

# TOWN OF DALTON, NEW HAMPSHIRE

## NATURAL RESOURCES INVENTORY

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**The Dalton Conservation Commission would like to dedicate this report to the residents of the Town of Dalton.**

**Town of Dalton - Conservation Commission Members**

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Gina Damiano, 2<sup>nd</sup> Alternate

Cover Photo: One of many scenic views in Dalton, NH.

Photo on current page: Baby snapping turtle found during the last NRI in Dalton. The baby snapping turtle is next to a dime! Photo taken 10-26-2004.

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## SUMMARY AND HOW TO USE THIS REPORT

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Land-use planning is instrumental in balancing future growth and development with protection of natural resources. We completed this report to give Dalton data on these resources, so the Town can make informed and balanced decisions about future growth and identify potential areas for conservation. By identifying and describing natural resources town-wide, this natural resource inventory (NRI) provides Dalton with a foundation for proactive planning, rather than the all-too-common reactive approach.

The Town of Dalton is committed to protecting and sustaining its quality of diverse natural resources. We completed a town-wide natural resource inventory using a combination of field work, mapping using GIS software, and assembling existing data. This project compiled natural resource data into a digital database in GIS format and produced a written report for use in the Town of Dalton. The data from this project is compatible for integration with the existing Town GIS. Efforts from this project will aid in future work and inventories, as well as provide tools to guide future development decisions in Dalton.

Based on results from this study, Elise Lawson of Watershed to Wildlife and the Dalton Conservation Commission offer the following additional recommendations:

1. **Surface Water Protection – 74.1 miles of streams/rivers – 164.1 acres of open water** - Many of Dalton's residents obtain drinking water from personal drilled or dug wells. Maintaining good water quality is one of the highest priorities for the Dalton Conservation Commission. Currently, the water quality in these streams, rivers, and lakes is in very good to excellent condition. Water quality should continue to be addressed not only in Forest and Mirror Lakes and the Connecticut and Johns Rivers, but also in smaller rivers, streams, and headwater brooks that feed these waterbodies.
2. **Aquifer Protection – 5,030.17 acres – 27.8% of town** - Based on locations of the underlying aquifers in Dalton, it is important to protect the quality of groundwater, brooks, streams, and aquifers in Town. Future water supplies are a very valuable natural resource for Dalton and the abutting municipalities - proven by the drinking water systems already in use.
3. **Forest lands – 81.5% forested**
  - a. **Dense Softwood Protection- 1,850.09 acres – 10.2% of Town** - Although many of the dense softwood stands are scattered and small, there are a few areas that contain adequate acreage of dense softwood for deer wintering areas throughout town. All dense softwood stands are beneficial to many wildlife species for cover particularly in the winter. Areas where dense softwoods are along wetlands, rivers, and streams are often used as wildlife travel corridors.
  - a. **Carbon Sequestration** – Given the number of larger properties in town, there are potential opportunities to generate income from Carbon offset programs. Funds can be used to purchase forested land for conservation. Sustainable forestry and

recreation are important components of this program. Funds can also be used to help private landowners put forested properties into conservation easements.

4. **Wetland Conservation – 2,828.47 acres wetlands – 15.6% of Town** - The Dalton Conservation Commission recognizes the importance of wetland protection to maintain good water quality and wildlife habitat. In 2006 the DCC completed a town-wide wetlands study (*Functional Assessment of Wetlands throughout Dalton, NH*, September 2006). It is hoped that the Town will continue to pursue ways to further conserve the functionality and diversity of these wetlands. An update of past wetland studies would help Dalton work with willing landowners to conserve some of these valuable wetland resources.
5. **Land Conservation – 2,065.04 acres of conserved land or easements – 11.4%** - Dalton's conservation lands include State Parks, Hydro-electric company easements, and conservation easements held by private landowners. The Conservation Commission should consider partnering with land conservation organizations to establish a Town Forest. This report prioritizes additional areas to consider for land conservation.
6. **Hillside and Viewshed Protection** - Dalton's hilly topography is directly related to the Town's tourism industry, scenic beauty, and diversity of natural resources: from the tops of hills to the beaver ponds, streams, and floodplain river habitat at the bottom of the slopes. Research and considerations should be made towards evaluating and possibly updating the zoning ordinance in Dalton to conserve viewsheds as an important feature and tourist attraction to the area, while continuing to consider landowner rights.
7. **Cooperation** - It is recommended that Dalton continue to work with neighboring municipalities, organizations, schools, and State and Federal agencies throughout the region to share future data as it becomes available. This will avoid an all-too-common problem of separate entities replicating work. Natural resource features do not end at town boundaries. A watershed approach to conserving them is recommended. Many surrounding towns have completed Natural Resource Inventories (including Lancaster and Whitefield most recently), and all the data between the towns and Dalton have compatible GIS formats.

Long-term uses of this project could include, but are not limited to:

- Assist in determining “least-impact” sites for future development
- Include in future Master Plan updates
- Promote protection plans for water quality, wetlands, and aquifers
- Locate ideal locations for telecommunication towers or wind farms while conserving scenic resources
- Continue to identify land for purchase or conservation easements for long term conservation of sensitive and diverse ecological areas

## INTRODUCTION, HISTORY, AND OBJECTIVES

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The Town of Dalton, New Hampshire is rural and mostly forested containing 28.3 square miles or 18,104.4 acres, with 164.08 acres of ponds and open water. The Town's geography is quite diverse, ranging from flat floodplain areas along the Connecticut and Johns Rivers to rugged mountainous areas including steep slopes to the tops of the Dalton Mountain Range which runs SW and NE across town. Out of 18,104 acres of land, approximately 2,065.04 acres are conserved lands – 11.4%. Over 81% of Dalton is forested.

The land within the Town of Dalton has a long and rich history based on natural resources, dating back to use by Native Americans living in the region. Dalton was incorporated in 1784 after being part of a territory called Chiswick, which originally included Lisbon, Littleton and Dalton. Some of the first settlers in Dalton found that the land was favorable for sheep farming. Timber harvest or “lumbering” was also a large part of the economy along with several lumber, brick and grist mills along rivers and streams.

The latest Master Plan for Dalton was completed in March 2023. According to this latest Master Plan, the vision for the future of Dalton is that “Dalton should remain an outstanding and desirable place to live, where the old country values and rural character of the town are preserved and enhanced” (Town of Dalton, 2023). Land use (LU) and natural resource (NR) goals include the following:

- LU Goal 1: Ensure orderly development of land within Dalton.
- LU Goal 2: Improve affordability, tie new residential development with land preservation.
- LU Goal 3: Have sound regulations that promote health and diversity in Dalton.
- NR Goal 1: Increase land protection, preservation, and stewardship in the community.
- NR Goal 2: Protect natural resources from inappropriate or hazardous development pressures.
- NR Goal 3: Expand network of outdoor recreation assets and use of them.

### Goals of the Natural Resource Inventory

This project provides a Natural Resource Inventory (NRI) with the addition of data to the existing Dalton GIS database that can integrate with past and future studies. One of the goals of this project is to provide an inventory, management recommendations, and further planning tools for the Town of Dalton. This report can be used as an educational and planning tool. It contains a written report with maps, as well as an extensive GIS database that can be overlaid existing maps in the Town's database. It promotes conservation of water, forested land, riparian habitat, wetlands, and unique co-existing natural resource features throughout the Town.

Measurable objectives of this project include the following:

1. Provide the Town of Dalton with updated, standardized coverages that can be integrated into the existing GIS database.

2. Create a document that can be incorporated into the latest (2023) Dalton Master Plan.
3. Identify areas for future conservation efforts, focusing on areas of contiguous open space, wildlife corridors, and sensitive ecological areas.
4. Maintain inventories of natural and scenic resources, including wetlands, open water, steep slopes, and hilltops.
5. Increase awareness of the values of the characteristics of Dalton including forest and water resources, scenic view areas, recreation areas, riparian buffer habitat, and wetlands with associated wildlife habitat through public presentations and discussion.
6. Provide the Town with the ability to continue to build upon and update the natural resources digital database.



## METHODOLOGY

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Nancy Comeau and Jon Swan, members of the Dalton Conservation Commission, were the main contacts for consultant Elise Lawson of Watershed to Wildlife. Elise has worked as a natural resource consultant for 25 years. This town-wide Natural Resource Inventory uses a combination of existing mapping data, previous work, and current field work to produce an overall base NRI for Dalton, NH.

### Field Work

Elise completed 3½ days of field work for this study (October 6, 2022, May 9, 11, 25, 2023). The Dalton Conservation Commission reached out to landowners for permission to walk on their properties for this NRI. We respect the rights of landowners, and we did not trespass on private property unless granted permission. Field work was conducted to get an overall view of Dalton with a focus on previously identified targeted areas. This work included inventories and assessments of several wetland complexes, beaver ponds, riparian habitats, and upland habitats including higher elevation uplands. In most cases Class VI roads and

established trails were followed, while in other cases, compass-based orienteering and handheld GPS units were used. At points of interest, GPS locational data was taken, along with photographs and field notes. During field work sessions any rare or endangered species found was noted and located on a map. Observed invasive plant species were also documented. Nancy Comeau joined for three field days, and DCC Chair, Jon Swan, joined one day.

Several Dalton residents contributed local knowledge for this NRI as well. They recorded and reported on plant species, wildlife sightings, as well as invasive species found throughout town. This includes a bioblitz which the Dalton Conservation Commission hosted on May 20, 2023. A list of species recorded is shown in Appendix A and can be found here - [iNaturalist website](#). We thank everyone who helped collect and report data for this Natural Resource Inventory!

### Gather Existing Digital Data

Existing maps and data for the Town of Dalton were collected. Since many decisions are based on parcels as they relate to rivers, roads, trails, ponds, wetlands, and other features, it is important to point out the working accuracies of these data sources. Combining these sources in various overlays provides an excellent overview and planning tool but does not replace the value to perform site-specific investigations and analyses. For example, the 2009 aerial photographs are accurate to within 12.5 feet. On the other hand, the newer 2015 aerial photographs are advertised with 1-foot resolution. The handheld GPS unit used for this study is a Garmin GPSMAP 76CSx. It is advertised within 30 feet, but often much better depending on satellite availability, refraction, and topography. The Avenza Map GPS feature was also used for this study is advertised within 50 feet, but often much better depending on satellite availability, refraction, and topography.

### Compile Existing Data into ArcGIS

Elise Lawson conducted GIS analyses. She gathered digital data from the Town of Dalton, GRANIT, Natural Resource Conservation Service (NRCS), and the US Fish and Wildlife Service. These data include the following:

1. Aerial photography
2. Topographic maps
3. Hydrology (rivers, streams, lakes and ponds)
4. Roads and trails
5. Power lines and rail roads
6. Conservation lands
7. National Wetlands Inventory
8. Soil Information (NRCS – Natural Resource Conservation Service)
9. Aquifers and Subwatersheds
10. Bedrock Geology

11. Maps created during the Wildlife Action Plans completed by the NH Fish and Game Department

Existing available maps were then integrated using ArcMAP software. Using the USDA 2009 and 2015 aerial photography, topographic maps, and soils maps, Elise digitized or queried features and overlaid them onto a base map. These include wetlands, hydric soils, farmland soils, forestry soil groups, steep slopes, permanent wildlife openings, and dense softwood stands. Potentially significant wildlife habitat areas were noted.

**Wetlands** were reviewed and analyzed using the 2009 and 2015 aerial photos, National Wetland Inventory (NWI), Natural Resource Conservation Service (NRCS) soils maps (displaying hydric soil map units), and field work to confirm wetland locations where visited. New Hampshire state laws require that three parameters be met for classification as a jurisdictional wetland: the presence of hydric soil (very poorly and poorly drained soils); sufficient hydrology; and hydrophytic<sup>1</sup> vegetation. When soil maps alone are used, they could potentially overestimate the number of wetlands throughout the Town. This is particularly true given that up to 35% of a soil classification can be inclusions (for example, upland areas within NRCS hydric soil units or wetland areas within NRCS upland units). On the other hand, examining the NWI data alone under-represents the number of wetlands, due to the U.S. Fish and Wildlife Service's method of using aerial photography to identify wetlands. Open water, emergent, and scrub-shrub wetlands can readily be identified using aerial photography alone, but forested wetlands are often missed. Some types of wetland delineations require extensive fieldwork beyond the scope of this project. Despite differences and potential errors, data provided from these sources are important tools, and can be built-upon in future studies.

**Farmland Soils** – Prime farmland, farmland of statewide importance, and farmland of local importance throughout Dalton were determined using the NRCS soils map data. Data were displayed in ArcMap and queried so only those soils classified as important farmland were displayed in the Town.

Land utilized for pasture, forestry, recreation, or land uses other than urban, built or disturbed areas can still qualify as prime farmland, farmland of statewide importance, or farmland of local importance. The rationale for this approach is that land not already committed to irreversible (urban) uses is still available for cropping. Three categories of important farmlands have been described by the NRCS and they are:

1. Prime Farmland Soils as defined by the U.S. Department of Agriculture is the land that is best suited for food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban and built-up land or water areas. The soil qualities, growing season, and moisture supply are

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<sup>1</sup> Hydrophytic vegetation are plants that grow in water or on a substrate that is at least partially deficient in oxygen as a result of excess water; plants typically found in and adapted to wet habitats.

those needed for a well-managed soil to produce a sustained yield of crops in an economic manner. These soils are generally flat and relatively free of stones.

2. Farmland soils of statewide importance are lands, in addition to prime farmland, that are of statewide importance to produce food, fiber, forage and oilseed crops. Criteria used to define this agricultural land were determined by State and local agencies in New Hampshire. The soils on the list are important to agriculture in New Hampshire, yet they exhibit some properties that exclude them from prime farmland. These soils can be farmed satisfactorily by greater inputs of fertilizer, soils amendments and erosion control practices than those necessary for prime agricultural farmland. They produce fair to good crop yields when managed properly.
3. Farmland of local importance is land, in addition to prime and statewide farmland, that is of local importance to produce food, fiber, forage and oilseed crops. The criteria used to define this farmland were determined by local agencies in Coos County.

**Permanent openings** (fields - areas dominated by grasses, forbs, brambles) were digitized from 2015 aerial photographs. The regions digitized include only those openings managed as permanent opening habitat. They do not include clear-cuts where the intent is for timber harvesting and regeneration for future logging. **Dense softwood** (or conifer) cover areas were also digitized from the aerial photographs. These areas are considered significant wildlife habitat and could be used by deer and moose for wintering areas.

**Steep slopes** were determined using the NRCS soils maps. Data was displayed in Arc Map and queried so only those soils map units with 20% slope and greater were displayed.

Maps are displayed at the end of this report with the features described above. All information gathered, compiled, and mapped for this report was delivered to the Dalton Conservation Commission in digital format. It is the property of the Town of Dalton

#### [Public Presentation and Discussion](#)

At the completion of this NRI, a public information meeting will be held on September 19, 2023, to explain the results from this study. The goal of this meeting is to increase public awareness of the importance of the natural resource inventory including scenic and recreation areas, water resources, riparian habitat, forested land, and associated wildlife habitat. It also allows for discussions on future studies and the importance of land conservation. In addition, we will display work from this project for public access on Dalton's town website.

## RESULTS

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### Forested Lands (Map #1 at the end of report)

Dalton is 81.5% forested. There are several different forest types, typical for this part of northern New Hampshire including:

- Northern Hardwood Conifer – 8,040.34ac = 44.4%
- Hemlock-Hardwood-Pine – 3,660.75 ac = 20.2%
- Lowland Spruce-Fir – 2,891.64 = 16.0%
  - Dense softwood – 1,850.09 ac = 10.2%
- Floodplain Forest – 165 ac = 0.9%

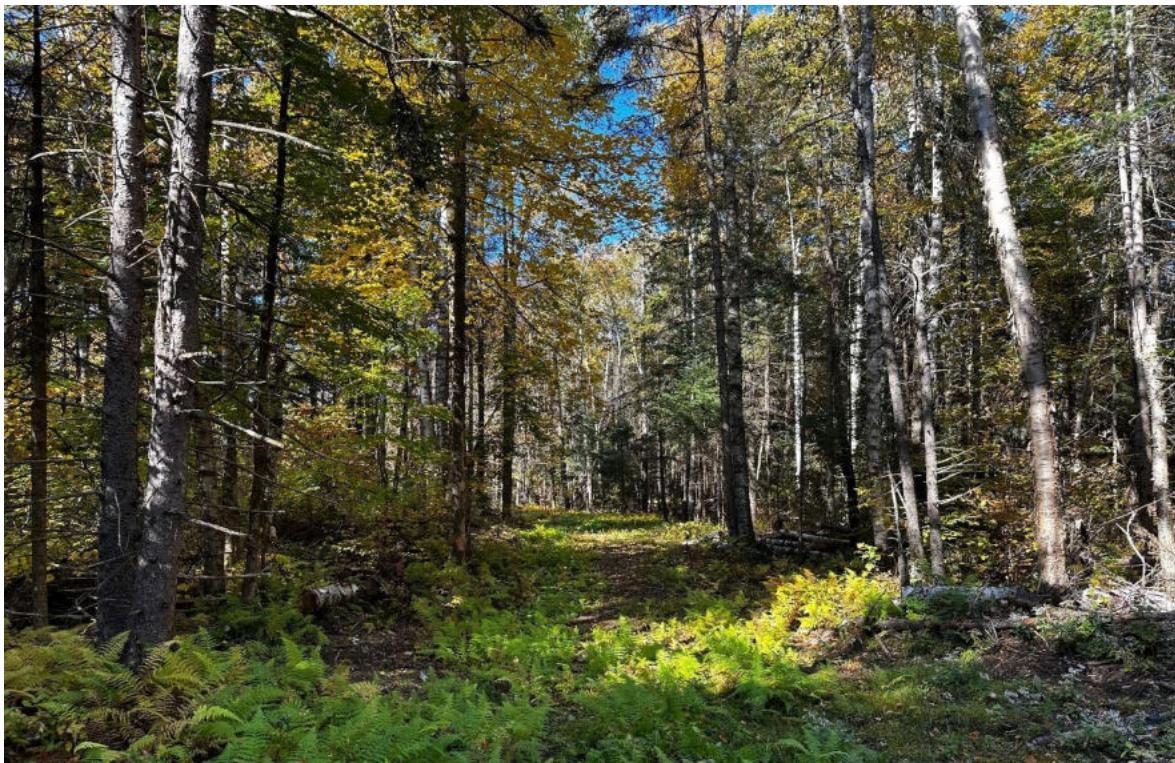
The list of forest types, acreages and percentages above are taken directly from the NH Fish and Game's Wildlife Action Plan mapping of habitat types. Dense softwood stands were digitized from the most recent aerial photographs. The age of forests throughout Dalton is diverse, ranging from newly regenerating forest to mature hardwood and softwood forests.



View across Chase Bog Brook there are several forest types including Lowland Spruce-Fir along the brook and wetland areas. The Dalton Mountain Range (shown in the distance) is dominated by Northern Hardwood-Conifer, and Hemlock-Hardwood-Pine. Photo taken 5-25-23.

**Carbon sequestration** – Forests have always provided tremendous personal and public benefits, including clean water, wildlife habitat, recreational opportunities, and forest products. Additionally, forests are an essential natural solution for climate change. Carbon sequestration is the process where atmospheric carbon dioxide is taken up by trees, saplings, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils. The sink of carbon sequestration in forests and wood products helps to offset sources of carbon dioxide put into the atmosphere through deforestation, forest fires, and fossil fuel

emissions. Sustainable forestry practices can increase the ability of forests to sequester atmospheric carbon while maintaining or enhancing soil stabilization and water quality.



Sustainable logging on this mixedwood forest on Wallace Hill will increase the amount of carbon dioxide that trees and other vegetation take out of the atmosphere. The overall forest health will increase. Photo taken 10-6-22.

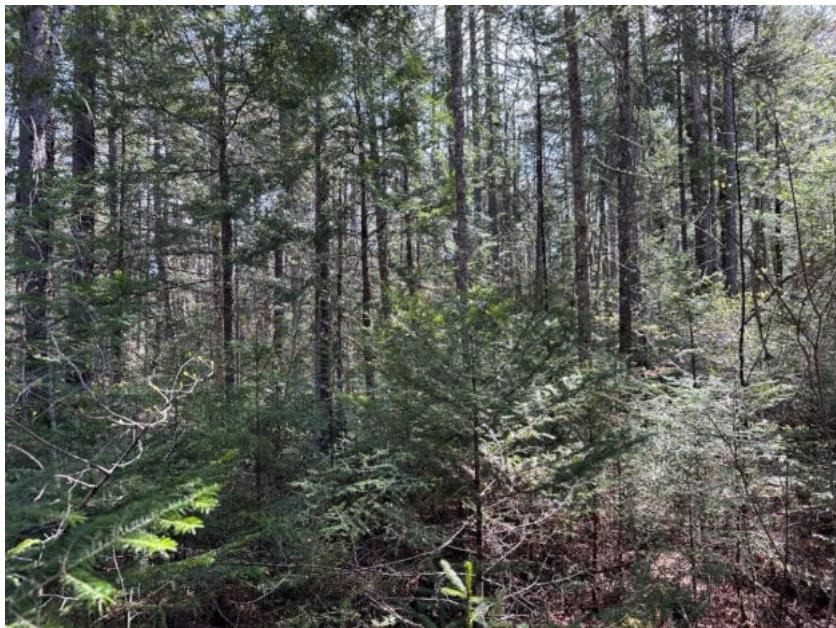
**Dense Softwood** – 1,850.09 acres of forested land (10.2%) of Dalton contains dense softwood stands, primarily eastern hemlock, balsam fir, and/or spruce. This is an increase from the 2005 NRI where 1,266 acres or 7% dense softwood stands were digitized and calculated. These softwood stands range in size from less than 2 acres to nearly 200 acres. Some of the larger softwood stands are found adjacent rivers and streams such as Chase Bog Brook, the Connecticut River and Cushman Brook. In Dalton, softwood stands are found in a variety of soil types ranging from flat, moderately well drained including Peru, Sunapee, Waumbek, Croghan, and Moosilauke, sandy loams to well-drained soils such as Tunbridge-Lyman Rock Outcrop complex. The areas dense softwood stands found along rivers, streams, ponds, and wetland complexes offer proximity to good cover and a diversity of habitat types. The softwood stands in Dalton are isolated, but a few close enough to allow for excellent winter cover and wildlife travel corridors.

*Deer yards cover only about 3% of the land base in New Hampshire so their identification and management are an important part of conserving the entire State's natural resources.*

Dense softwood stands are an important habitat type to many wildlife species. They provide important cover and foraging habitat during harsh winter conditions by reducing snow

## Natural Resource Inventory for Dalton, NH

accumulations and wind speeds. Therefore, animals such as red squirrels, snowshoe hare, ruffed grouse, white-tailed deer, and moose are often found utilizing them during the winter months. White-tailed deer are not well adapted for traveling in and dealing with deep snow conditions and require dense softwood stands to survive New Hampshire's harsher winters. When they congregate in these stands, they are referred to as deer yards or deer wintering areas. For the stand to be considered a deer yard two basic elements must be met: (1) A core area is identified by concentrations of dense softwoods, and (2) Mixed hardwood and softwoods adjacent to, or within the core area will provide accessible forage.



This dense softwood stand is in Forest Lake State Park in Dalton. It is relatively young, with a combination of cover and regenerating balsam fir. It is excellent cover for wildlife. Photo taken on 5-9-2023.

There are several dense softwood stands around the Chase Bog Brook wetland complex. During field work, these softwood stands contained a large network of wildlife trails. Photo taken on 5-25-23.



**Mast Trees** - Dalton has several species of trees that are considered important because of their mast production. These include red oak, beech, maple, hop horn beam, hemlock, black cherry, white ash, apple, and pine. Mast are the fruits produced by woody stemmed plants and can be either hard (seeds and nuts) or soft (fruits and berries). Wildlife species from nuthatches, chickadees, squirrels, and eastern chipmunks to white-tailed deer, black bears, turkeys, and wood ducks rely heavily on mast as a source of feed. Hard mast produced by red oak, and beech, and some shrubs such as beaked hazelnut, is considered extremely important because it can persist for a longer amount of time than soft mast and therefore is accessible to wildlife during times of the year when other food sources are limited.



**Left Photo:** Both mature and young red oak trees were noted throughout Dalton. This mature oak is in Forest Lake State Park. The entire area is important fall food for bear, deer and many other wildlife species. Photo taken on 5-9-23.

**Upper Right Photo:** Bear claw marks on this American beech indicate that it is a good mast tree. Both beech nuts and acorns are important fall food supply for many wildlife species.

**Lower Right Photo:** Beaked hazelnut documented during the May 20, 2023 Bioblitz in Dalton.

**Early Successional Habitat** – Early successional habitat includes an area with grasses, forbs, shrubs, and young trees (aspen, white birch, and white pine are common in New Hampshire). It provides excellent food and cover for wildlife but needs some sort of disturbance to be maintained. Early successional habitats have been declining throughout the Northeast for decades, as have the wildlife species associated with them. For example, American woodcock have declined by 40% over the past 30 years, and New England cottontails occur in only 20% of their historic range. In Dalton some examples of areas with early successional habitat are along the transmission lines, inactive rail roads, and former gravel pits. In these early successional habitats, the soil is sandy with very little topsoil. As a result, we found areas where birds had dusted themselves with the sand. Dust baths are part of a bird's preening and plumage maintenance. The sandy dust is worked into the bird's feathers and absorbs excess oil to help keep the feathers from becoming greasy or matted. It also helps smother or minimize lice, feather mites and other parasites.

Sandy and gravel areas are also important for turtles. The proximity of a sandy area to open water gives turtle hatchlings a better chance of making it to water as shown in the photo below. One of the biggest problems with early successional habitat is invasive species. Invasives can grow quickly and prevent native species from establishing and thriving. Examples of this are several colonies of Japanese knotweed are thriving at the expense of native pioneer species along roadsides especially.



Early successional habitat such as this area along a former railway bed, offers unique habitat for wildlife. Here is evidence of past turtle nests in the gravel. We also observed garter snakes warming up in the sun. Photos taken 5-25-23.

### [Permanent Wildlife Openings \(Map #1 at the end of report\)](#)

Permanent wildlife openings are dominated by grasses, forbs, wildflowers, brambles and fruiting shrubs. These include hay land, pastureland, cropland, brush-hogged fields, and mechanically maintained transmission lines. It is estimated that they provide required habitat for about 22% of New England's wildlife species and are seasonally important for nearly 70% of species. White-tailed deer, black bear, rodents, such as deer mice, meadow voles, shrews, and woodchucks, commonly feed on the vegetation present in these habitats, and carnivores from weasels and hawks to coyotes and bobcats in turn feed on these species. Permanent wildlife openings are heavily used by bird species as feeding and nesting sites, specifically by the eastern bluebird, Bobolink, and northern harrier, which are species of concern in New Hampshire. They also create important edge habitat. Wherever an open area meets the forest, the area of transition will attract the largest diversity of species, both plant and animal. Generally, there will be species adapted to permanent wildlife openings, those adapted to forested habitat, and those who specialize in the transition zone area, who will frequent these edge habitats. For example, many bird species that feed in openings are known to nest within the edge habitat because there is typically more structural diversity and cover.

Currently, Dalton has 1,165.45 acres maintained as permanent wildlife openings which make up 6.4% of the Town's area. These areas are down from the 2005 NRI where 1,605 acres (nearly 9%) were digitized in town. The New Hampshire's State average is 10% permanent wildlife openings. For the current NRI, Elise digitized a total of 146 different openings from aerial photos during this project ranging in size from 0.44 acres to approximately over 91 acres. These openings are scattered throughout town and generally found along roads and often associated with private properties or working farms. Varying sizes of permanent openings are preferred by different species. For example, northern harriers – a predatory bird or raptor - prefer larger openings while feeding, yet snowshoe hare are more likely to feed in smaller openings where cover is more readily available. Smaller areas such as lawns near homes and seeded woods roads were not included in this mapping analysis. These openings, especially those in more isolated parts of the Town, are still important habitat and help maintain Dalton's plant and wildlife diversity.

As the percentage of permanent opening in New Hampshire has decreased significantly over the past 50+ years, the State is encouraging landowners to create or maintain permanent opening as important wildlife habitat.



Right in the center of this photo is a healthy black bear at the edge of a field, feeding on grasses and clovers. Most wildlife species prefer the edges of these permanent openings where they can be close to forest cover. Photo taken on May 9, 2023.

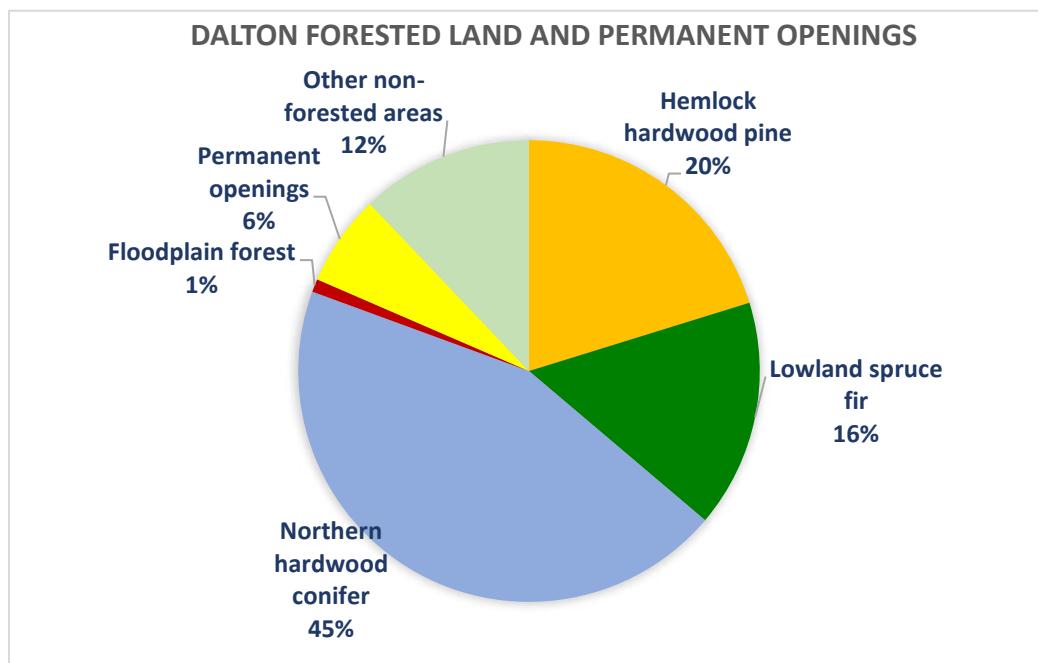
***Retain, and possibly increase, permanent wildlife openings to increase the diversity of wildlife and plant community types throughout Dalton. When possible, it is a good practice to remove non-functioning fencing, such as barb wire and woven sheep fence.***



Permanent openings are not only excellent for wildlife, but also offer scenic and expansive views. This photo was taken from the base of Wallace Hill looking across the northern part of Dalton and into Vermont – 10-6-2022.



This field was reclaimed and is maintained by private landowners. There is funding available to help landowners create and maintain permanent wildlife openings. Photo taken 5-11-2023.



#### Conservation Land (Map #2 at the end of report)

Over 2,108.4 acres equaling 11.6% of Dalton is land conserved through conservation easement, state parks, and town owned school. This is nearly double the amount of conserved land from the 2005 NRI (1,146.3 or 6.3%). Land conservation is not only a goal of the Dalton Conservation Commission, but also one of the top goals of Dalton's latest master plan. The table below shows the list of conserved land in Dalton.

Natural Resource Inventory for Dalton, NH

Tax ID	Name	Type of Conserved Land	Acres
035-002	Bradley	Conservation Easement	269.74
035-006	Dalton School Lot	Town Owned Land	10.79
035-004	Dana Easement	Conservation Easement	55.52
035-005	Dana Forest		300.81
044-001	Forest Lake State Park	State Park	413.05
035-001	Greasen	Conservation Easement	268.05
044-004	Hall-Nilsen	DR	4.37
	Dannis – NRCS Easement	USDA -NRCS Easement	483.23
044-002	Ruth & Slade Gorton Memorial Forest	FO	105.51
035-003	Smith Farm – 2 parcels	Conservation Easement	43.42
044-003	Thompson	DR	11.55
043-018	TransCanada CE – two parcels	Conservation Easement	142.4



The Trails on the David Dana Forest lead through many different habitat types, wetlands, and even a cave! Photo taken on 10-6-22.



Trail in Forest Lake State Park. This trail winds through a variety of habitat types, including vernal pools. The state recently completed a logging job to enhance wildlife habitat and generate income.  
Photo taken 5-9-2023



Standing in Gilman, VT looking towards the Dalton shore along the Connecticut River. This NW corner of Dalton along the Connecticut River is under a conservation easement held by TransCanada. Photo taken 5-25-23.

There are several ways to conserve land. Many lands are owned by federal, state, and local governments (national forests, state parks, and state/town forests, for example). A conservation easement on private land is another means to protect property. It creates a legally binding agreement between a landowner and a conservation organization to limit future development on the property while protecting its natural resources.

enforceable land preservation agreement between a landowner and a municipality or a qualified land protection organization or trust. It restricts real estate development, commercial and industrial uses, and certain other activities on a property to a mutually agreed upon level. The decision to place a conservation easement on a property is strictly a voluntary one where the easement is sold or donated. The restrictions, once set in place, are binding for all future landowners. The restrictions are spelled out in a legal document that is recorded in the local land records, and the easement becomes a part of the chain of title for the property. The landowner who gives up these development rights continues to privately own and manage the land and may receive significant state and federal tax advantages with their land for future generations. The easement holder has a responsibility to monitor future uses of the land to ensure compliance with the terms of the easement and to enforce the terms if a violation occurs.

***Consider working with land trusts, state agencies and/or federal agencies to establish one or more Community Forests. Community Forests are town-owned and managed. They are for the residents of Dalton to manage, conserve, and enjoy. Additional things to consider on future town-owned, state-owned or federally-owned properties include:***

- ***Recreational opportunities such as trails and wetland viewing areas***
- ***Protection of sensitive areas including wetlands, streams, steep slopes and vernal pools***
- ***Working with agencies to determine if eligible for carbon offset programs, which can be additional revenue for Dalton***

***Four broad areas were highlighted for priority conservation efforts in the future. They are described in the Discussion – Future Opportunities and Benefits section and shown on Map #10 at the end of this report. The Town of Dalton has a Conservation Fund with monies coming from land use change tax. This fund can facilitate land conservation projects.***

#### [\*\*Rivers, Streams, Lakes, and Ponds \(Maps #3 to #4 at end of report\)\*\*](#)

There are 74.1 miles of perennial streams and rivers that flow through Dalton. The Connecticut River is the largest and flows for 7.18 miles through town. The Connecticut River begins just south of the international border with Quebec, Canada. It starts as a drainage from the Fourth Connecticut Lake, then flows through the Third, Second, and First Connecticut Lakes, followed by Lake Frances. It then moves along Route 3, eventually forming the Vermont and New Hampshire border. Once leaving NH it flows through Massachusetts, and Connecticut before entering Long Island Sound in the Atlantic Ocean – covering 410 miles and making up a watershed totaling 11,260 mi<sup>2</sup> (7.2 million acres). It was designated into the New Hampshire Rivers Management and Protection Program in July 1992 (NH DES, 2019). The NH Rivers Management and Protection Program is a partnership created between state government and local citizens through the formation of a Local River Management Advisory Committee (LAC) for each Designated River. The LAC for the Connecticut River in New Hampshire is the Connecticut

## Natural Resource Inventory for Dalton, NH

River Joint Commissions (<http://www.crjc.org/>). The Connecticut flows predominantly southwest through Dalton.

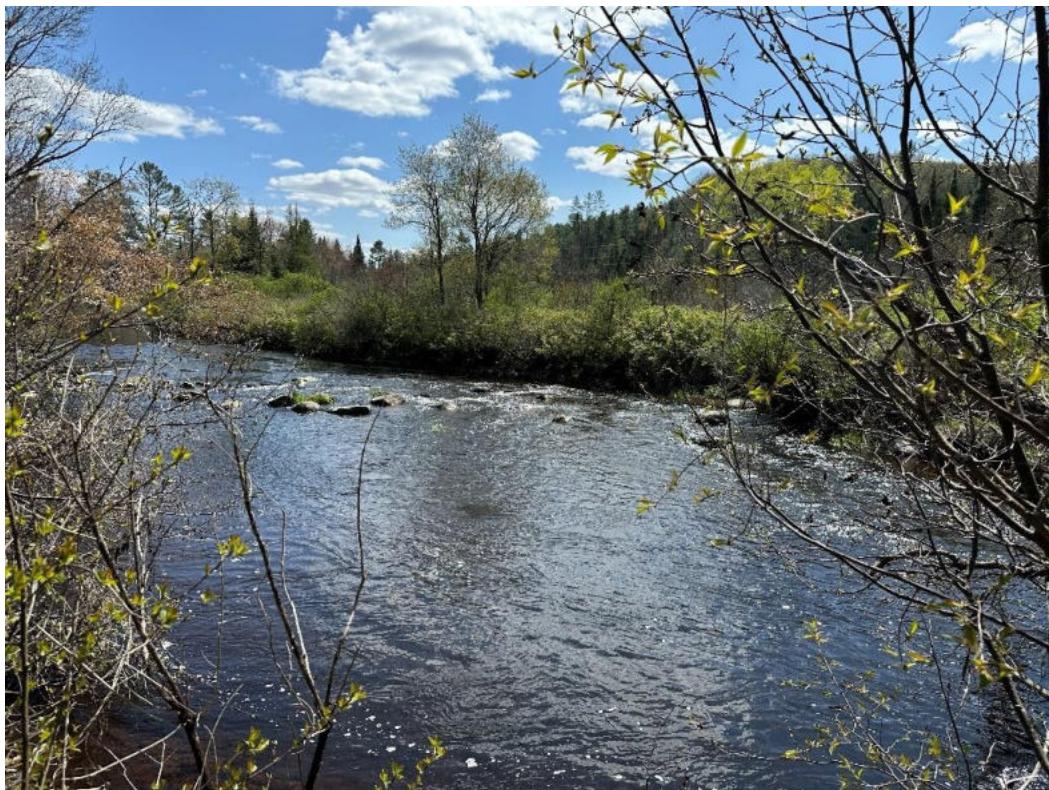


The Connecticut River in the northeast part of Dalton right by its confluence with the Johns River. Photo taken on 10-6-22.

The Johns River is the second largest river in Dalton running north along the eastern part of town. It begins in Jefferson at the outlet of Little Cherry Pond in the Pondicherry Wildlife Refuge. It flows through Jefferson, Whitefield and then Dalton before entering the Connecticut River in the northeast corner of town. It contains a variety of habitat types, gradients, and associated wetlands making it a hotspot for a diversity of wildlife species.



The Johns River upstream from its confluence with the Connecticut River. Here it is slow-moving with a diversity of associated wetlands. Photo taken 10-6-2022.



The Johns River further upstream near Carlton Hill Road has more flow and a cobbly, rocky bottom.

Photo taken 5-9-2023.

Cushman Brook is the next longest perennial stream in Dalton at 4.82 miles. It begins just north of Forest Lake, flowing north and northwest through Dalton before entering the Connecticut River in the northwest part of town. Several headwater streams enter Cushman Brook draining Dalton Mountain, Beede Mountain, Wallace Hill and Blue Hill.

Chase Bog Brook flows northeast in the southern part of Dalton for 3.78 miles. It begins in Dalton just south of Faraway Road and enters the Johns River in Whitefield. The perennial stream and associated wetlands have been considered a “gem” ecologically, which lead to a comprehensive wetland study of Chase Bog Brook and associated wetlands in 2004 (Watershed to Wildlife, Inc., 2004). This study recommended protection of the entire wetland complex, working with willing landowners to put their property in this area into a conservation easement, and/or designating it as a Prime Wetland with the State of New Hampshire.



Chase Bog Brook near an old beaver dam. Access to this stream and wetland complex is challenging in some areas, but the diversity of wetlands and upland areas make it excellent wildlife habitat. Photo taken 5-25-2023.



Chase Brook by an active beaver dam during the first snow of the season. This photo was taken for the 2004 Chase Brook Bog Wetland study on a snowy morning - 10-24-2003.

## Natural Resource Inventory for Dalton, NH

All perennial streams in Dalton not only have a variety of upland forest types, but they also have several wetland types associated with them. Beaver activities along streams are dynamic and ongoing. Beaver enhance the diversity of wildlife habitat and make these rivers and streams some of the most diverse river/wetland complex systems throughout town. The Johns River and Chase Bog Brook are two high value areas ecologically, in part thanks to the presence of beaver. There are many unnamed headwaters streams located throughout Dalton with diverse habitat and excellent vegetative buffers. These areas provide high value plant and wildlife habitat and connectivity to forests, wetlands, and other habitat types.

***The Connecticut River is the largest river in Dalton, and the most vulnerable to runoff, erosion, and pollution because it flows right through several towns in New Hampshire and Vermont. Wherever possible:***

- ***minimize impervious surfaces adjacent to the river***
- ***maintain and enhance native vegetative buffers***
- ***continue to test the water quality throughout the year***

**Table1: List of named Rivers and Streams in Dalton**

River/Stream	Length in Dalton (miles)	Direction of flow	Watershed Area in Dalton (HUC 12)	River Confluences
Connecticut River	7.18	Southwest	Dalton Tributaries Lancaster Tributaries	Atlantic Ocean
Johns River	6.3	North and northwest	Johns River Watershed	Connecticut River
Cushman Brook	4.82	North and northwest	Dalton Tributaries	Connecticut River
Chase Bog Brook	3.78	Northeast	Johns River Watershed	Johns River in Whitefield to Connecticut River in Dalton

**Lakes/Ponds** – Dalton contains 164.08 acres of lakes, ponds and open water, making up less than 1% of the town area. Forest Lake is the largest lake at 196.22 acres. Of that 106.02 acres are in Dalton and the remaining in Whitefield. Forest Lake is mostly developed around it except for a section along the southern shoreline which contains a 12-acre forested wetland in Whitefield. The water quality of this lake is particularly important as it is not only habitat for wildlife, but also a popular recreation area. Residents and several towns around Forest Lake are concerned with a proposed landfill adjacent to Forest Lake, Alder Brook and the Ammonoosuc River. Recent water quality testing of Forest Lake (including 14 private wells adjacent to the

lake) has shown that the water quality<sup>2</sup> of Forest Lake is excellent. Many residents are concerned with future water quality levels if a landfill is constructed. See appendix A for the latest water quality reports on Forest Lake.



Forest Lake is the largest body of water in Dalton and is in the southwest corner of town. The lake is also in Whitefield. Water quality, wildlife, and stunning mountainous views are all what make it a popular destination. Photo taken on 5-9-2023 facing southeast towards the White Mountains.

The second largest lake in Dalton is Mirror Lake which is 54.4 acres total. Of that, 9.1 acres are in Dalton, and 45.3 acres are in Whitefield.



Mirror Lake looking towards the portion within Dalton. Like Forest Lake, Mirror Lake is important for recreation, and maintaining excellent water quality should be a priority. Water leaving Mirror Lake enters the Johns River and eventually the Connecticut River. Photo taken 7-27-22 during field work in Whitefield.

<sup>2</sup> Most recent water testing was for PFAS - Per- and poly-fluoroalkyl substances are a group of human-made chemicals (of which there are thousands) known as PFAS. These chemicals were developed in the 1940s to repel water or make a surface slippery. Since then, PFAS have been adapted for many consumer products and are now common drinking water contaminants throughout the United States. More information found [here](#).

There are several smaller unnamed ponds found in Dalton, most of which are dependent on beaver activities. These ponds can be any size from no open water to a several acre pond. The size can vary year to year. There are a few areas of open water, especially along the Johns River and Chase Bog Brook.

All rivers and water bodies offer recreational and wildlife value for Dalton, and the entire region. Swimming, kayaking, canoeing, birdwatching, hiking, skiing, fishing and hunting are all common activities in Dalton. Tourism accounts for a large portion of income for New Hampshire and these waterbodies are significant components.

***Maintaining good water quality of these areas is not only important ecologically, but also for valued tourism. Continue monitoring water quality in these lakes, especially with potential land use changes and continued development.***



This pond adjacent to route 142, although relatively small, it offers excellent habitat for wildlife. 5-25-23

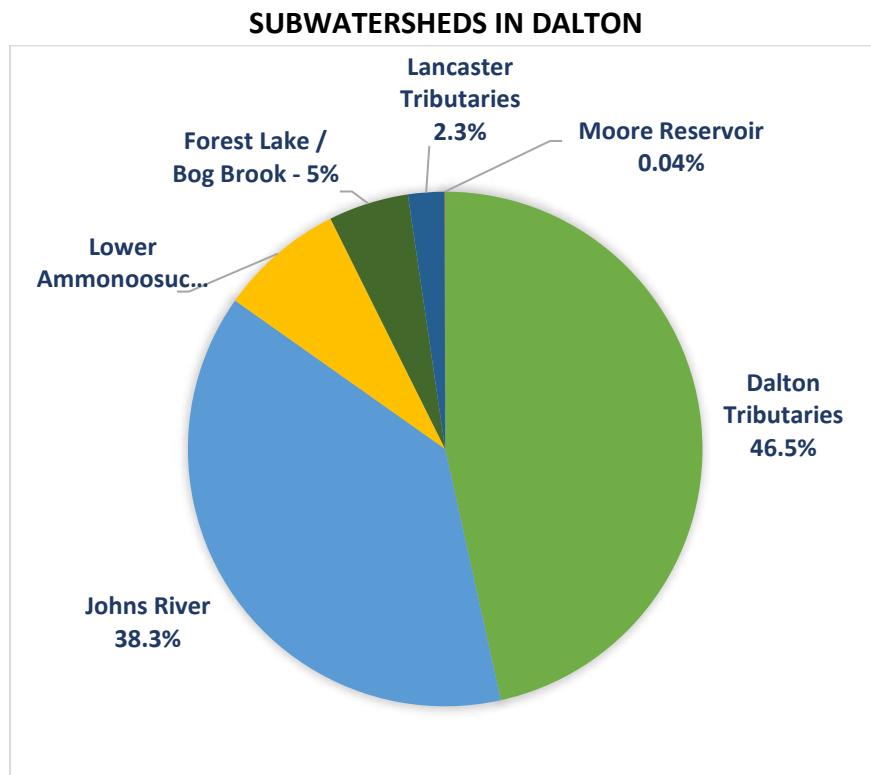
#### Sub-Watersheds (Map #4 at end of report)

The ability to view the landscape from a watershed or sub-watershed perspective helps to understand drainages, flows, and associated habitat throughout the Town. Sub-watersheds do not stop at municipal boundaries. All things downstream are affected by land management upstream, particularly in the headwaters. The State of NH breaks down the watershed to the HUC 12 level, and most towns and cities contain more than one subwatershed determined by topography and ridgelines.

Dalton contains portions of 6 sub-watersheds when broken down to the level 12 hydrologic unit code (HUC) listings. The largest subwatershed in Dalton is Dalton Tributaries which cover north and west portions of town at 8,424 acres. It includes Blue Hill, Beede Mountain, Wallace Hill and a portion of Dalton Mountain. The drainage from these hills and ridges flows into the Connecticut River. The Johns River subwatershed is the next largest in Dalton covering 6,926.5 acres and includes both the Chase Bog Brook and Johns River areas and drainages.

## Natural Resource Inventory for Dalton, NH

All 6 of the subwatersheds in Dalton are part of a larger watershed area called the Upper Connecticut River Watershed. A list of these subwatersheds are shown and described in the following chart and table.



**Table 2: List of Sub-watersheds in Dalton, NH**

HUC 12 Name - subwatershed	Acres in Dalton	General Location description	HUC 6 Name – larger watershed Area	Acres in Dalton
Dalton Tributaries	8,423.99	Northwestern to central areas		
Johns River	6,926.52	South and eastern areas including the Johns River and Chase Bog Brook		
Lower Ammonoosuc River	1,422.14	Southwest corner of Dalton	Upper Connecticut River	18,104.42
Forest Lake-Bog Brook	911.86	Part of Forest Lake State Park just east of Ammonoosuc River subwatershed		
Lancaster Tributaries	413.52	Northeast corner of Dalton		
Moore Reservoir	6.39	Small area on the west townline with Littleton		

## Riparian Zones and Floodplains

A riparian zone or riparian area is the interface between land and a stream or river. Riparian zones are important habitats because of their role in soil conservation, their biodiversity, and the influence they have on aquatic ecosystems. Riparian habitats occur in many forms including grassland, woodland, wetland, floodplains, or a combination of features. They are important travel corridors for many wildlife species. A floodplain is flat or nearly level land adjacent to a stream or river that experiences occasional, seasonal, or periodic flooding. Floodplains are a category of riparian zones and often support rich, diverse ecosystems. Dalton contains a diverse amount of riparian and floodplain areas.

Floodplains are very fertile agricultural areas, especially along larger rivers. The floodplains along the Connecticut River contain fertile areas and have a long history of farming in both Vermont and New Hampshire. There are smaller although equally fertile floodplain areas along some of the smaller rivers and streams including Johns River and Chase Bog Brook. Floods carry nutrient-rich sediment and distribute it across a wide area. Although some portions of Dalton's riparian areas and floodplains have been impacted by development, most areas have not, and there are a few opportunities for maintenance of adjacent riparian habitat and creation of additional buffers.



Large undeveloped riparian habitat along the Johns River in northeastern Dalton. This area contains high value wildlife habitat and diverse plant communities. Photo taken 10-6-2022.



The riparian buffers along the Connecticut River are excellent in this area near the confluence with the Johns River. Photo taken on 10-6-2022.

Floodplains and riparian areas are home to a diversity of wildlife. The rich soils create excellent insect and amphibian breeding habitats, and these species in turn become prey for birds such as woodcock and barred owl, for mammals such as mink and raccoon, and for reptiles such as smooth green snake and wood turtle. These corridors allow wildlife to move from one habitat to another. Intact riparian areas are essential for creating and maintaining a healthy aquatic system. Overhanging vegetation such as shrubs and trees provide important shade to aquatic habitats allowing them to maintain cooler water temperatures and adequate amounts of dissolved oxygen. This is particularly important for trout and other salmonid species. The root systems of the riparian vegetation are also important for reducing the amount of erosion and subsequent sediment accumulation that the constant moving water and flooding situations can cause. Riparian habitats also slow and hold floodwaters reducing shoreline damage and can work as a filtration system removing nutrients and toxins from the water and assisting in maintenance of water quality. Riparian vegetation can also provide habitat structure to aquatic systems through dead or broken limbs and whole trees that fall into the water.

Logging these forested riparian areas is generally not recommended due to proximity to the rivers and wetlands. If timber is harvested in these areas, it should occur during the winter months when the ground is completely frozen.

***Conserving or expanding riparian areas and shoreland buffers is a vital part of conserving Dalton natural resources. Adherence to New Hampshire's Shoreland Protection Program will help maintain existing riparian habitat, providing wildlife travel corridors and maintaining good water quality.***

### Wetlands and Hydric Soils (Maps #3 at end of report)

Wetlands are an essential habitat type for most plant and animal species in New Hampshire. Wetlands are extremely diverse depending on the hydrology, soils, topography, and climate of an area. In addition to the rivers, lakes, and ponds, there are four general types of Palustrine<sup>3</sup> wetlands: forested, scrub shrub, emergent (wet meadow), and open water, with additional sub-types within each of these categories. This diversity extends into each individual wetland where a variety of plant/wildlife species and water regimes co-exist. In addition, the edge habitats within and around wetlands are frequently used by many wildlife species. It is estimated that riparian areas and wetlands are used by over 90% of the region's wildlife species and provide preferred habitat for 50% of local species. For these reasons wetlands provide critical wildlife habitat and offer plentiful viewing and hunting opportunities.



A diverse wetland in Dalton. The open area is mostly an emergent wetland with open water. Scrub shrub and forested wetlands are around the edges, followed by upland habitats. There is an unnamed perennial stream flowing through this wetland as well as fresh beaver activity. Photo taken 10-6-2022.

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<sup>3</sup> Palustrine wetlands are a group of vegetated wetlands traditionally called marshes, swamps, bogs, fens. They also include the small, shallow, permanent or intermittent water bodies often called ponds.



Small perennial stream and associated forested wetland in the David Dana Forest, Dalton, NH. Photo taken on 10-6-2022.



Beaver have a huge impact on wetlands throughout Dalton. Here they have expanded the ponded area of this wetland compared to the 2005 NRI in town. A perennial stream leaving this wetland enters the Johns River near French and Whitefield Roads. Photo taken 5-25-23.

Along with providing important plant, wildlife, and fish habitat, wetlands are also an important protector of water sources. Because they often contain hydrophytic vegetation (plants adapted to living in water and/or wet conditions) and poorly drained soils, wetlands store significant amounts flood and/or run-off water, minimizing serious damage in times of high water. They are important contributors to groundwater recharge. This ability to retain water allows wetlands to act as a filtration source. As moving water is slowed and stored in wetlands, suspended sediments and particles settle to the mucky substrate and plant roots are

given a chance to absorb excess nutrients, toxins, pollutants, and contaminants. These functions make wetlands an important source for maintaining the health of aquatic systems.

Wetland areas are dynamic and constantly changing. The general trend (without severe weather or other outside influences) is for wetlands to slowly fill in over time. The process begins with open water, and over time, submerged plants appear. Floating-leaved plants, such as water lilies, eventually follow. Then emergent plants such as reeds, sedges, and wetland grasses begin to flourish. Shrubs such as high bush cranberry (*Viburnum trilobum*), sweet gale (*Myrica gale*), mountain holly (*Ilex mucronata*), and bog rosemary (*Andromeda glaucophylla*) begin to appear and heaths such as leatherleaf (*Chamaedaphne calyculata*) and labrador tea (*Ledum groenlandicum*) surface among the shrubs. Trees including red maple (*Acer rubrum*), gray birch (*Betula populifolia*), and larch (*Larix laricina*) subsequently emerge. This natural successional process is often referred to as lakefill.

On the other hand, there are several environmental and human-induced reasons for wetlands to increase in size. Some examples of these include:

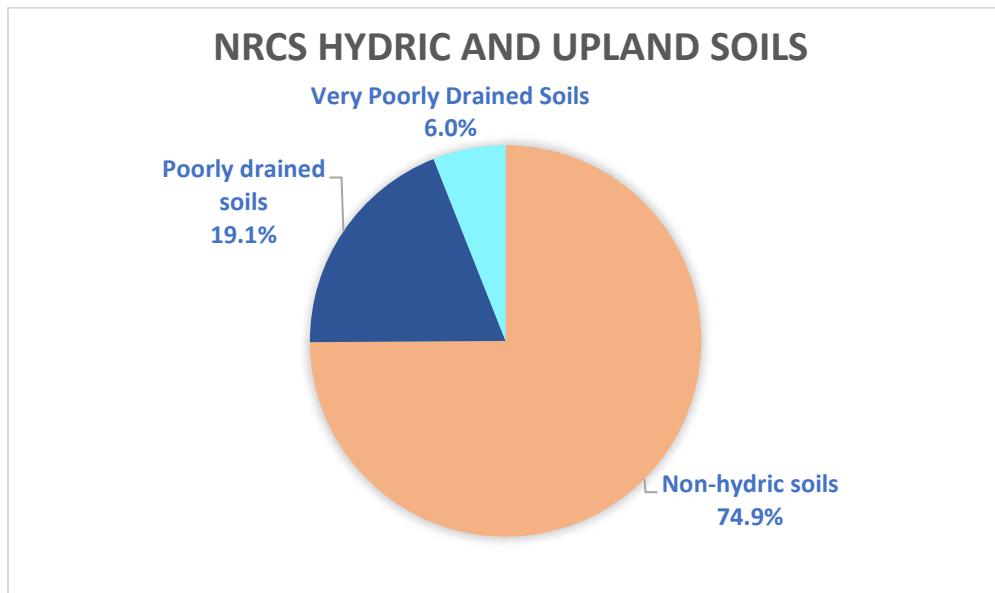
- Human development, including damming or excavation such as the mining of gravel and sand could increase wetland sizes and often create new wetlands
- Severe weather changes – an increase in rain will increase the wetland area, whereas a drought may diminish the area
- The cyclic movements of beaver as hardwood saplings regenerate in early succession. In Dalton there is fresh sign of beaver activities in most of the wetland complexes throughout Town
- Human activities such as logging and landscape alteration can dredge out wetland areas or increase the amount of runoff into wetlands



**Left Photo:** 2003 aerial photo of a wetland in Dalton. At the time of this photo, there was no open water areas indicating the beaver were not living there and maintaining the dams. The area is predominantly emergent wetland.

**Right Photo:** 2015 aerial photo of same wetland. The presence or absence of beaver living in this area will dictate the amount of open water. Beaver activities can dramatically change the look and hydrology of wetlands and are impressive engineers.

Dalton contains over 2,828.5 acres of wetlands (15.6% of town). They range in size from less than an acre to several hundred acres and contain a variety of wetland habitats including forested, scrub shrub, emergent, riverine, and open water wetlands. Most wetlands mapped in Dalton have been obtained from the U.S. Fish and Wildlife Service's National Wetland Inventory. By examining the 2015 aerial photographs, Elise digitized 45 additional wetland areas for this study making up nearly 70 acres. These figures are much higher compared to the last NRI, most likely due to the quality of aerial photography and inclusion of identified forested wetlands.



Of the hydric soils mapped throughout Dalton, 3,455.41 acres are classified as poorly drained and 1,088.38 acres are very poorly drained – with a total of 4,543.79 acres (25.1%) hydric soils throughout Dalton. Poorly drained soils are defined as soils where water is removed from the soil so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. In very poorly drained soils, water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Hydric soils are scattered throughout the Town. There are generally fewer wetlands in the hilly or mountainous parts of Town. On the other hand, along flatter areas like the Johns River, Chase Bog Brook and Cushman Brook, there are more areas with very poorly drained soils. The largest wetland areas are found along the Johns River near where it enters the Connecticut River: at the northeastern corner of Dalton. These series of wetlands contain a combination of forested, scrub shrub, emergent wetlands, open water, and a Lower Perennial stream. Another large wetland complex is along Chase Bog Brook in the southern part of Dalton. Both of these areas have been highlighted in the past as ecological hotspots in town.

***Dalton should continue to prioritize maintaining and enhancing water quality, working to conserve and maintain all types of wetlands throughout the Town. Emphasis should be placed on wetlands outside of conserved lands that are important linkages for wildlife.***



This flat wetland area is associated with Chase Bog Brook. It contains very poorly drained soil called Bucksport Muck and Peacham very poorly drained soils. Pillsbury and Lyme poorly drained soils are in adjacent the forested wetlands. These hydric soils are common in northern New Hampshire. Photo taken 5-25-2023.

**Vernal Pools** – During this NRI and a previous vernal pool study, 8 vernal pools were documented in Dalton. An additional 5 vernal pools were documented on private property as part of a wetland permit application and there are likely many more in Town. **We recommend continuing to document and record vernal pools throughout town to build upon the database.** Vernal pools are unique, often isolated and important wetland types. Vernal pools provide essential breeding habitat for certain amphibians and invertebrates such as wood frogs (*Rana sylvatica*), spring peepers (*Pseudacris crucifer*), yellow spotted salamanders (*Ambystoma maculatum*), blue spotted salamanders (*Ambystoma laterale*), and fairy shrimp (*Branchinecta lynchi*). These creatures depend on vernal pools as breeding sites because they are only temporary water bodies preventing fish and other aquatic predators from taking up residency. Reptiles such as painted turtles (*Chrysemys picta*) also rely on vernal pools as important feeding areas in early spring. Vernal pools fill annually from precipitation, runoff, and rising groundwater in the fall and spring. By mid-summer, however, these wetlands are typically dry, making them a dynamic system inhabitable to many species except for specifically adapted plant and wildlife species. For this reason, many unique, rare, threatened, and endangered species are linked to this wetland type. The State of New Hampshire (Fish and Game Department and Wetlands Bureau) recognizes their value as important habitat and give them special attention. Refer to Map #4 – *Wetlands and Water Resources* - at the end of the report

Natural Resource Inventory for Dalton, NH

for locations of known vernal pools throughout Dalton. A description of vernal pools documented during this study is shown in the table below.

Vernal Pool Number	Location/ Description	Probable or Confirmed	Documentation Date
VP01	Near Johns River and CT River confluence	Confirmed during region-wide vernal pool study – presence of fairy shrimp	2004
VP02	Near Johns River and CT River confluence	Confirmed during region-wide vernal pool study	2004
VP03	In ag field in northeastern Dalton	Confirmed during region-wide vernal pool study	2004
VP04	Near French and Whitefield Roads, and Johns River	Confirmed – wood frog tadpoles and yellow spotted salamander egg masses	5-9-2023
VP05	Forest Lake State Park	Confirmed – wood frog tadpoles and yellow spotted salamander egg masses	5-9-2023
VP06	Forest Lake State Park near the road	Confirmed – wood frog tadpoles and yellow spotted salamander egg masses	5-9-2023
VP07	Near Faraway Road	Confirmed – wood frog tadpoles, yellow spotted salamander egg masses, and blue spotted salamander egg masses	5-9-2023 - has been monitored for many years.
VP08	Near Faraway Road	Confirmed – wood frog tadpoles and yellow spotted salamander egg masses	5-9-2023 - has been monitored for many years.
VP09	West of Forest Lake Within 100 feet of VP10	Confirmed – Spotted salamander egg masses	2019 and 2020 Documented by Horizons Engineering for Wetland Permit Application
VP10	West of Forest Lake Within 100 feet of VP09	Confirmed – wood frog and spotted salamander egg masses	2019 and 2020 Documented by Horizons Engineering for Wetland Permit Application

Natural Resource Inventory for Dalton, NH

Vernal Pool Number	Location/ Description	Probable or Confirmed	Documentation Date
VP11	West of Forest Lake	Confirmed – wood frog and spotted salamander egg masses	2019 and 2020 Documented by Horizons Engineering for Wetland Permit Application
VP12	West of Forest Lake Connected to VP13 by forested wetland	Confirmed – wood frog egg masses	2019 and 2020 Documented by Horizons Engineering for Wetland Permit Application
VP13	West of Forest Lake Connected to VP 12 by forested wetland	Confirmed – Wood frog and spotted salamander egg masses	2019 and 2020 Documented by Horizons Engineering for Wetland Permit Application



An active vernal pool with abundant salamander (yellow spotted and blue spotted) egg masses and wood frog tadpoles in a hemlock forest. The pool is approximately 200 x 75 feet and well buffered all around.

Photo taken 5-9-2023.

Vernal pool documented in Forest Lake State Park right off Forest Lake Road. There were two other vernal pools along a trail heading further into the state park as well. All had adequate buffers. Photo taken 5-9-2023.



#### Geology (Map #5 at the end of this report)

Geologic events that occurred thousands and millions of years ago still influence the management of forests today. Parent bedrock material provides the nutrients for vegetation today and to some extent determines which species will grow where in the forest. The most recent glacier also has an influence on the soil and forest types that are seen today.

The geologic rock types in Dalton are approximately half metamorphic and half plutonic - igneous rock types. When magma never reaches the Earth's surface and cools to form intrusions, the resulting rocks are called plutonic. These include granite, granodiorite, and diorite rocks which are found throughout NH. When the magma does reach the surface during a volcanic eruption, the rocks that form there are called volcanic rocks (examples in NH are rhyolite rocks). The Biotite granodiorite is the largest plutonic feature. It runs east/west through southern Dalton encompassing all the Chase Bog Brook area at 3,434.7 acres. The next largest plutonic formation contains Tonalite, diorite, granodiorite and granite (1,595.4 acres), which is found right at the Johns River and Connecticut River confluence in the northeast corner of town.

Over half of Dalton, mostly throughout the northern half of town, is made up of metamorphic rock. Metamorphic rocks are formed through tremendous heat and pressure and include metapelite, quartzite, schist, and metawacke. These are Littleton Formation, Ammonoosuc Volcanics, Smith Falls Formation, Dead River Formation, and Madrid Formation.

The Littleton Formation is the largest of the metamorphic rock features at 3,172.1 acres and contains most of Dalton Mountain.

The bedrock and resultant soil formed during past geologic periods together with the transport and deposition of this material by the glacier is a strong influence on the trees, shrubs and herbaceous vegetation that grows in the forest. The bedrock geology map attached at the end of this report was done at a coarse scale without field verification. Future detailed studies can be completed to refine and give a more detailed view of geology throughout Dalton.

### **Soils**

Like bedrock geology, the nature of soil has a profound effect on plant growth. Whether it is rich with organic material, very poorly drained, or sandy, these characteristics will affect the type of vegetation adapted to grow in those conditions, and thus affect the type of wildlife in the area. Scientists can learn much about the soil type by examining the vegetation. At the same time, examining the soil will predict the type of vegetation that can grow in the area. Because soils affect the vegetation that will grow in an area, they also influence the habitat types and therefore the wildlife species dwelling there. Understanding soil conditions and characteristics can be indicators of critical areas such as wetlands, agricultural lands, forestlands, and wildlife habitat. In descriptions of soil types, the NRCS evaluates soils according to their capacity for agriculture, sand and gravel production, woodland, community development, recreation, and wildlife habitat. Certain soils are better suited for certain land uses such as agriculture or residential development. For example, residential development should be located away from areas with unstable soil conditions such as high-water tables, and slow percolation rates, due to constraints for building foundations and septic system placement.

### **Farmland Soils (Map #6 at the end of report)**

Similar to many New England towns and cities, Dalton had family farms in the 1800's and early 1900s. Farming in Dalton was not easy given the abundance of steep slopes, rugged terrain, and rocky soil types. Overall, New Hampshire has experienced a loss of working farms. Many of the former, larger-scale farms have been replaced with smaller farms. There are few working farms in Dalton including:

- Rose Martin Farms
- Roots and Fruits Farm
- Ruth Duval: vegetable stand
- Lawrence Newton: Beef cattle
- White Hemp Farm

In the survey for the latest Master Plan for Dalton, residents were asked what businesses or services they would like to see more of in Dalton. Of the people who completed the survey, 63% believe that farms and agricultural businesses are considered the most desirable businesses (Dalton Master Plan, 2023).

Out of the 18,104.42 acres of land within Dalton the NRCS has classified 3,150.58 acres (17.4%) as farmland; 647.85 acres (3.6%) of land classified as USDA prime farmland soils, 666.84 acres (3.7%) are classified as farmland soils of statewide importance, and 1,835.89 acres (10.1%) is classified as farmland soils of local importance. Most of the prime farmland soils are found along the Connecticut and Johns River areas. Generally, where there are steeper slopes (hills and mountains in town), there is less agricultural soil. Because of Dalton's topography, there is relatively less agricultural soil compared to neighboring towns.

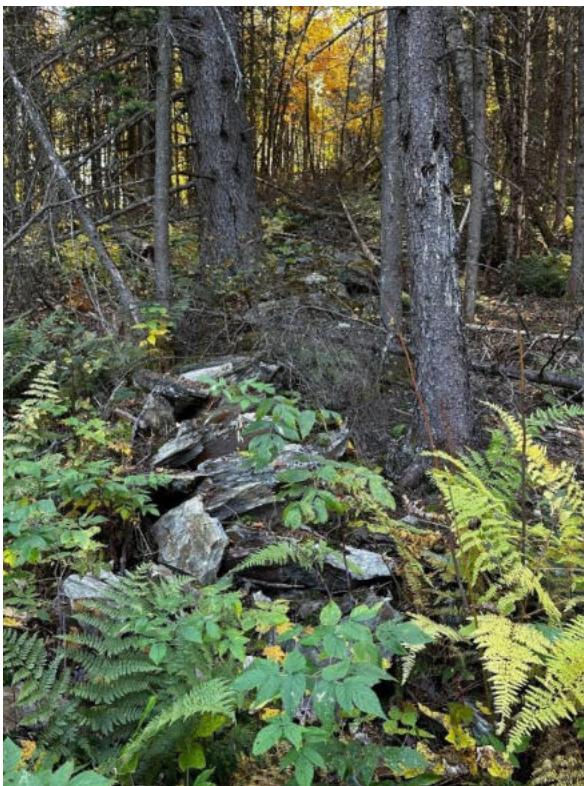
***As mentioned in the “Permanent wildlife openings” section, areas which had been used for agriculture, but are now abandoned, could be maintained as permanent opening habitat to benefit many wildlife species.***



This field on Blakeslee Road is classified as Farmland of Statewide Importance. Retaining the open field is recommended for wildlife. This time of the year, people often observe bear grazing at the edge of this field. Photo taken on 5-9-2023.

The fields shown in the photo to the right are classified as farmland soils. They are excellent wildlife habitat and offer panoramic views. Photo taken 10-6-2022.





This stonewall in Dalton indicates farming occurred here. The upland sections of this parcel are classified as farmland soils. Although this area has not been a field for many years, the mature, healthy mixed wood forest indicates good soil quality for vegetation growth. Photo taken 10-6-2022.

### Forestry Soil Groups (Map #7 at the end of report)

New Hampshire soils are complex and highly variable primarily due to their glacial origins. The Natural Resource Conservation Service (NRCS) has organized the soil into Important Forest Soil Groups like the work they have done with farmland soils described in the previous section. The objective is to offer a simplified tool to aid natural resource professionals and landowners. These groupings allow managers to evaluate the relative productivity of soils and to better understand patterns of plant succession and how soil and site interactions influence management decisions. All soils have been grouped into one of six categories, as described below (UNH Extension, 2023). Map #8 at the end of the report displays the forest soil classifications.

**Group IA** consists of the deeper, loamy, moderately well-drained and well-drained soils. Generally, these soils are more fertile and have the most favorable soil-moisture conditions. Successional trends are toward climax stands of shade-tolerant hardwoods such as sugar maple and beech. Early successional stands frequently contain a variety of hardwoods such as sugar maple, beech, red maple, yellow, gray, and white birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and white pine. The soils in this group are well-suited for growing high-quality hardwood veneer and sawtimber, especially sugar maple, white ash, yellow birch, and northern red oak.

**Group IB** generally consists of soils that are moderately well-drained and well-drained, sandy or loamy-over-sandy, and slightly less fertile than those in group 1A. Soil moisture is adequate for good tree growth but may not be quite as abundant as in group 1A. Successional trends and the

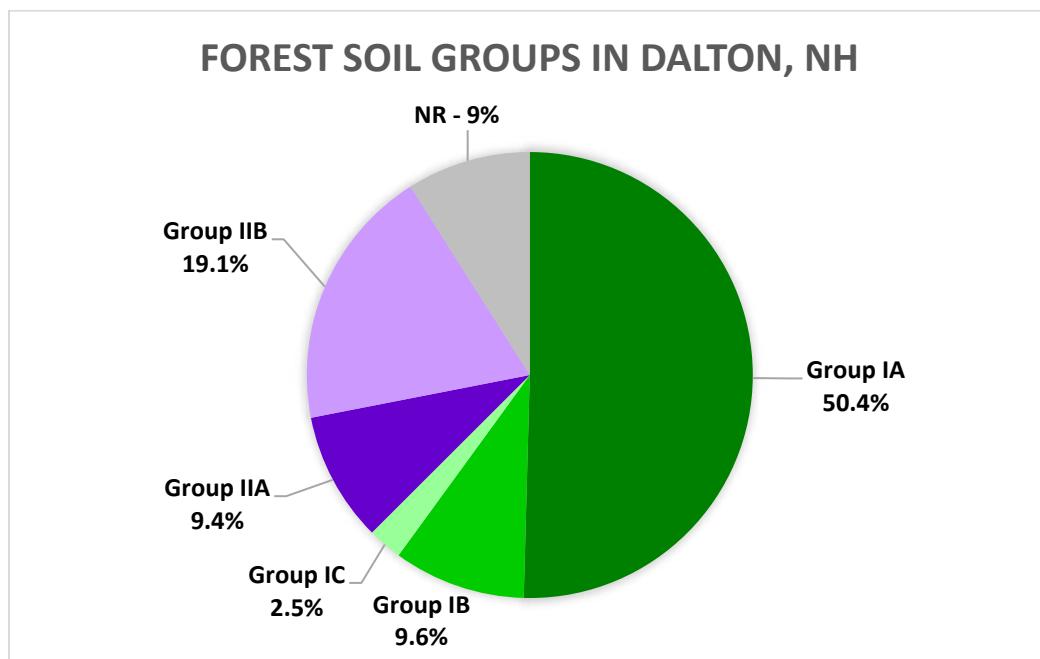
trees common in early successional stands are similar to those in group IA. However, beech is usually more abundant in group IB and is the dominant species in climax stands. Group IB soils are well-suited for growing less-nutrient-and-moisture-demanding hardwoods such as white birch and northern red oak. Softwoods generally are scarce to moderately abundant and managed in groups or as part of a mixed stand. Hardwood competition is moderate to severe on these soils.

**Group IC** soils are derived from glacial outwash sand and gravel. The soils are coarse textured and are somewhat excessively drained to excessively drained and moderately well-drained. Soil moisture and fertility are adequate for good softwood growth but are limiting for hardwoods. Successional trends on these soils are toward stands of shade-tolerant softwoods, such as red spruce and hemlock. White pine, northern red oak, red maple, aspen, gray birch, and paper birch are common in early successional stands. These soils are well-suited for high quality softwood sawtimber, especially white pine, in nearly pure stands. Less site-demanding hardwoods such as northern red oak and white birch have fair to good growth on sites where soil moisture is more abundant. Hardwood competition is moderate to slight.

**Group IIA** consists of diverse soils and includes many of the soils that are in groups IA and IB. The soils in IIA, however, have limitations such as steep slopes, bedrock outcrops, erodibility, surface boulders, and extreme stoniness. Productivity of these soils isn't greatly affected by those limitations, but management activities such as tree planting, thinning, and harvesting are more difficult and more costly.

**Group IIB** soils are poorly drained. The seasonal high water table is generally at a depth of 12 inches or less. Productivity is lower than in IA, IB, or IC. Fertility is adequate for softwoods but is a limitation for hardwoods. Successional trends are toward climax stands of shade-tolerant softwoods, such as red spruce and hemlock. Balsam fir is a persistent component in nearly all stands. Early successional stands frequently contain a variety of hardwoods such as red maple, yellow, gray, and paper birch, aspen, and white and black ash in varying mixtures with red spruce, hemlock, balsam fir, and white pine. These soils are well-suited for spruce and balsam fir pulpwood and sawtimber. Advanced regeneration is usually adequate to fully stock a stand. Hardwood competition isn't usually a major limitation, but intensive management by chemical control of competing woody and herbaceous vegetation may be desirable.

**Not Rated** Several mapping units in New Hampshire are either so variable or have such a limited potential for commercial production of forest products that they haven't been placed in a group. Examples are very poorly drained soils and soils at high elevations.



#### Stratified-Drift Aquifers (Map #3 at the end of report)

An aquifer is an underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt, or clay) from which groundwater can be pumped for drinking. Groundwater is a critical natural resource for the State of New Hampshire. Approximately 98% of public water systems rely on groundwater. There are three types of groundwater aquifers: stratified-drift, till, and bedrock. Stratified drift and till aquifers are composed of unconsolidated glacial deposits (loose earth materials), while bedrock aquifers are fractured rock. In stratified drift aquifers, the materials are sorted sand and gravel. In till aquifers, the material is a gravel, sand, silt, and clay mixture. In bedrock aquifers, the material is rock with fractures.

Stratified-drift aquifers are an important source of groundwater for commercial, industrial, domestic, and public-water supplies in the State of New Hampshire. They typically are the most productive sources of groundwater and therefore the highest yielding public water supply wells tap these aquifers. Stratified-drift or overburden aquifers are most directly influenced by surface waters and land-use activities. They are, therefore, perhaps most susceptible to contamination. Approximately 14% of land surface in the State is underlain with stratified-drift aquifers.

In Dalton 5,030.17 acres (27.8%) of the land area contains an aquifer. The largest contiguous aquifer runs along Chase Bog Brook, the Johns River and the Connecticut River in town. Most areas of the aquifer have a transmissivity of less than 2,000 square feet per day with some areas close to the Connecticut and Johns Rivers in the northern corner of Dalton having transmissivity rates between 2,000 and 4,000 and even over 4,000 square feet per day. These smaller areas within the larger aquifer areas are excellent water sources.



The aquifer under and around the Johns River (shown here) and Connecticut River has some of the highest water transmissivity in Town. Photo taken 10-6-2022.

Stratified drift aquifers consisting of sand materials, such as those in Dalton tend to be more porous and have a higher potential for quicker transmissivity and recharge. This also raises the risk of contamination and requires a region-wide approach, working with neighboring towns. ***Most people in Dalton get water from surface water, drilled or dug wells, and these aquifers are important water sources in the future. Whenever possible, these aquifers should be protected from contamination (impervious surfaces, point and non-point source pollution sources, development) to ensure future water quality and availability for the Town.***

#### [Slope \(Map #6 at the end of this report\)](#)

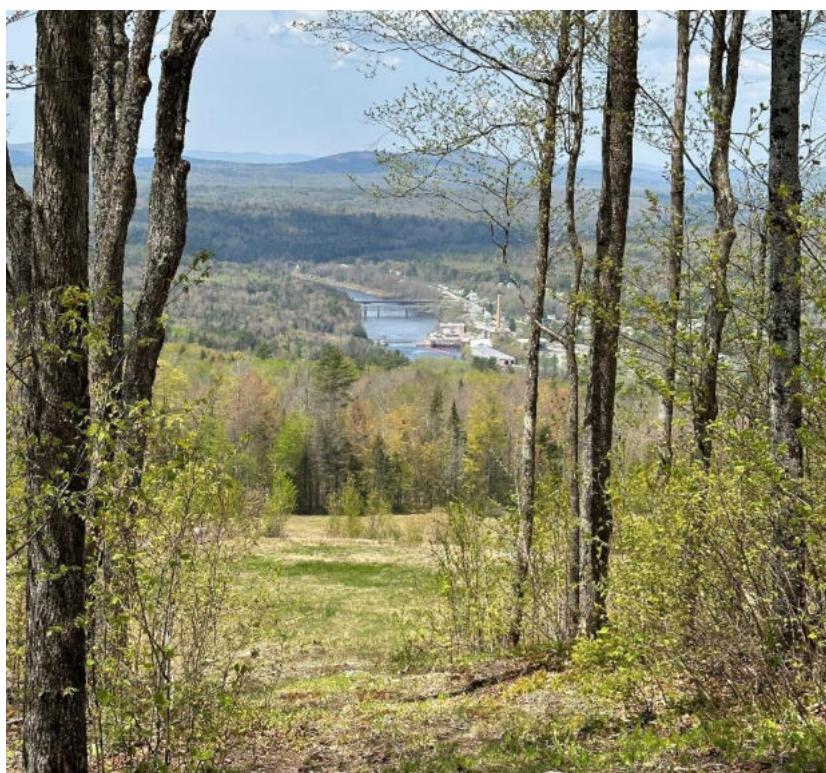
Slope is an important component of an area's landform and influences the plants and animals living there. Soils tend to be shallower on steeper slopes, the volume and amount of surface water runoff is higher, and the erosion potential is greater compared to flatter areas. These conditions create a unique habitat where in some cases plants and wildlife have special adaptations for dealing with the limitations associated with steep slopes.

Steep slopes provide opportunities for panoramic views and for this reason tend to be sought for residential development. Slope has several limitations for building such as structural problems and a greater chance of erosion. The consequences of erosion are loss of soil resulting in sedimentation of surface waters, loss of the productive capability of the land, and in severe cases, visual scars that can be seen from far away. Slope is traditionally expressed as a percent and represents the amount of rise or fall in feet for a given horizontal distance. For example, a 15% slope means that for a 100-foot horizontal distance, the rise or fall in height is 15 feet. As slope becomes steeper the expenses associated with building increase. In general, slopes between 15% and 25% are considered areas where development would be restrictive and

## Natural Resource Inventory for Dalton, NH

slopes greater than 25% are considered too steep to provide adequate sites for structures such as roads, homes, and septic systems.

NRCS soil data was used to determine areas in Dalton with slopes equal to and greater than 20%. Using NRCS data, 6,251.53 acres or 34.5% of the land in Dalton contains slopes that are 20% and over. Of that nearly 2,748.32 acres or about 15.2% of Dalton's land mass contains slopes over 30%. The topography in Dalton is quite different from neighboring towns, Lancaster and Whitefield, which have 13% and 10.8% steep slopes respectively. Although steep slopes are scattered throughout town, they are predominantly associated with Dalton Mountain, Beede Mountain, Wallace Hill, and Blue Hill. There are also steep slopes associated with the Connecticut River. This illustrates why there is less farming in many areas along the Connecticut River through town.



The view from the top of a hill towards the Connecticut River Valley is enhanced by the permanent opening and steep slope. Photo taken May 11, 2023.

## Rare Species and Exemplary Natural Communities

The Town of Dalton has documented occurrences of rare species and communities. They are listed by the NH Natural Heritage Bureau (NHB), the State agency that houses reported occurrences.

New Hampshire is home to more than 500 species of vertebrate animals. Many of these animals live in Dalton and the surrounding towns. The number would be considerably larger if a complete list of invertebrates (insects, crustaceans, clams and snails) were included. About 75% are nongame wildlife species – not hunted, fished, or trapped. Thirty species are endangered and 21 are threatened in the state. The New Hampshire Fish and Game Department maintains

## Natural Resource Inventory for Dalton, NH

lists of Endangered or Threatened animals in New Hampshire, shown below, with details at this [link](#). Minimal information is available relative to their occurrence in Dalton, but their habitats, when identified, should be protected.

Dalton has large tracts of land that are unfragmented, with many areas being conserved. These contain a diversity of habitat types and thus, Dalton has potential for containing many rare and endangered plant and wildlife species, beyond those currently recorded in Town.



Bald Eagles are often seen hunting along the Connecticut River in Dalton. NH Audubon Society photo taken by Donna Ellis (2022).



During a survey of the Johns River in 2003, Watershed to Wildlife, Inc documented a wood turtle near the Johns River and French Road. Wood Turtle are a species of concern in Dalton.

# ENDANGERED AND THREATENED

## Wildlife of New Hampshire

### ENDANGERED



**Endangered wildlife** are those native species that are in danger of extinction in New Hampshire because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to ensure these species' continued existence as viable members of the state's wildlife community.

#### INVERTEBRATES

- Dwarf wedge mussel, *Alasmidonta heterodon*\*\*
- Brock floater mussel, *Alasmidonta varicosa*
- Cobblestone tiger beetle, *Cicindela marginipennis*
- Puritan tiger beetle, *Cicindela puritana*\*
- Frosted elfin butterfly, *Callophrys irus*
- Kramer blue butterfly, *Lycaeides melissa samuelis*\*\*
- White Mountain fritillary, *Boloria titania montinus*
- Persius duskywing skipper, *Erynnis persius*
- Rusty Patched Bumblebee, *Bombus affinis*\*\*

#### FISH

- American brook lamprey, *Lethenteron appendix*
- Shortnose sturgeon, *Acipenser brevirostrum*\*\*

#### AMPHIBIANS

- Marbled salamander, *Ambystoma opacum*

#### REPTILES

- Blanding's turtle, *Emydoidea blandingii*
- Eastern box turtle, *Terrapene carolina*

- Eastern hognose snake, *Heterodon platirhinos*
- Timber rattlesnake, *Crotalus horridus*

#### BIRDS

- Northern harrier, *Circus cyaneus*
- Golden eagle, *Aquila chrysaetos*
- Common nighthawk, *Chordeiles minor*
- Piping plover, *Charadrius melodus*\*
- Upland sandpiper, *Bartramia longicauda*
- Roseate tern, *Sterna dougallii*\*\*
- Least tern, *Sterna antillarum*

#### MAMMALS

- Eastern small-footed bat, *Myotis leibii*
- Little brown bat, *Myotis lucifugus*
- Northern long-eared bat, *Myotis septentrionalis*\*
- Tri-colored bat, *Perimyotis subflavus*
- New England cottontail, *Sylvilagus transitionalis*
- Canada lynx, *Lynx canadensis*\*
- Eastern wolf, *Canis lupus*\*\*

\* Federally Threatened    \*\* Federally Endangered

### THREATENED



**Threatened wildlife** are those native species that are likely to become endangered in the near future, if conditions surrounding them begin, or continue, to decline.

#### INVERTEBRATES

- Eastern pond mussel, *Ligumia nasuta*
- Pine pinion moth, *Lithophane lepida lepida*
- Ringed boghaunter, *Williamsonia lintneri*
- White Mountain arctic, *Oeneis melissa semideia*
- Hessel's hairstreak, *Callophrys hesseli*

#### FISH

- Bridle shiner, *Notropis bifrenatus*
- Atlantic sturgeon, *Acipenser oxyrinchus*
- Round whitefish, *Prosopium cylindraceum*

#### AMPHIBIANS

- Fowler's toad, *Anaxyrus fowleri*

#### REPTILES

- Spotted turtle, *Clemmys guttata*
- Black racer, *Coluber constrictor*

#### BIRDS

- Pied-billed grebe, *Podilymbus podiceps*
- Common loon, *Gavia immer*
- Peregrine falcon, *Falco peregrinus*
- Common tern, *Sterna hirundo*
- Red knot, *Calidris canutus*\*
- Cliff swallow, *Petrochelidon pyrrhonota*
- Purple martin, *Progne subis*
- Cerulean warbler, *Setophaga cerulea*
- Eastern meadowlark, *Sturnella magna*
- Grasshopper Sparrow, *Ammodyramus savannarum*

### Nongame and Endangered Wildlife Program • NH Fish and Game Department

List of Endangered and Threatened species in New Hampshire. Screen shot from NH Fish and Game department website 08-2023.



Early Blue Cohosh (*Caulophyllum giganteum*) documented during Dalton's Bioblitz on May 20, 2023. Although not rare in NH, this plant indicates a "sweeter" soil with higher pH. Plants such as this and Maidenhair fern can indicate rare plants in the area.

## NH Natural Heritage Bureau Listing for Dalton



Town	Flag	Species or Community Name	Listed? US	Listed? NH	~ reports last 20 yrs Town	~ reports last 20 yrs State
<u>Dalton</u>						
<b>Plants</b>						
~ clustered sedge - <i>Carex cumulata</i>						
~ greater yellow lady's-slipper - <i>Cypripedium parviflorum</i> var. <i>makasin</i>						
~ large-fruited sanicle - <i>Sanicula trifoliata</i>						
~ Lindley's american-aster - <i>Symphyotrichum ciliolatum</i>						
~ northern arrowhead - <i>Sagittaria cuneata</i>						
~ parasol sedge - <i>Carex umbellata</i>						
~ satiny willow - <i>Salix pellita</i>						
~ stiff dwarf-gentian - <i>Gentianella quinquefolia</i> ssp. <i>quinquefolia</i>						
<b>Vertebrates - Birds</b>						
** Common Loon - <i>Gavia immer</i>						
** Eastern Meadowlark - <i>Sturnella magna</i>						
<b>Vertebrates - Reptiles</b>						
*** Wood Turtle - <i>Glyptemys insculpta</i>						
<b>Invertebrates - Mollusks</b>						
*** Dwarf Wedge Mussel - <i>Alasmidonta heterodon</i>						

<b>Listed?</b>	E = Endangered	T = Threatened	SC = Special concern
<b>Flags</b>	**** = Highest importance	These flags are based on a combination of (1) how rare the species or community is and	
	*** = Extremely high importance	(2) how large or healthy its examples are in that town. Please contact the Natural	
	** = Very high importance	Heritage Bureau at (603) 271-2215 to learn more about approaches to setting priorities.	
	* = High importance		
	- = Historical Record		

May 2022

To learn more about threatened or endangered species or unique communities, contact the New Hampshire Natural Heritage Bureau office of NH Division of Forest and Lands for plant species 603-271-2214 website – <https://www.nh.gov/nhdfi/about-us/natural-heritage-bureau.htm>.

## Wildlife Action Plan (Map #2)

The New Hampshire Fish and Game Department worked together with many partners in the conservation community to create New Hampshire's Wildlife Action Plan (WAP). The plan, which was mandated and funded by the federal government through the State Wildlife Grants Program, provides a base tool for restoring and maintaining critical habitats and populations of the state's species of concern and their habitat. New Hampshire Fish and Game states that the Wildlife Action Plan is a first step on a statewide scale to work towards helping keep species off the rare species lists. The NH Wildlife Action Plan was submitted to the U.S. Fish and Wildlife Service on October 1, 2005, and was approved in the spring of 2006. It was then revised in 2015.

In the GIS phase of the Wildlife Action Plan, biologists and GIS technicians conducted co-occurrence analyses using a variety of digitized natural resource features such as wetlands, riparian habitat, unique rock outcrops, dense softwood stands, alpine areas, etc. This analysis identified and ranked areas of conservation priorities throughout the state and at a statewide level.

Dalton contains several areas classified as "Highest Rank Habitat in NH" as well as "Highest Ranked Habitat in the Biological Region". Areas classified with these two categories include the following:

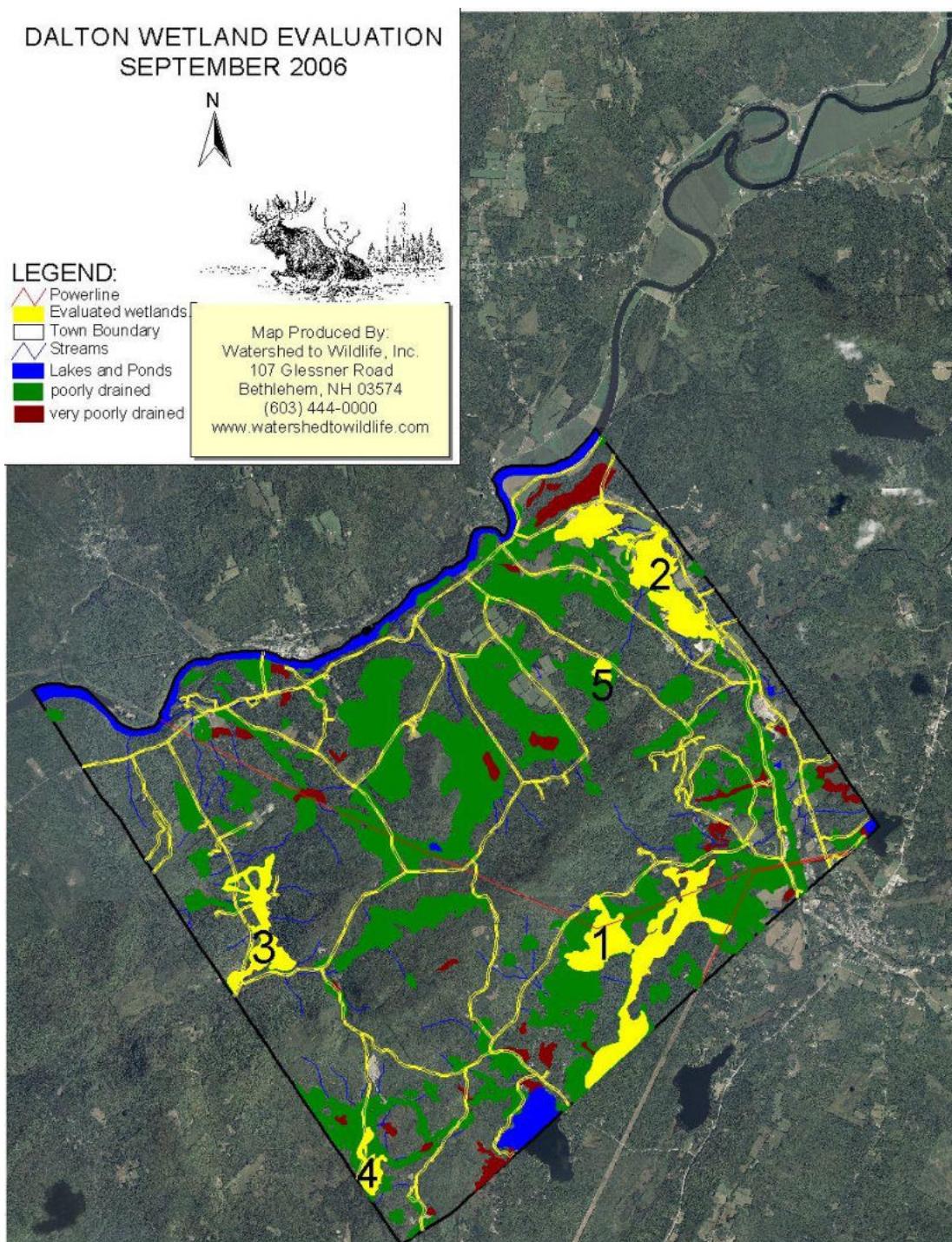
- Along the entire length of the Johns River, including its confluence with the Connecticut River – eastern and northeastern portions of Dalton
- Surrounding and including the Chase Bog Brook and associated wetland complex in the southern part of Dalton
- Undeveloped areas and wetlands along Cushman Brook through its confluence with the Connecticut River in the northwestern part of Dalton
- Southwestern corner of Dalton including Forest Lake and tributaries to Alder Brook.

*Of note, these same areas were also highlighted in a town-wide wetland study completed in Dalton in 2006 (Watershed to Wildlife and North Country Council, 2006). This study ranked the wetland complexes in Dalton and found the top four wetland areas in order of ranking were:*

1. Chase Bog Brook Wetland
2. Johns River – Gilead Farm Wetland
3. Cushman Brook Wetland
4. Alder Brook Wetland

These same areas are priority areas for land conservation if possible. Data from this study and previous studies can be leveraged when applying for funds or partnerships with land trusts and other granting agencies.

Future work, including this NRI, can be shared with Fish and Game, and incorporated into the Wildlife Action Plan to build upon and improve data and habitat analyses. For more details on the Wildlife Action Plan visit the NH Fish and Game's website at: <https://wildlife.state.nh.us/wildlife/wap.html>. The plan and associated maps can be downloaded and viewed. Fish and Game keeps records of updates and on how the WAP is being used and updated. There is also an opportunity to sign up for regular WAP e-mails.



Map from the 2006 wetland study in Dalton. The number on the map corresponds to the ranking of wetland areas assessed for this project.

## Scenic Resources

With a hilly topography, ponds, rivers, and wetlands, Dalton has many scenic views and viewsheds throughout the entire Town. Most areas offer scenic views overlooking rivers, streams, lakes, ponds, and mountains. Almost every road in Dalton is scenic, and a list of a few scenic areas includes:

- Forest Lake State Park
- Mirror Lake
- Route 135 along the Connecticut River Scenic Byway
- Blakeslee Road
- Confluence of Connecticut and Johns Rivers
- Mountain Road
- Dalton Mountain Ridge
- Cushman Brook Valley



Scenic View from Mountain Road looking towards snow-covered White Mountains. Photo taken 5-9-2023.

In addition to views across ponds, lakes and rivers, excellent views can be found across fields and permanent wildlife openings. People experience scenic views in all directions while driving, biking or walking along the roads in the town, particularly where fields and permanent wildlife openings are maintained. ***Continuing to maintain permanent wildlife openings will retain these outstanding views throughout Dalton.***

Development and population growth throughout the State and region have caused people to increase their appreciation of the natural scenery New Hampshire has to offer. As with many other towns and cities in NH, there are potential threats to viewsheds. Several communities are struggling with the concern of future development on the ridgelines and top of hills. In many communities there have been extensive debates over wind towers, cell towers, and houses built on ridgelines because of their detrimental effect on viewsheds.



The view across Chase Bog Brook Wetland complex towards Dalton Mountain. Photo taken 5-25-2023.

### Cultural Resources

The Town of Dalton has a rich history of land use changes and cultural features from its original settlement to current times. Many of these historic and cultural features can be seen at:

1. Four cemeteries – Cushman, Johns River, Ladd, and St. Matthews Cemeteries
2. Along trails throughout Dalton
3. Snowmachine trails
4. Old railroad trails through town
5. Many rural, Class VI roads

European settlers and later entrepreneurs were drawn to Dalton due to its forested landscape topography, the Connecticut River, and farming and timber opportunities. Construction of the railroad made Dalton accessible to new residents and visitors. Dalton was, and still is, a land of abundant opportunity thanks to its natural resources.



An old well near in the middle of a sugar maple forest in Dalton. Photo taken 5-11-2023.



There are many stonewalls throughout Dalton. They are evidence of land clearing for farming and often along property boundaries. Photo taken 5-25-2023.



This stone foundation is in excellent condition and evidence of past dwellings. Foundations in various conditions are found throughout town. Photo taken 5-11-2023.

## Invasive Plant Species

There continues to be an increase in public awareness and concern about the rapid spread of invasive species in NH and throughout New England. Invasive species are plant and wildlife species that are not native to an area but take up residency and can out-compete native species. These species tend to be more common in wet areas such as lakes, wetlands, riparian habitats, and areas of recent disturbance including roadsides and old gravel pits. They can also be found at old farm sites where people have planted various fruiting and ornamental plants for agricultural purposes.

During field work for this NRI the invasive species noted were:

- Japanese Knotweed (*Polygonum cuspidatum*) is widespread and observed in several locations in town
- Japanese barberry (*Berberis thunbergii*) was seen in mixed forested areas throughout town. Mostly isolated plants were observed.
- Reed Phragmites (*Phragmites australis*) was observed in one area near the edge of Forest Lake
- In 2005 NRI Purple Loosestrife (



Japanese barberry in a mixedwood forest in Dalton. This isolated shrub does not appear to be taking over currently. There were a few of these isolated shrubs noted throughout town.



Reed Phragmites was documented along this section of Forest Lake. 5-9-2023.

Information on how to deal with these species is described in the table below. Any weed management activity should include planting native plant species. This allows the area to recover and resist future invasions.

#### **Invasive Species Documented and Methods to Eradicate**

Species	Eradication Methods <b>(sources: USDA Forest Service, 2007, UNH Cooperative Extension, 2018, and US Fish and Wildlife Service, 2023)</b>
Japanese Knotweed ( <i>Polygonum cuspidatum</i> )	<ul style="list-style-type: none"> <li>• Repeated cutting several times (4-6) during growing season leaving cut plants onsite</li> <li>• Or cover with durable material for 3-5 years, checking regularly</li> <li>• Knotweed plants may be controlled by application of a systemic herbicide containing glyphosate or triclopyr to the actively growing plants. The injection method is recommended to reduce injury to desirable vegetation.</li> <li>• <a href="#">Click here for detailed information on this invasive and details to eradicate.</a></li> </ul>
Japanese barberry ( <i>Berberis thunbergii</i> )	<ul style="list-style-type: none"> <li>• Hand removal is the best option for eliminating small, isolated plants. Larger plants can be removed with a garden spade, hoe, or weed wrench.</li> <li>• Take care to wear thick gloves to protect your hands from the sharp thorns.</li> <li>• Try to remove as much of the root system as possible because Japanese barberry can easily re-sprout from the remaining roots.</li> <li>• Large populations can be effectively controlled using recommended herbicides.</li> <li>• <a href="#">Click here for more information</a></li> </ul>

Species	<b>Eradication Methods – an Overview</b> <b>(sources: USDA Forest Service, 2007, UNH Cooperative Extension, 2018, and US Fish and Wildlife Service, 2023)</b>
Reed Phragmites ( <i>Phragmites australis</i> )	<ul style="list-style-type: none"> <li>• The most challenging invasive to control</li> <li>• Recommend working with State and/or Federal agencies to help with its removal, particularly near Forest Lake, the Connecticut River and the Johns River</li> <li>• Three basic methods include: Prescribed fire, herbicide application, mechanical removal</li> <li>• <a href="#">Click here for detailed information</a> from the US Fish and Wildlife Service. This link offers excellent details on the difficult removal of Phragmites.</li> </ul>
Purple Loosestrife ( <i>Lythrum salicaria</i> )  Note: Documented in 2005 NRI along the Johns River	<ul style="list-style-type: none"> <li>• Best time to manage is when it is flowering (late summer)</li> <li>• Small new infestations can be hand-pulled or removed with a shovel or digging fork</li> <li>• Before digging remove flower heads to prevent seed spreading</li> <li>• Plants can also be cut to the ground. This treatment only slows their spread</li> <li>• Dispose of all plant parts – do not put them on a compost pile</li> <li>• Can be controlled with an herbicide if in an upland area</li> <li>• Purple loosestrife is also being biologically controlled by two species of introduced leaf-eating beetles</li> <li>• <a href="#">Click here for more information</a></li> </ul>

This NRI is not an all-inclusive search and documentation of invasive species in Dalton. Undoubtedly, other species and locations where invasive species occur in Dalton have been or will be documented. The Town of Dalton should continue their efforts to help identify and eradicate these invasive species and may want to seek assistance from the Invasive Plant Atlas of New England (IPANE), New England Wildflower Society, UNH Cooperative Extension, and other organizations that have begun programs to control or eradicate invasive species. For further information on invasive species, and an update of the list of these species, review the IPANE website <https://www.eddmaps.org/ipane/>. The Invasive Plant Atlas of New England's (IPANE) mission is to create a comprehensive web-accessible database of invasive and potentially invasive plants in New England that will be continually updated by a network of professionals and trained volunteers. Another excellent resource is the USDA National Invasive Species Information Center (website: <https://www.invasivespeciesinfo.gov/> ). It includes an overview of Invasive species, individual species information including control methods, resources, and news.

## Habitat Area Summary Table

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The table below is a summary of different habitat areas in acres, square miles, and percentage of town land area.

Habitat Type	Acres	Square Miles	Percentage of Town Land Area
Dalton Town Boundary	18,104.42	28.3	100%
Conservation Land	2,108.44	3.29	11.6%
Ponds and Open Water	164.08	0.26	0.9%
Wetland Complexes (from National Wetland Inventory data & field work)	2,828.47	4.42	15.6%
Hydric Soils – poorly and very poorly drained	4,543.79	7.10	25.1%
Floodplain Forest	164.99	0.26	0.9%
Aquifers	5,030.17	7.86	27.8%
Northern Hardwood Conifer	8,040.34	12.56	44.4%
Hemlock-Hardwood Pine Forest	3,660.75	5.72	20.2%
Lowland spruce-fir	2,891.64	4.52	16.0%
Permanent Wildlife Openings	1,165.45	1.82	6.4%
Farmland Soils – prime, statewide and local importance	3,150.58	4.92	17.4%
Steep slopes – 20% and greater	6,251.53	9.77	34.5%
Steep slopes – 30% and greater	2,748.32	4.29	15.2%

## DISCUSSION – FUTURE OPPORTUNITIES AND BENEFITS

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This project is an inventory of natural resources, including a written report, maps, and a digital database in GIS format. It is the property of the Town of Dalton and was funded by the Town. Mapping data from this project is compatible with the existing Town GIS. Efforts from this project will aid in future work and inventories, as well as provide tools to guide future development and conservation decisions in Dalton.

It is anticipated that the results from this study will help the Town of Dalton in many ways. Town-wide zones based on habitat and vegetation can be assessed and modified. Data gathered from this work will also assist the Conservation Commission, Planning Board, and Select Board in foreseeing possible conflicts with future development. Perhaps the most powerful advantage of this project is that future studies and work can be easily integrated to build upon this database indefinitely.

Based on results from this study, Elise Lawson and the Dalton Conservation Commission offer the following additional recommendations:

1. **Surface Water Protection** - Many of Dalton's residents obtain drinking water from personal drilled or dug wells. Maintaining good water quality is one of the highest priorities for the Dalton Conservation Commission. Currently, water quality in these streams, rivers, and lakes is in very good to excellent condition. Water quality should continue to be addressed not only in Forest and Mirror Lakes and the Connecticut and Johns Rivers, but also in smaller rivers, streams, and headwater brooks that feed these waterbodies..
  - a. Where possible work to maintain or enhance riparian habitat adjacent to headwater streams and brooks. Any wetland setback should also apply to all riparian habitat along perennial streams.
  - b. Continue monitoring water quality in the Connecticut and Johns Rivers, Forest Lake, and some of the smaller feeder streams and ponds in town. Areas where there are little buffers and/or downstream from developed land should be prioritized. Continue to encourage Dalton landowners to test their private wells regularly.
  - c. The Town should update potential contamination source location inventory at least on an annual basis and ensure that compliance (secondary contain structures, and spill kits) are in place.
2. **Aquifer Protection** - Based on the locations of the underlying aquifers in Dalton, it is important to protect the quality of groundwater, brooks, streams, and aquifers in Town. Future water supplies are a valuable natural resource for Dalton and the abutting municipalities.

- a. Implement Best Management Practices (BMPs) within aquifer areas.
  - b. Monitor septic system plumes with a focus on parcels adjacent to rivers, wetlands, and aquifers.
  - c. Monitor the placement of future septic systems keeping in mind the potential high permeability of many of Dalton's soils.
  - d. Develop Town-wide ordinances to help protect aquifers, including restriction of impervious surface development and dumping of waste on top of aquifers, particularly areas with high productivity and flow.
3. **Dense Softwood Stand Protection** – Based on results from this project, there are a few areas that contain adequate acreage of dense softwood stands scattered throughout Town. These areas are beneficial to many wildlife species for cover as well as important wintering areas.
    - a. Maintain existing dense softwood stands for the benefit of the deer, moose, and other wildlife populations.
    - b. Where possible, investigate extending some existing softwood areas and/or connect patches of softwood stands to increase overall size. Willing landowners can be encouraged to do so, particularly those abutting wetlands and riparian habitat.
  4. **Wetland Conservation** – The Dalton Conservation Commission recognizes the importance of wetland protection as an important means to maintain good water quality. It is hoped that the Town will pursue ways to conserve the functionality and diversity of these wetlands. An update of Dalton's overall wetland study could help Dalton work with willing landowners to conserve some of these valuable wetland resources. This NRI recommends the following:
    - a. Update an overall wetland study throughout Dalton to identify, assess and functionally rank wetlands in town.
    - b. Continue to inventory vernal pools throughout Dalton to enable the Conservation Commission, Planning Board, and Select Board to critique and adjust future subdivision proposals if vernal pools are likely to be impacted.
    - c. Monitor stormwater runoff and associated drainage immediately after storm events whenever possible. Treatment devices for stormwater structures should be installed and maintained; particularly within 150 feet of rivers and wetlands.
  5. **Land Conservation** – Create a Town Forest working with local, state, and national land trusts to help make this happen. Over 11.5% of the land is conserved. Four main areas have been identified as higher priority areas for conservation based on this NRI, NH

## Natural Resource Inventory for Dalton, NH

Wildlife Action Plan work, and previous wetland studies. They are described below and shown on Map #2 at the end of this report.

- a. **Connecticut and Johns Rivers with associated wetlands and floodplain habitat -** Any opportunity to conserve riparian and wetland habitat along these rivers would increase water quality, aquifer protection, and unique habitat in Dalton. Within these areas, maintaining and increasing vegetative buffers is highly recommended.
  - b. **Chase Bog Brook and associated wetlands –** This area has been termed the “Gem of Dalton”. Since the last NRI and wetland study in town, there has been some development along the perennial stream and wetlands. It has a very high ecological value, and any opportunity to protect this habitat is highly recommended.
  - c. **Cushman Brook and associated riparian habitat –**The area along this brook has high value due to limited development, a variety of habitat types, and its confluence with the Connecticut River.
  - d. **Southwestern corner of Dalton -** The southwest corner of Dalton contains a series of headwater streams, open habitat, and Forest Lake. It offers diverse wildlife habitat and is ranked high priority to maintain good water quality.
6. **Hillside and Viewshed Protection** - Dalton’s hilly topography, lakes, and rivers are directly related to the Town’s tourism industry, scenic beauty, and diversity of natural resources (wetlands, streams and rivers, wildlife, plants, soils, etc.). We recommend evaluating and possibly updating the zoning ordinance in Dalton to conserve viewsheds as an important feature and tourist attraction to the area, while continuing to consider landowner rights.
    - a. **Scenic View Conservation** - The potential for continued population increase in Dalton makes it wise to take a proactive approach to deal with future development pressures and preserve the scenic vistas and beauty. Scenic easements are types of conservation easements that make protection of scenic resources possible.
    - b. **Ridge-line Development Criteria** - Several municipalities throughout the State have developed ridge-line ordinances to protect ridgeline views. Dalton may want to review some of these and explore the possibility of implementation.
    - c. **Steep Slope Development Criteria** – Develop town-wide ordinances to restrict future development and road construction at sites with over 25% slopes and limit development on slopes between 20% and 25%.
  7. **Cooperation** – Natural resources do not end at the town boundary. It is recommended that Dalton continue to work with neighboring towns, schools, organizations, and State

and Federal agencies throughout the region to share future data as it becomes available. This will avoid an all-too-common problem of separate entities replicating work. A watershed approach to conserving natural resources including water quality is recommended. Most of the surrounding municipalities have completed or are in the process of completing Natural Resource Inventories, and all the data between the towns and Dalton should be compatible in GIS software programs.

- a. Work with North Country Council, who has developed several templates for town-wide ordinances in areas from wetland and shoreline setbacks to restrictions on steep slopes, to ridgeline development.
  - b. Consider working with the [Connecticut River Joint Commissions](#) on projects to ecologically enhance the Connecticut River area
  - c. Partner with local high schools and colleges to encourage young people to be involved and outdoor classrooms.
8. **Carbon Sequestration** – Explore the possibility of bringing funds into Dalton from Carbon offset programs. A great resource is The Northeast Forest Carbon Program (website: <https://www.northeastforestcarbon.org/>). Funds from participating organizations can be used to incentivize landowners to protect their land from development for a period of time. Sustainable forestry is an important part of this process.

Long-term uses of this project could include, but are not limited to:

- Include NRI data in future Master Plan updates.
- Assist the Town and others in determining “least-impact” sites for future development.
- Locate ideal locations for telecommunication towers or wind farms while conserving scenic resources.
- Promote the protection of water quality, wetlands, and aquifers under portions of the Town.
- Continue to identify land for purchase or easements for protection into the future.

Furthermore, Dalton officials should consider requesting that all future development plans be delivered in digital format, which would build upon the existing database (including assist in updating tax maps for assessment) at little cost to the Town.

## RESOURCES

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Natural Resource Inventory for Dalton, NH

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## Appendix A: Natural Resource Reports May 20, 2023 Bioblitz

**MAY 20, 2023 BIOBLITZ - DALTON, NH**

<b>Date of obs</b>	<b>user_name</b>	<b>Location</b>	<b>Scientific Name</b>	<b>Common Name</b>
5/20/2023	Jon Swan	Dalton Rd, Dalton, NH, US	<i>Dermacentor variabilis</i>	American Dog Tick
5/20/2023	Jon Swan	Dalton Rd, Dalton, NH, US	<i>Taraxacum officinale</i>	common dandelion
5/20/2023		Dalton Rd, Dalton, NH, US	<i>Thuja occidentalis</i>	northern whitecedar
5/20/2023	Jon Swan	Dalton Rd, Dalton, NH, US	<i>Thuja</i>	arborvitae
5/20/2023		Dalton Rd, Dalton, NH, US	<i>Malus baccata</i>	Siberian crabapple
5/20/2023	Jon Swan	Dalton Rd, Dalton, NH, US	<i>Scorzonerooides</i>	
5/20/2023	Jon Swan	Dalton Rd, Dalton, NH, US	<i>Hypochaeridinae</i>	
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Abies balsamea</i>	balsam fir
5/20/2023		Ridge Rd, Dalton, NH, US	<i>Houstonia caerulea</i>	azure bluet
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Maianthemum canadense</i>	Canada mayflower
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Polytrichum commune</i>	Common Haircap Moss
5/20/2023		Whitefield Rd, Dalton, NH, US	<i>Acer rubrum</i>	red maple
5/20/2023		Ridge Rd, Dalton, NH, US	<i>Lysimachia borealis</i>	northern starflower
5/20/2023		Ridge Rd, Dalton, NH, US	<i>Oxalis montana</i>	mountain woodsorrel
5/20/2023		Ridge Rd, Dalton, NH, US	<i>Quercus rubra</i>	northern red oak
5/20/2023		Ridge Rd, Dalton, NH, US	<i>Lysimachia borealis</i>	northern starflower
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Polypodiaceae</i>	
5/20/2023		Ridge Rd, Dalton, NH, US	<i>Bryophyta</i>	mosses
5/20/2023		Ridge Rd, Dalton, NH, US	<i>Maianthemum canadense</i>	Canada mayflower
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Acer</i>	maples
5/20/2023		Hall Rd, Dalton, NH, US	<i>Lonicera</i>	honeysuckles
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Frangula</i>	False-Buckthorns
5/20/2023		Dalton, NH, US	<i>Polytrichum commune</i>	Common Haircap Moss
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Betula papyrifera</i>	paper birch
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Tetraphis pellucida</i>	Tetraphis Moss
5/20/2023		Whitefield Rd, Dalton, NH, US	<i>Vaccinium angustifolium</i>	lowbush blueberry
5/20/2023	Jon Swan	Ridge Rd, Dalton, NH, US	<i>Pleurozium</i>	big red stem moss
5/20/2023		Ridge Rd, Dalton, NH, US	<i>Fagus grandifolia</i>	American beech
5/20/2023		Dalton, NH, US	<i>Cladonia</i>	Pixie Cup Lichens
5/20/2023		Dalton, NH, US	<i>Prunus serotina</i>	black cherry
5/20/2023		Dalton, NH, US	<i>Larix laricina</i>	tamarack
5/20/2023		Dalton, NH, US	<i>Rubus occidentalis</i>	black raspberry
5/20/2023	Jon Swan	Dalton, NH, US	<i>Osmundastrum</i>	Cinnamon ferns

## Natural Resource Inventory for Dalton, NH

### MAY 20, 2023 BIOBLITZ - DALTON, NH

5/20/2023		Dalton, NH, US	Polygonatum pubescens	hairy Solomon's-seal
5/20/2023	Jon Swan	Dalton, NH, US	Impatiens capensis	common jewelweed
5/20/2023	Jon Swan	Dalton, NH, US	Crepidinae	dandelions, hawksbeards, and rattlesnake roots
5/20/2023	Jon Swan	Dalton, NH, US	Ranunculus	buttercups
5/20/2023		Dalton, NH, US	Cypripedium acaule	pink lady's slipper
5/20/2023		Dalton, NH, US	Acer pensylvanicum	striped maple
5/20/2023	Jon Swan	Dalton, NH, US	Oxalis montana	mountain woodsorrel
5/20/2023	Jon Swan	Dalton, NH, US	Acer rubrum	red maple
5/20/2023		Dalton, NH, US	Tsuga canadensis	eastern hemlock
5/20/2023	Jon Swan	Dalton, NH, US	Betula alleghaniensis	yellow birch
5/20/2023		Dalton, NH, US	Phegopteris connectilis	long beech fern
5/20/2023	Jon Swan	Dalton, NH, US	Fagus grandifolia	American beech
5/20/2023	Jon Swan	Dalton, NH, US	Dulichium arundinaceum	Three-way Sedge
5/20/2023		Dalton, NH, US	Ranunculus recurvatus	Hooked buttercup
5/20/2023	Jon Swan	Dalton, NH, US	Fagus grandifolia	American beech
5/20/2023	Jon Swan	Dalton, NH, US	Ilex mucronata	Mountain holly
5/20/2023	Jon Swan	Dalton, NH, US	Callicladium imponens	brocade moss
5/20/2023		Dalton, NH, US	Equisetum sylvaticum	wood horsetail
5/20/2023	Jon Swan	Dalton, NH, US	Sphagnum	Sphagnum mosses
5/20/2023	Jon Swan	Dalton, NH, US	Tiarella stolonifera	Creeping Foamflower
5/20/2023	Jon Swan	Dalton, NH, US	Betula	birches
5/20/2023	Jon Swan	Dalton, NH, US	Usnea subfloridana	Boreal Beard Lichen
5/20/2023	Jon Swan	Dalton, NH, US	Ilex mucronata	Mountain holly
5/20/2023		Dalton, NH, US	Agrobacterium radiobacter	bacterial crown gall
5/20/2023	Jon Swan	Dalton, NH, US	Pinus strobus	eastern white pine
5/20/2023	Jon Swan	Dalton, NH, US	Picea	spruces
5/20/2023		Dalton, NH, US	Tiarella stolonifera	Creeping Foamflower
5/20/2023		McIntyre Rd, Whitefield, NH, I	Onoclea sensibilis	sensitive fern
5/20/2023		Dalton, NH, US	Viola selkirkii	Great-spurred Violet
5/20/2023	Jon Swan	Dalton, NH, US	Sphagnum girgensohnii	Girgensohn's Peatmoss
5/20/2023	Jon Swan	Dalton, NH, US	Tiarella stolonifera	Creeping Foamflower
5/20/2023	Jon Swan	Dalton, NH, US	Coptis trifolia	threeleaf goldthread
5/20/2023	Jon Swan	Dalton, NH, US	Sphagnum	Sphagnum mosses
5/20/2023		Dalton, NH, US	Sorbus americana	American mountain ash

## Natural Resource Inventory for Dalton, NH

### MAY 20, 2023 BIOBLITZ - DALTON, NH

5/20/2023	Jon Swan	Dalton, NH, US	Rubus	brambles
5/20/2023	Jon Swan	Dalton, NH, US	Asteraceae	sunflowers, daisies, asters, and allies
5/20/2023	Jon Swan	Dalton, NH, US	<i>Pinus strobus</i>	eastern white pine
5/20/2023	Jon Swan	Dalton, NH, US	<i>Acer saccharum</i>	sugar maple
5/20/2023		Dalton, NH, US	<i>Clintonia borealis</i>	bluebead lily
5/20/2023		Dalton, NH, US	<i>Spiraea alba</i>	white meadowsweet
5/20/2023		Dalton, NH, US	<i>Onoclea sensibilis</i>	sensitive fern
5/20/2023		Dalton, NH, US	Sphagnum	Sphagnum mosses
5/20/2023	Jon Swan	Dalton, NH, US	<i>Clintonia borealis</i>	bluebead lily
5/20/2023		Dalton, NH, US	<i>Dendrolycopodium</i>	tree-clubmosses
5/20/2023	Jon Swan	Dalton, NH, US	<i>Lysimachia borealis</i>	northern starflower
5/20/2023		Dalton, NH, US	Sphagnum	Sphagnum mosses
5/20/2023	Jon Swan	Dalton, NH, US	<i>Dicranum</i>	Forkmosses
5/20/2023		Dalton, NH, US	<i>Pteridium aquilinum</i>	common bracken
5/20/2023		Dalton, NH, US	<i>Houstonia caerulea</i>	azure bluet
5/20/2023		Dalton, NH, US	<i>Scleroderma citrinum</i>	common earthball
5/20/2023	Jon Swan	Dalton, NH, US	<i>Acer pensylvanicum</i>	striped maple
5/20/2023		Dalton, NH, US	Polypodiopsida	ferns
5/20/2023	Jon Swan	Dalton, NH, US	<i>Aralia nudicaulis</i>	wild sarsaparilla
5/20/2023	Jon Swan	Dalton, NH, US	<i>Osmunda claytoniana</i>	interrupted fern
5/20/2023		Dalton, NH, US	<i>Aralia nudicaulis</i>	wild sarsaparilla
5/20/2023	Jon Swan	Dalton, NH, US	<i>Houstonia caerulea</i>	azure bluet
5/20/2023		Dalton, NH, US	<i>Brachyelytrum aristosum</i>	Northern Shorthusk
5/20/2023	Jon Swan	Dalton, NH, US	Equisetum	horsetails
5/20/2023	Jon Swan	Dalton, NH, US	<i>Ranunculus abortivus</i>	small-flowered buttercup
5/20/2023		Dalton, NH, US	<i>Cardamine diphylla</i>	Two-leaved Toothwort
5/20/2023		Dalton, NH, US	<i>Acer pensylvanicum</i>	striped maple
5/20/2023		Dalton, NH, US	<i>Erythronium americanum</i>	yellow trout lily
5/20/2023	Jon Swan	Dalton, NH, US	<i>Prunella vulgaris</i>	common selfheal
5/20/2023		Dalton, NH, US	<i>Lonicera canadensis</i>	American fly-honeysuckle
5/20/2023		Dalton, NH, US	<i>Ranunculus abortivus</i>	small-flowered buttercup
5/20/2023	Jon Swan	Dalton, NH, US	<i>Ranunculus abortivus</i>	small-flowered buttercup
5/20/2023	Jon Swan	Dalton, NH, US	<i>Cardamine diphylla</i>	Two-leaved Toothwort
5/20/2023	Jon Swan	Dalton, NH, US	<i>Polytrichum</i>	haircap mosses

## Natural Resource Inventory for Dalton, NH

### MAY 20, 2023 BIOBLITZ - DALTON, NH

5/20/2023		Dalton, NH, US	<i>Fraxinus americana</i>	white ash
5/20/2023		Dalton, NH, US	<i>Ostrya virginiana</i>	American hophornbeam
5/20/2023		Dalton, NH, US	<i>Fraxinus americana</i>	white ash
5/20/2023	Jon Swan	Dalton, NH, US	<i>Myosotis scorpioides</i>	water forget-me-not
5/20/2023	Jon Swan	Dalton, NH, US	<i>Caulophyllum giganteum</i>	early blue cohosh
5/20/2023	Jon Swan	Dalton, NH, US	<i>Tiarella stolonifera</i>	Creeping Foamflower
5/20/2023	Jon Swan	Dalton, NH, US	<i>Clematis</i>	Clematis and leatherflowers
5/20/2023	Jon Swan	Dalton, NH, US	<i>Fallopia cilinodis</i>	Fringed Bindweed
5/20/2023		Dalton, NH, US	<i>Thalictrum dioicum</i>	early meadow-rue
5/20/2023		Dalton, NH, US	<i>Trillium erectum</i>	red trillium
5/20/2023	Jon Swan	Dalton, NH, US	<i>Callicladium</i>	
5/20/2023		Dalton, NH, US	<i>Prunus virginiana</i>	chokecherry
5/20/2023	Jon Swan	Dalton, NH, US	<i>Viola</i>	violets
5/20/2023	Jon Swan	Dalton, NH, US	<i>Trichaptum</i>	
5/20/2023	Jon Swan	Dalton, NH, US	<i>Rubus</i>	brambles
5/20/2023		Dalton, NH, US	<i>Viola sororia</i>	common blue violet
5/20/2023	Jon Swan	Dalton, NH, US	<i>Atrichum</i>	Smoothcap Mosses
5/20/2023	Jon Swan	Dalton, NH, US	<i>Ribes glandulosum</i>	skunk currant
5/20/2023	Jon Swan	Dalton, NH, US	<i>Polygonatum pensylvanicum</i>	Algal Haircap Moss
5/20/2023		Dalton, NH, US	<i>Polygonatum pubescens</i>	hairy Solomon's-seal
5/20/2023	Jon Swan	Dalton, NH, US	<i>Viola</i>	violets
5/20/2023	Jon Swan	Dalton, NH, US	<i>Quercus</i>	oaks
5/20/2023	Jon Swan	Dalton, NH, US	<i>Carex</i>	true sedges
5/20/2023		Dalton, NH, US	<i>Houstonia caerulea</i>	azure bluet
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Corylus cornuta</i>	beaked hazelnut
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Corylus cornuta</i>	beaked hazelnut
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Betula papyrifera</i>	paper birch
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Pinaceae</i>	pine family
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Prunus pensylvanica</i>	fire cherry
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Populus tremuloides</i>	trembling aspen
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Acer pensylvanicum</i>	striped maple
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Acer pensylvanicum</i>	striped maple
5/20/2023	Terri Parks	Dalton, NH 03598, USA	<i>Convallaria majalis</i>	European lily of the valley

## Appendix B: Results from Water Quality Testing at Forest Lake



**GRANITE STATE**  
ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038

Phone: (800) 699-9920 | (603) 432-3044

website: www.granitestateanalytical.com

**CERTIFICATE OF ANALYSIS FOR DRINKING WATER**

DATE PRINTED:	05/29/2020							<b>Legend</b> Passes ✓ Fails EPA Primary ✗ Fails EPA Secondary ▲ Fails State Guideline ✖ Attention ⚠		
CLIENT NAME:	Eliot Wessler									
CLIENT ADDRESS:	66 Newell Lane Whitefield, NH 03598									
SAMPLE ID#:	2005-02181-001							DATE AND TIME COLLECTED:	05/19/2020	11:15AM
SAMPLED BY:	Finkle, Adam							DATE AND TIME RECEIVED:	05/20/2020	10:56AM
SAMPLE ADDRESS:	Forest Lake Whitefield/Dalton NH							ANALYSIS PACKAGE:	PFC-6-alpha-NH	
MORE LOC INFO:								RECEIPT TEMPERATURE:	ON ICE 6.6° CELSIUS	
								CLIENT JOB #		
Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date-Time Analyzed	
Date Extracted	-					No Limit	EPA 537.1	2062	05/26/20	7:00AM
Perfluorobutanesulfonic Acid (PFBS)	<2.00	ng/L			Sub Report	No Limit	EPA 537.1	2062	05/27/20	9:19PM
Perfluoroheptanoic Acid (PFHpA)	<2.00	ng/L			Sub Report	No Limit	EPA 537.1	2062	05/27/20	9:19PM
Perfluorohexanesulfonic Acid (PFHxS)	<2.00	ng/L	✓		Sub Report	18 ng/L	EPA 537.1	2062	05/27/20	9:19PM
Perfluorononanoic Acid (PFNA)	<2.00	ng/L	✓		Sub Report	11 ng/L	EPA 537.1	2062	05/27/20	9:19PM
Perfluorooctanesulfonic Acid (PFOS)	<2.00	ng/L	✓		Sub Report	15 ng/L	EPA 537.1	2062	05/27/20	9:19PM
Perfluorooctanoic Acid (PFOA)	<2.00	ng/L	✓		Sub Report	12 ng/L	EPA 537.1	2062	05/27/20	9:19PM

The results presented in this report relate to the samples listed above in the condition in which they were received.

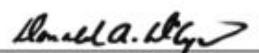
RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

Note: Air present in VOC vials. Analyst 2062 = Alpha Analytical (Mansfield).

\* NELAP Accredited Analysis





Donald A. D'Anjou, Ph. D.  
Laboratory Director



# GRANITE STATE ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038

Phone: (800) 699-9920 | (603) 432-3044

website: www.granitestateanalytical.com

## CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 05/29/2020

CLIENT NAME: Eliot Wessler

CLIENT ADDRESS: 66 Newell Lane  
Whitefield, NH 03598

SAMPLE ID#: 2005-02181-002

SAMPLED BY: Finkel, Adam

Legend	
Passes	✓
Fails EPA Primary	✗
Fails EPA Secondary	▼
Fails State Guideline	✗
Attention	⚠

DATE AND TIME COLLECTED: 05/19/2020 11:15AM

DATE AND TIME RECEIVED: 05/20/2020 10:56AM

SAMPLE ADDRESS: Forest Lake  
Well 2 West Lake  
Whitefield NH 03598ANALYSIS PACKAGE: Methylene Chloride-524.3-  
RECEIPT TEMPERATURE: ON ICE 6.6° CELSIUS

MORE LOC INFO:

CLIENT JOB #

Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date-Time Analyzed
Methylene chloride*	<0.5	ug/L	✓		0.5	5 ug/L	EPA 524.3	KV-NH	05/20/20 5:56PM
1,2-Dichlorobenzene-d4	107	%	✓		0.5	70-130%	EPA 524.3 - SS	KV-NH	05/20/20 5:56PM
4-Bromofluorobenzene	102	%	✓		0.5	70-130%	EPA 524.3 - SS	KV-NH	05/20/20 5:56PM
Methyl tert-Butyl Ether-d3	104	%	✓		0.5	70-130%	EPA 524.3 - SS	KV-NH	05/20/20 5:56PM

The results presented in this report relate to the samples listed above in the condition in which they were received.

RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

Note: Air present in VOC vials. Analyst 2062 = Alpha Analytical (Mansfield).

\* NELAP Accredited Analysis



Donald A. D'Anjou, Ph. D.  
Laboratory DirectorGSA Final Report  
2 of 23This analysis meets NELAP requirements except as noted.  
State Certifications: | NH 1015 | MA M-NH003 | ME NH00003 | RI 101513 | VT VT-101507 |  
This certificate shall not be reproduced, except in full, without the written approval of Granite State Analytical Services, LLC

Page 2 of 3



# GRANITE STATE ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038

Phone: (800) 699-9920 | (603) 432-3044

website: www.granitestateanalytical.com

## CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED:	05/29/2020	<b>Legend</b> Passes ✓ Fails EPA Primary ✗ Fails EPA Secondary ▲ Fails State Guideline ✖ Attention ⚠							
CLIENT NAME:	Eliot Wessler								
CLIENT ADDRESS:	66 Newell Lane Whitefield, NH 03598								
SAMPLE ID#:	2005-02181-003								
SAMPLED BY:	Finkel, Adam								
DATE AND TIME COLLECTED:	05/19/2020 11:15AM								
SAMPLE ADDRESS:	Forest Lake Deep Lake Whitefield NH 03598								
ANALYSIS PACKAGE:	PFC-6-alpha-NH								
RECEIPT TEMPERATURE:	ON ICE 6.6° CELSIUS								
MORE LOC INFO:									
CLIENT JOB #									
Test Description	Results	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date-Time Analyzed
Date Extracted	-				No Limit	EPA 537.1	2062	05/26/20 7:00AM	
Perfluorobutanesulfonic Acid (PFBS)	<2.00	ng/L			Sub Report	No Limit	EPA 537.1	2062	05/27/20 9:37PM
Perfluoroheptanoic Acid (PFHpA)	<2.00	ng/L			Sub Report	No Limit	EPA 537.1	2062	05/27/20 9:37PM
Perfluorohexanesulfonic Acid (PFHxS)	<2.00	ng/L	✓		Sub Report	18 ng/L	EPA 537.1	2062	05/27/20 9:37PM
Perfluorononanoic Acid (PFNA)	<2.00	ng/L	✓		Sub Report	11 ng/L	EPA 537.1	2062	05/27/20 9:37PM
Perfluorooctanesulfonic Acid (PFOS)	<2.00	ng/L	✓		Sub Report	15 ng/L	EPA 537.1	2062	05/27/20 9:37PM
Perfluorooctanoic Acid (PFOA)	<2.00	ng/L	✓		Sub Report	12 ng/L	EPA 537.1	2062	05/27/20 9:37PM

The results presented in this report relate to the samples listed above in the condition in which they were received.  
 RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.

Data Qualifier (DQ) Flags: None

Note: Air present in VOC vials. Analyst 2062 = Alpha Analytical (Mansfield).

\* NELAP Accredited Analysis




Donald A. D'Anjou, Ph. D.  
Laboratory Director

## MAPS

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### Map #1: Dense Softwoods and Permanent wildlife openings

#### Map Data Sources:

- Town Boundary, Roads, Open Water, and Streams obtained from GRANIT
- Dense Softwood Stands and Permanent wildlife openings digitized by Elise Lawson 2022 using the 2015 aerial photographs

### Map #2: Conservation Lands with Priorities for Future Conservation

#### Map Data Sources:

- Town Boundary, Roads, Open Water, Streams obtained from GRANIT
- Conservation Lands obtained from GRANIT and the Town of Dalton
- New Hampshire Fish and Game Department – downloaded from GRANIT and queried so the highest rank and supporting areas displayed.

### Map #3: Wetlands and Water Resources

#### Map Data Sources:

- Town Boundary, Roads, Aquifers, Open Water, Streams, obtained from GRANIT
- Vernal Pool locations taken using Avenza GPS during field work by Elise Lawson over three days of field work and previous vernal pool study
- National Wetlands Inventory wetlands obtained from U.S. Fish and Wildlife Service and GRANIT
- Additional Wetlands were field verified by Elise Lawson and/or digitized using 2015 aerial photographs (obtained from GRANIT)
- Poorly and Very Poorly Drained Soils obtained from the Natural Resource Conservation Service

### Map #4: Subwatersheds

#### Map Data Sources:

- Town Boundary, Roads, Open Water, Streams obtained from GRANIT
- Subwatershed Units (NH DES HUC 12 Names) obtained from GRANIT

### Map #5: Bedrock Geology

#### Map Data Source:

- Town Boundary, Roads, Bedrock Geology downloaded from GRANIT

### Map #6: Steep Slopes and Farmland Soil

#### Map Data Sources:

- Town Boundary, Roads, Open Water, Streams obtained from GRANIT
- Soil data obtained from Natural Resource Conservation Service and queried to display farmland soils and soils with steep slopes

### Map #7: New Hampshire Forest Soil Groups

#### Map Data Sources:

- Town Boundary, Roads, Open Water, Streams obtained from GRANIT
- Soil data obtained from Natural Resource Conservation Service and queried to display NH Forest Soil Groups

Dalton, NH  
Natural Resource Inventory  
Permanent Openings and  
Dense Softwood Stands  
June 2023



8,000 4,000 0 8,000 Feet



N



Map Produced by:  
Watershed to Wildlife / Elise Lawson  
507 West Darling Hill Rd  
West Burke, VT 05871  
watershedtowildlife.net

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Dalton, NH  
Natural Resource Inventory  
Conservation Land /  
Conservation Priority Areas  
September 2023

Johns River /  
Connecticut River Region

N

Cushman Brook and  
undeveloped areas around  
including its confluence with CT River

**Legend**

- Roads
- Town Boundary
- Rivers and Streams
- Lakes and Ponds
- Conserved Land
- Wildlife Action Plan Tier 1
- Wildlife Action Plan Tier 2

Southwestern Dalton  
Streams, wetlands and  
undeveloped area

Chase Bog Brook  
Wetlands and undeveloped areas

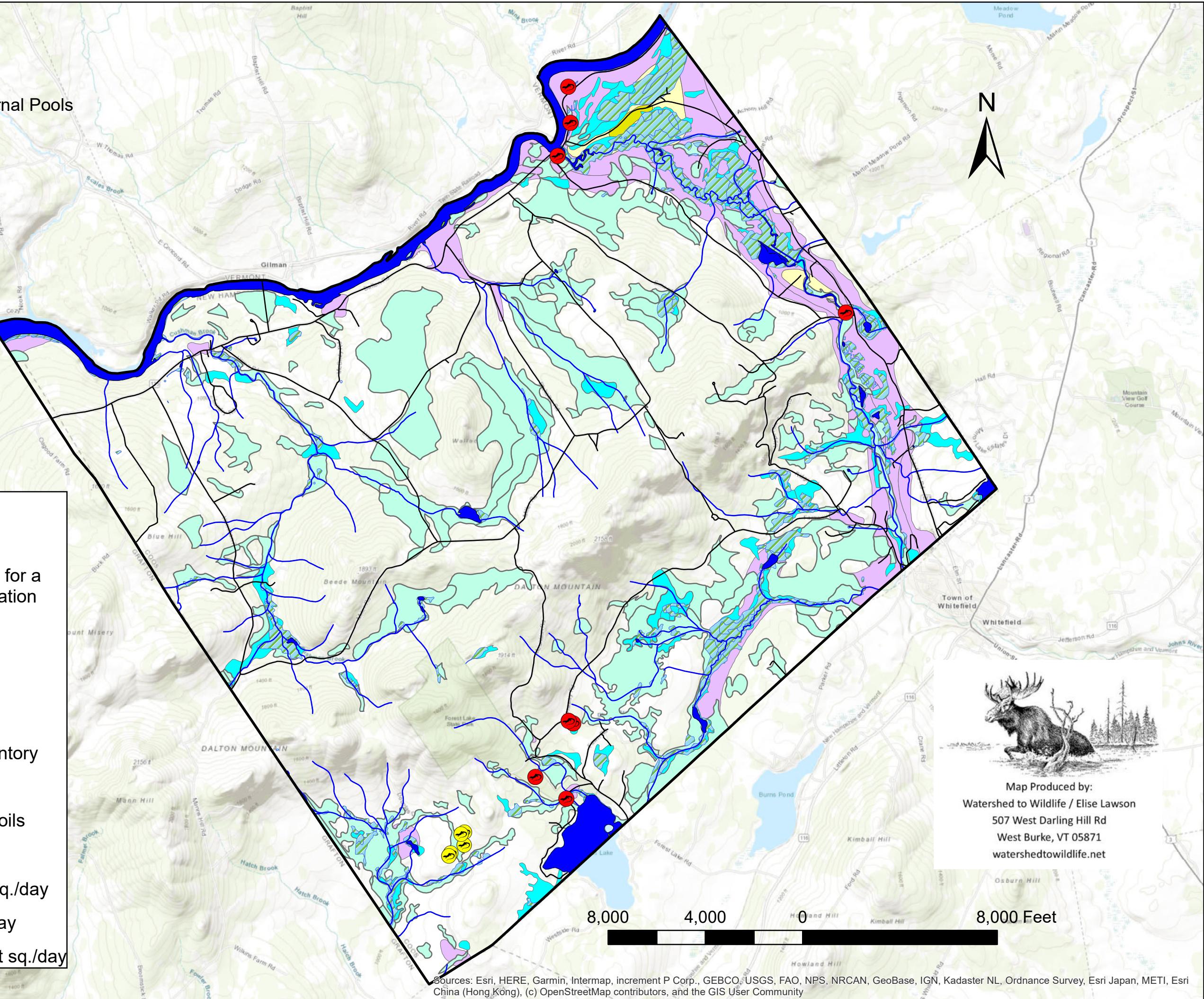
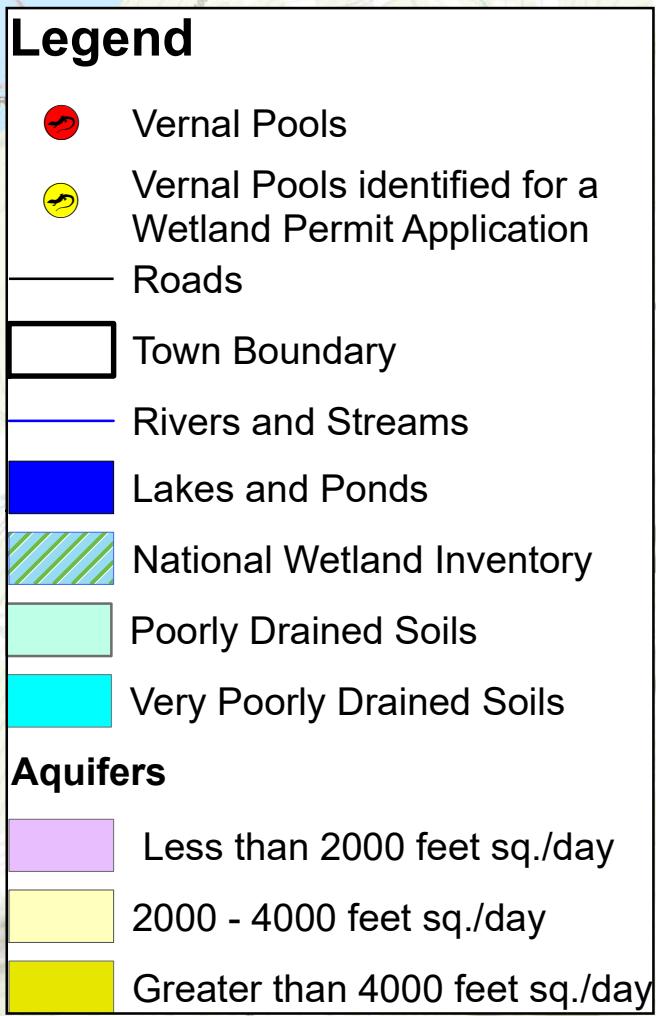
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Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



Map Produced by:  
Watershed to Wildlife / Elise Lawson  
507 West Darling Hill Rd  
West Burke, VT 05871  
watershedtowildlife.net

Dalton, NH  
Natural Resource Inventory  
Wetlands, Water Resources, and Vernal Pools  
September 2023



Dalton, NH  
Natural Resource Inventory  
Subwatersheds - HUC 12 with  
Wetlands and Vernal Pools  
September 2023

N  

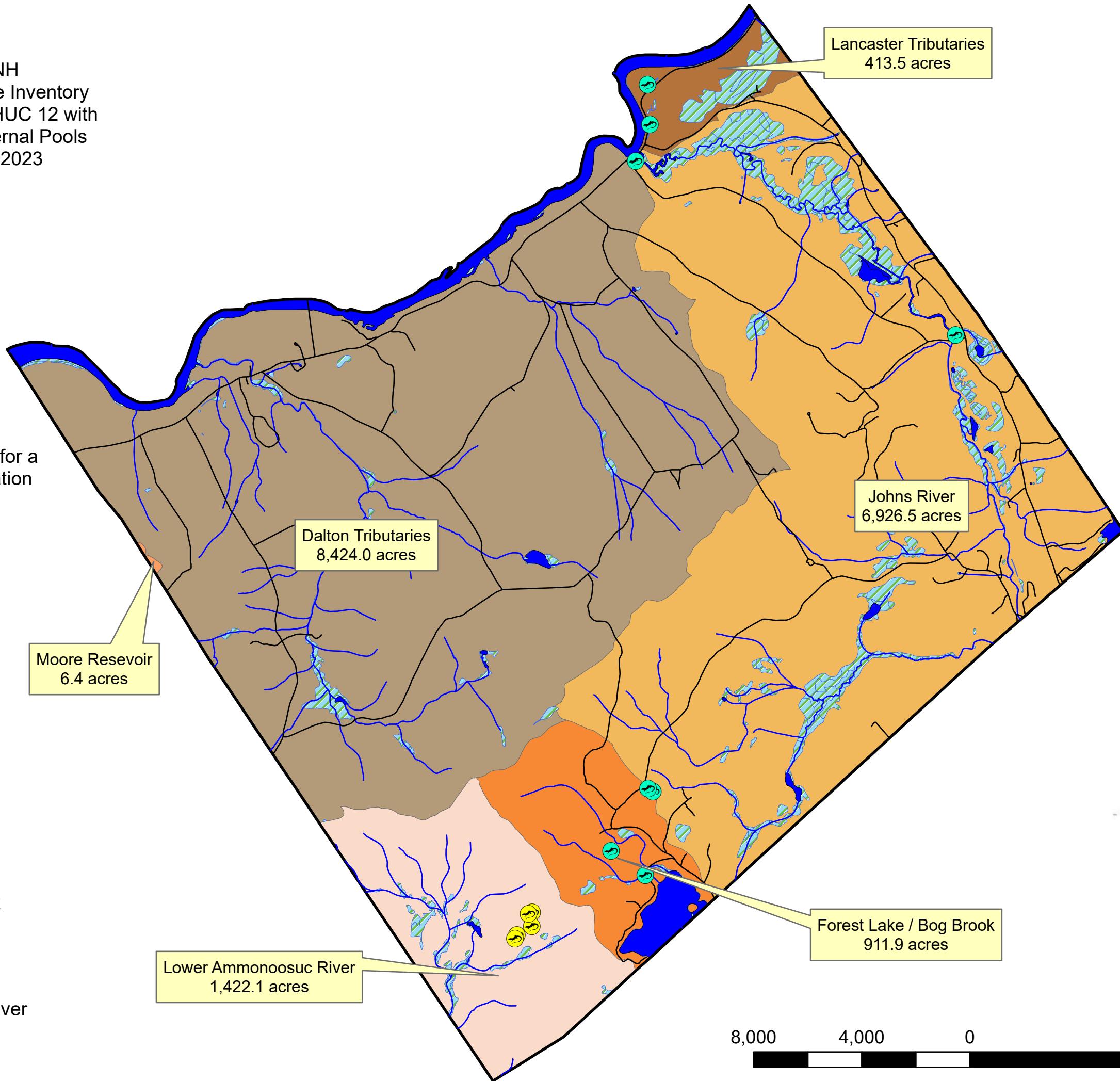

## Legend

-  Vernal Pools Identified for a Wetland Permit Application
-  Vernal Pools
-  Roads
-  Rivers and Streams
-  Town Boundary
-  Connecticut River
-  Lakes and Ponds
-  additional wetlands
-  Dalton NWI

## Subwatersheds

### HU\_12\_NAME

-  Dalton Tributaries
-  Forest Lake-Bog Brook
-  Johns River
-  Lancaster Tributaries
-  Lower Ammonoosuc River
-  Moore Reservoir



Map Produced by:  
Watershed to Wildlife / Elise Lawson  
507 West Darling Hill Rd  
West Burke, VT 05871  
watershedtowildlife.net

8,000 4,000 0 8,000 Feet  


Dalton, NH  
Natural Resource Inventory  
Bedrock Geology  
June 2023

N



**Legend**

- Roads
- Town Boundary
- Rivers and Streams
- Connecticut River
- Lakes and Ponds

**FORMATION1**

- Ammonoosuc Volcanics
- Biotite granodiorite
- Dead River Formation, undivided
- Littleton Formation
- Littleton Formation, undivided
- Madrid Formation
- Perry Mountain Formation
- Pink equigranular biotite granite
- Smalls Falls Formation, undivided
- Tonalite, diorite, granodiorite, and granite

8,000 4,000 0

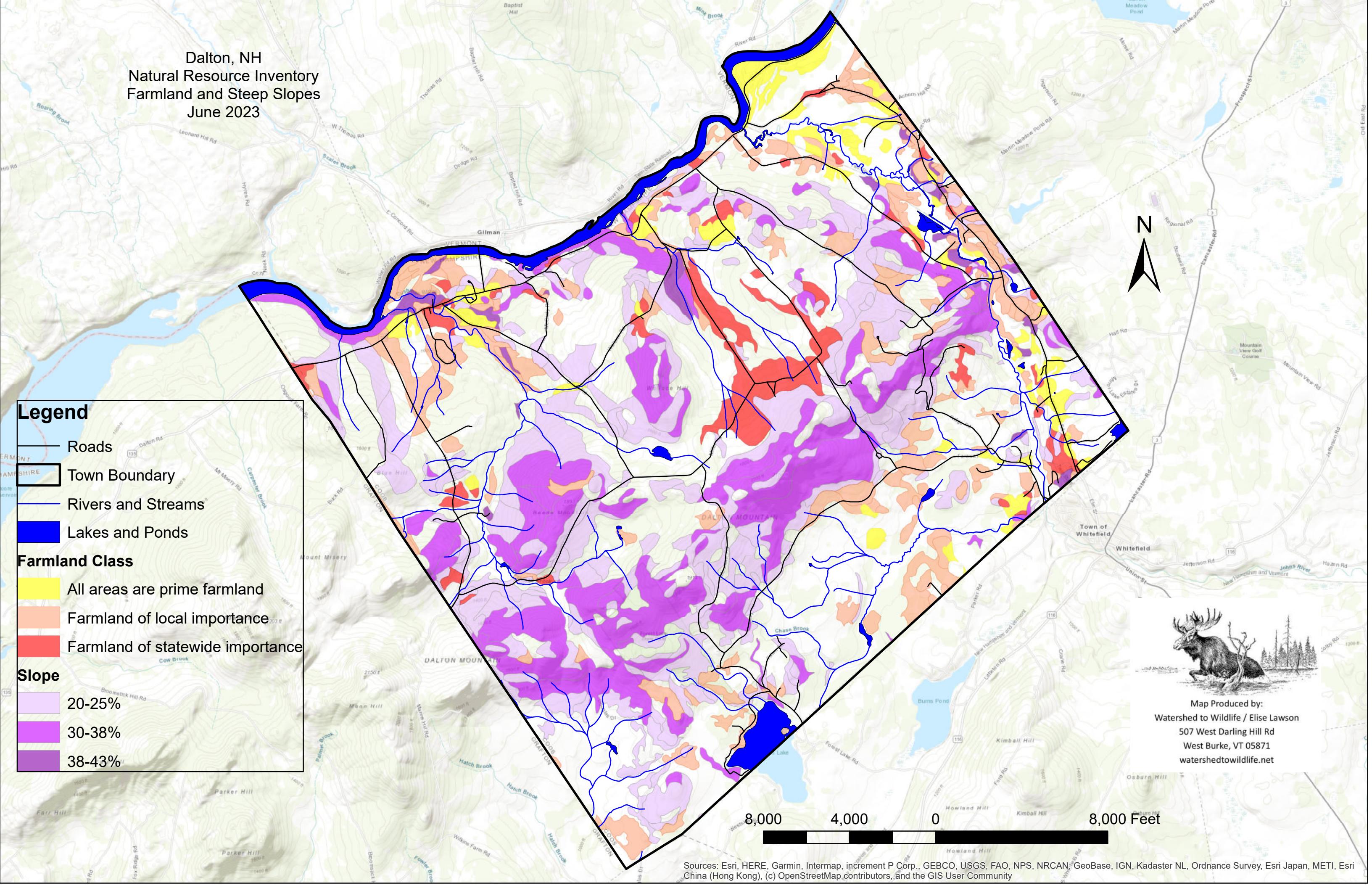
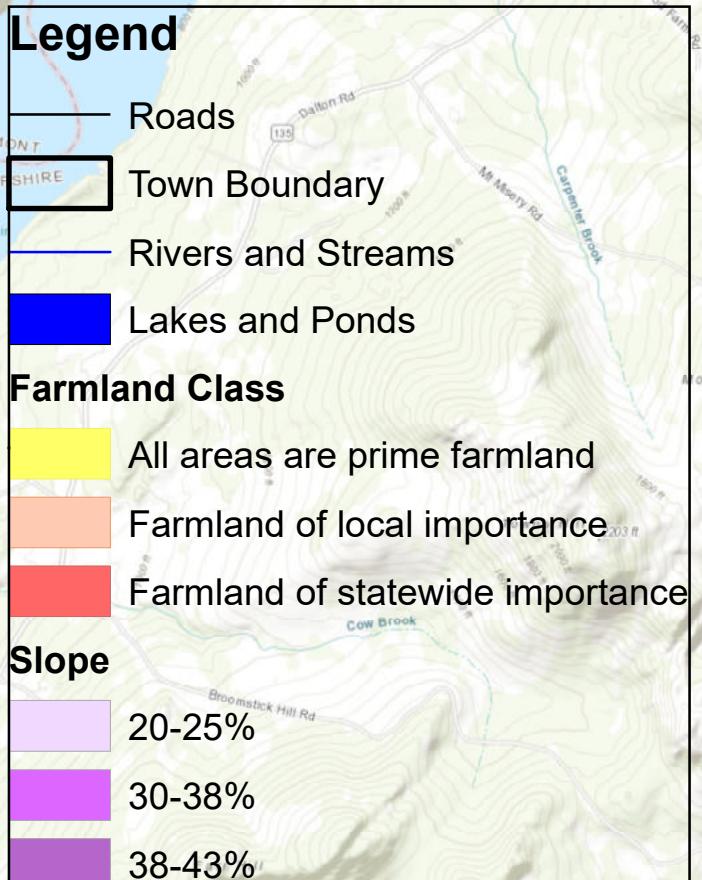
8,000 Feet

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

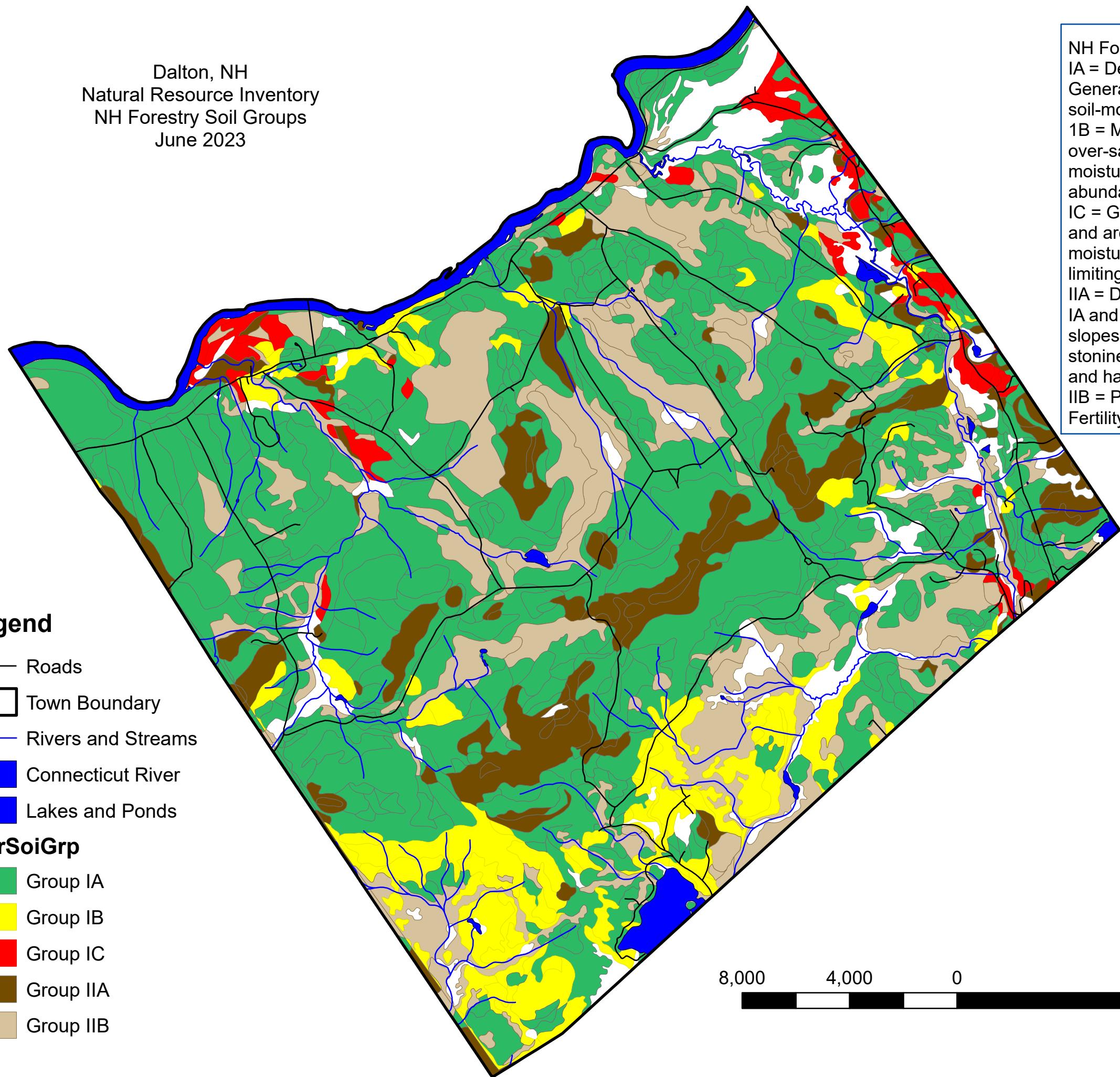


Map Produced by:  
Watershed to Wildlife / Elise Lawson  
507 West Darling Hill Rd  
West Burke, VT 05871  
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Dalton, NH  
Natural Resource Inventory  
Farmland and Steep Slopes  
June 2023



Dalton, NH  
Natural Resource Inventory  
NH Forestry Soil Groups  
June 2023



Map Produced by:  
Watershed to Wildlife / Elise Lawson  
507 West Darling Hill Rd  
West Burke, VT 05871  
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