.

The desirability of maintaining open space and natural areas, both aesthetically and environmentally, is a necessary element of the Future Land Use Plan and every consideration should be given to implementing this policy through innovative land use controls and alternatives to conventional residential development. Specifically designed land use controls such as open space (cluster) development and planned unit development are among the methods which Temple should investigate to assure the retention of open space as well as environmentally sensitive areas."

Statement of Purpose

The updated Natural Resources Inventory (NRI) was initiated in September 2022. The overall scope of this project was to develop a basic NRI to update Temple's natural resources data and maps with the most currently available data, and to support the Town's natural resource protection efforts, providing a basis for informed land use and conservation planning. Field data collection and natural resources data development and refinement were not intended for this particular phase of the updated NRI. These steps represent the natural progression the Town should move towards to identify conservation focus areas and better support future innovative land use planning.

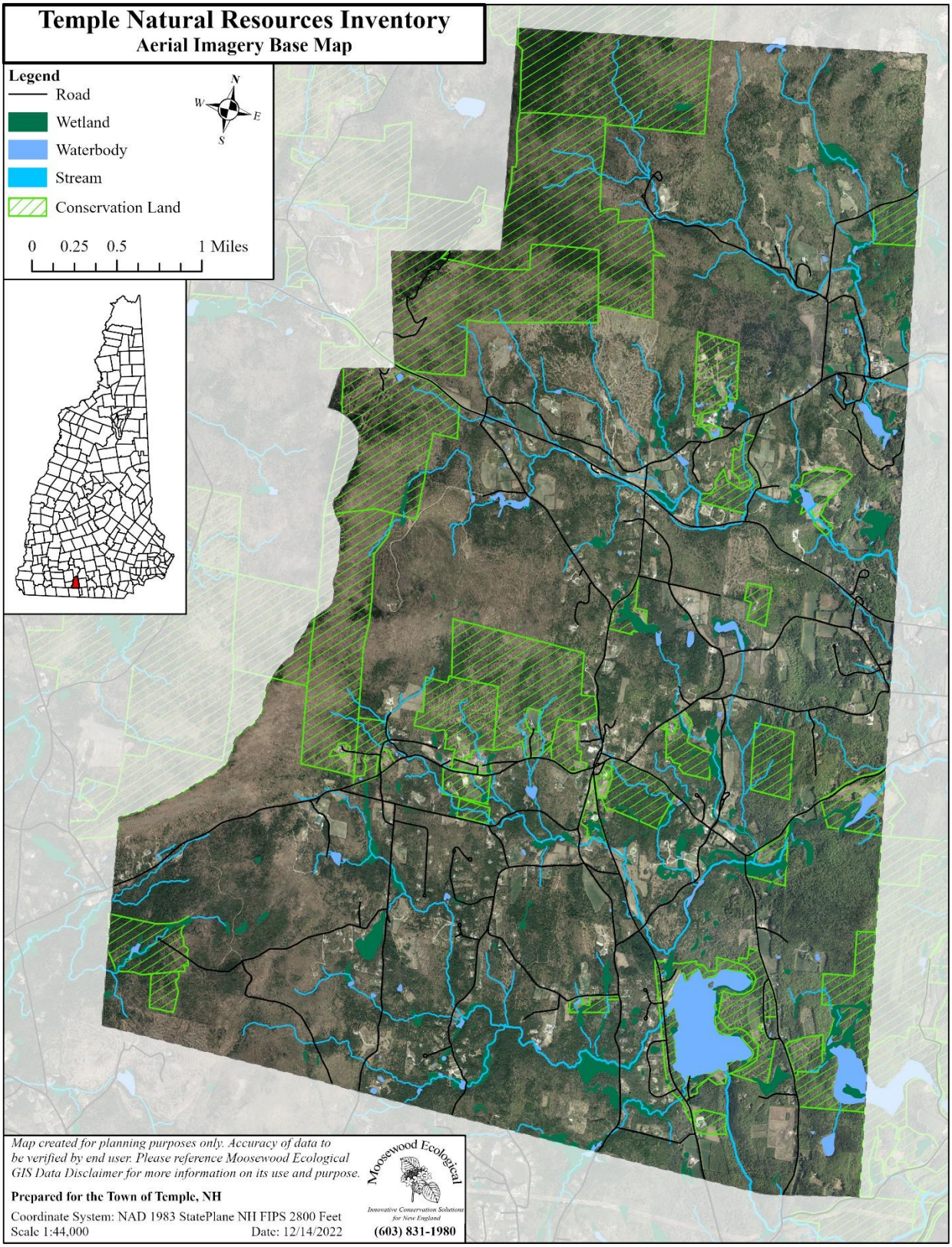
Goals of this NRI project were to 1) review and analyze existing natural resources data and reports, 2) develop a series of updated NRI maps designed for educational and planning purposes, and 3) combine the natural resources data and maps into this NRI report. Future expansion of these goals would afford the opportunity to provide more detailed information to help support and guide Temple's community-wide planning documents, such as the Master Plan, zoning ordinances, and other land use regulations.

The information found herein can be used in many ways by the Conservation Commission, Planning Board, and Selectboard, as well as landowners, natural resource professionals, and the general public. The NRI is intended to provide more detailed information to support the following Conservation Commission goals:

- Better management of Town-owned lands for wildlife and recreation, including land currently protected;
- Identification of Town-owned lands that may warrant protection by easements or other means;
- Identification of additional land that may warrant protection based on significant natural resource value;
- Identification of threats to resources to inform parcel-based land use decisions or changes to current land use regulations;
- Support outreach to citizens about the importance of Temple's natural resources.

Land Use and Open Space

The aerial base map provides a perspective of the landscape -- current areas of development and open space in Temple (Figure 1). It displays roads, streams, ponds, and wetlands as a base layer to assist the viewer in navigating throughout the town with a bird's eye view.


Temple Natural Resources Inventory
Aerial Imagery Base Map
Legend
Road
Wetland
Waterbody
Stream
Conservation Land
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0 0.25 0.5 1 Miles
Map created for planning purposes only. Accuracy of data to be verified by end user. Please reference Moosewood Ecological GIS Data Disclaimer for more information on its use and purpose.
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WATER RESOURCES

Water resources, including surface water and groundwater resources are among Temple's valuable assets. Drinking water sources depend on groundwater in bedrock or sand and gravel aquifers. Ponds, streams and King Brook Reservoir (aka, Heald Pond) provide recreational opportunities and habitat for many wildlife species and contribute to downstream drinking water supplies. Wetlands provide varied habitats for wildlife, flood control by absorbing floodwaters and slowly releasing them, support maintenance of base flows in streams, protect and maintain water quality, and shoreline stabilization, among many important functions. This section provides detailed information about the type and extent of these resources in Temple.

Wetlands

Wetlands include habitats such as marshes, wet meadows, beaver impoundments, swamps, fens, and bogs. As noted above, they perform a variety of functions and values, such as providing significant habitats for wildlife and plants, maintaining good water quality, storing floodwaters, and recreation opportunities.

In New Hampshire, wetlands are defined by RSA 482-A:2 as "an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soils conditions." Activities in wetland resources are regulated by the NH Dept. of Environmental Services Wetlands Bureau under RSA 482-A:2. These protected wetlands include forested, scrub-shrub, and emergent wetlands, marshes, wet meadows, bogs, shorelines of streams, rivers, lakes, and ponds.

The US Fish and Wildlife Service (FWS) has mapped wetlands in the United States through its National Wetlands Inventory (NWI) program. The NWI use the Classification of Wetlands and Deepwater Habitats of the United States to describe the different types of wetlands (Cowardin et al. 1979 and Federal Geographic Data Committee 2013).

This NWI mapping products are used by the state, municipalities, and natural resource managers to promote the understanding, conservation, and restoration of wetlands. The NWI provides useful information, including the type of wetland as well as its hydrology, associated plant communities, water chemistry, and other descriptors such as man-made dams and beaver influence. The NH Department of Environmental Services recently updated the NWI for parts of the state, including Temple. This new dataset is referred as the NWI Plus, and includes additional functional assessment information.

Temple has approximately 630 acres of mapped wetlands dispersed throughout the town (Table 1 & Figure 2). These include two main types of wetland systems - lacustrine and palustrine. Lacustrine wetlands include deepwater habitats in lakes and ponds (greater than 8.2 feet in depth) and the shallow littoral habitats that are considered wetlands. Examples of lacustrine wetlands in Temple include Greenville Reservoir and King Brook Reservoir (aka, Heald Pond).

All other wetlands in Temple are palustrine wetlands, defined as shallow, freshwater habitats dominated by vegetation. These include aquatic bed communities dominated by water lilies and other floating or rooted aquatic plants, emergent marshes, shrub and forested swamps, and beaver ponds (unconsolidated bottom wetlands). The largest and most extensive wetlands can be found along the many streams and ponds. In addition, the landscape supports many small isolated palustrine wetlands.

Table 1. Summary of wetlands in Temple.

Wetland Classification	Area (acres)
Lacustrine	157
Palustrine	
Unconsolidated Bottom	70
Aquatic Bed	12
Emergent Marsh	117
Scrub-shrub Swamp	97
Forested Swamp	177

SOURCE: National Wetlands Inventory Plus (2021)

To gain a better sense of the extent of wetlands it is important to also consider hydric soils. Essentially, these are wetland soils, including poorly drained and very poorly drained soil types. These have been mapped by the USDA Natural Resources Conservation Service. Poorly drained soils are estimated to cover about 726 acres while very poorly drained soils cover 262 acres. These are estimates and field checking is needed when appropriate, especially for the determination of a jurisdictional wetland boundary under NH RSA 482-A.

Watersheds

A watershed is an area of land that drains to a common outlet. Watersheds exist at an almost infinite range of scales, from the tiniest tributary stream that is not mapped to major continent-draining rivers. Regardless of their scale, watersheds are a convenient way to parse the landscape into smaller ecological units. All precipitation within a watershed drains toward a common water resource, which may be a wetland, lake, pond, or ocean. The land use within a watershed affects the quality and quantity of surface waters and the underlying groundwater. Land use planning based on watershed protection can help protect a town's water resources, ensuring clean water for humans and ecosystem health.

Temple is located within the larger Merrimack River basin or watershed. Most of Temple, including Temple Brook and Blood Brook, drains into the Souhegan River watershed which flows into the lower Merrimack River. A small portion of the southwest part of Temple drains into the Contoocook River. This river eventually makes it way to the upper Merrimack River in Concord.

Surface Water Bodies

Temple contains a variety of surface water bodies, including streams, ponds, and reservoirs, that are distributed throughout the town (Figure 4). Not only do water bodies provide a multitude of human benefits such as drinking water supplies, fishing, hunting, boating, and nature watching, they are also extremely significant for diverse wildlife and plants that depend upon these resources for part or all of their life cycle needs. Generally, major threats to water resources include potential water quality degradation and habitat loss due to surrounding land uses, including unsustainable forestry and agricultural practices and land conversion associated with various types of developments.

The three prominent ponds and reservoirs in Temple cover approximately 156 acres, ranging in size from approximately 3 acres to nearly 122 acres (Table 2 and Figure 2). These have been recognized by the NH Dept. of Environmental Services and the US Geological Survey. Greenville and King Brook Reservoirs are included on the NH Dept. of Environmental Services Consolidated List of Water Bodies subject to the Shoreland Water Quality Protection Act under RSA 483-B. In addition to these water bodies, Temple has several smaller ponds scattered throughout the town.

Table 2. Summary of lakes and ponds in Temple.

Ponds and Reservoirs	Size (acres)
Greenville Reservoir	121.6
King Brook Reservoir	30.6
Caswell Pond	2.8

SOURCE: USGS topography and National Wetlands Inventory Plus (2021)

Approximately 35 miles of streams have been mapped in Temple (Table 3 and Figure 2). Three of these have been identified by the U.S. Geological Survey by name. There are no streams listed on the NH DES Consolidated List of Water Bodies subject to the Shoreland Water Quality Protection Act under RSA 483-B.

Table 3. Summary of streams in Temple.

Streams	Length (miles)	Stream Order
Temple Brook	4.1	1st - 3rd
Blood Brook	3.9	2nd
County Farm Brook	0.9	2nd
Unnamed Streams	26.2	1st - 3rd

SOURCE: NH Wildlife Action Plan - Rivers and Streams (2020)

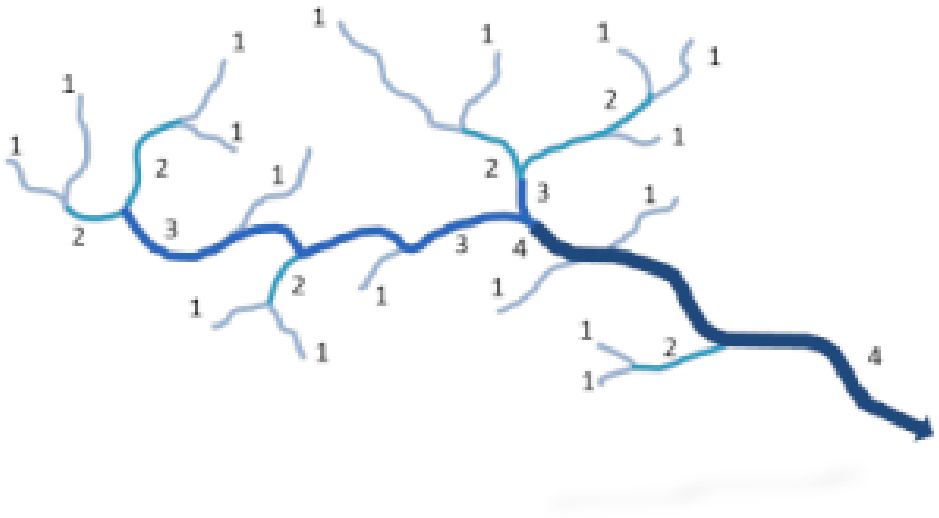
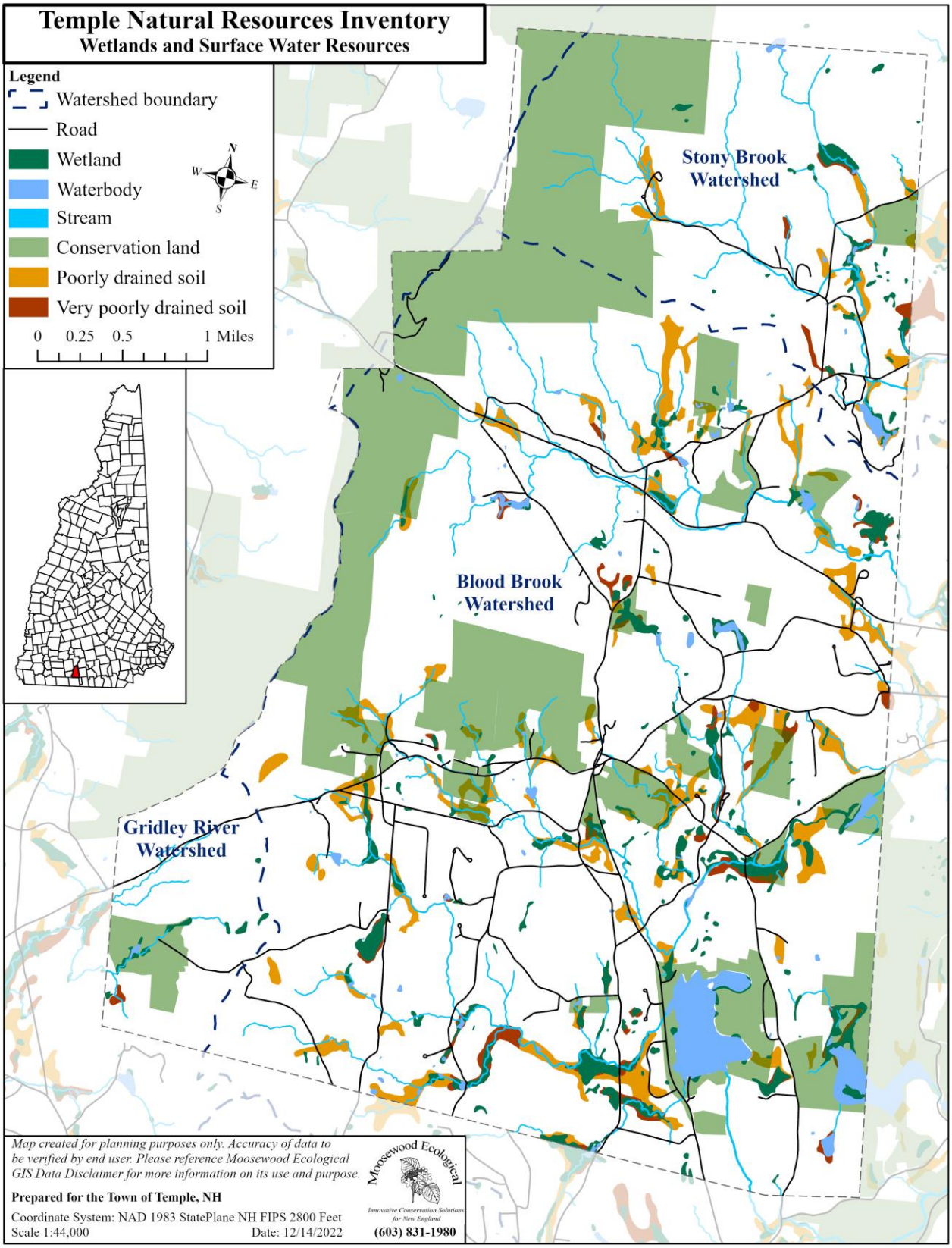


Diagram of how stream order is determined. Stream ordering is a method of classifying the hierarchy of tributaries within a watershed. The smaller the stream order value, the smaller the stream. First order streams include the headwater streams that can be found along the steeper slopes in Temple. When two first order streams converge, they form a second order stream, and on. The numbers in this figure represent the stream order.

Shoreland Water Quality Protection Act

The Shoreland Water Quality Protection Act (SWQPA), RSA 483-B, is a state statute enacted (initially as the Comprehensive Shoreland Protection Act) to protect the shorelands and water quality of public waters. These include all great ponds (>10 acres), fourth order streams or higher (as noted in the figure above), and state-designated rivers that have been identified by the NH Dept. of Environmental Services as water bodies that are subject to the SWQPA. The Act established minimum standards for the subdivision, use, and development of the shorelands along the state's larger waterbodies. For most new construction, as well as land excavating and filling, a state permit may be required (certain exemptions apply). Greenville Reservoir and King brook Reservoir are included on the NHDES Consolidated List of Water Bodies subject to the SWQPA.

For more details on the Shoreland Water Quality Protection Act, as well as certified administrative rules, refer to the NH DES at:
https://www.des.nh.gov/land/waterfront-development/protected-shoreland


Temple Natural Resources Inventory
Wetlands and Surface Water Resources
Legend
Watershed boundary
Road
Wetland
Waterbody
Stream
Conservation land
Poorly drained soil
Very poorly drained soil
0 0.25 0.5 1 Miles
N
W
E
S
Stony Brook Watershed
Blood Brook Watershed
Gridley River Watershed
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Groundwater Resources - Stratified Drift Aquifers

Groundwater resources are stored in two main types of aquifers and can serve as sources for drinking water. Aquifers can be located within saturated areas of sand and gravel deposits or in fractured bedrock. In the past as glaciers melted, they left behind layers of coarse sediments including sand and gravel. The space between these sediments provides opportunity for groundwater storage and flow. Groundwater stored in *stratified drift aquifers* of this kind can serve as an excellent source for drinking water. Locating and protecting these geologic features can help to ensure a supply of clean drinking water for the community as these areas are vulnerable to contamination.

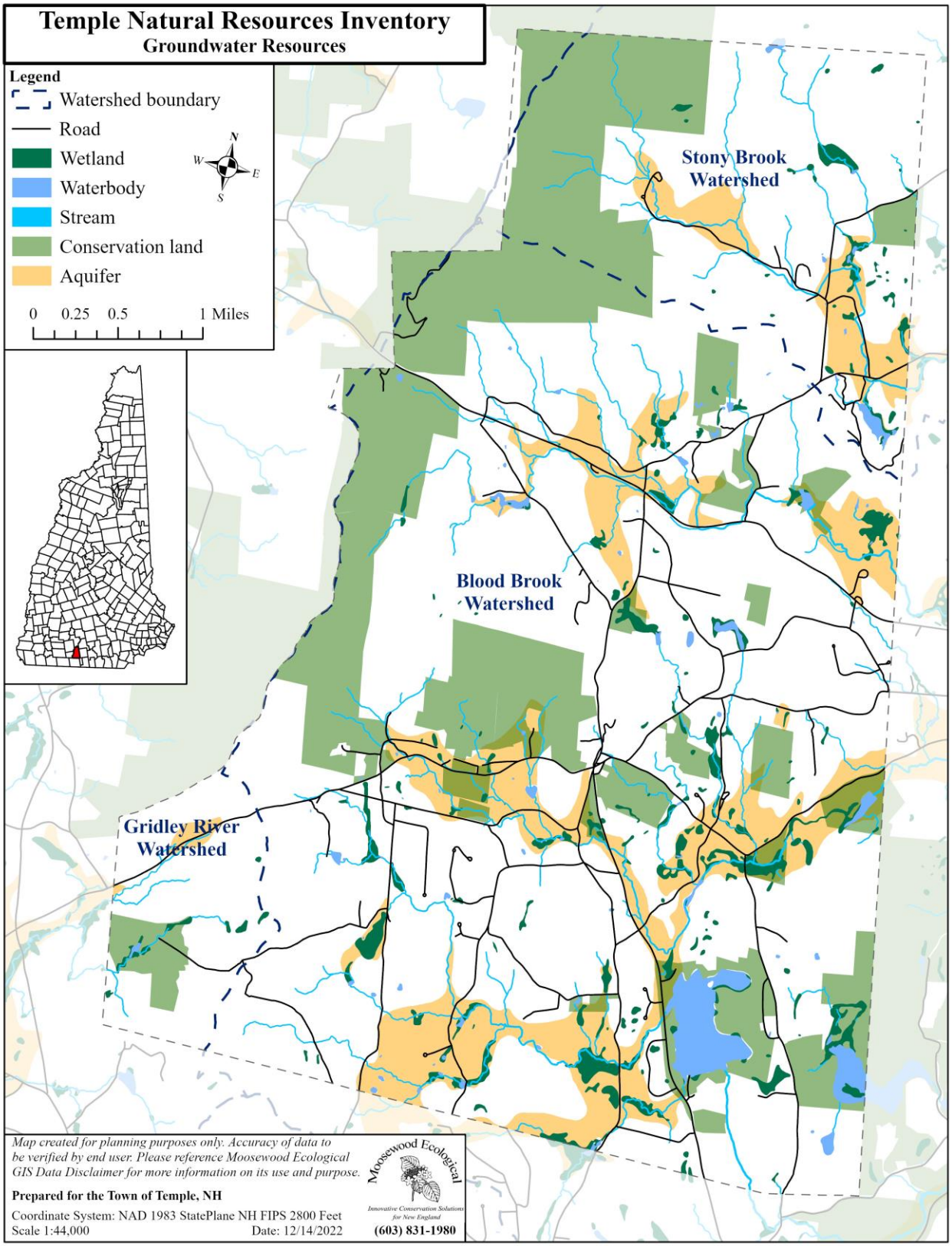
Temple contains approximately 2,056 acres of stratified drift aquifers (Table 4 and Figure 3). The largest stratified drift aquifer is located in the southern part of town along Temple Brook, its tributaries, and Greenville Reservoir. Two additional aquifer systems are located along Blood Brook and the headwater stream to the north.

Table 4. Summary of aquifers and favorable gravel well analysis in Temple.

Groundwater Attribute	**Size (acres)**
Stratified Drift Aquifer Transmissivity Rates	
<2,000 feet^2/day	2,056
2,000-4,000 feet^2/day	0
>4,000 feet^2/day	0

Source: USGS stratified drift aquifers.

Aquifers are divided into categories based on *transmissivity*, or the rate at which water moves through an aquifer and is measured in square feet per day (ft^2/day). Therefore, higher rates of transmissivity correspond to a potentially higher yield of groundwater. All of the aquifers in Temple have a transmissivity rate of 2,000ft^2/day or less, which corresponds to a potential yield of less than 75 gallons per minute.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Groundwater Resources
Legend
Watershed boundary
Road
Wetland
Waterbody
Stream
Conservation land
Aquifer
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ECOLOGICAL RESOURCES

Ecological resources are natural resources that provide certain necessary but overlooked system maintenance functions within ecosystems (Scott et al. 1998). Ecological resources in Temple include many features such as wildlife habitats, natural (plant) communities, and rare species. These natural resources encompass the realm of biodiversity, or the variety and variability of life, which supports healthy ecosystems for wildlife, plants, and humans.

NH Wildlife Action Plan

Temple's landscape supports a variety of wildlife habitats and natural communities, including streams, ponds, wetlands, rocky outcrops, and talus slopes interspersed with a variety of upland forests, grasslands, and shrublands distributed throughout the town. This diverse landscape supports a high degree of biodiversity.

The NH Fish and Game Department, in cooperation with other agencies, organizations, and individuals, produced the NH Wildlife Action Plan (WAP) in 2005. The latest revision was produced in 2020 (NH Fish and Game 2020), and these habitat data are revised every 5 years. The WAP was designed as a planning and educational tool for federal, state, and municipal governing bodies, conservation commissions, land trusts and other conservation organizations, natural resource professionals, and private landowners, as well as the general public, to promote the conservation and management of NH's biological diversity. The WAP provides a resource for developing informed land use decisions and land management planning. The intent was to ensure that an adequate representation of various wildlife habitats is maintained across New Hampshire's landscape, keeping common species common in New Hampshire and working to prevent the loss of our rare and endangered species.

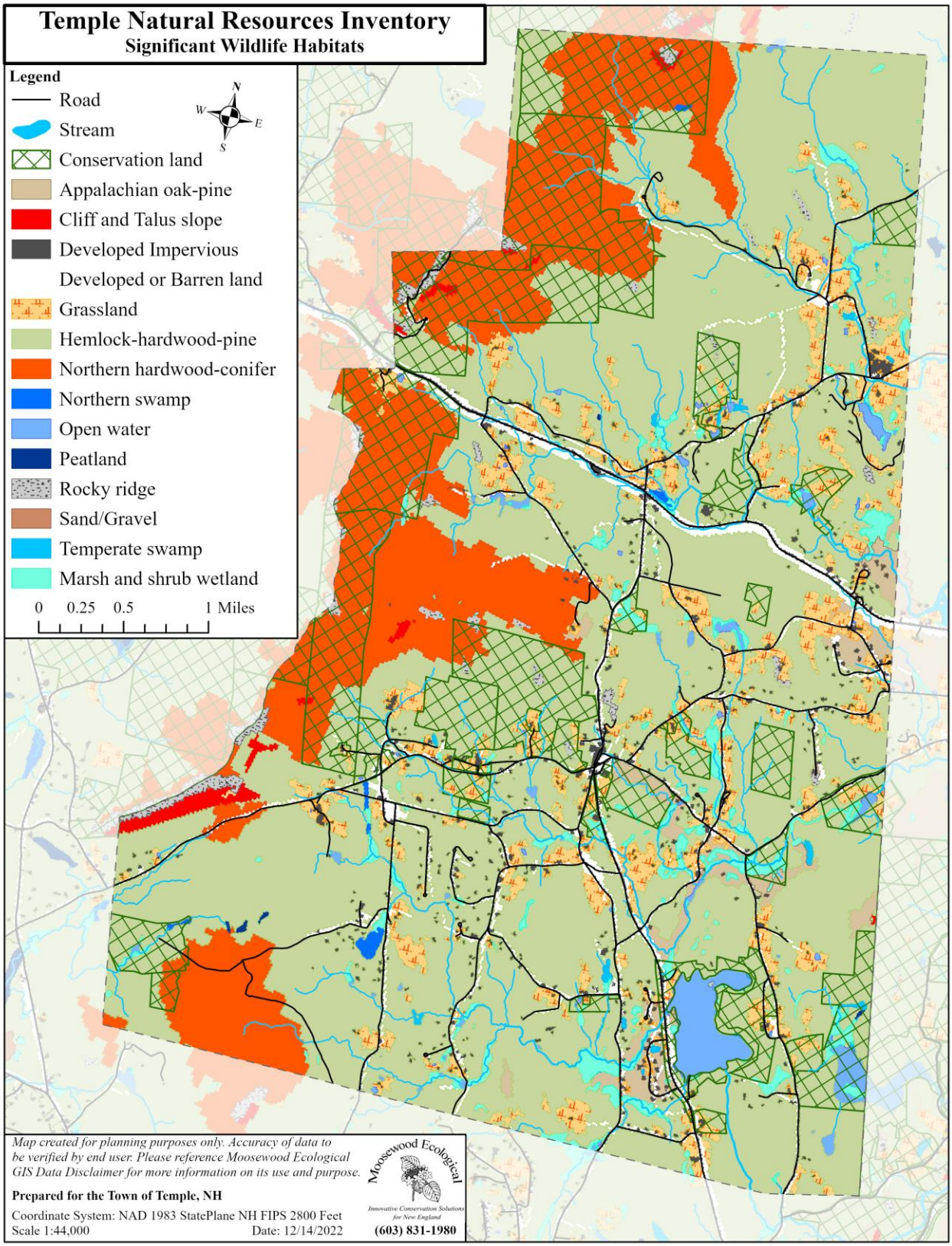
The WAP project grouped habitats at three scales: broad-scale (matrix forests and sub-watershed groupings), patch-scale (priority habitats such as grasslands and peatlands), and site-scale (documented occurrences of rare and uncommon species and natural communities). Mapped data are available for viewing and use only at the broad- and patch- scale levels. Habitat mapping is intended to predict, not necessarily guarantee that the habitats shown are present. For this reason, field and remote sensing verification is recommended by NH Fish and Game to increase the accuracy of the mapping at the parcel and municipal scale.

A total of 13 wildlife habitats described in the WAP were mapped for Temple (Table 5 and Figure 4). The most common types include hemlock-hardwood-pine forests found throughout most of Temple, and the cooler, higher elevation northern hardwood-conifer forests along the Wapack Trail. Rare or uncommon habitat types such as grasslands, peatlands, Appalachian oak-pine forests, cliffs, talus slopes, and rocky ridges greatly add to the overall biodiversity in Temple. These areas provide critical habitats for a variety of species of greatest conservation concern in New Hampshire (NH Fish and Game 2020).

Table 5. Summary of wildlife habitats in Temple.

Wildlife Habitat	Extent (Area or Miles)	Percent of Town
Appalachian oak-pine	265 acres	1.8%
Barren or Developed	1,139 acres	7.9%
Cliff and talus slopes	82 acres	0.6%
Grassland	1,086 acres	7.6%
Hemlock-hardwood-pine forest	8,680 acres	60.4%
Northern hardwood-conifer forest	2,326 acres	16.2%
Northern swamp	24 acres	0.2%
Open water	241 acres	1.7%
Peatland	6 acres	0.0%
Rocky ridge	128 acres	0.9%
Temperate swamp	28 acres	0.2%
Marsh and shrub wetland	375 acres	2.6%
Streams	35.2 miles	N/A

Source: Wildlife Action Plan (2020)


Temple Natural Resources Inventory
Significant Wildlife Habitats
Legend
Road
Stream
Conservation land
Appalachian oak-pine
Cliff and Talus slope
Developed Impervious
Developed or Barren land
Grassland
Hemlock-hardwood-pine
Northern hardwood-conifer
Northern swamp
Open water
Peatland
Rocky ridge
Sand/Gravel
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Wildlife Action Plan Highest Ranked Habitat by Ecological Condition

The Wildlife Action Plan Highest Ranked Habitats map (Figure 5) shows where habitats in the best ecological condition in the state are located; this was based on biodiversity, arrangement of habitat types on the landscape, and lack of human impacts. With the goal of setting priorities for conservation of important wildlife habitat in New Hampshire, the WAP also identified areas of the state with unusually pristine, influential, diverse, or extensive examples of "exemplary" habitat. These areas were, in turn, ranked by condition on both sub-state regional and statewide levels, resulting in a tiered ranking of priority areas for conservation.

Color-coded areas shown in Figure 5 indicate highest ranked habitats by condition, both within New Hampshire (hot pink) and within an ecoregion (green), and include several areas along the periphery of the town boundary. The extensive matrix of highest-ranked habitats is surrounded by large areas of "Supporting Landscape," indicating that Temple has substantial highest-ranked WAP wildlife habitats. Supporting Landscapes (orange) provide significant habitat of local importance. All three categories are considered unusually significant for wildlife, and especially important areas for land conservation.

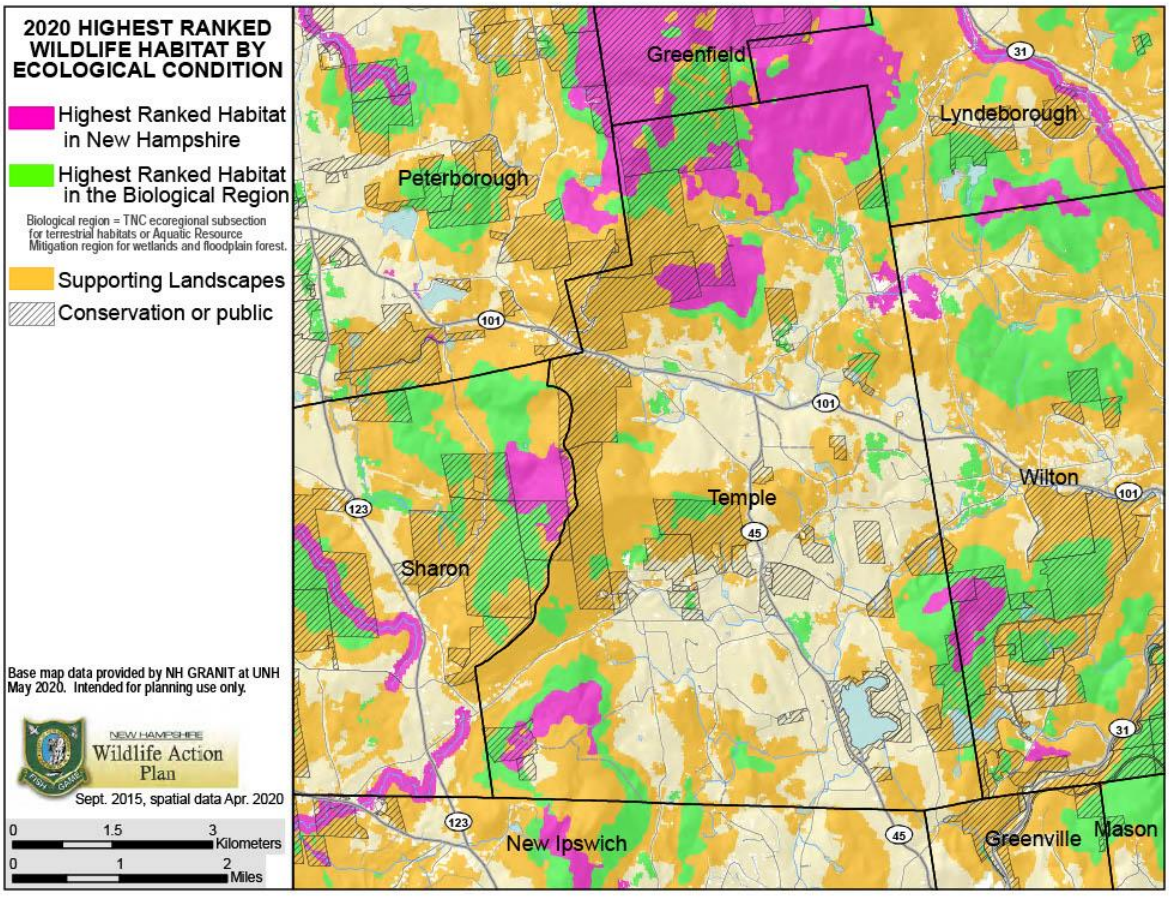


Figure 5. NH Wildlife Action Plan - Highest Ranked Habitat Map.

Documented Rare Species and Natural Community Systems in Temple
Only a couple of rare wildlife species have been documented in the town of Temple, and these data are maintained by the New Hampshire Natural Heritage Bureau of the NH Division of Forests and Lands, in cooperation with the New Hampshire Fish and Game Department's Nongame and Endangered Wildlife Program. Generalized information on the presence of these species and communities is available from the Natural Heritage Bureau by municipality.

According to the Bureau's *Rare Plants, Rare Animals and Exemplary Natural Communities in New Hampshire Towns*, the species listed in Table 7 have been documented in the town of Temple in the last 20 years (NH Natural Heritage Bureau 2020). This list does not represent an exhaustive survey for rare species, but rather represents the species that are known in Temple. Therefore, there is a major gap in information pertaining to species of conservation concern, as well as exemplary natural communities.

Table 7. Known rare species and exemplary natural communities in Temple, NH.

Rare Elemental Occurrence	Rarity Rank
Natural Communities	
none documented	
Plants	
none documented	
Birds	
none documented	
Mammals	
none documented	
Reptiles	
Smooth Green Snake**	SC
Wood Turtle***	SC
Amphibians	
none documented	
Invertebrates	
none documented	

Source: NH Natural Heritage Bureau database (2020).
SC - Special Concern
*** - Extremely High Importance
** - Very High Importance

The NH WAP (2020) predicts that 55 wildlife species of conservation concern in New Hampshire may be found in Temple (Appendix B). Federally listed species include the rusty-patched bumble bee (federally endangered) and northern long-eared bat (federally threatened). A total of 11 state endangered and threatened species are potentially found in

Temple, including of 3 turtles, 1 amphibian, 1 snake, 1 bird, 1 bumble bee, 1 mussel, and 3 bats. Additional rare species may also be found in Temple.

Unfragmented Lands and Habitat Connectivity

Unfragmented lands are relatively large blocks of contiguous habitat that include a mix of forests, wetlands, riparian areas, or other habitat and thus support wide-ranging mammals and forest interior birds. Unfragmented lands are defined by the lack of human infrastructure, such as roads and developed areas. Fragmentation of landscapes can negatively affect wildlife populations in various ways, from reducing habitat quality and availability to causing direct mortality for wildlife migration across roads. Increased predation and nest parasitism occurs along edges of smaller blocks of habitat resulting in diminished breeding success, and may lead to species loss altogether. The degree of severity of fragmentation can be affected by the size and shape of unfragmented blocks, the species or natural community in question, the extent of loss of natural habitats, intensity of human use, and colonization by invasive species.

The NH Wildlife Action Plan developed an unfragmented lands analysis. However, this data layer has inherent errors due to incorrect classification of Class VI roads as being a fragmenting feature. As such, the unfragmented lands were refined to more accurately reflect Temple's landscape (Figure 6). Fragmenting features were defined as 500 feet from existing roadways, including all state and town roads, but excluding Class VI roads and trails, as well as private driveways. This analysis assumes that most development occurs within 500 feet of roadways.

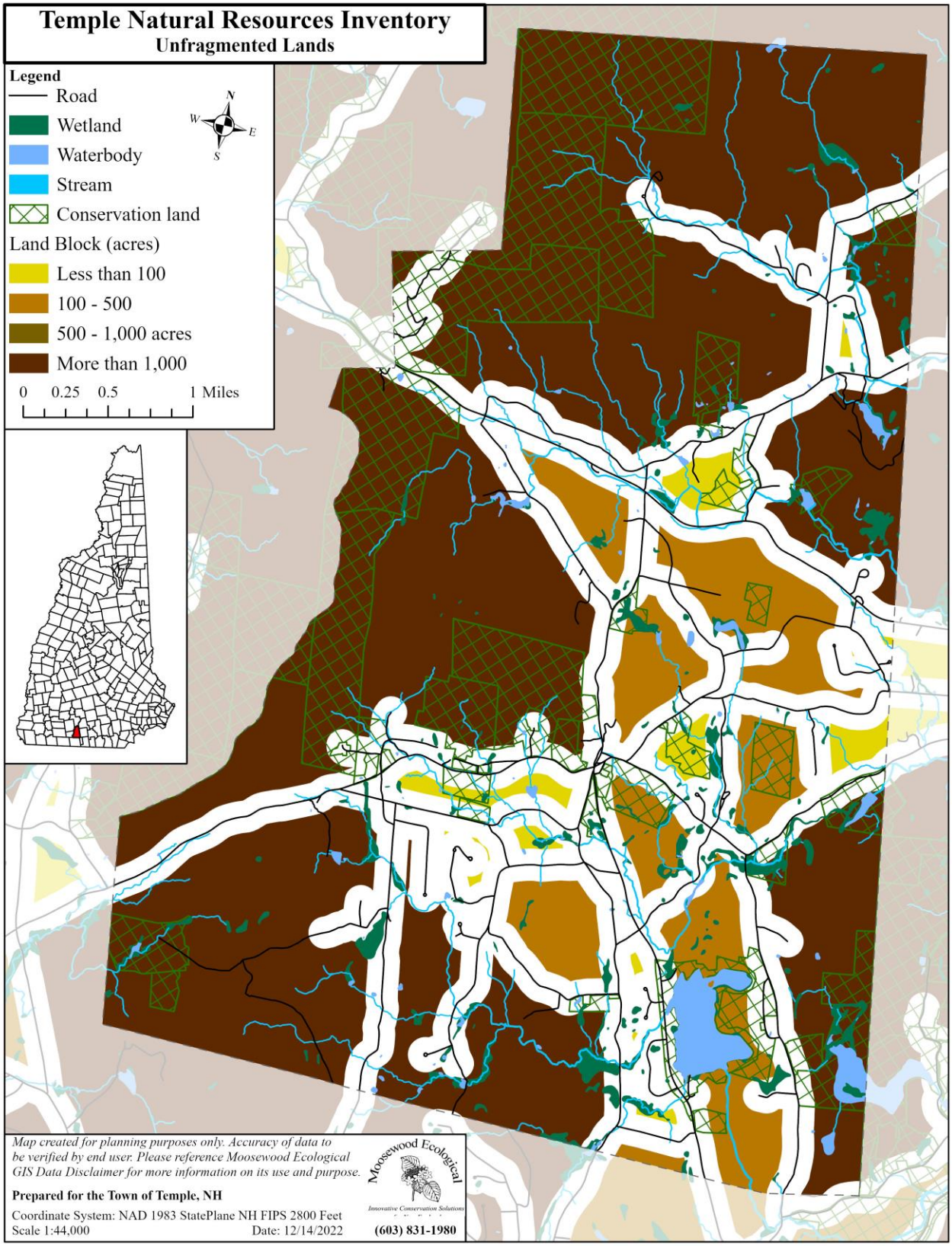
Larger blocks of unfragmented areas support greater biodiversity than smaller blocks. They include a variety of natural habitats such as forests, wetlands, streams, and ponds but also can include human-modified areas such as agricultural lands and shrublands. As unfragmented areas become fragmented due to the construction of roadways and development, their biodiversity generally decreases. This fragmentation effect has less immediate impact on generalist species or those with small home ranges (such as gray squirrel, raccoon, many amphibians, and small rodents) while affecting and potentially eliminating area-sensitive specialists that need large forested blocks in order to maintain their home ranges and for long-term survival (such as bear, bobcat, moose, wood thrush, goshawk, and various reptiles such as Blanding's turtles). Appendix C provides a general list of habitat block size requirements for wildlife to help illustrate this point. Species noted in bold type were observed in Temple during this project.

Large unfragmented landscapes allow wildlife to move among critical feeding, breeding, nesting, and overwintering habitats, and to migrate to new territories. Maintaining connectivity between critical habitats can provide permanent wildlife corridors within the built environment, enabling wildlife populations to survive.

Wildlife must be able to travel safely throughout the landscape to meet their biological needs. Many depend upon a variety of habitats for their survival and may utilize many natural features for travel. These include features such as riparian zones of wetlands,

ponds and streams, ridgelines, utility rights-of-way, and forest patches acting as a safe route between two or more habitats. A variety of wildlife can be associated with these corridors, including otter, muskrat, fox, coyote, bobcat, deer, moose, fisher, mink, and bear.

Wildlife corridors are not only significant for mammals but equally important for amphibians, reptiles, and migratory birds. Amphibians and reptiles begin to move from their wintering habitats to their respective breeding and nesting grounds in the spring. This is the time of year that most mortality can be noticed as these species travel across roadways in search of suitable habitats. This negative effect is repeated when the same individuals return to their wintering habitats. Thus, there is a great significance in maintaining habitat connectivity, as well as understanding where these patterns of movement are taking place. This latter point can be an especially important focus for community education and awareness about wildlife corridors that cross roadways. It can provide a means to adjust transportation patterns to help eliminate potential road mortality or identify sites for road modifications, including bridges and culverts designed to allow wildlife to safely cross within them.


Temple Natural Resources Inventory
Unfragmented Lands
Legend
Road
Wetland
Waterbody
Stream
Conservation land
Land Block (acres)
Less than 100
100 - 500
500 - 1,000 acres
More than 1,000
0 0.25 0.5 1 Miles
N
W
E
S
Map created for planning purposes only. Accuracy of data to be verified by end user. Please reference Moosewood Ecological GIS Data Disclaimer for more information on its use and purpose.
Prepared for the Town of Temple, NH
Coordinate System: NAD 1983 StatePlane NH FIPS 2800 Feet
Scale 1:44,000
Date: 12/14/2022
Moosewood Ecological
Innovative Conservation Solutions
(603) 831-1980

AGRICULTURAL AND FOREST RESOURCES

Temple is rich with important soils for both forest management and agriculture. These areas represent some of the best soils for the production of forest products and food, feed, and fiber from farming. These natural resources can help provide us with insight into the potential production within the working landscape.

Important Agricultural Soils

In response to the Farmland Protection Policy Act of 1981[3], agricultural soils were mapped by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Based on a variety of physical and chemical properties (i.e., drainage, texture, hydric regime, pH, erodibility factor), these soils have been identified as being among the most productive lands for many types of farming practices. These include prime farmland soils, farmland soils of statewide significance, and farmland soils of local significance. Each is defined below by the USDA NRCS:

Prime Farmland

- Soils that have an aquic or udic moisture regime and sufficient available water capacity within a depth of 40 inches to produce the commonly grown cultivated crops adapted to New Hampshire in 7 or more years out of 10.
- Soils that are in the frigid or mesic temperature regime.
- Soils that have a pH between 4.5 and 8.4 in all horizons within a depth of 40 inches.
- Soils that have either no water table or have a water table that is maintained at a sufficient depth during the cropping season to allow cultivated crops common to New Hampshire to be grown.
- Soils that have a saturation extract less than 4 mmhoc/cm and the exchangeable sodium percentage is less than 15 in all horizons within a depth of 40 inches.
- Soils that are not frequently flooded during the growing season (less than a 50% chance in any year or the soil floods less than 50 years out of 100.)
- The product of the erodibility factor times the percent slope is less than 2.0 and the product of soil erodibility and the climate factor does not exceed 60.
- Soils that have a permeability rate of at least 0.06 inches per hour in the upper 20 inches.
- Soils that have less than 10 percent of the upper 6 inches consisting of rock fragments larger than 3 inches in diameter.

Farmland of Statewide Importance

These soils refer to land that is not prime or unique but is considered farmland of statewide importance for the production of food, feed, fiber, forage and oilseed crops. Criteria for defining and delineating farmland of statewide importance are determined by a state committee chaired by the Commissioner, New Hampshire Department of

[3] As defined by the USDA NRCS: "The Farmland Protection Policy Act of 1981 was established to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses.

Agriculture, Markets and Food, with members representing the University of New Hampshire Cooperative Extension, New Hampshire Association of Conservation Districts and the New Hampshire Office of State Planning. The NRCS State Soil Scientist serves on this committee in an advisory capacity. The original criteria were established on June 20, 1983. It was updated on December 7, 2000.

Soils of statewide importance are soils that are not prime or unique and:

- Have slopes of less than 15 percent
- Are not stony, very stony or bouldery
- Are not somewhat poorly, poorly or very poorly drained
- Includes soil complexes comprised of less than 30 percent shallow soils and rock outcrop and slopes do not exceed 8 percent.
- Are not excessively drained soils developed in stratified glacial drift, generally having low available water holding capacity.

Farmland of Local Importance

Farmland of local importance is farmland that is not prime, unique or of statewide importance, but has local significance for the production of food, feed, fiber and forage. Criteria for the identification and delineation of local farmland are determined on a county-wide basis by the individual County Conservation District Boards. The original criteria were established on June 20, 1983. Updates are noted according to the county initiating the update. The criteria for soils of local importance in Temple are as follows:

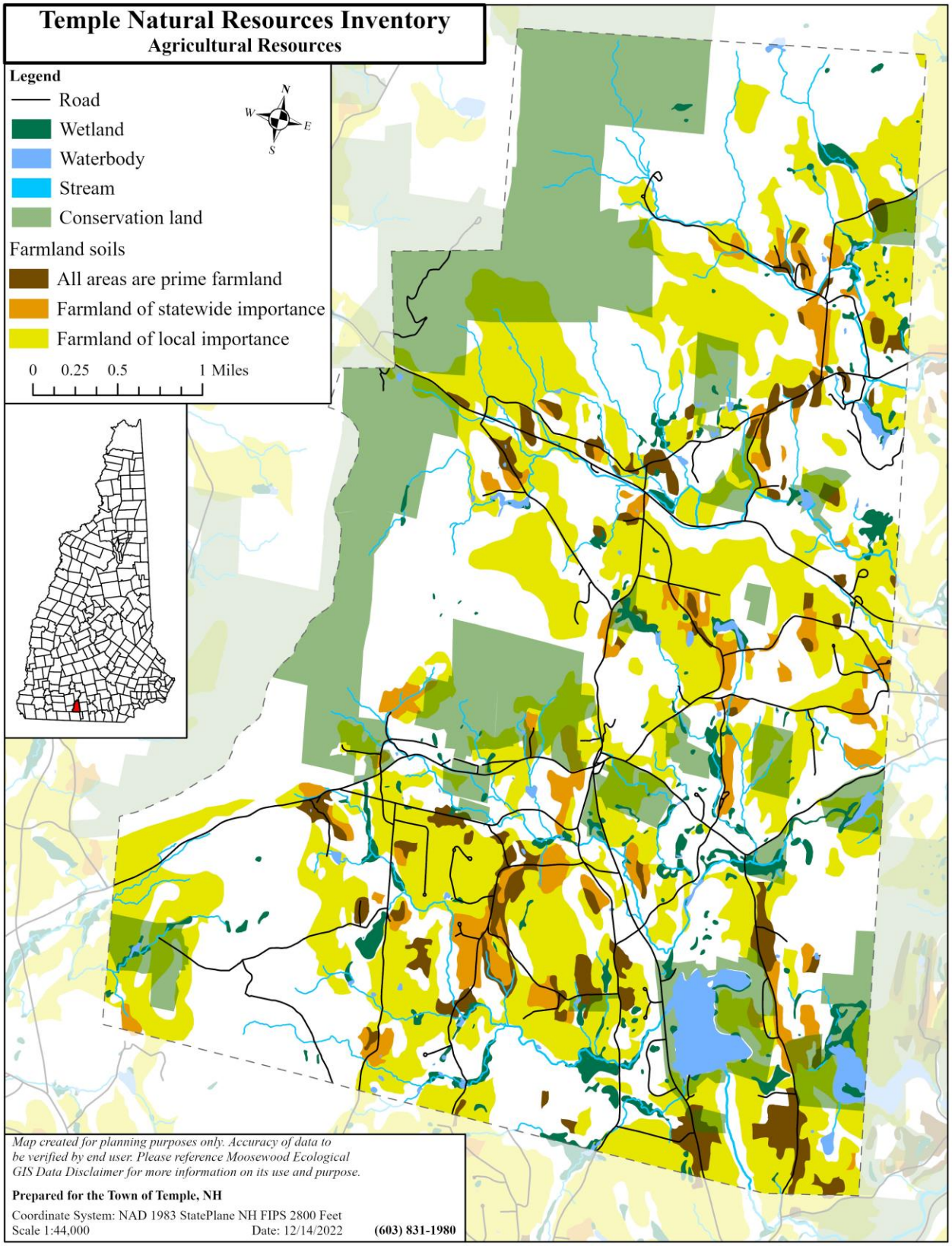
- Soils that are poorly drained, have artificial drainage established and are being farmed.
- Specific soil map units identified from the NRCS county soil survey legend, as determined by the Conservation District Board.

Important agricultural soils cover approximately 5,560 acres, or roughly 39% of Temple (Table 8 and Figure 7). These soils are widely distributed throughout the town. Prime farmland soils make up about 4% of the total acreage of agricultural soils while farmlands of local and statewide significance represent the majority of the coverage in Temple.

Table 8. Summary of important soils for farm production in Temple.

Important Soil Type	Size (acres)	% of Town
Prime Farmland Soils	531	3.7%
Farmland Soils of Statewide Significance	597	4.2%
Farmland Soils of Local Significance	4,432	30.8%

SOURCE: USDA Natural Resources Conservation Service soils (2009).


Temple Natural Resources Inventory
Agricultural Resources
Legend
Road
Wetland
Waterbody
Stream
Conservation land
Farmland soils
All areas are prime farmland
Farmland of statewide importance
Farmland of local importance
0 0.25 0.5 1 Miles
N
W
E
S
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Prepared for the Town of Temple, NH
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Important Forest Soils

Forest resources within New Hampshire are significant for many reasons. They provide sources of employment, a multitude of forest products, promote local economies, recreation and tourism, provide clean air, mitigate the effects of climate change, and provide substantial habitats for wildlife and plants, as well as diverse ecological functions (such as nutrient cycling, carbon sequestration, and water quality maintenance through sediment trapping). For these reasons, it is important to maintain large tracts of forests and to better understand where important forest soils exist in Temple.

The USDA Natural Resources Conservation Service has mapped the distribution of important forest soils and has classified them according to their capacity to grow trees. These soils signify areas as providing the most productive lands for timber production. The NRCS has identified three soils groups within this category and have described each as follows:

Forest Soil Class IA

This group consists of the deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships. The successional trends on these soils are toward stands of shade tolerant hardwoods, i.e., beech and sugar maple. Successional stands frequently contain a variety of hardwoods such as red oak, beech, sugar maple, red maple, white birch, yellow birch, aspen, and white ash in varying combinations with red spruce, hemlock, and white pine. Hardwood competition is severe on these soils. Softwood regeneration is usually dependent upon persistent hardwood control efforts.

Forest Soil Class IB

The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood species such as red oak, red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with white pine, red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.

Forest Soil Class IC

The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Successional trends on these coarse-textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., hemlock and red spruce. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are

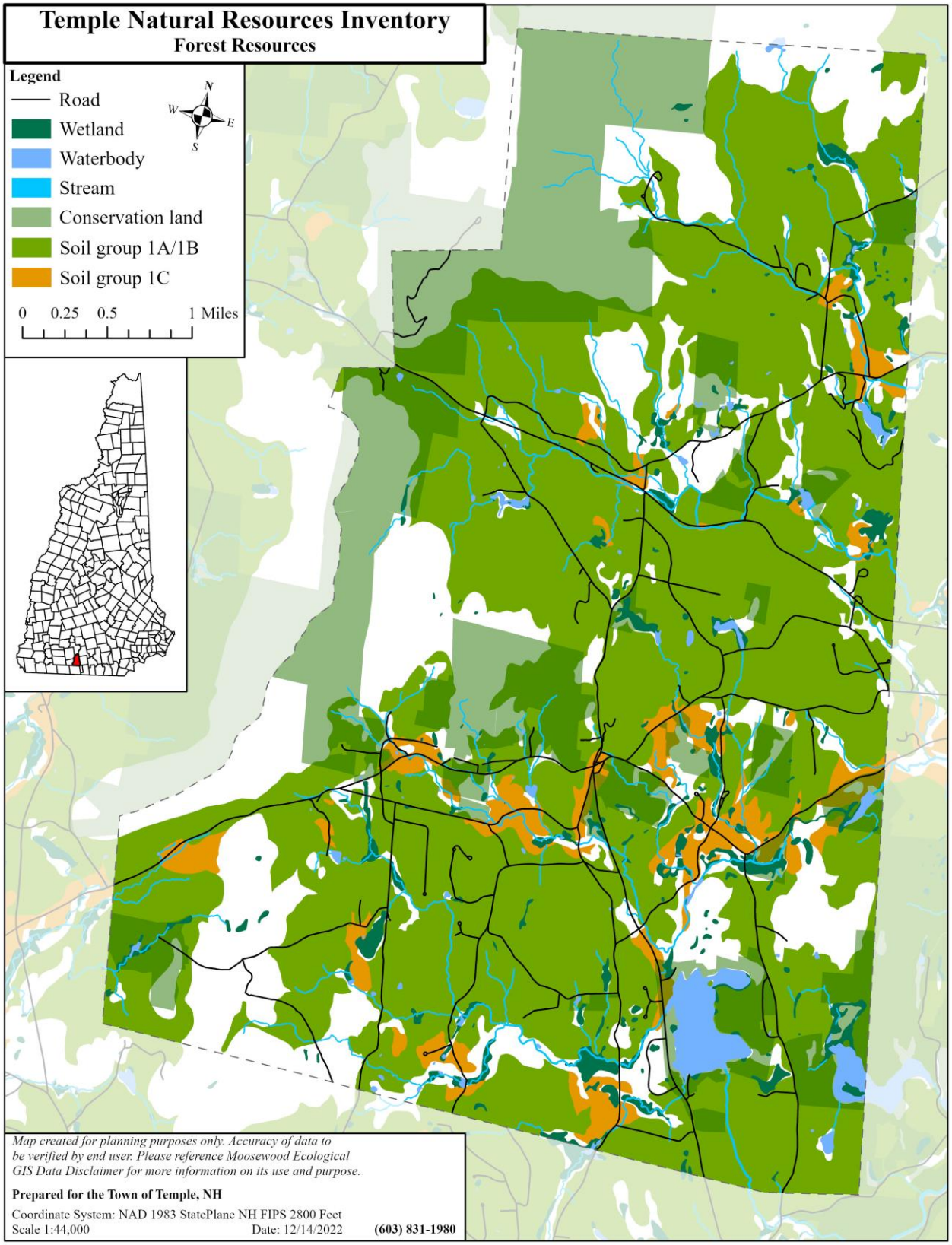
ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.

Important forest soils represent nearly 9,508 acres, or approximately 66% of Temple (Table 9 and Figure 8). Forest soil groups IA and IB make up the majority of this resource and are most ideally suited for hardwood production. Soil group IC appears to be more restricted to stream drainages where outwash sands and gravels were deposited by glacial activity about 11,000 years ago. Group IC soils types are suited for softwood production, mainly white pine.

Table 9. Summary of important forest soils for timber production in Temple.

Important Soil Type	Size (acres)	% of Town
Hardwood Production (Groups IA and IB)	8,786	61.1%
Softwood Production (Group IC)	722	5.0%

SOURCE: USDA Natural Resources Conservation Service soils (2009).


Temple Natural Resources Inventory
Forest Resources
Legend
Road
Wetland
Waterbody
Stream
Conservation land
Soil group 1A/1B
Soil group 1C
0 0.25 0.5 1 Miles
N
W
E
S
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CONSERVATION AND PUBLIC LANDS

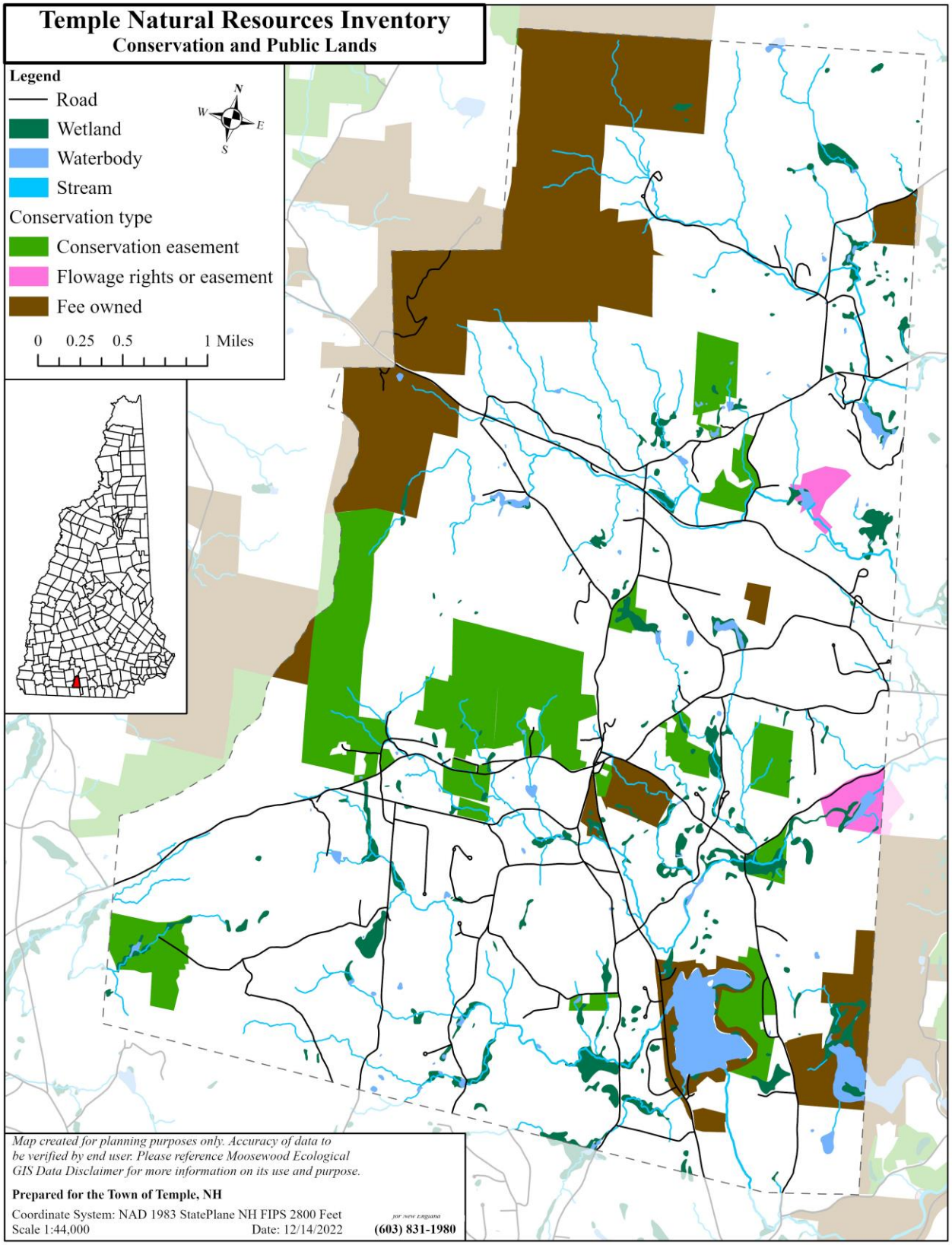
The permanent protection offered by conservation easements and deed restrictions, and lands held by public entities for conservation, protect open space, natural resources, traditional uses, natural processes (i.e., protection of drinking water), and provide access to recreational resources that are essential to sustaining Temple's rural character and quality of life. These lands will remain undeveloped and in their natural state, often in perpetuity, to support important environmental or aesthetic functions. Some may also be used for agriculture, forestry, or outdoor recreation.

There are approximately 3,249 acres of conservation lands in Temple (Table 10 and Figure 9). This represents roughly 23% of the town. The largest, contiguous tracts of conservation lands are located along the Wapack Range as it traces along the western part of town northward into Greenfield through private, state, and federal lands. Temple Town Forest, other town-owned lands, and conservation easements are scattered throughout town. Lands bordering Greenville Reservoir and King Reservoir are also under protection. Numerous opportunities exist to build upon these natural ecological reserves to create permanent corridors whereby protecting Temple's critical biodiversity.

Table 10. Conservation lands by protection type in Temple.

Protection Type	Acres
Conservation Easement	1,217
Flowage Rights or Easement	108
Fee Ownership	1,924

SOURCE: GRANIT Conservation Lands database (2022).


Temple Natural Resources Inventory
Conservation and Public Lands
Legend
Road
Wetland
Waterbody
Stream
Conservation type
Conservation easement
Flowage rights or easement
Fee owned
0 0.25 0.5 1 Miles
N
W
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CLIMATE CHANGE and RESILIENT LANDSCAPES

In light of evidence of a changing climate, many communities are now incorporating the concept of resiliency into their proactive planning efforts. The concept of ecological resiliency refers to the capacity of wildlife and plants and the natural processes and physical conditions they depend on, to sustain change over time. Resiliency studies attempt to predict how the landscape may respond to a changing climate where extreme temperature and precipitation patterns, a higher annual base temperature, increasing intensity and frequency of storms, flooding, and rising sea levels are predicted.

When crafting a conservation and open space plan it is necessary to understand the distribution of the various natural resources and conserved lands within and adjacent to Temple. As part of this planning process, it is imperative to identify and capture climate-resilient landscapes. This provides a more inclusive approach, integrating significant natural resources with areas that are capable of recovering from major disturbance events (such as stronger storms, increased droughts, and floods) for long-term conservation success.

There are three major measures of resiliency at the landscape level that we can use to plan for this future change. The first characteristic is the *geophysical diversity* of a landscape. This aspect refers to the diversity of geology, soils, elevations, and landforms, including water features such as lakes and streams. Physical diversity promotes both habitat and species diversity due to a wide range of conditions, including elevations, sun exposure (temperature and moisture), soils, hydrology, and ecological processes that help define distinct ecosystems. In general, the more physical diversity there is in a landscape, the more likely that landscape is to recover from extreme disturbances – thus it is more resilient.

The second major characteristic is *connectedness*. This refers to the ability of species to freely move throughout the landscape unimpeded by major barriers such as human developments or human-altered ecosystems. Connectedness can be viewed at the local and regional levels. The goal is to connect conservation open space to promote free movement of wildlife and plant species.

Biological condition is the third and final consideration in planning for climate resilience. This characteristic takes into consideration the impact of stressors on the environment, including past land use, human development, invasive species, air and water pollution, and climate change. Biological condition also considers the presence of species of greatest conservation need.

A number of recent predictive models have shown that northeastern forests are likely to experience a greater loss in tree species diversity than other parts of the United States due to climate change. Climate change effects are a global threat, but also impact New Hampshire. Invasive species and introduced pathogens have been recognized as a significant threat, ever since the decimation of virtually all American chestnut trees in North America by the introduced Asian chestnut blight. The absence of this tree species,

once a keystone forest species, has fundamentally altered forest composition in certain forested areas of Temple. In more recent years, invasive plants as well as introduced insects and diseases have become widespread. Major river valleys and smaller streams such as Temple Brook are especially susceptible to the introduction and spreading of such exotic plant species as Asian bittersweet, Japanese knotweed, and glossy buckthorn, due to the popularity as a food for migrating and resident birds which spread their seeds along these important migration routes.

According to the US Environmental Protection Agency (2021), the Northeast is experiencing the largest increase in the amount of rainfall measured during heavy precipitation events than any other region in the US. More frequent heat waves in the Northeast are also expected to increasingly threaten human health through more heat stress and air pollution. Sea level rise and more frequent heavy rains are expected to increase flooding and storm surge, threatening infrastructure. And as temperatures rise, agriculture will likely face reduced yields, potentially damaging livelihoods and the regional economy.

A progressively warmer climate has been seen as one cause of the spread of many of these species. In the last 5 years alone, the emerald ash borer (EAB) and red pine scale have quickly spread to their respective host trees much in the way the American elm was once so drastically affected. As road maintenance, forestry, and recreational improvements are planned on open space, roads, and Town-owned lands, extra precautions need to be taken to minimize the introduction and spread of invasive plants.

NH Wildlife Action Plan

The 2020 NH Wildlife Action Plan (WAP) includes a risk assessment of 27 habitats and 157 species of greatest conservation need that was based on standards adopted by other northeastern states (NH Fish and Game 2020). The assessment assigned a number of risk factors to each of these species within each described habitat to determine which habitat types (and the species they support) appear to be most vulnerable to various effects including pollution, climate change, natural systems modification, invasive species, disease and development. Table 13 includes a list of WAP habitats occurring in Temple that were determined to be the highest at risk from these factors.

Table 13 Critical Habitats for Species at Risk.

Forests	**Other Terrestrial Habitats**
Hemlock-Hardwood-Pine Forest	Shrublands
Appalachian Oak-Pine Forest	Grasslands
Freshwater Wetlands	**Freshwater Aquatic**
Shrub Wetlands	Warmwater Rivers and Streams
Vernal Pools	Warmwater Lakes and Ponds

Temperate Swamps	
Peatlands	

SOURCE: NH Fish and Game (2020).

TNC Resilient and Connected Landscapes Study

In 2016, The Nature Conservancy released the Resilient and Connected Landscapes study, which mapped climate-resilient sites, confirmed biodiversity locations, and species movement areas (zones and corridors) across Eastern North America. The study used the information to prioritize a conservation portfolio that naturally aligns these features into a network of resilient sites integrated with the species movement zones, and thus a blueprint for conservation that represents all habitats while allowing nature to adapt and change. The following brief concept descriptions come from The Nature Conservancy's online portal:

- Resilient Area: places buffered from climate change because they contain many connected micro-climates that create climate options for species.
- Flow: the movement of species populations over time in response to climate. Flow tends to concentrate in the zones and corridors described below.
- Climate Corridor: narrow zone of highly concentrated flow, often riparian corridors or ridgelines.
- Climate Flow Zone: broad areas of high flow that is less concentrated than in the corridors - typically intact forested regions.
- Confirmed Diversity: known locations of rare species or unique communities based on ground inventory. Unconfirmed areas may contain the same species.

Resilient sites are projected to retain high quality habitat and continue to support a diverse array of plants and animals. Sites that have both complex topography and connected land cover are places where conservation action is most likely to succeed in the long term. Permanent conservation of the resilient areas should be prioritized to ensure they can continue to provide habitat for species. Securing resilient sites safeguards natural benefits such as fresh drinking water and clean air for local communities now and into the future.

The western side of Temple associated with the Wapack Range is one of the most ecologically resilient parts of town. Other smaller areas of significance have been identified as well. While these data and analyses are best when conservation practices

are applied to larger regions, this also helps temple to understand its significance in regional natural resources protection in light of climate change. To learn more about resilient and connected landscapes and to view the full maps developed by The Nature Conservancy and the process behind them, see: www.conservationgateway.org

RECOMMENDATIONS

The information provided herein, including the various maps, can be used when considering the adoption of various land use planning techniques or when working with willing landowners on resource protection efforts. The data used to develop this information represents the most current, readily available data to better understand Temple's natural resources. As such, there are some basic guidelines that the town can use to promote innovative and informed land use planning.

- Protect large unfragmented blocks, especially those with high quality habitats located within close proximity of one another and with limited barriers for wildlife movement;
- Protect known rare species populations;
- Protect representative examples of critical habitats for known rare species;
- Protect rare and representative examples of natural communities;
- Protect intact wetland and stream riparian buffers and promote the restoration of degraded areas;
- Support voluntary and regulatory approaches at natural resources protection;
- Build upon existing contiguous protected lands;
- Connect protected lands and other critical habitats with upland, aquatic, and/or riparian corridors;
- Better understand wildlife movement patterns to identify and design the most effective conservation corridors; and
- Promote community education and outreach regarding Temple's biodiversity and the importance of long-term protection strategies.

The following general recommendations were based on the findings of the project. These are considered as the next Actions Steps that Temple could consider while proceeding with community land use planning and education.

1. Continue with Temple's NRI efforts by conducting various site assessments. The purpose of these assessments should focus on collecting ecological information such as biodiversity, natural communities, invasive plants, and small-scale habitats (such as vernal pools, dens, talus slopes, heron rookeries, and turtle nesting areas), as well as verify the extent of the Wildlife Action Plan habitats. Other elements could include mammal tracking to understand corridors and connectivity, culvert assessments, and wetlands evaluations. Community outreach and education should also be a component of the Phase II NRI.

2. Conduct a Parcel-based Ecological Assessment. This is a computer-based model that ranks parcels based on their natural resource values. The assessment can assist with conservation planning and working with willing landowners interested in land protection.

3. Identify and map conservation focus areas (CFAs). This provides a critical piece to a Conservation or Open Space Plan. This provides the town with an objective means for working on a variety of voluntary or regulatory options for protecting some of Temple's most significant natural areas.

4. Update the Temple Open Space Plan developed in 2008 to include newly acquired natural resources data. This will help to revise Temple's conservation planning efforts and enhancing conservation focus areas while reviewing how the current plan has been helpful, how can it serve Temple better, and what projects have been accomplished.

5. Incorporate the NRI into the latest Temple Master Plan. This provides a vision for the town from which adaptive land use planning can be adopted. Build public support for the NRI through informational sessions, published materials, and other means of community education and outreach. This will help to inform the community about its natural resources and future planning.

6. Conduct a wildlife habitat and natural resources protection audit of current zoning regulations to better understand if and how they protect critical natural resources. This effort can illuminate certain land use planning techniques that Temple might want to consider adopting in an effort to develop informed land use decisions for a more sustainable future. This could identify ways to use land more efficiently, encourage more compact development, and allocate specific areas for conservation and development.

7. Continue to work with adjacent communities on similar conservation initiatives of common interest. It would be helpful to meet annually with the Conservation Commissions within each of the adjacent communities to build strong relationships and create open lines of communication, as well as to inform these communities about Temple's conservation planning efforts.

8. Continue with community outreach and landowner education regarding Temple's natural resources and conservation planning. This can be accomplished in many ways, including workshops, hikes, Bioblitzes. and printed materials such as brochures and maps to help landowners with resource protection and management. A subcommittee of the Conservation Commission could be developed to focus on outreach and education efforts.

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APPENDIX A

MOOSEWOOD ECOLOGICAL
GIS DATA DISCLAIMER

Moosewood Ecological LLC GIS Data Disclaimer

A variety of existing and newly created data layers were used to prepare the Natural Resources Inventory (NRI) maps. These existing data have been developed by numerous government agencies and other sources. They have been produced specifically for the town, the state of New Hampshire, or the entire United States using *remote data*. These sources of remote data were developed from the interpretation of satellite imagery and aerial photography. The data were produced at various scales and therefore, represent different degrees of errors, omissions, and inaccuracies.

The NRI maps are for education and planning purposes only. They are suitable for general land use planning. However, they are not suitable for detailed site planning and design, including wetlands delineations and other jurisdictional determinations. As such, boundaries of all habitats, including wetlands, and parcels are approximate locations and should be field verified. The accuracy of the data is the end user's responsibility, and Moosewood Ecological LLC cannot be responsible for the accuracy and completeness of the data. Moosewood Ecological LLC makes no warranty, expressed or implied, as to the accuracy or completeness of the data. Furthermore, Moosewood Ecological LLC shall assume no responsibility for any errors, omissions, or inaccuracies in the information provided.

APPENDIX B

WILDLIFE OF GREATEST CONSERVATION CONCERN

COMMON NAME	TAXONOMIC GROUP	SPECIES STATUS
Blanding's Turtle	Amphibians and Reptiles	SE, SGCN
Blue-Spotted/Jefferson Salamander	Amphibians and Reptiles	SC, SGCN
Eastern Box Turtle	Amphibians and Reptiles	SE, SGCN
Eastern Ribbon Snake	Amphibians and Reptiles	SGCN
Fowler's Toad	Amphibians and Reptiles	ST, SGCN
Northern Black Racer	Amphibians and Reptiles	ST, SGCN
Northern Leopard Frog	Amphibians and Reptiles	SC, SGCN
Smooth Green Snake	Amphibians and Reptiles	SC, SGCN
Spotted Turtle	Amphibians and Reptiles	ST, SGCN
Wood Turtle	Amphibians and Reptiles	SC, SGCN
American Black Duck	Birds	SGCN
American Kestrel	Birds	SC, SGCN
American Woodcock	Birds	SGCN
Bald Eagle	Birds	SC, SGCN
Bank Swallow	Birds	SC, SGCN
Black-billed Cuckoo	Birds	SGCN
Bobolink	Birds	SGCN
Brown Thrasher	Birds	SGCN
Canada Warbler	Birds	SGCN
Chimney Swift	Birds	SGCN
Eastern Towhee	Birds	SGCN
Field Sparrow	Birds	SGCN
Golden Eagle	Birds	SE, SGCN
Northern Goshawk	Birds	SGCN
Northern Goshawk	Birds	SGCN
Purple Finch	Birds	SGCN
Ruffed Grouse	Birds	SGCN
Scarlet Tanager	Birds	SGCN
Veery	Birds	SGCN
Wood Thrush	Birds	SGCN
American Bumble Bee	Bumble Bees	SGCN
Rusty-patched Bumble Bee	Bumble Bees	FE, SE, SGCN
Yellow-banded Bumble Bee	Bumble Bees	SGCN
Yellow Bumble Bee	Bumble Bees	SGCN
Monarch Butterfly	Butterflies and Moths	SC
American Eel	Fish	SC, SGCN
Banded Sunfish	Fish	SC, SGCN
Eastern Brook Trout	Fish	SGCN
Longnose Sucker	Fish	SGCN
Brook Floater	Freshwater Mussels	SE, SGCN
Creeper	Freshwater Mussels	SGCN

COMMON NAME	TAXONOMIC GROUP	SPECIES STATUS
Eastern Pearlshell	Freshwater Mussels	SGCN
Triangle Floater	Freshwater Mussels	SGCN
American Water Shrew (Eastern)	Mammals	SGCN
Big Brown Bat	Mammals	SC, SGCN
Eastern Red Bat	Mammals	SC, SCGN
Hoary Bat	Mammals	SC, SGCN
Little Brown Myotis	Mammals	SE, SGCN
Long-tailed Shrew	Mammals	SC, SGCN
Moose	Mammals	SGCN
Northern Long-eared Bat	Mammals	FT, SE, SGCN
Rock Vole	Mammals	SGCN
Silver-haired Bat	Mammals	SC, SGCN
Southern Bog Lemming	Mammals	SGCN
Tricolored Bat	Mammals	SE, SGCN

FE = federally endangered
FT = federally threatened
SE = state endangered
ST = state threatened
SC = special concern
SGCN = species of greatest conservation need

APPENDIX C

HABITAT BLOCK SIZE REQUIREMENTS FOR WILDLIFE

1-19 Acres	20-99 Acres	100-499 Acres	500-2,500 Acres	>2,500 Acres
raccoon	raccoon	raccoon	raccoon	raccoon
	hare	hare	hare	hare
				coyote
small rodent	small rodent	small rodent	small rodent	small rodent
	porcupine	porcupine	porcupine	porcupine
				bobcat
cottontail	cottontail	cottontail	cottontail	cottontail
	beaver	beaver	beaver	beaver
				black bear
squirrel	squirrel	squirrel	squirrel	squirrel
	weasel	weasel	weasel	weasel
		mink	mink	mink
				fisher
	woodchuck	woodchuck	woodchuck	woodchuck
		deer	deer	deer
muskrat	muskrat	muskrat	muskrat	muskrat
			moose	moose
red fox	red fox	red fox	red fox	red fox
songbirds	songbirds	songbirds	songbirds	songbirds
		sharp-shinned hawk	sharp-shinned hawk	sharp-shinned hawk
			bald eagle	bald eagle
skunk	skunk	skunk	skunk	skunk
		Cooper's hawk	Cooper's hawk	Cooper's hawk
		harrier	harrier	harrier
		broad-winged hawk	broad-winged hawk	broad-winged hawk
			goshawk	goshawk
		kestrel	kestrel	kestrel
			red-tailed hawk	red-tailed hawk
		great-horned owl	great-horned owl	great-horned owl
			raven	raven
		barred owl	barred owl	barred owl
		osprey	osprey	osprey
		turkey vulture	turkey vulture	turkey vulture
		turkey	turkey	turkey
most reptiles	most reptiles	reptiles	reptiles	reptiles
	garter snake	garter snake	garter snake	garter snake
	ring-necked snake	ring-necked snake	ring-necked snake	ring-necked snake
most amphibians	most amphibians	most amphibians	amphibians	amphibians
		wood frog	wood frog	wood frog