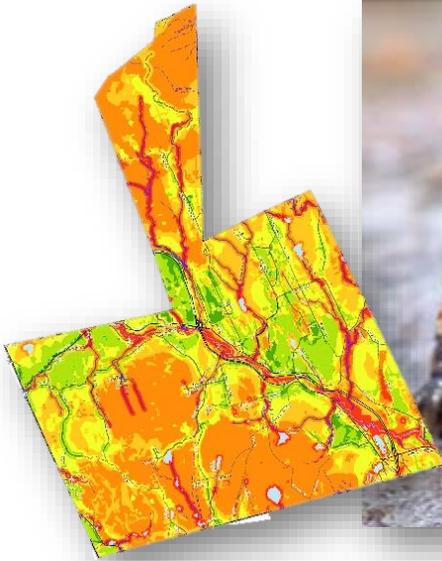


Natural Resources Inventory



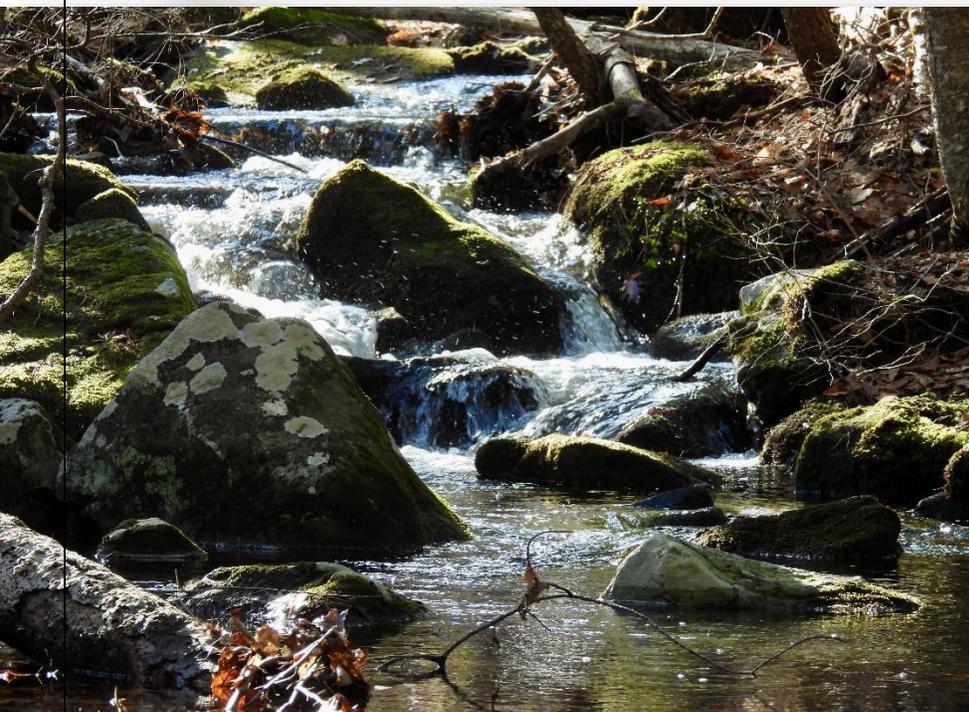
Town of Warner, New Hampshire



Credit: NH Fish and Game



Credit: NH Audubon Society



Credit: Karinne Heise

July 2025

Central New Hampshire
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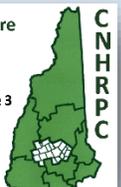


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Executive Summary

1.E Defining the Natural Resource Inventory Document

A natural resource inventory (NRI) is a land-use planning tool that describes and maps natural resources in a given area. In this NRI, these resources are also described in how they affect Warner's ecology, economy, and culture. The resulting document and its maps, data tables, and written descriptions can be used to inform land use and conservation decisions.

Objectives

1. Increase identification and understanding of the Town's natural resources and the lands that support them.
2. Develop information that can inform land use and conservation decisions.
3. Identify resources that are potentially at risk.
4. Compile information that may be used to develop a conservation strategy, comprehensive Open Space Plan, or folded into a Master Plan update.
5. Provide a base of material regarding natural resources and open spaces for educational or outreach efforts in the community, and for collaboration across municipal government.

Process

First, a broad list of natural resources and associated geographic information system (GIS) data are inventoried and mapped. Second, natural resource layers are assigned a score for its relative importance to the town. This score is based on community input from previous planning work, research, local technical knowledge, and best practices. Third, the individual natural resource map layers are overlaid to create a weighted co-occurrence map. The process of overlaying natural resource layers highlights areas that support the most and highest value natural resources. The final step is the creation of the report that includes written analysis of each natural resource, and recommendations based upon the results of the co-occurrence process. Natural resources are broken into one of five broad categories of information, including agriculture, wildlife habitat, culture and recreation, drinking water, and surface water.

These tasks were completed by CNHRPC Staff, Conservation Commission members, and volunteers on the NRI Project Team.

1.E.1 Co-occurrence Analysis Conclusions and Recommendations

The NRI identifies and maps natural resources and lands that support the highest natural resource value. The details of the natural resources, their locations, and their contributions to the Town of Warner also lead to a series of specialized recommendations.

Conclusions

The Weighted Co-Occurrence Map (Map 8) visually displays the highest priority natural resource locations in the community. The analysis found the most critical locations in Warner to protect for current and future generations include large swaths of the Mink Hills, the northern part of Warner including Mount Kearsarge, and various areas along the Warner River and other streams, including Willow Brook, Stevens Brook, and Schoodac Brook. More detailed findings and additional analysis are discussed.

Recommendations

The set of recommendations included were developed from the results of this natural resource inventory and are accompanied by additional information and context.

- ❖ **Recommendation 1:** Use this Natural Resources Inventory and the Co-Occurrence Analysis to inform decision making on natural resource protections, including future easement and conservation property purchases.
- ❖ **Recommendation 2:** Work with the Planning Board and other boards and commissions as appropriate to cooperatively identify priority conservation land, and to identify lands better suited for other community objectives, such as economic development, housing, or community facilities.
- ❖ **Recommendation 3:** Vigilantly protect the town’s stratified drift aquifers, particularly near the municipal drinking water wells.
- ❖ **Recommendation 4:** Maintain and update this NRI and associated data as needed and consider developing an Open Space Plan to accompany it.
- ❖ **Recommendation 5:** The Conservation Commission should continue to strengthen its ties to the Warner Agricultural Committee to support long term sustainability of agricultural lands and businesses.
- ❖ **Recommendation 6:** Continue actively participating with the Warner River Local Advisory Committee (WRLAC) as part of the NHDES Rivers Management and Protection Program (RMPP).
- ❖ **Recommendation 7:** Establish a standing committee or working group dedicated to the stewardship of the Mink Hills.
- ❖ **Recommendation 8** Routinely consider the anticipated impacts of climate change in all Conservation Commission actions and evaluate how a changing climate may impact conservation needs. Coordinate with others to address climate resiliency and mitigation.



Credit: Nancy Bowers

Chapter 1 | Introduction and Objectives



The Town of Warner’s Master Plan highlights the importance of a wide range of natural resources and services to the community. These resources serve the community with important consumable products such as clean, safe drinking water and crops from productive agricultural land. However, their value is also qualitative, providing natural beauty and the town’s defining landscapes that are cherished by residents.

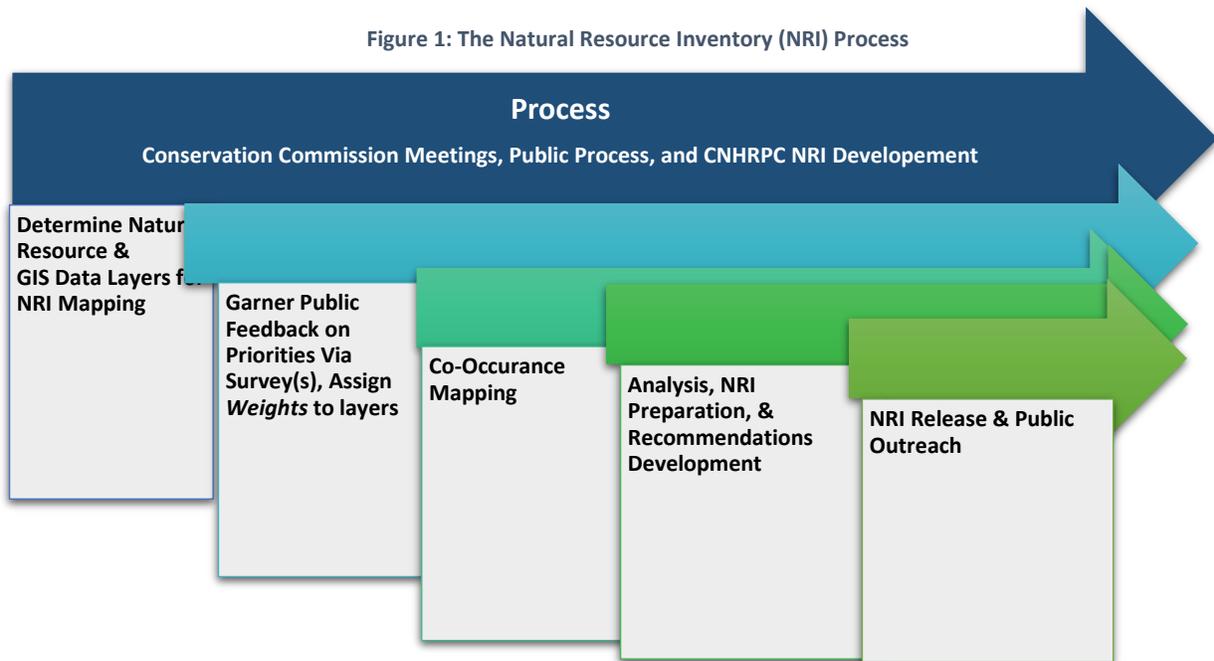
Natural resources are essential to providing habitat for wildlife, preserving rare or sensitive species and ecosystems, ensuring the sustainability of agriculture, and providing a wide range of ecological services that support the Town of Warner over the long term. This NRI identifies, prioritizes, and maps these resources. The plan was informed using results from preexisting outreach and new connections with the community, along with direct involvement with the Conservation Commission. The results will help inform of land conservation priorities in Warner and other town practices that help sustain these natural resources and the benefits they bring.

1.1 Components of the NRI

This Natural Resource Inventory (NRI) document contains descriptions of various natural resources, maps these resources, weighs the importance of these resources, and describes the process undertaken in the development of the plan. A series of basic recommendations are also provided. An online interactive *Story Map* version of the NRI was also created.

Process

This Natural Resources Inventory document includes a weighted co-occurrence analysis in addition to its inventory of natural resources. The inventory portion of the document maps and describes a multitude of natural resources in Warner, including water resources, agricultural resources, cultural and recreational resources, and habitat resources. The weighted co-occurrence analysis is a method of assigning relative value to the resources and the land that support them.



The first step, the inventory component, involved developing a list of natural resources in Warner, identifying the appropriate GIS data layers to display each resource, and mapping the resource. The result of this step was a set of maps that depict the current state of natural resources in Warner.

The next step involved assigning each natural resource layer a score that identified its relative importance to the town. This valuation was based on information gleaned from analyzing the set of natural resource maps, results of a public survey, knowledge and experience from the Conservation Commission, best practices, and advice from experts in the field. Natural resources with a higher value to the Town were given a greater weighted score, and resources with a relatively lower value were given a lower weighted score.

The third step was overlaying the weighted layers in a co-occurrence mapping exercise. The result was six co-occurrence maps that display areas of Town with the highest natural resource value and presumably the highest land conservation value for the Town. Five weighted co-occurrence maps showing natural resource score results for the different topic areas: Agriculture; Cultural and Recreational; Drinking Water; Surface Water; and Wildlife Habitat. The final co-occurrence map encompasses all five resource categories.

The last step in the process was constructing this NRI document which incorporates an analysis of each co-occurrence category and their inputs, as well as recommendations based on the results. Additionally, a large map set including the natural resource and co-occurrence maps was developed, in both paper and digital format, and was provided to the Conservation Commission.

The NRI Working Group of the Conservation Commission was directly involved in this process and reviewed and refined the maps, analysis, and recommendations. The group collaboratively assigned the weights with input from previously held outreach, surveys, the Master Plan, and input from the Agriculture Committee.

Recommendations

The priority conservation areas included in this document are developed based on the co-occurrence analysis and data obtained in the map set. In addition, general strategies for outreach, management, and regulatory action are included.

Intended Use

The information in this NRI is intended to inform and guide land conservation efforts in the Town of Warner. It provides information about specific habitats and resources - at both the site level and throughout the Town - that can support land use decisions and conservation priorities. This NRI provides a benchmark for observing short and long-term changes, and it should be updated as conditions change and when new information is available. This baseline assessment may be refined through field investigations and gathering of ground truth data, further developing this document into a more comprehensive inventory and assessment. The NRI may be incorporated into the Town's Master Plan and other planning documents. It is intended to serve as an informational tool that may inform future changes in zoning, land use regulations, and policies. Additionally, Town staff, boards, residents, and other interested individuals can use the NRI document as a means to educate themselves or others on the importance and presence of natural resources in Warner.

1.2 Natural Resource Town Survey

An online survey of open space resources was taken by Warner residents less than a year prior to conducting this NRI. The project team agreed that this existing survey which garnered a substantial amount of feedback from the Community could be used for this NRI. It was agreed that a new survey would be confusing and redundant given that the existing survey was so recently completed and produced by the Conservation Commission with assistance from the Regional Planning Commission modeled after surveys that had been used for other NRIs.

NRI Objectives

1. Increase identification and understanding of the Town's natural resources and the lands that support them.
2. Develop information that can inform land use and conservation decisions.
3. Identify resources that are potentially at risk. Identify natural resources that interact as systems.
4. Provide a visual resource that can be used as a reference for collaboration among Town Commissions and Boards.
5. Capture a snapshot of the Town's natural resources for use as a baseline in tracking land use trends.
6. Compile information that may be used to develop a conservation strategy or comprehensive Open Space Plan.
7. Inform decisions regarding improving and protecting water quality, including surface waters, groundwater, and drinking water supplies.
8. Provides a base of material for educational or outreach efforts in the community regarding natural resources and open spaces.

An online survey of open space resources was taken by Warner residents less than a year prior to conducting this NRI. The project team agreed that this existing survey which garnered a substantial amount of feedback from the Community could be used for this NRI. It was agreed that a new survey would be confusing and redundant given that the existing survey was so recently completed and produced by the Conservation Commission with assistance from the Regional Planning Commission modeled after surveys that had been used for other NRIs.

There was a total of 128 responses received. Respondents answered 14 questions, some of which were in the format of multiple choice, check all that apply, and write-in responses.

Results showed staunch support for conservation efforts in Warner, with an emphasis on protecting large tracts of unfragmented lands. Water resources were considered the highest priority for protection with a strong emphasis on drinking water supplies, followed by wildlife habitat, forests, wetlands, and farmland. Cultural items such as trails, historic sites, and scenic views ranked comparatively lower. Survey respondents recognized a range of benefits conservation lands can bring, and most respondents used conservation lands for recreational purposes. Results can be found in the appendix.

1.3 Co-Occurrence Weighting

Each natural resource data layer has been assigned a value score. A higher score indicates a higher natural resource value to the Town, and a lower score indicates a lower relative value. These scores were assigned through a collaborative process with the working group and Regional Planning staff. Committee members based these scores on results of public input from the community survey, study of research and best practices, and experience and knowledge from the working group members. Thorough discussion on the issues resulted in multiple adjustments before coming to the final score.

The natural resource data layers were divided into five categories: Agriculture; Wildlife Habitat; Cultural and Recreational; Drinking Water; and Surface Water. Co-occurrence weighting maps were created for each of these five categories, as well as for a final co-occurrence weighted analysis map that includes all data inputs. The table lists each data layer representing a natural resource, and the value score assigned to it. These layers and values were the inputs for the GIS based co-occurrence analysis maps and add up to total 100. The five weighting maps, the full weighted analysis map, and a description of the input data layers, are included in the next section. Additional information on each natural resource is available throughout the document.

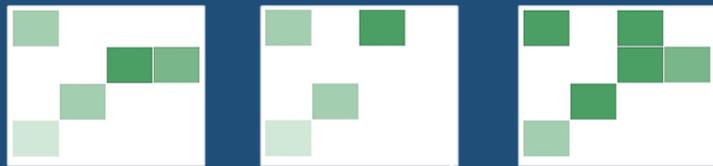
What is a Co-Occurrence map?

Co-occurrence maps display how many individual natural resources overlap in a given area. If, for example, a point in town overlaps a high-quality drinking water aquifer, a floodplain, and a high-quality wildlife habitat; the given co-occurrence value for that point would be 3.

In a weighted co-occurrence map, each natural resource input layer is assigned a relative value. Using the weights from this NRI in the above example, the weighted values would look as follows: drinking water aquifer – 12; floodplain – 6; and wildlife habitat – 10; equating to a total value of 28. You can compare this point on the map with other locations that support other combinations of natural resources and their corresponding weights.

Benefits of this approach:

- Allows Assigning of Relative Value to Natural Resources
- Emphasizes areas with multiple resources.
- Encapsulates all (or a subset of all) natural resources in one product.



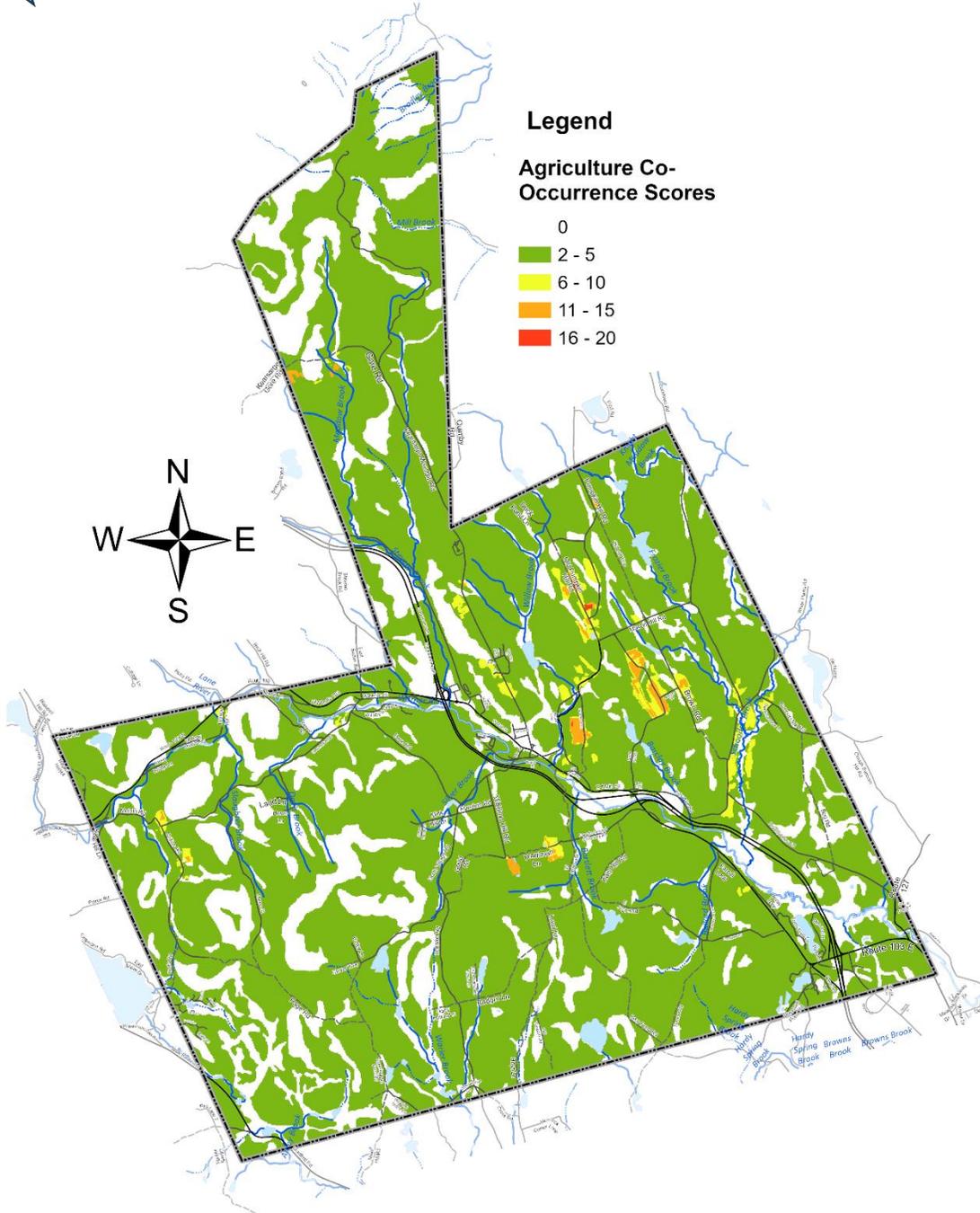
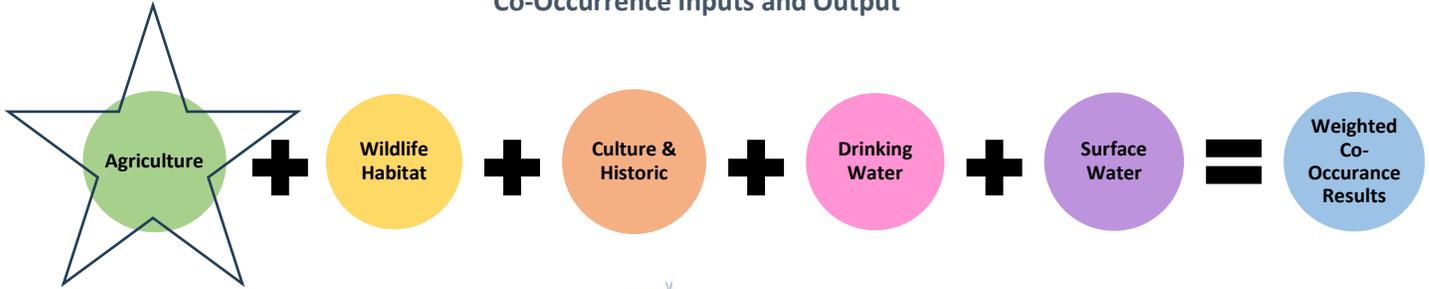
Natural Resource Data Layers		Weights
Data Layer		
Agriculture		
Agricultural Lands		4
Active croplands (includes Ag Lands)		6
Farm Soils - Prime		3
Farm Soils - Statewide Importance (includes prime)		3
Forestry Soils - Group 1A and 1B		2
Agriculture Total		18
Wildlife Habitat		
Conservation Land Buffer 1,000'		4
Wildlife Action Plan Highest Ranked Habitat in NH		14
Wildlife Action Plan Highest Biological Habitat in Region		10
Wildlife Action Plan Supporting Landscapes		6
Unfragmented Blocks (Kearsarge and Minks)		3
Unfragmented Blocks (Minks)		2
Wildlife Habitat Total		39
Scenic Views, Historical Sites, Cultural, and Recreation		
Historic and Cultural Sites Buffer 300'		3
Stone Walls (100' buffer)		2
Scenic Views, Historical Sites, Cultural, and Recreation Total		5
Drinking Water		
Wellhead Protection Areas and Public Water Supply Well Buffer 400'		6
Stratified Drift Aquifers (all)		6
Stratified Drift Aquifers Transmissivity >2,000 sq ft/day		6
Drinking Water Total		18
Surface Waters (wetlands, rivers, streams, lakes, ponds)		
Wetlands (NWI)		2
Wetland Buffer 100' (Includes Wetlands)		4
Floodplains, 1% Annual Chance (100-year)		6
Waterbodies (3+ acre), Rivers, and Stream Buffers 300' (riparian zones)		8
Surface Waters (wetlands, rivers, streams, lakes, ponds) Total		20
Total		100

Table 1: Natural Resource Data Layers in Co-Occurrence Mapping

1.4 Co-Occurrence Results

A co-occurrence map was produced for each of the five categories. The data inputs and value scores for each of these maps are described in the corresponding chapter later in the document. The final Weighted Co-occurrence Map, which is displayed on P.16, is described with the conclusions and recommendations. The following five (5) pages (P.11 – p.15) depict each of the categorial co-occurrence maps (one per page); and illustrate the cumulative process by which they comprise the resulting weighted co-occurrence result map.

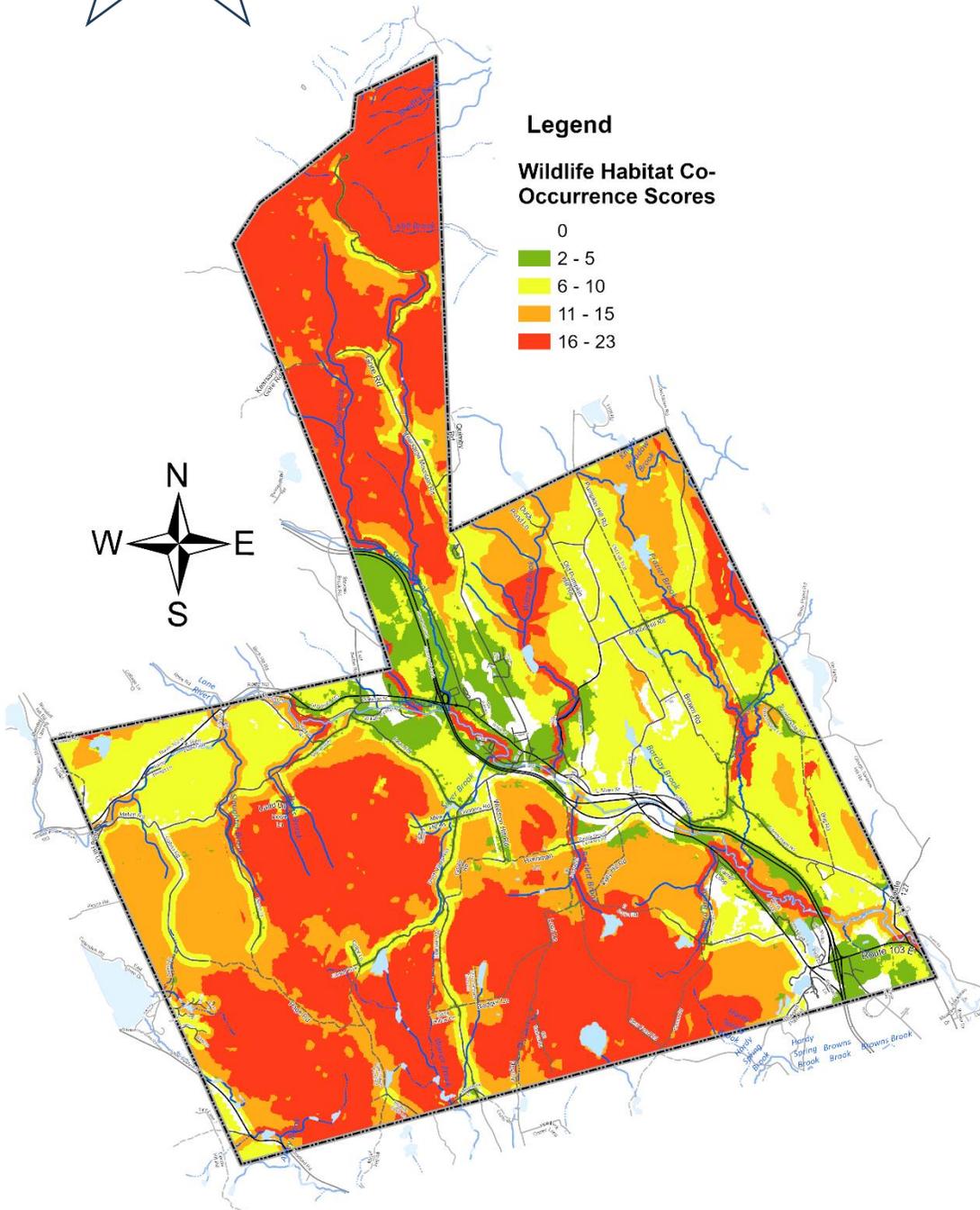
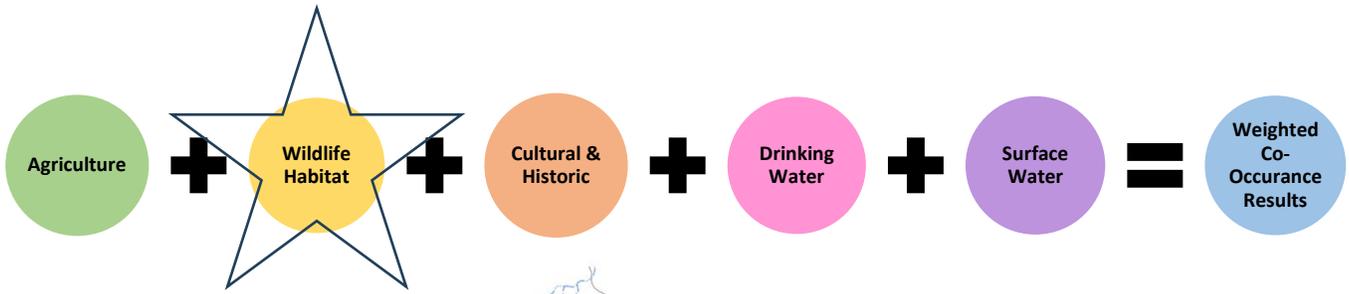
Co-Occurrence Inputs and Output



Map 1: Agriculture Co-Occurrence Results

This map shows the co-occurrence results from the Agriculture data layers. They include agricultural soils, forestry soils, and agricultural lands.

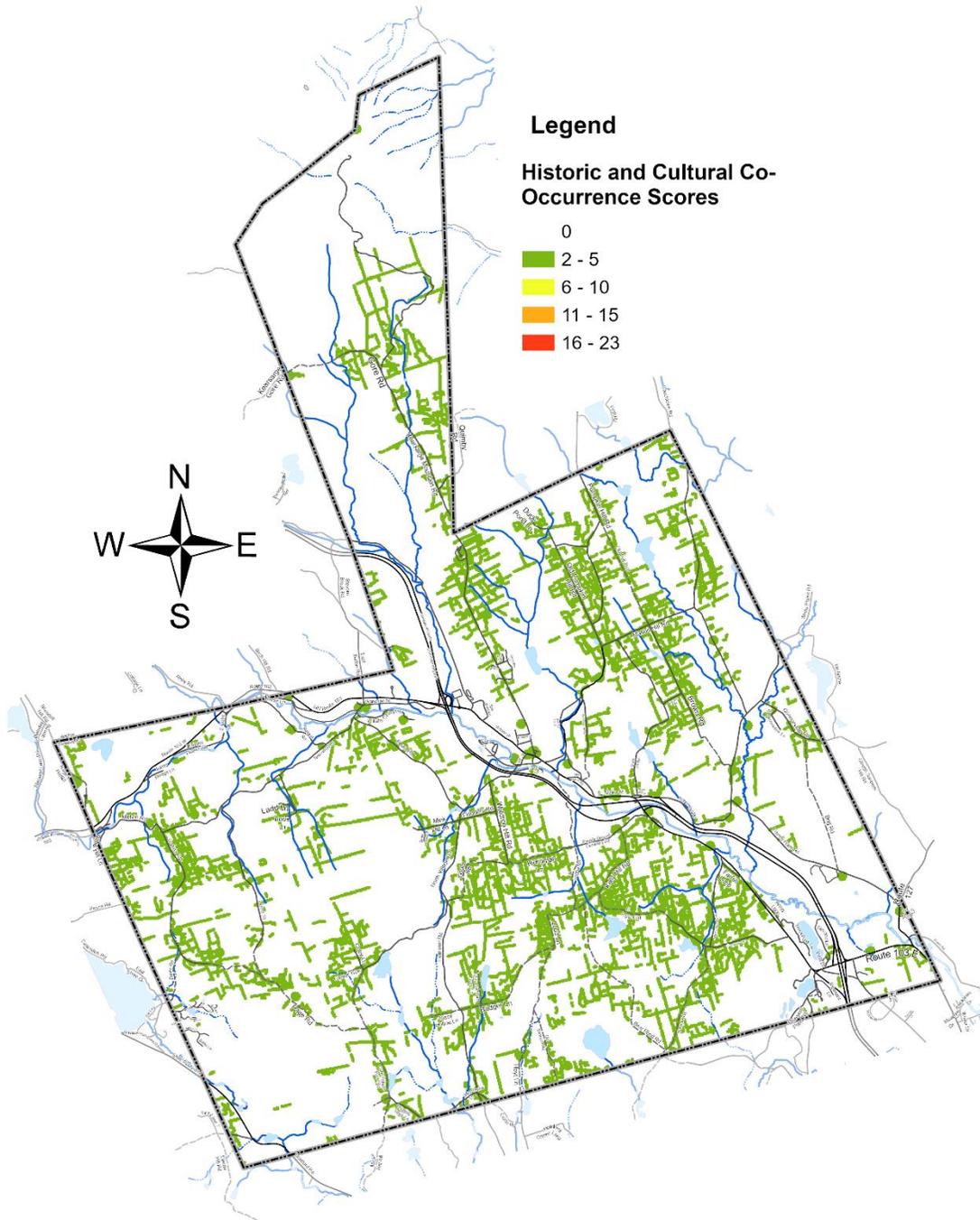
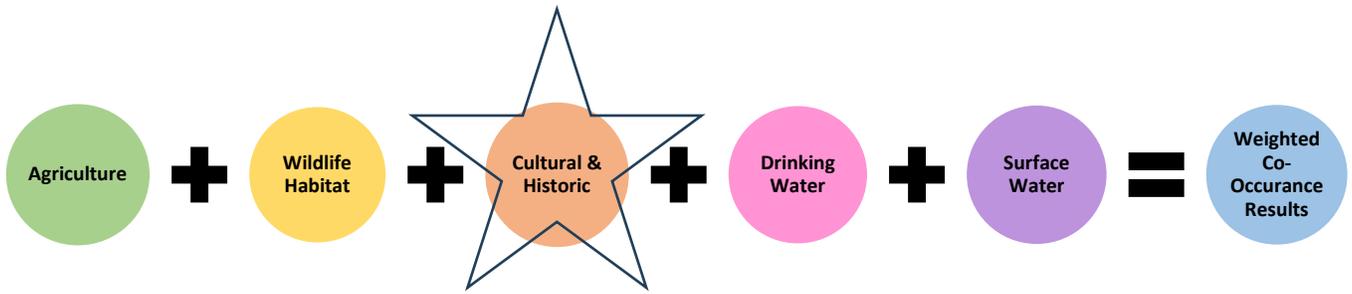
Co-Occurrence Inputs and Output



Map 3: Wildlife Habitat Co-Occurrence Results

This map shows the co-occurrence results from the Wildlife Habitat data layers. They include the Wildlife Action Plan tiers, unfragmented lands, and conservation lands buffer layers.

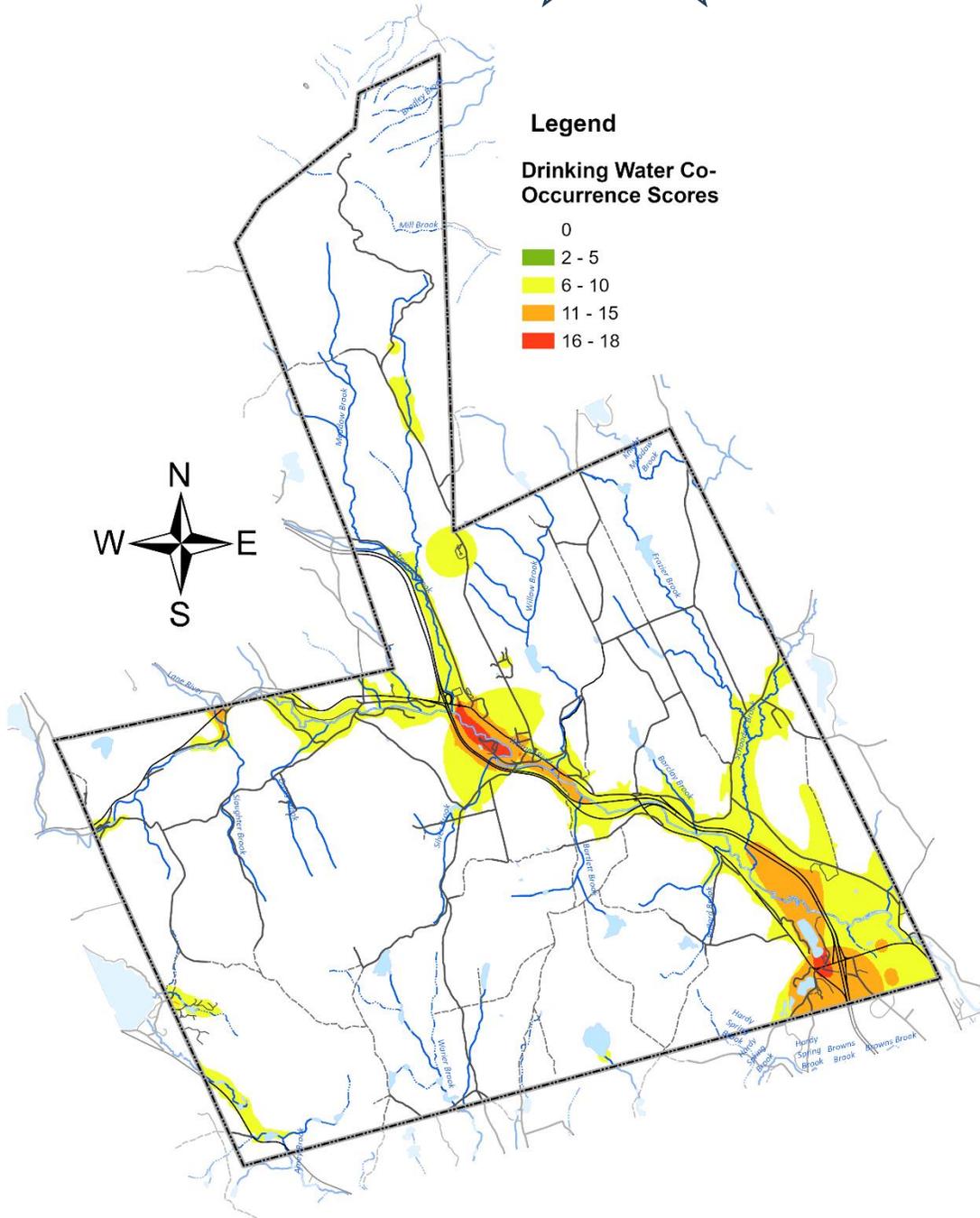
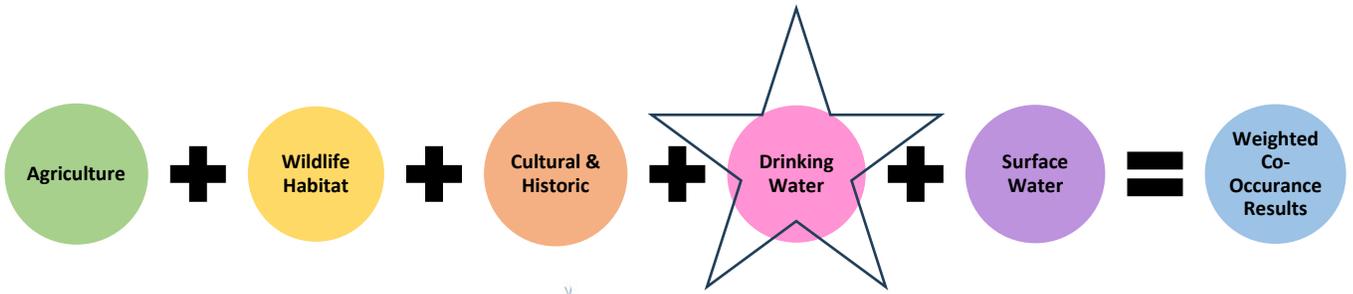
Co-Occurrence Inputs and Output



Map 4: Historic & Cultural Co-Occurrence

This map shows the co-occurrence results from the Cultural and Historic layers. They include stone walls, and historic and cultural sites 300' buffer layers.

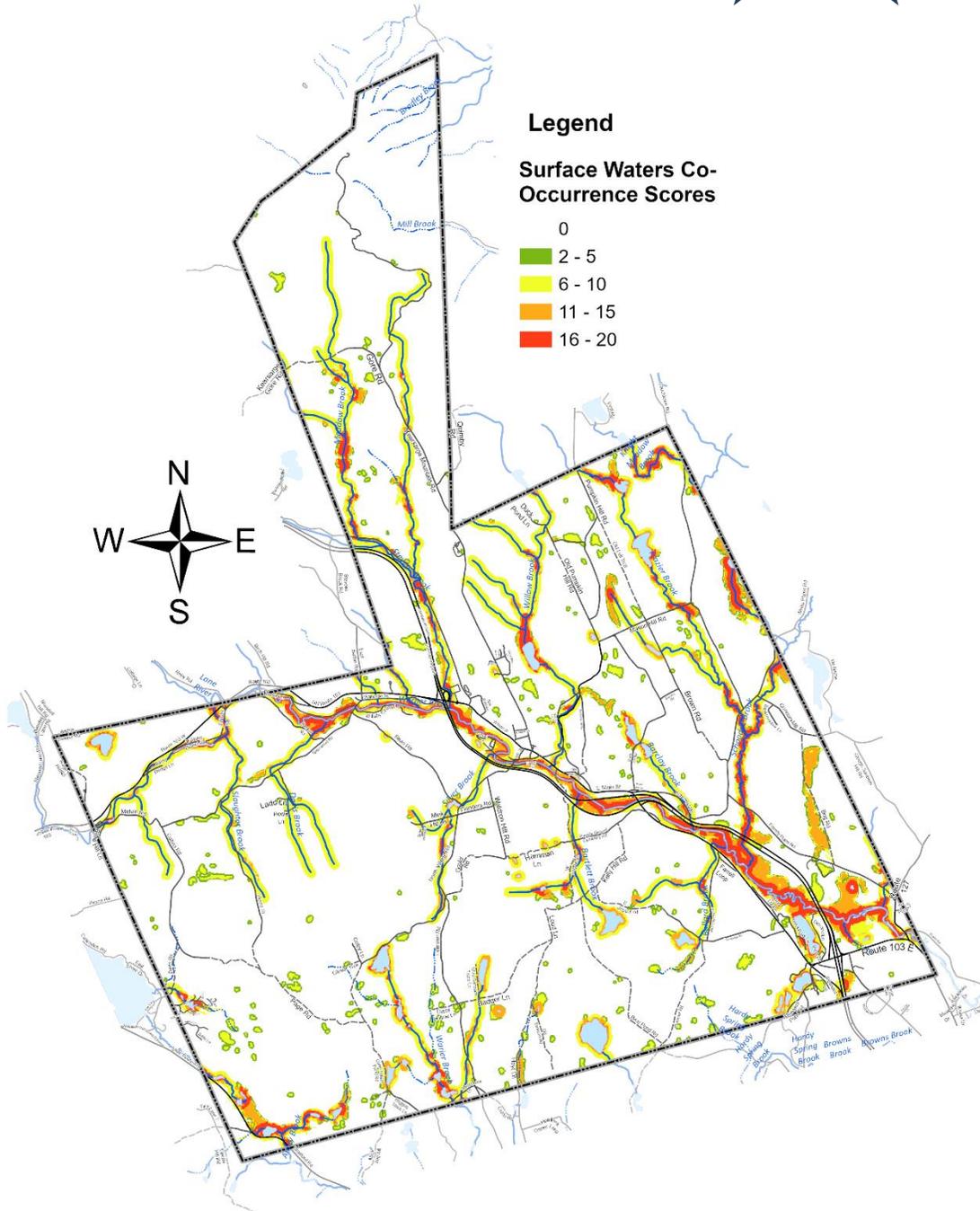
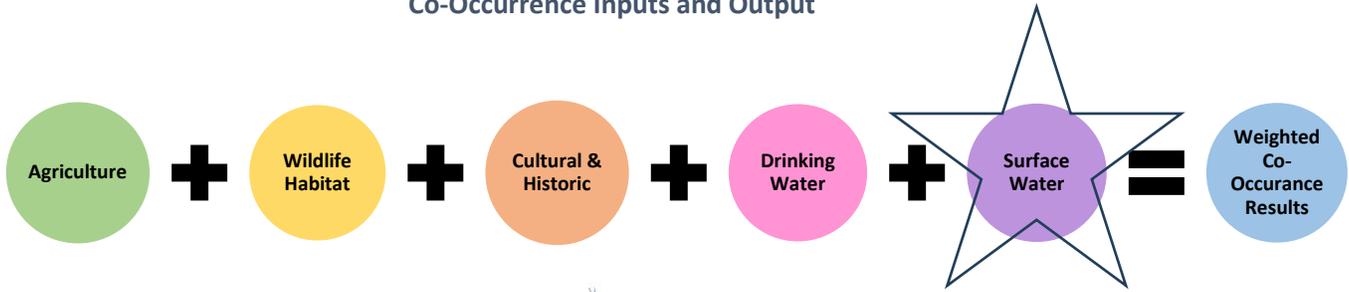
Co-Occurrence Inputs and Output



Map 6: Drinking Water Co-Occurrence Results

This map shows the co-occurrence results from the Drinking Water layers. They include stratified drift aquifers, wellhead protection Areas and public water supply buffer layers.

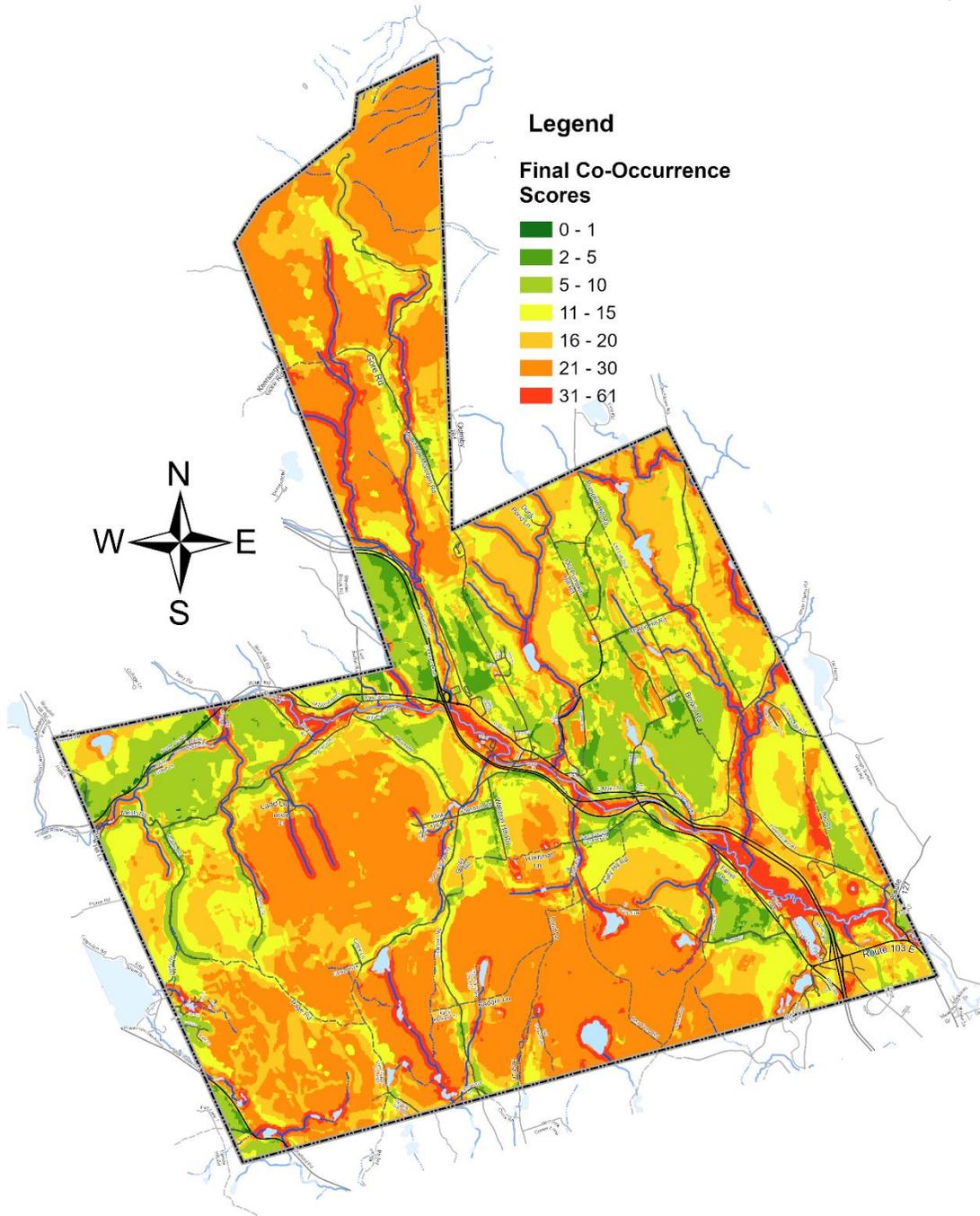
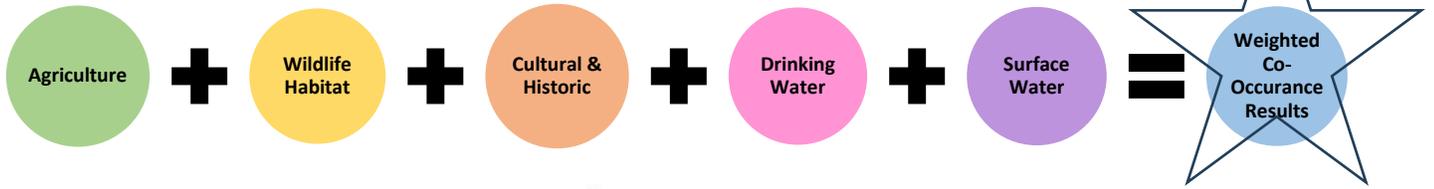
Co-Occurrence Inputs and Output



Map 8: Surface Waters Co-Occurrence Results

This map shows the co-occurrence results from the Surface Waters layers. They include waterbody 300' riparian buffers, wetland 100' buffers, and 100-year floodplains.

Co-Occurrence Inputs and Output



Map 9: Weighted Co-Occurrence Analysis Results

The Weighted Co-Occurrence map shows which areas in Warner have the highest natural resource value (red shades) versus less (green shades). The orange and red shades overlap with multiple natural resources that add up to a cumulative high natural resource value. The green shades overlap with fewer and/or lower value natural resources.

Chapter 2 | Water Resources



Credit: Phil Stockwell

Water resources are a critical asset in Warner, providing drinking water, recreational opportunities, flood storage, and habitat for wildlife. Comprising both surface water and groundwater resources, they represent some of the most fragile ecosystems and are particularly sensitive to certain land uses and the risk of contamination. This section provides an overview of the watersheds, surface waters, floodplains, wetlands, water infrastructure, and aquifers in the Town as depicted on the NRI's Water Resources Map. For the purpose of co-occurrence weighting, results are broken into a drinking water category and surface water category.

2.1 Drinking Water Input Value Scores and Co-Occurrence Results

Wellhead Protection Areas and Public Water Supply Wells

Warner is fortunate to have municipal water servicing the village and nearby areas. Water for Warner's municipal water supply is drawn from wells in the aquifer along the Warner River. In addition to the municipal public water supply, there are several other private wells that are considered public water supplies and produce water for drinking and other potable uses. A 400' buffer was applied to all public water supply wells, plus the entire Wellhead Protection Area for the Warner Village Water Precinct and the Pleasant Lake Estates water supply. These areas were scored as having a value of 6 of the total sum of 100 for all co-occurrence input layers.

Groundwater Aquifers

Groundwater aquifers provide water that feeds into rivers, streams, and lakes, but also are the source of water for residential and commercial wells. The Town has many residential wells used for drinking water and other potable uses, as well as larger wells that supply water to larger facilities or communities such as a mobile home park. Many residential wells in Warner provide water through bedrock aquifers. Stratified drift aquifers are the most productive and highest quality aquifers, and filter water through deposits of sand and gravel. These stratified drift aquifers were assigned increasing values based on their transmissivity, a measure of how much water the aquifer can move.

All stratified drift aquifers in Warner were assigned a value score of 6. In addition, the portions of the aquifers with the highest transmissivity (>2,000 square ft/day) were assigned with an additional value score of 6.

Drinking Water Co-Occurrence Results

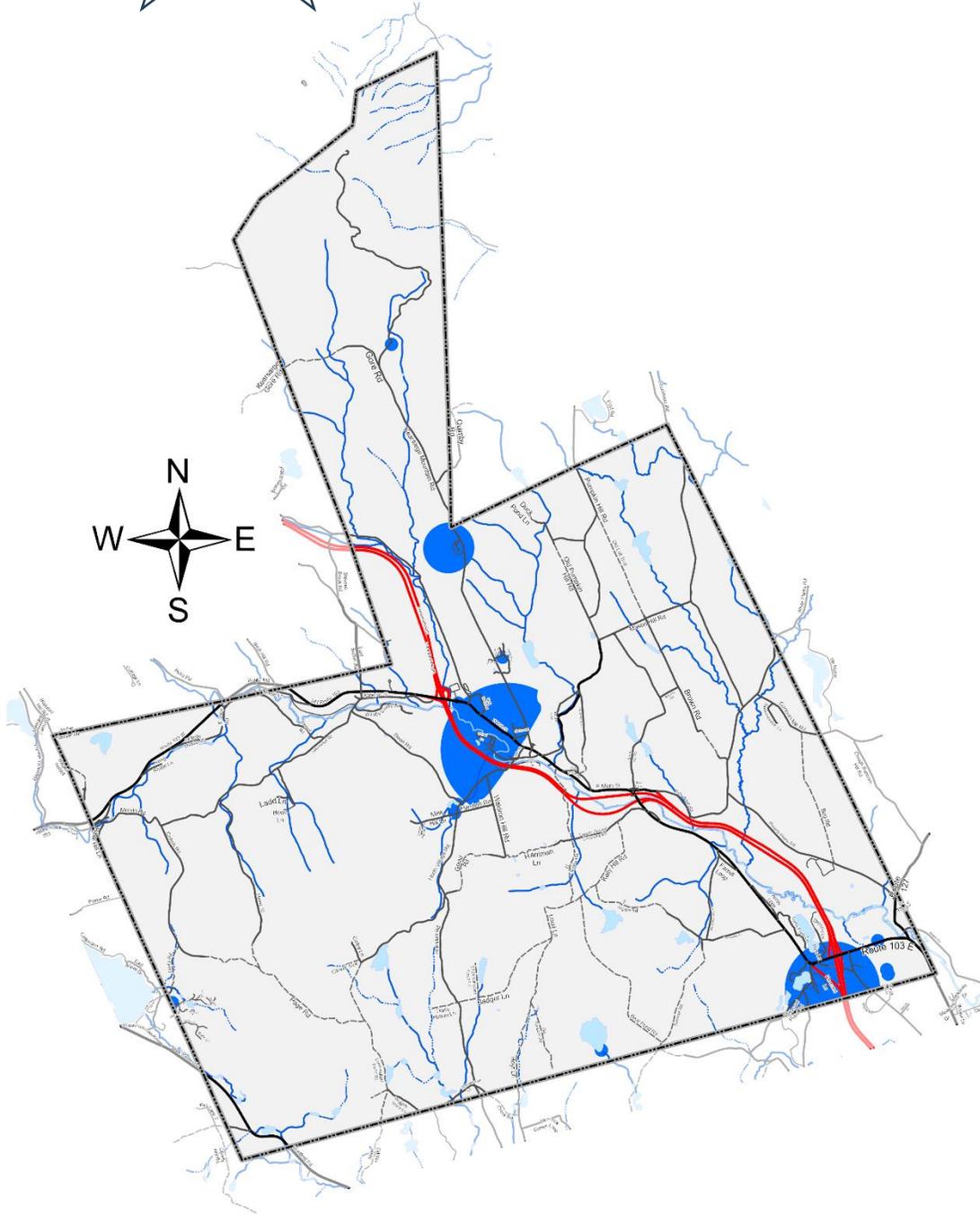
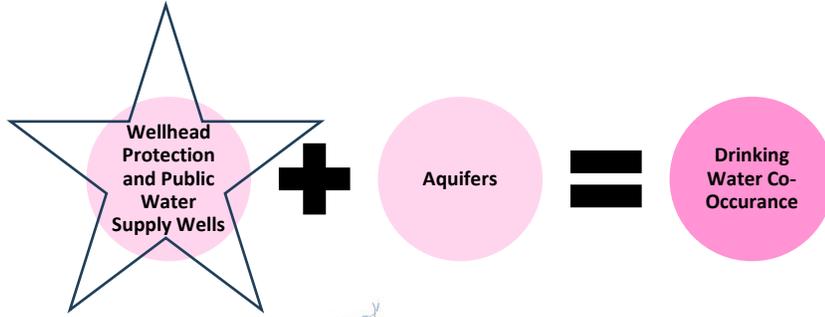
The highest value lands for drinking water follow the Warner River with two focus points. One focus point is located just northeast of Warner Village, and the other is located in the southeast corner of town in the vicinity of Tom Pond and Pleasant Pond. A more detailed analysis of drinking water resources may be prudent for analyzing any future public water supply needs, but this analysis shows these lands are valuable for the water resources they provide.

Safe and secure drinking water resources are critically important to any town, including Warner. It was by far considered the highest priority based on survey responses. The category is worth 18% of the total scores for the Town.



Credit: Karinne Heise

Drinking Water Co-Occurrence Inputs and Outputs



Map 11: Wellhead Protection & Public Water Supply

2.2 Surface Waters Input Value Scores and Co-Occurrence Results

Water Bodies and 400' Buffer

This layer includes rivers, streams, and water bodies (lakes and ponds), plus a 400' buffer around them. The area is derived from the National Hydrological Database. This layer was scored highly at 8. Water bodies have habitat, ecological, hydrological, and cultural value to the Town of Warner.

Wetlands and 400' Buffer

The wetlands identified in the National Wetlands Inventory were assigned a value score of 6. Areas within 400' of wetlands were assigned a value score of 4. Wetlands are important for clean surface waters, mitigating floods, and providing critical habitat for wildlife. Intact wetland buffers are important for the health of the wetland and the services they provide.

Floodplains

Areas with a 1% flood risk, also known as the 100-year floodplain, were assigned a value score of 8. Protecting floodplains can help reduce flood damage by keeping development out of flood prone areas. Floodplains also absorb and distribute floodwater, helping reduce the severity of flooding downstream. This data layer is from the 2023 preliminary FEMA Flood Insurance Rate Map (FIRM) data. This represents an improved data set from the existing FIRMs and is expected to be officially implemented in the near future.

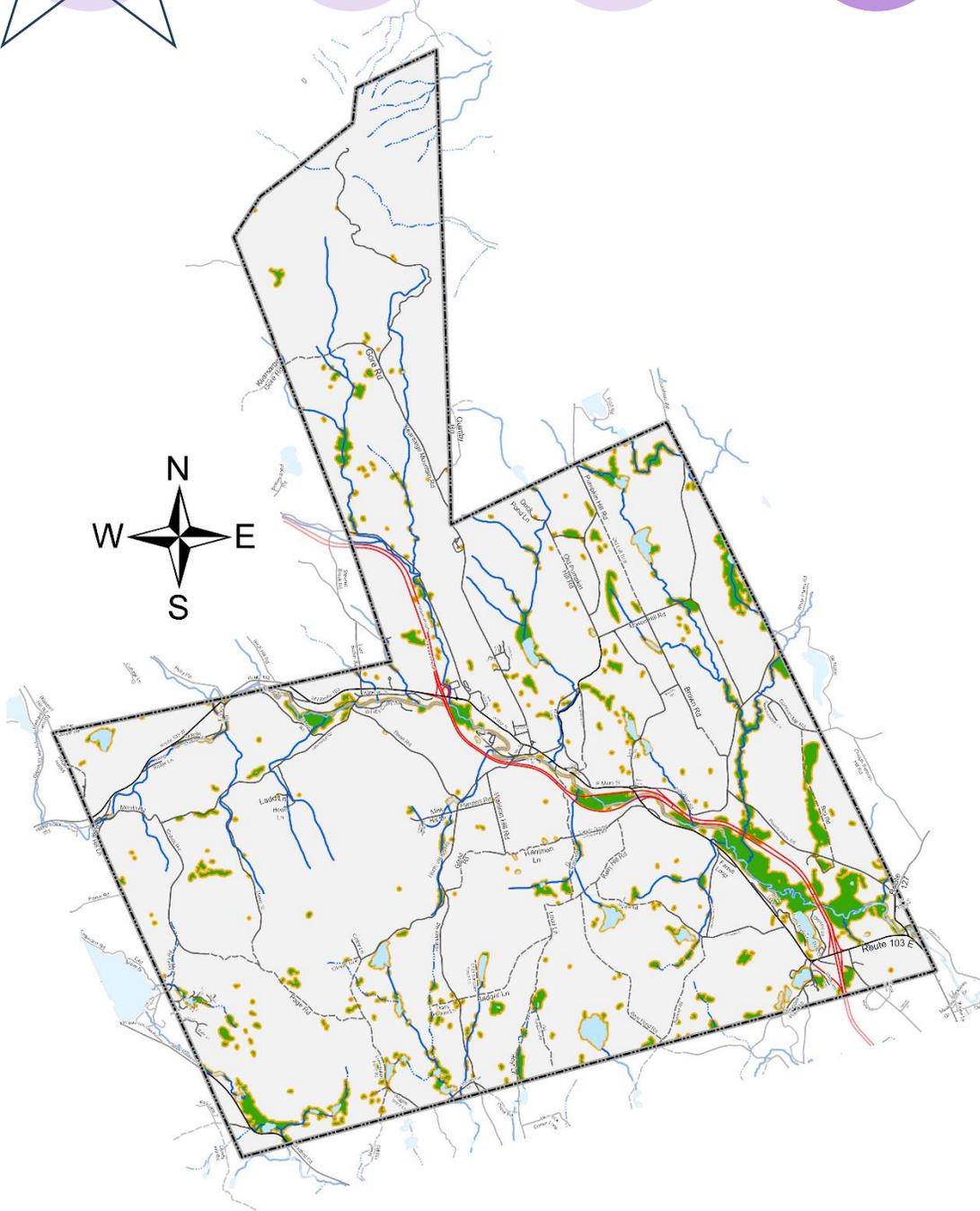
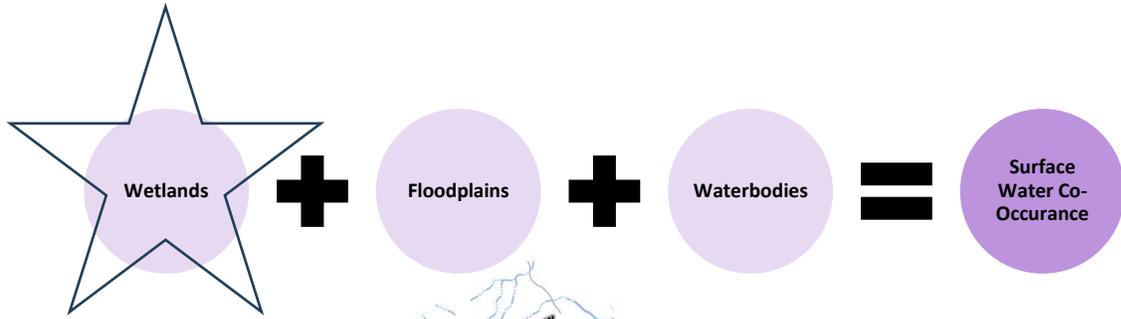


Surface Water Co-Occurrence Results

The co-occurrence results of the Surface Water related layers highlights the Warner River. The river is a prominent feature of the town historically as well as from a natural resource perspective. The river, the floodplain, and associated wetlands complexes all contribute to the high value of the Warner River corridor.

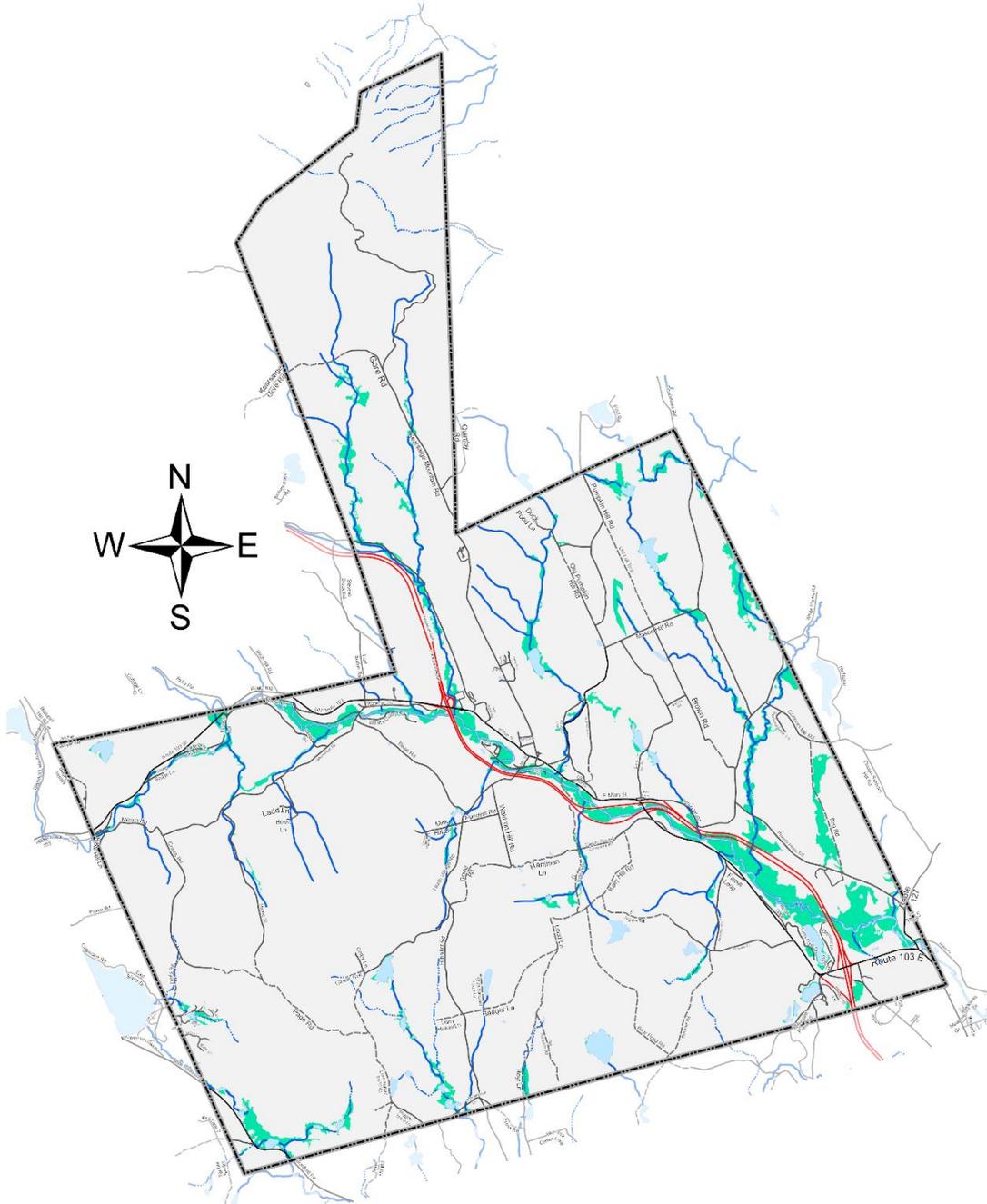
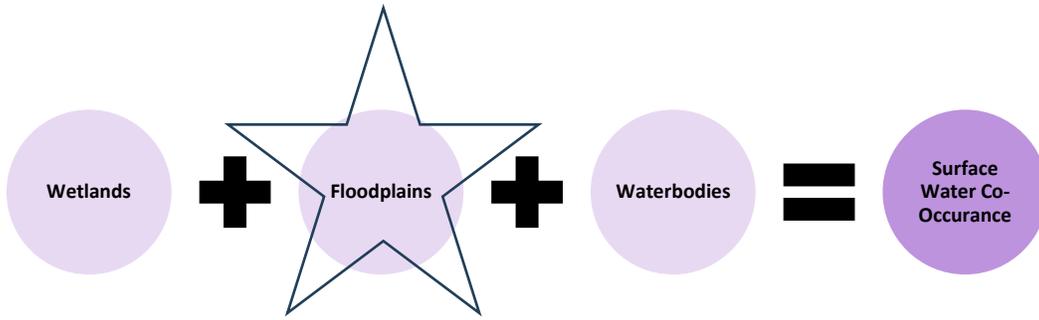
Survey results and Conservation Commission discussions indicate that clean healthy bodies of water are important to the Town of Warner. Rivers and Streams ranked second, compared to drinking water, in survey responses regarding conservation priorities. The Surface Waters category makes up 20% of the total co-occurrence score for Warner.

Surface Water Co-Occurrence Inputs and Outputs



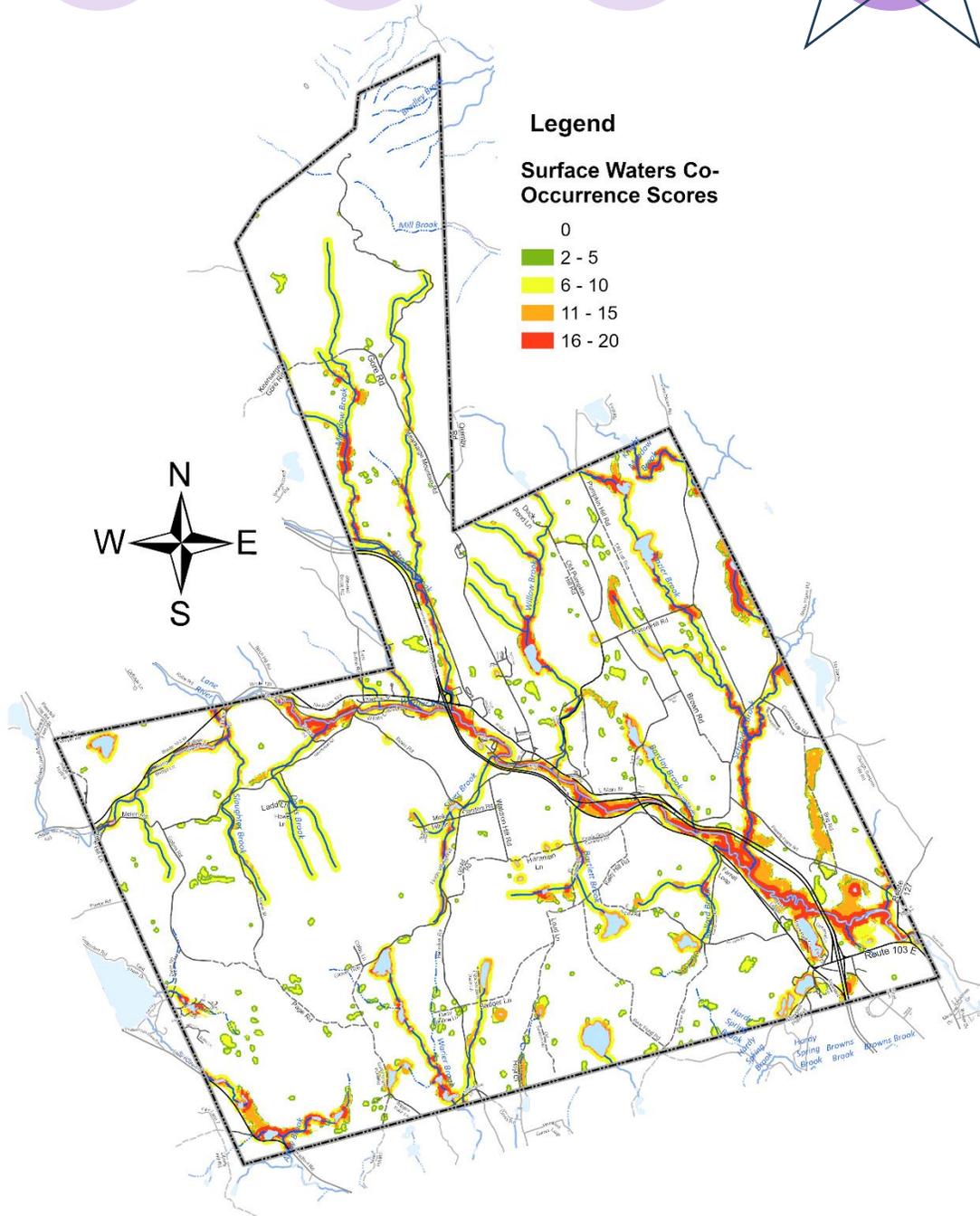
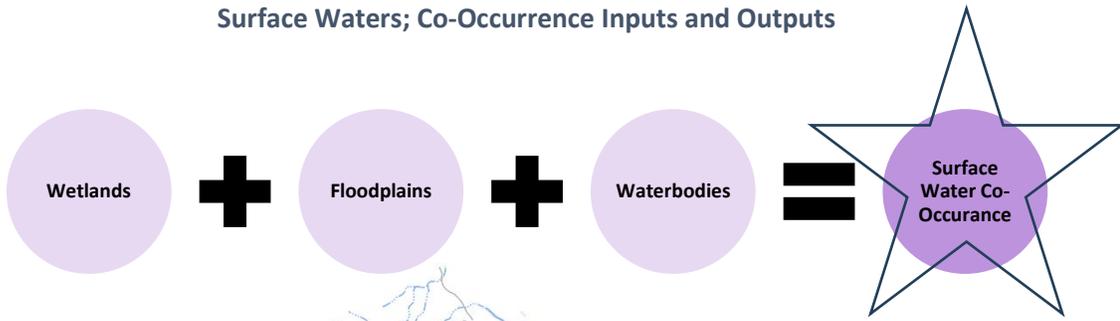
Map 16: Wetlands and 100' Buffers

Surface Waters Co-Occurrence Inputs and Outputs



Map 17: 100-Year (1% annual flood risk) Floodplains

Surface Waters; Co-Occurrence Inputs and Outputs



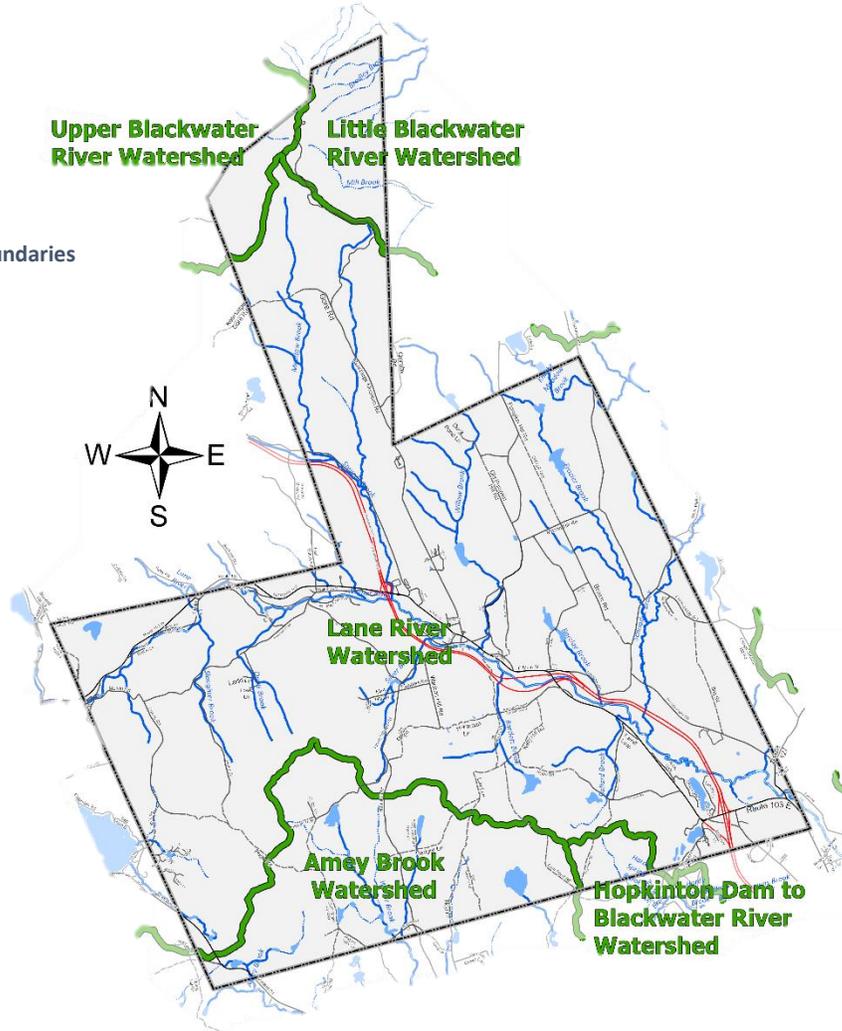
Map 20: Surface Waters Co-Occurrence Results

The Surface Water Co-Occurrence analysis results are the sum of the values assigned to wetlands, floodplains, and waterbodies layers. This map makes up a portion of the overall co-occurrence results map (Map 5 on page 16).

2.3 Watersheds

Warner is located primarily in the Warner River Watershed, also called the Lane River Watershed, which leads to the Contoocook River. This exceptionally large sub-watershed could be further broken out in Warner to include the Schoodac Brook sub watershed, and Willow Brook sub watershed whose headwaters are in Salisbury, and the Steven’s Brook sub watershed flowing south from mountainous terrain south of Mount Kearsarge. Far northern portions of Warner on the slopes of Mount Kearsarge are in the Upper and Lower Blackwater River Watershed. On the other side of town, the southern half of the Mink Hills in Warner are in the Amey Brook Watershed, which drains south to the Contoocook. A 2009 NRI for the town of Warner evaluated resources by these watersheds. While some of the data from the 2009 report is outdated, the watershed perspective and narrative in the document is still applicable today.

Map 21: Watershed Boundaries



2.5 Surface Waters

The primary water course in Warner is the Warner River, which flows from east/northeast to west/southwest through the town for over 21 miles. Some areas have swift-flowing waters, while others are slow and meandering with adjacent wetlands. Schoodac Brook and Willow Brook flow from Salisbury and Webster southward through the eastern part of Warner to the Warner River. The flow of Steven’s Brook begins at the elevated terrain – south of Mount Kearsarge and empties into the Warner River near I-89 Exit 9. According to the National Hydrological Dataset, there are in total about 75 miles of perennial rivers and streams coursing through Warner.

While there are no major lakes in Warner, there are several smaller ponds which dot the landscape including Bear Pond in the Mink Hills, which serves as a water supply for Hopkinton; Cunningham Pond; Tom Pond; Bagley Pond; and the tiny Silver Lake which hosts a municipal beach.

Warner’s zoning ordinance requires a 75’ setback from the Warner River, ponds greater than 10 acres and all other perennial waterways and streams.

Warner Waterbodies (ponds, lakes, brooks)

Name	Acres	Name	Miles (in Warner)
Bear Pond	49	Willow Brook	4
Tom Pond	32	Warner River	13.2
Bagley Pond	26	Warier Brook	2
Cunningham Pond	23	Stevens Brook	2.7
Simmons Pond	22	Slaughter Brook	2.2
Pleasant Pond	16	Silver Brook	2.4
Meadow Pond	12	Schoodac Brook	3.3
Day Pond	7	Meadow Brook	4.1
Silver Lake	3.5	Frazier Brook	4.4
		Davis Brook	2.2
		Bartlett Brook	1.7
		Barclay Brook	1.4
		Ballard Brook	2.2
		Amey Brook	1.5

Table 2 and 2.A: The area and length of prominent waterbodies in Warner.

Riparian and Wetland Buffers

Riparian buffers are naturally vegetated areas along rivers and streams, and function as living filters that protect surface water quality, in turn helping to preserve the state’s high-quality lakes and rivers. These riparian buffers are important for waterbodies of all sizes, as small streams gather and feed the larger waterbodies in town and further downstream.

2.5 Groundwater Aquifer Types

There are two types of groundwater sources from which Warner obtains its water, bedrock aquifers and stratified drift aquifers. Most upland areas in town, and most private residential wells, are drilled into bedrock aquifers, from which water flows through lineaments or cracks in the bedrock. Stratified drift aquifers are deposits of sand and gravel that can transmit and filter water efficiently and are often the best locations for public water supply wells.

The stratified drift aquifers are portrayed below as the unconfined aquifer most easily accessed and recharged close to the earth’s surface. The bedrock aquifers are portrayed as the confined aquifers which are more difficult to access and require centuries, or even millennia to recharge with water.

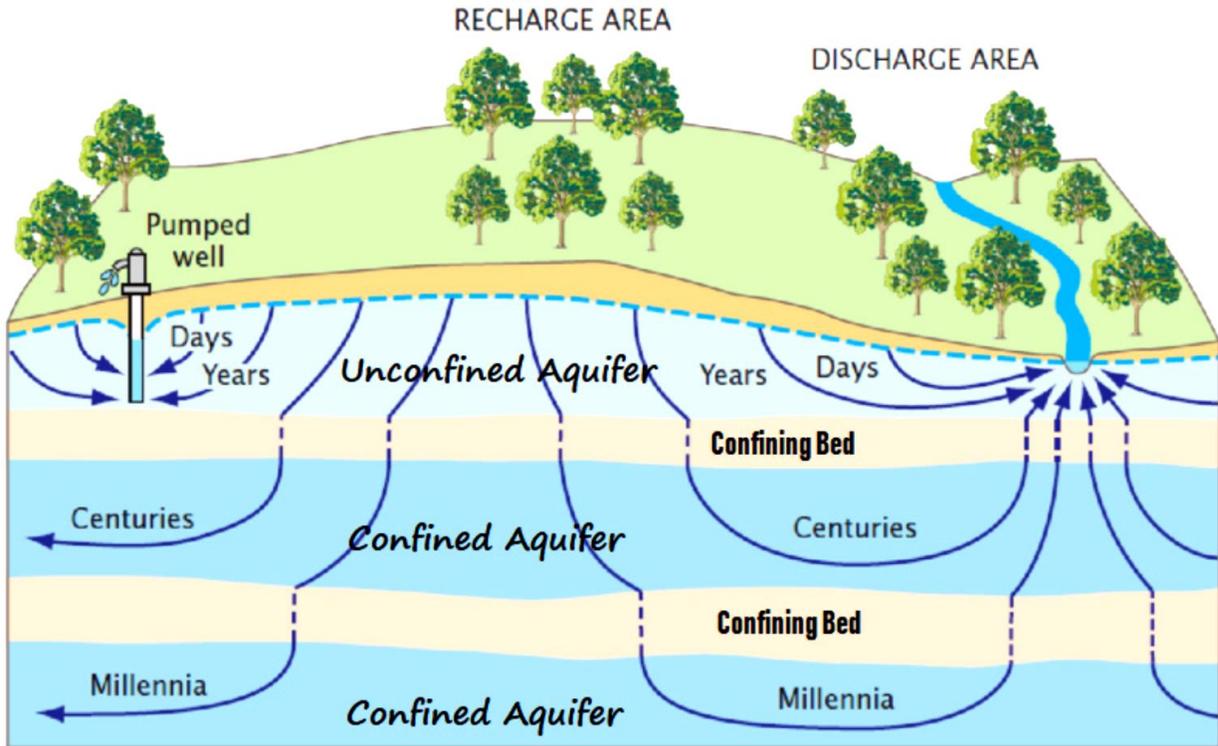


Figure 7: Illustrative Depiction of Aquifer Types (unconfined + confined). In the context of Warner, the top unconfined aquifer represents stratified drift aquifers, and the confining bed represents bedrock where water transmits slowly through lineaments or cracks.

Bedrock Aquifers

The ability of varying bedrock types to yield drinking water supplies is irregular. This yield is referred to as “transmissivity.” Bedrock aquifer yields are positively correlated with proximity to water and lineaments (cracks), and negatively to slope, elevation, and the Plutonic bedrock group. Because much of Warner is elevated on steep slopes and is underlain by igneous bedrock, relatively less water is available. These geological factors could contribute to any problems related to water quantity and pumping in areas outside of the town’s stratified drift aquifers and not connected to the municipal public water supply.

Stratified Drift Aquifers

Stratified drift aquifers are highly valued for their ability to provide a source for drinking water. Over the course of several thousand years, stratified drift aquifers were created layer-by-layer from meltwaters, during periods of ice age melting. These sometimes-thick deposits of sand and gravel today are a resource known as stratified drift aquifers, which are valuable for their ability to sustain high quality and productive water wells.

Aquifer transmissivity is a measure of how much water can be transmitted, with higher transmissive aquifers having better potential for drawing volumes of water. The highest transmissivity areas in Warner are situated along the Warner River, particularly near the village center and near and north of Tom Pond in the southwest corner of town, where there are areas that exceed 2,000 and even 4,000 square feet/day. These areas are highly valuable for their ability to provide drinking water for present and future needs. The town’s municipal water supply as well as other public water supply wells tap into this aquifer.

Stratified drift aquifers are frequently mined for their quality sand and gravel deposits, presenting a potential threat to water resources. The threat of contamination of these aquifers is real, as pollutants can easily filter into the ground and contaminate groundwater resources. These issues and the Groundwater Protection overlay are discussed under Public Water Supplies.

2.6 Public Water Supplies

Warner has several critical public water supplies that provide municipal drinking water and water to other residential areas, businesses, and institutions. Of utmost importance are two Warner Village Water District wells in an aquifer along the Warner River. These wells provide municipal water to over 200 residences and businesses in and around Warner Village. Additional public water supply wells include a community well for the Pleasant Lake Mobile Home Park, wells for the Magdalen College site, and various other businesses. Bear Pond is the public water supply for Contoocook Village in Hopkinton.

Public water supplies, including water bodies and stratified drift aquifers are susceptible to contamination from numerous sources. Contamination can result from agricultural activity that utilizes pesticides or herbicides, or that host livestock. Other public water supply contamination comes from ageing and underperforming septic systems, the presence of highways (salt, oil, gas, etc.), leaking storage tanks from gas stations and other facilities, as well as a range of other possible sources.

Warner has a Groundwater Protection Overlay District, which restricts or adds certain requirements to development that may pose a risk to groundwater. The district includes all stratified drift aquifers in town, as well as the wellhead protection areas associated with each public water supply in town.

The Warner Village Water District is responsible for monitoring, system reporting, and handling of violations as required by the New Hampshire Department of Environmental Services (NHDES).

Many Warner residences are too widespread to access public water supplies and instead have their own wells. These wells are often drilled into bedrock and cannot provide the quantity or quality of water as those found in stratified drift aquifers. These wells rely on cracks in the bedrock for water to flow. These private wells can also have similar pollutants, plus radon and arsenic from the bedrock. Well owners are encouraged to assess their wells every few years.

2.7 Floodplains

A floodplain is the low-lying ground adjacent to rivers that are prone to flooding. Flood hazard areas that have a one percent chance of being inundated by a flood event in any given year are commonly referred to as the 100-year floodplain. The flood hazard areas with a 0.2% chance of annual flooding are often referred to as the 500-year floodplain. The Warner Hazard Mitigation Plan describes the floodplain in detail, provides a series of recommendations, and includes a series of maps. The approximate assessment of existing structures in the floodplain, including 20 single family and one multi family home, totals over \$6 million.

Floodplain in Warner is found along the length of the Warner River, with 1% flood risk extending hundreds of feet on either side of the river in most places. Other smaller rivers, streams, and wetland complexes also have floodplain, including Schoodac Brook. Preserving land in the floodplain, limiting pervious surfaces, and limiting fill or raising of the floodplain will help maintain nature's ability to spread and absorb floodwaters.

Flood Crests, Warner River at Davisville			
Historic		Recent	
Feet	Date	Feet	Date
12.8	09/22/1938	8.63	7/30/2021
12.35	05/15/2006	8.62	12/24/2022
11.87	04/16/2007	8.58	04/02/2004
10.14	10/09/2005	8.45	12/19/2023
9.88	03/27/1953	8.38	07/17/2023
9.78	04/05/1960	8.37	03/31/2010
9.11	04/03/2005	8.08	08/29/2011

Source: NOAA, National Weather Service

Table 3: Historic Flood Crests of Warner River at Davisville

2.8 Wetlands

In New Hampshire, wetlands are defined as “an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soils conditions.” Wetlands are not always wet, but they generally include familiar places such as marshes, wet meadows, beaver impoundments, swamps, fens, bogs, vernal pools, and the surroundings of other surface water bodies. Wetlands perform a variety of ecological functions, such as providing significant habitats for wildlife and plants, maintaining good water quality, providing storage during a flood event, and as sources for recreation. Warner’s wetlands are depicted on the Water Resources Map.

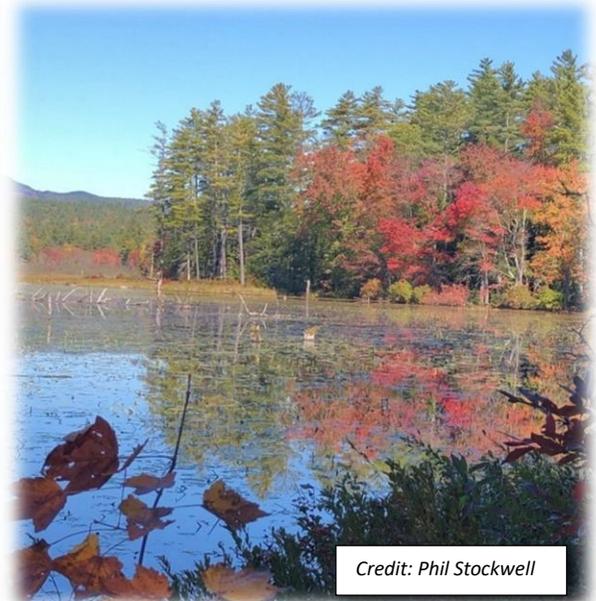
The US Fish and Wildlife Service’s National Wetland Inventory contains three classifications of wetlands, palustrine (marshes or swamps and trees), lacustrine (around lakes and of a shallow depth), and riverine (connected by rivers). Of Warner’s 35,502 total acres, 5.3% (1,877 acres) are wetlands. Most wetland within Warner are Forested Wetlands.

Wetlands and Acreage	
Wetland Type	Acres
Emergent Wetland	381
Forested/Shrub Wetland	980
Freshwater Pond	240
Lake	51
Riverine	98

Table 4: Wetland Types and Acreage



Credit: Karinne Heise



Credit: Phil Stockwell

Chapter 3 | Agriculture & Forestry



Warner is home to many productive agricultural lands, including farms, orchards, hay fields, grazing for livestock, and equine centers. Agriculture has been a key component of the town's economy from the very beginning and continues today. Agricultural lands and agriculture generally serve more than economic purposes in Warner by preserving part of the community's heritage, adding to local quality of life, providing locally sourced food and other products, and stewarding valuable working landscapes for future generations.

In the Agriculture Weighting Map, the highest value agriculture lands are located where active agricultural sites overlap with prime farm soil. These areas are clustered in the eastern portion of the town, off Pumpkin Hill Road, Burnt Hill Road, Brown Road, and a few other isolated locations elsewhere in town. In addition, a lot of agricultural land is located off Schoodac Road.

Survey results and Conservation Commission discussions revealed that agriculture, active farmland, and farms were important to the Town of Warner. The agriculture category makes up 18% of the total co-occurrence score for Warner.

3.1 Agriculture Input Value Scores and Co-Occurrence Results

Agricultural Soils

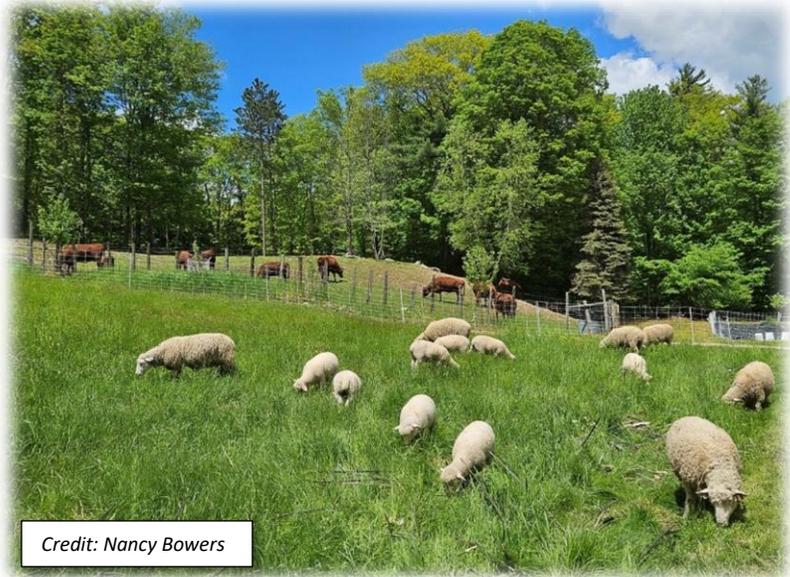
The Merrimack County Soils Survey identifies various soil types that are considered the best soils for agricultural purposes. Discussions with the Warner Agricultural Commission felt that the locations of these prime soils did not include some of the most productive agricultural sites in Warner. In addition, farmlands classified as of “local importance” in the soils survey included nearly all areas of town that were not wetlands. As such, there was a hesitancy to assign high scores to soil types. Soils categorized as “Prime Farmland Soils” identifying the best soils, are assigned 6 points, “Soils of Statewide Importance” were given 3 points.

Forestry Soils

The Merrimack County Soils Survey also identifies soils that are most productive for forestry purposes. The best forestry soils, groups IA and IB soils, were assigned 2 points.

Active Agricultural Lands

As part of this project, a GIS data layer of all agricultural lands was developed using aerial imagery from 2022 and verified under review from the Warner Agricultural Commission. All areas associated with agriculture were identified, and categorized as either developed areas (barns, greenhouses, etc.), maintained hay fields, pasture/grazing areas, and active crop land.



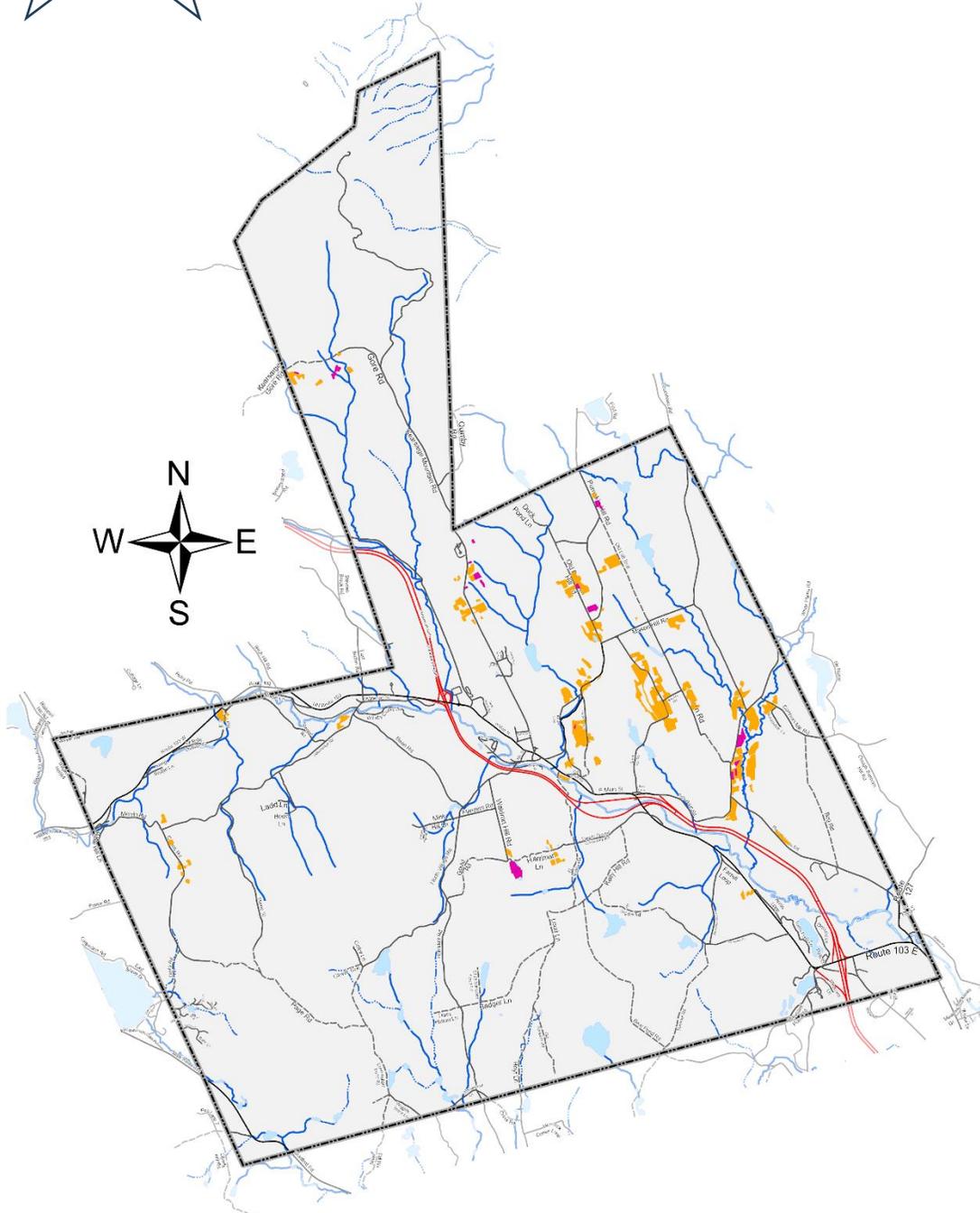
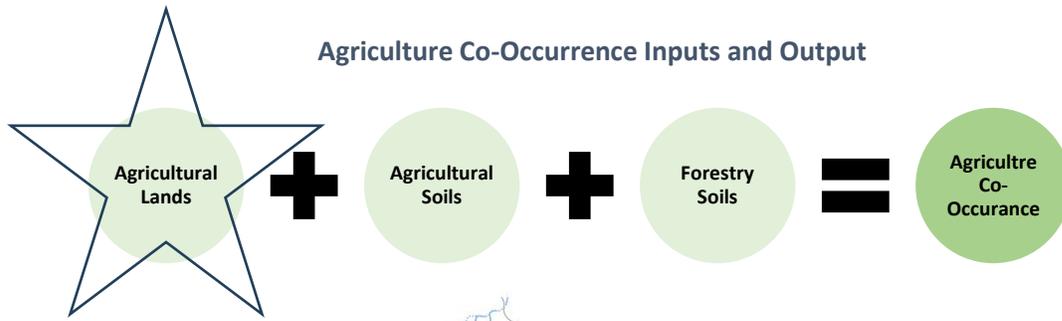
Input from the Warner Agricultural Commission and agreement from the Conservation Commission felt that these areas identified as agricultural lands were indeed the highest value land for agricultural purposes at present and in the future. Not all areas of active agriculture are of equal quality, and an attempt to sort out differences was made by assigning a higher score to active crop lands. It was noted that some agricultural activities including crop lands rotate and change from year to year, and the 2022 imagery was a literal snapshot in time. Thus, the higher scoring of active crop lands is an imperfect measure.

All agricultural areas were assigned 4 points, with areas of active crop land awarded an additional 6 points for a total of 10.

Agriculture Co-Occurrence Results

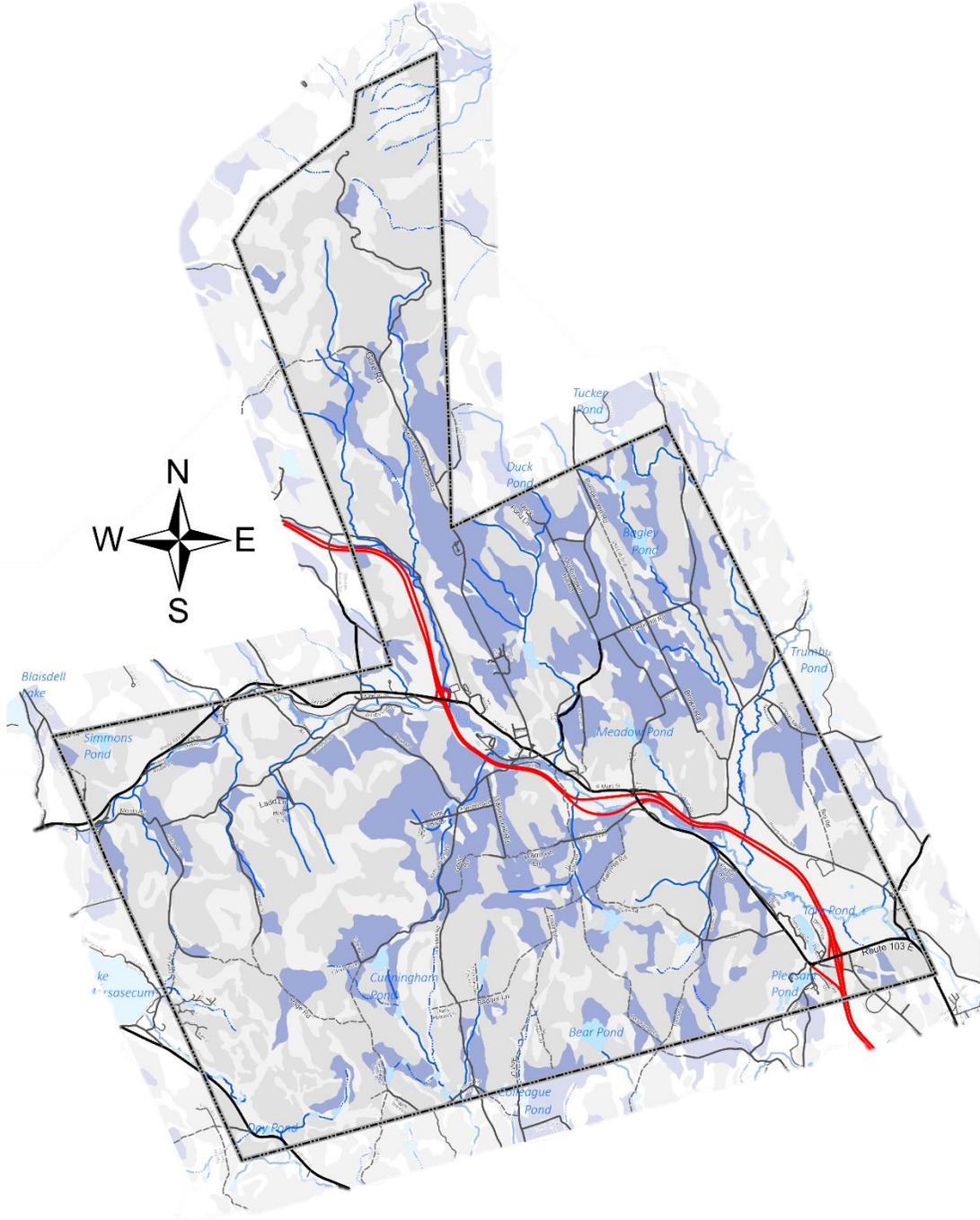
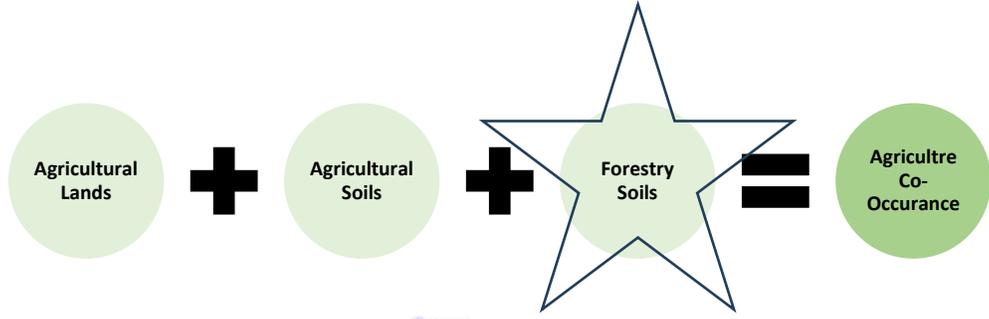
The Agriculture Weighting Map shows the high value agriculture lands clustered in parts of the eastern portion of the town, including off Pumpkin Hill Road, Burnt Hill Road, Brown Road, Schoodac Road, as well as a few other isolated locations elsewhere in town. Highest scores are found where active agricultural sites overlap with prime farm soil. These lands have a strong agricultural value and should be targeted for conservation if preserving agriculture and agricultural lands is a goal.

Agriculture Co-Occurrence Inputs and Output



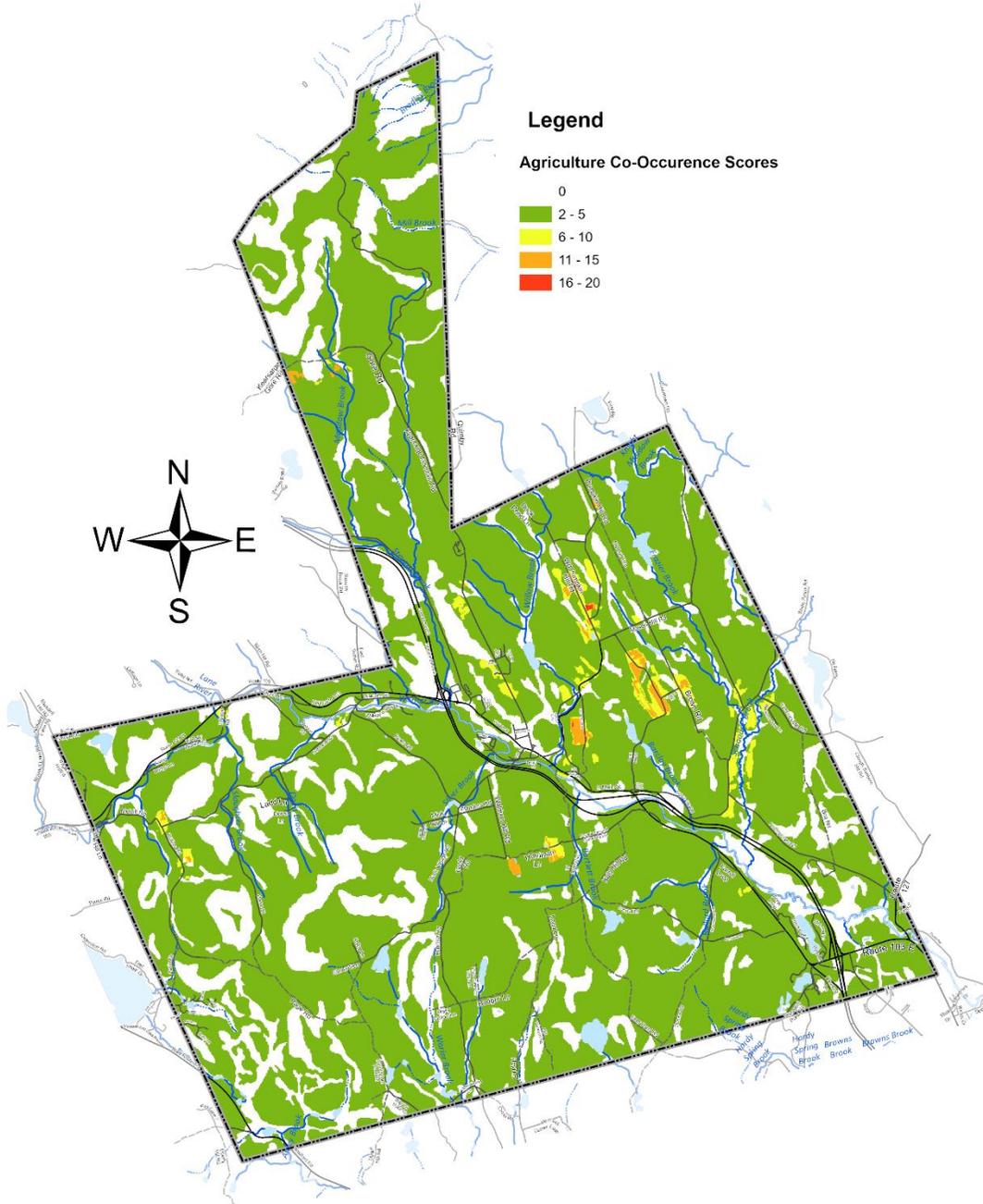
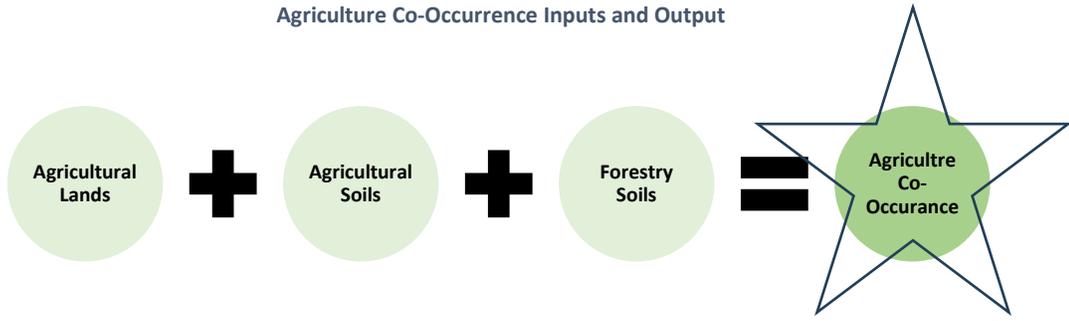
Map 22: Agricultural Lands

Agriculture Co-Occurrence Inputs and Output



Map 24: Forestry Soils

Agriculture Co-Occurrence Inputs and Output



Map 25: Agriculture Co-Occurrence Results

The Agriculture Co-Occurrence analysis results are the sum of the values assigned to agricultural lands, agricultural soils, and forestry soils layers. Agricultural lands and prime agricultural soils are concentrated in small pockets that often overlap, shown here in yellow, orange, and red shades. This map makes up a portion of the overall co-occurrence results map (Map 5 on p.16).

3.2 Agricultural Operations

There are multiple agricultural operations which encompass active farms, nurseries, and orchards in Warner, including many acres of hay fields, covering 523 acres or about 1.5% of Warner. At the time of the 2022 inventory, only 46 of these acres were active cropland. Warner has a lower proportion of agricultural land than many other neighboring communities, largely due to large tracks of mountainous terrain in the Mink Hills and Mount Kearsarge that have little or no agriculture other than forestry. The Agricultural Soils and Agricultural Lands maps show these areas.

Agricultural Land Distribution, Composition	
Agricultural Land Type	Acres
Active cropland	46
Built Agricultural Land	26
Maintained Fields/Hay Fields	299
Pasture/Grazing	152
Total	523

Table 5: Acreage of Agricultural Land Types in Warner. There are nearly 300 acres of maintained fields, but fewer acres of more intensive agricultural use.

The agricultural lands in Warner support multiple farms and agricultural businesses. Active farms typically work agricultural lands on their property but will also work lands owned by other landowners across town. In some cases, these operations cross municipal lines. Table 6 lists farms and agricultural operations known to be active in 2025.

Farms & Agricultural Operations	
Entity Name	Location
Alprilla Farm (Organic Produce and Grain)	106 Connor's Mill Road
Back in the Saddle (Horse Boarding, Trail Riding, Arena)	5 Poverty Plains Road
Blue Moon Berry Farm (Blueberries)	195 Waldron Hill Road
Courser Farm (Produce, Cattle)	374 Schoodac Road
Curly Q Farm (Alpaca Farm)	355 Kearsarge Mountain Road
Double Clear Farm (Horse Boarding, Arena)	244 Schoodac Road
Dun Fooling Farm (Hay)	22 Denny Hill Road
Fun with Ponies (Donkey, Pony Farm)	108 Collins Road
Kearsarge Gore Farm (Organic Produce)	173 Gore Road
Kearsarge Meadows (Horse Boarding & Training)	381 Kearsarge Mountain Road
No Acre Farm (Dairy, Livestock)	49 Waldron Hill Road
Pumpkin Blossom Farm (Lavender) Farm	393 Pumpkin Hill Road
The Vegetable Ranch (Organic Produce)	443 Kearsarge Mountain Road
Twin Ridge Farm (Horse Training & Boarding)	223 Pumpkin Hill Road
Yankee Farmer's Market (Buffalo Farm)	360 Route 103 East

Table 6: Farms & Agricultural Operations in Warner

Maple sugaring plays a prominent role in Warner’s history and culture, as evidenced by the annual Warner Maple Weekend. Sugaring operations rely on stands of mixed hardwood with sugar maple trees. The higher quality forestry soils, particularly Group 1A (see Forestry Soils and Table 9), are best suited to support sugarbushes. Forest lands in Warner support multiple sugaring operations, with known commercial sugaring operations in Warner as of 2025 listed in Table 7.

Maple Sugaring Operations	
Entity Name	Location
B&M Maples	6 Collins Road
Baker’s Syrup	611 New Market Road
Beaver Meadowbrook Farm Sugar House	402 Route 103 East
Caruso Maple	167 Newmarket Road
Courseer Farm Sugar Kings	427 Schoodac Road
Kearsarge Gore Farm	173 Gore Road
Rogers Maple	133 Couchtown Road
What’s Sopenin	204-222 Brown Road

Table 7: Maple Sugaring Operations in Warner

3.3 Farmland Soils

The Agricultural Soils Map displays the locations of the highest quality soil in Town using data from the Merrimack County Soil Survey. These areas are focused within the northeastern portion of town, largely along Pumpkin Hill Road, Burnt Hill Road, Brown Road, and elsewhere.

Prime farmland soils are the highest category of important farmlands and comprise less than 1% of the Town. Farmland soil categorized of statewide importance are also located in Warner, representing about 2.3% of town (822 acres). Many but not all agricultural operations are located within one of these soil groupings. Most of the rest of Warner that is not either wetland or mountain areas are categorized as farmland of local importance, covering 62% of town.

Categories of Farmland Soils	
Soil Type	Acres (percentage of total farmland soil cover)
Prime Farmland	297 (0.8%)
Prime Farmland – *If Protected from Flooding	292 (0.8%)
Farmland – Statewide Importance	822 (2.3%)
Farmland – Local Importance	22,130 (62.0%)
Not Prime Farmland	11,921 (34.0%)
Total	35,502 (100.0%)

Table 8: Acreage Farmland Soils by Type. Data is from the Merrimack County Soils Survey. Prime farmland in Warner is concentrated in small pockets of town (see Map 23).

The USDA Natural Resources Conservation Service (NRCS) updates soil survey maps every 30-40 years. In New Hampshire, soils are updated on a county basis. Merrimack County was updated in 2011 together with Belknap County.



Regulate Water Flow



Sustain Plant and Animal Life

Functions of Healthy Soil



Cycle Nutrients



Filter Potential Pollutants



Support Structures

Source: usda.gov

Figure 3: Healthy Soil Functions Diagram

3.4 Forestry Soils

Nearly all of Warner, or about 95%, is capable of supporting tree growth, including all but the wettest areas. Deeper, richer, and well drained soils are better able to sustain healthy forests and productive woodlots than shallow, steep, or wet soils. Of Warner’s 35,502 total acres, 24,685 acres are Forestry Soils Type IA or IB, which are known to have loamy, well drained soils that are most productive for forestry.

The forestry soils map displays the locations of Warner’s forest soils by group, also displayed in Table 7. Soil types can support more than one kind of use, and some forestry soils can also be categorized as agricultural soils.

Forestry Soils				
Forest Group	Definition	Types of Forest	Acreage	Total % of Town
Group IA	Deeper loamy soils, moderately- to well- drained	Prime Northern Hardwood	8,571	24%
Group IB	Sandy or loamy soil, moderately- to well-drained	Oak & Beech	16,114	45%
Group IC	Outwash sand & gravel	White Pine	2,356	7%
Group IIA	1A &1B with limitations (very steep, shallow, or rocky)	Northern Hardwood	4,483	14%
Group IIB	Poorly drained soils	Northern Spruce & Fir	1,707	5%
Total				35,502

Table 9: Forestry Soil Groups and Acreage



Credit: Scott Warren

Chapter 4 | Cultural & Recreational Resources



Credit: Scott Warren

This is a chapter dedicated to Cultural and Recreation Resources may seem out of place in a Natural Resource Inventory, but there is a strong nexus between the natural world and our place in it. In addition, when conservation priorities are being assessed, historic, cultural, or economic considerations will be part of the decision making. A sound understanding of the cultural and recreational features and opportunities of any given property will only serve to clarify the value of our natural resources.

The Cultural and Recreational Sites and Trails map, along with the Recreation and Cultural Resources Weighting Map, shows some of the sites and features that may add to the value of open spaces. These sites and features are not an exhaustive inventory, but a starting point.

Survey results and Conservation Commission discussions indicated that while scenic, recreational, historic, and cultural significance was important to the Town, it was a contributing factor rather than a primary driver in determining priorities for land conservation. In addition, something as intangible as “cultural significance” cannot be easily mapped and assigned a numeric value. In light of these considerations and limitations, the category makes up 5% of the total co-occurrence score for Warner.

4.1 Cultural and Recreational Input Value Scores and Co-Occurrence Results

Recreational, Historic, and Cultural Sites

The presence of historic, recreational, or cultural sites often add appeal when considering locations to conserve. Using public input and past planning documents, a database of sites was developed and reviewed. A 400' buffer from these sites is included in the analysis and assigned a value score of 3.

Stone Walls

Warner is fortunate to have a particularly good dataset of historic stone walls, mapped using a combination of sophisticated LIDAR data and volunteer contributors. These stone walls have existed since the first agricultural uses of land, for penning in livestock, marking property boundaries, or simply as a place to put stones removed from fields. The historic value of stone walls is appreciated by anyone who traverses the rural New Hampshire landscape. A 100' buffer from these stone walls were used in the analysis and assigned a value score of 2.

Scenic Views

Warner has a vast rural landscape with many hills, summits, and open spaces, resulting in plenty of scenic views. While a meaningful view can be subjective, scenic resources can provide value to a town and be preserved through regulations and incentive-based approaches. For the purposes of the Co-occurrence analysis, there were no specific viewsheds that stood out as particularly important over others. In addition, many views included agricultural areas that are covered in the agriculture category, or Mount Kearsarge or the Mink Hills which are included in the Wildlife Habitat category. For these reasons and because of the subjective nature and difficulty of tracking all scenic views, scenic views were not assigned any points for the co-occurrence analysis.

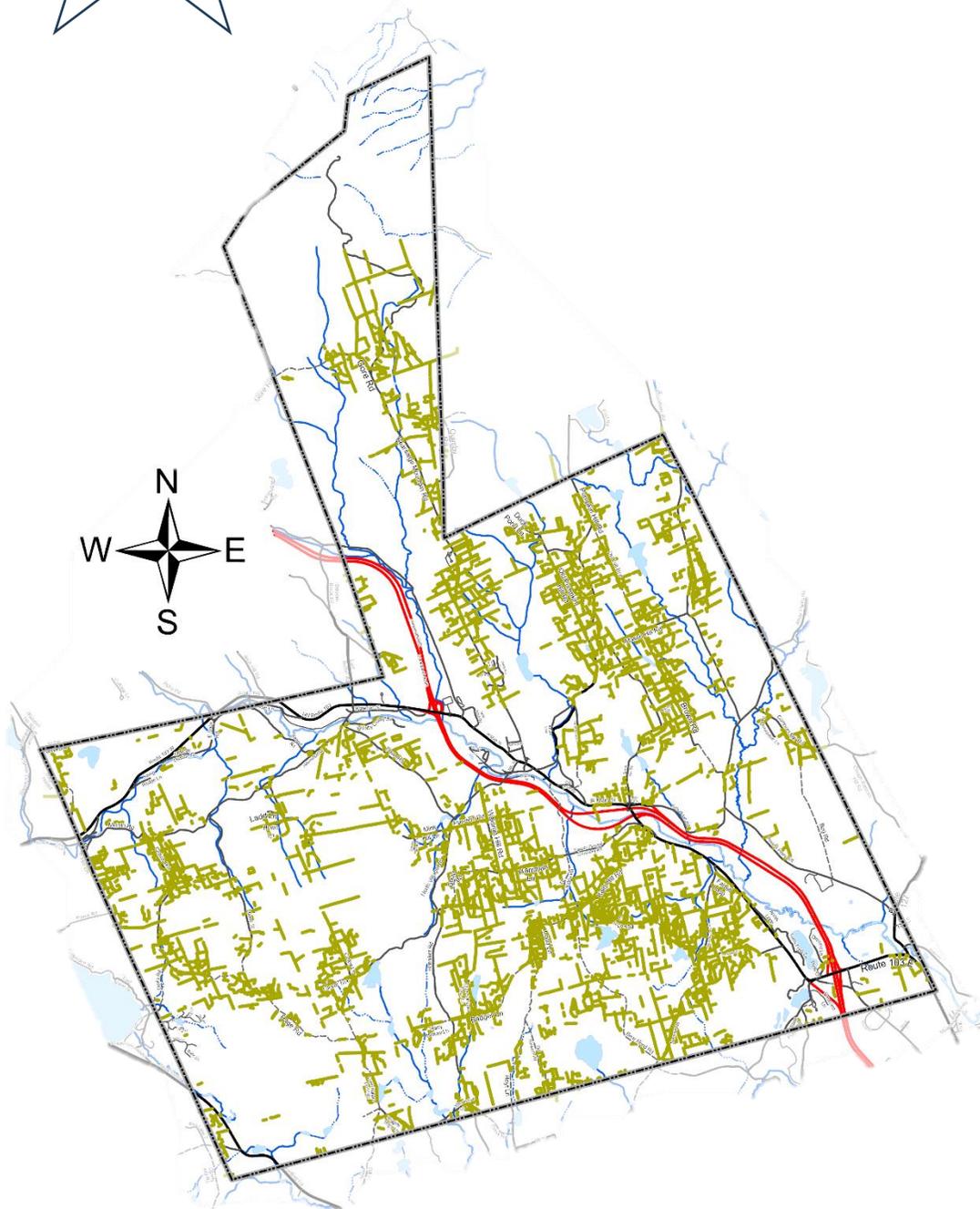
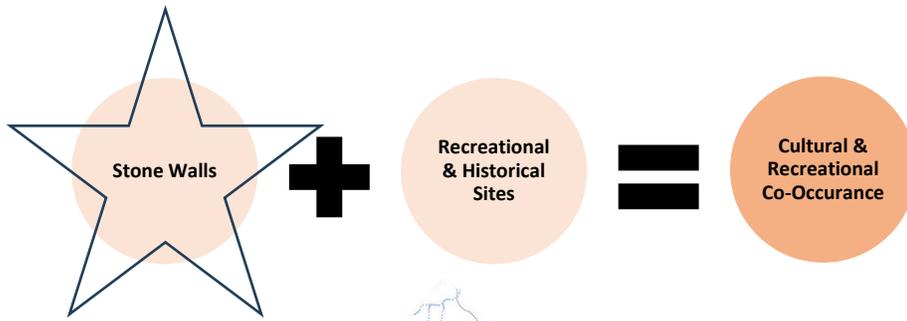
Cultural and Recreational Co-Occurrence Results

The following map has scattered points and lines that coincide with the cultural sites as well as stone walls. Its effect on the overall weighting of any given area of town is relatively small but noting and inventorying historic or cultural features in the landscape can be locally important.



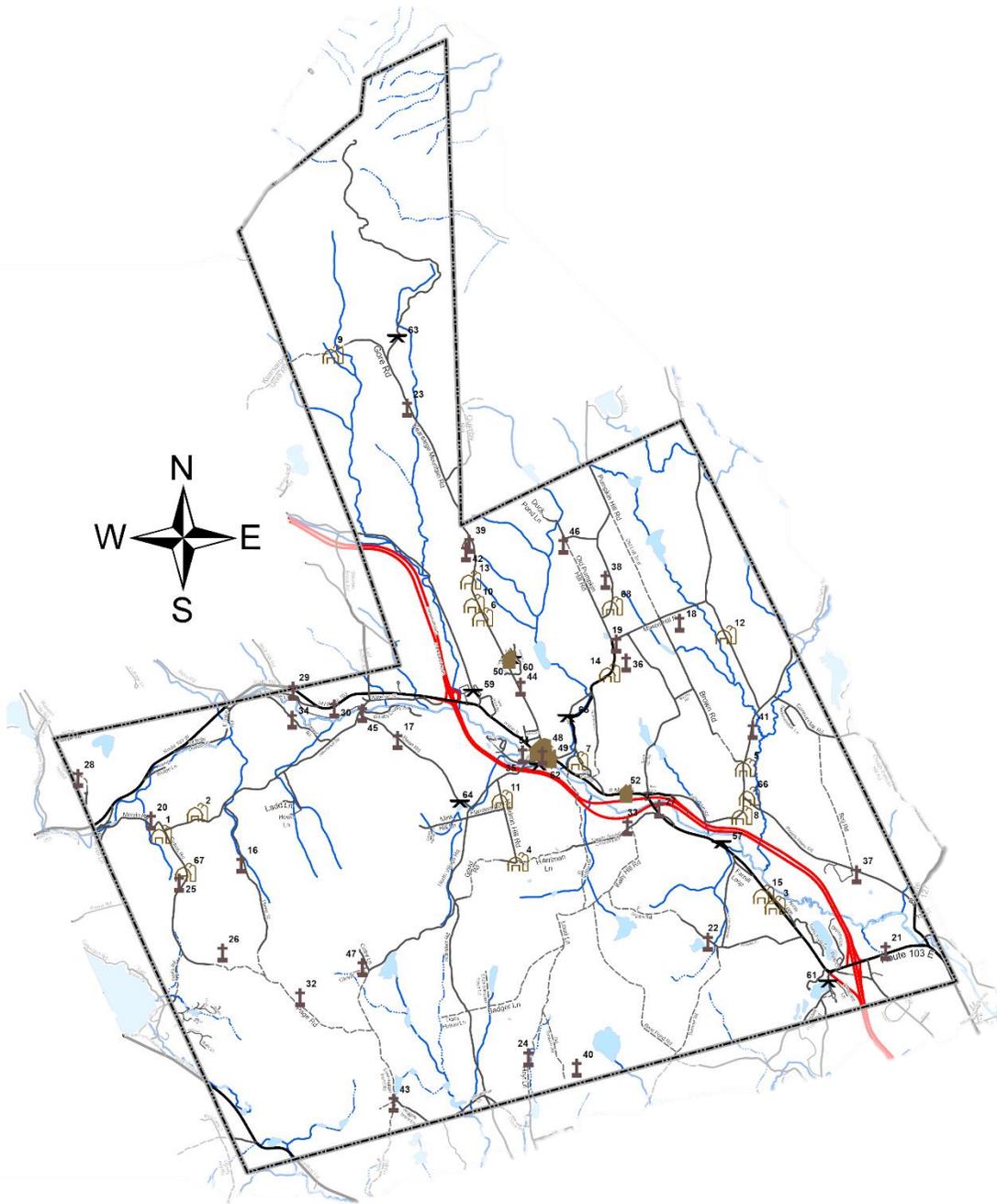
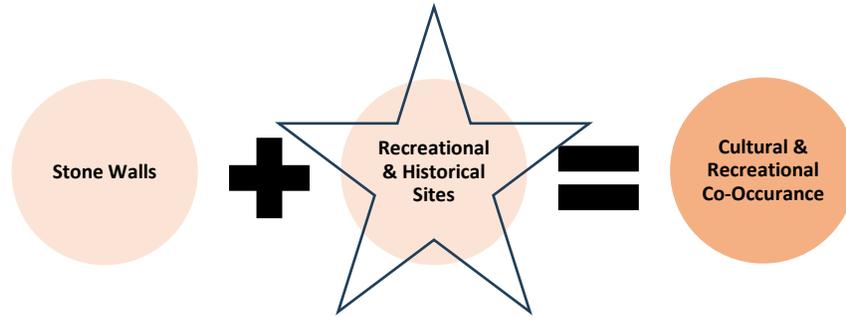
Credit: Grace Dunklee Cohen

Cultural and Recreational Co-Occurrence Inputs and Output



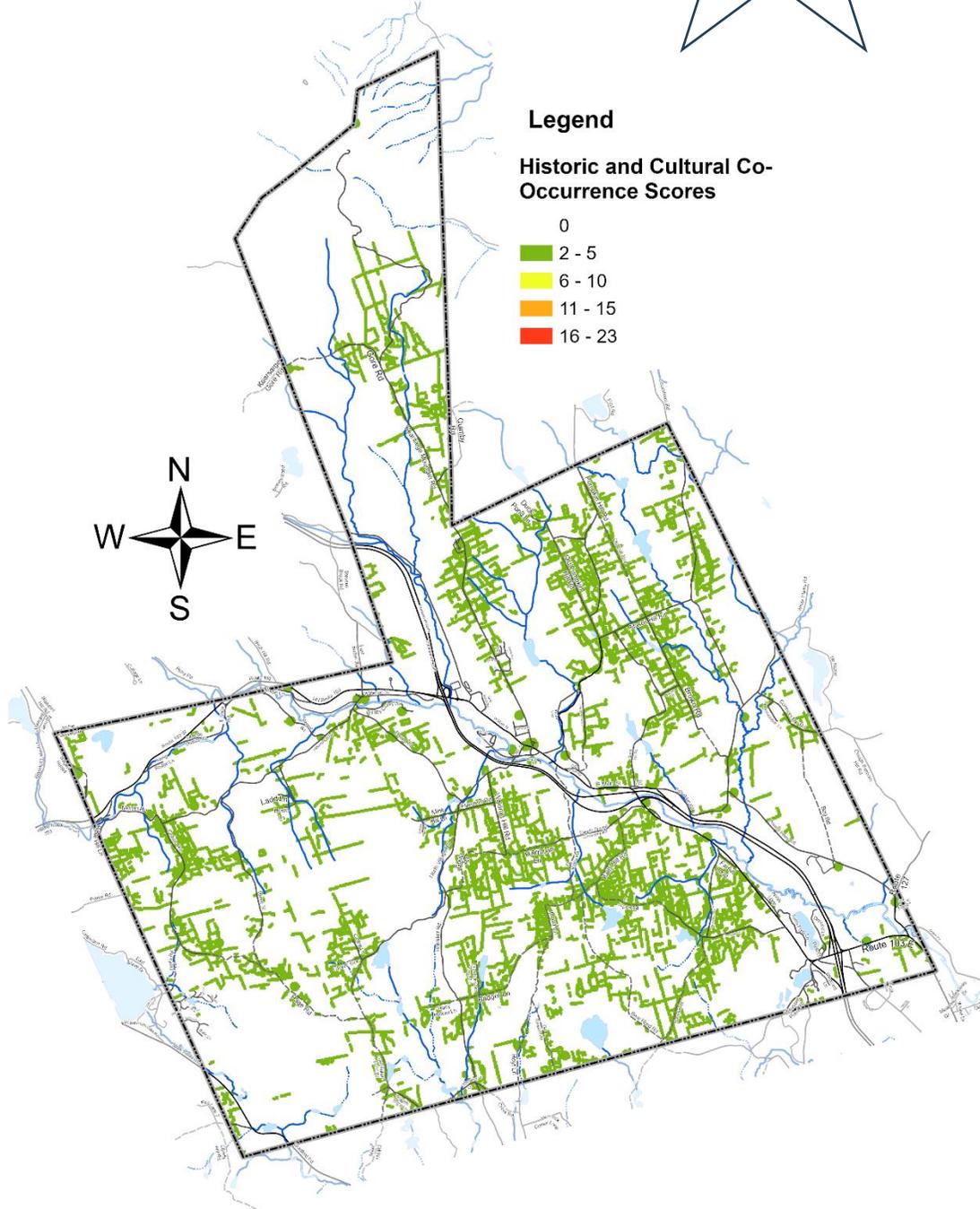
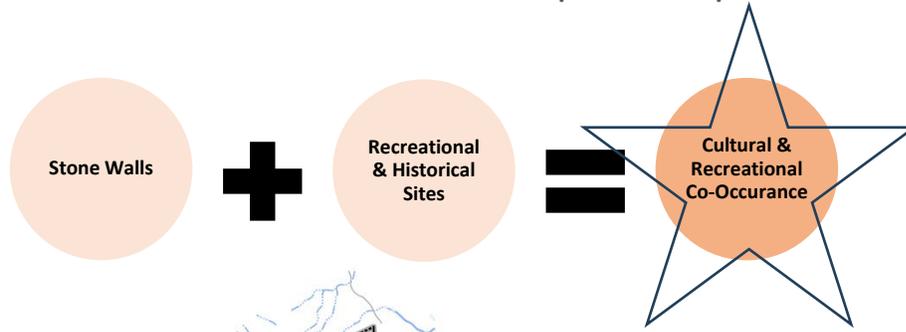
Map 19: Stones Walls Co-Occurrence

Cultural and Recreational Co-Occurrence Inputs and Output



Map 20: Recreational & Historical Sites Co-Occurrence

Cultural and Recreational Co-Occurrence Inputs and Output



Map 21: Cultural, Recreational, Historical Co-Occurrence Results

4.2 Conservation and Public Lands

A conservation easement is a permanent legal restriction against future development and other activities on a parcel as specified in the conservation easement deed. There are over 120 conservation properties in Warner as displayed on the Conservation and Public Lands Map. These properties, which may or may not be permanently preserved, include conservation easements, deed restrictions, scenic easements, and open space. These areas are located throughout town, with the largest connected or concentrated areas including Mount Kearsarge and Mink Hills. There are multiple gaps in the string of conserved land in the Mink Hills, only sporadic conservation lands along the Warner River, and there are large swaths of unprotected remote land in western and southwestern Warner. Conservation lands (and 1000' buffers) are included in the co-occurrence analysis as part of the Wildlife Habitat category.

4.3 Recreational Trails

Notable recreational trails in Warner include popular trails at Rollins State Park, trails in the Chandler Reservation, completed sections of the Warner Rail Trail, and an extensive network of snowmobile trails in winter. Given Warner's considerable size and quantity of conserved public lands, there are relatively few established public recreational trails when compared to nearby communities, and there is little interconnectivity between trails or connecting trails into developed areas. Warner does have an abundance of unmaintained class VI roads. Some of these class VI roads are widely used for recreation, with some in good condition and others that have suffered from erosion and many years of use without maintenance.

4.4 Current Use

Current use provides a lower tax rate for land over 10 acres utilized for a non-residential purpose. Rules produced by the New Hampshire Department of Revenue Administration and assessment ranges change annually.

4.5 Historic and Cultural Sites

The Town has a rich history with important sites, features, buildings, or monuments throughout the community. As displayed and labeled on the Cultural Sites map, these are not only located in Warner Village but scattered across nearly all parts of town. Many of the locations were just as important for the Town's history as they are in today's life. They include cemeteries, parks, farms, boat ramps, public sites, and historic buildings.

4.6 Steep Slopes and Ridgelines

Within its borders, Warner hosts a wide range of elevations, from under 400 feet above sea level along the Warner River to the summit of Mount Kearsarge at 2,937 feet. The Town is especially hilly with relatively little flat land, and the Mink Hills area being especially rugged with multiple peaks from 1,200 to 1,800 feet.



Credit: Karinne Heise

Many of these slopes and ridgelines can be seen from distant viewpoints across town. There are ridgeline preservation and protection opportunities to be considered. Steep slopes are a development constraint and are often defined as between 15% to 25% or greater. Watershed runoff is exaggerated by the presence of steep slopes without proper management. Many of Warner’s farms are located along hillsides or atop steep slopes, and agricultural runoff can cause water quality degradation.

4.7 Scenic Views and Viewsheds

Warner’s topography lends itself to views of hillsides and mountains. In addition, many of Warner’s farms are situated along steep slopes or at hilltops which also offer expansive views. Schoodac Road features abundant agricultural views. The areas of Burnt Hill Rd are known for sweeping views of hilltop agricultural fields and distant hillsides. Mount Kearsarge and its fire tower feature 360-degree views extending well beyond Warner. These notable locations should be considered in natural resource planning, and the community could be surveyed to identify other scenic views that are of particular importance to the Town.



Credit: Nancy Bowers

Chapter 5 | Wildlife Habitat



Credi: Karinne Heise

Warner is an expansive town with a large land area, and its population and development are efficiently clustered in and around the village. This leaves large blocks of undeveloped land, containing natural communities and habitats which are home to a wide variety of wildlife. The New Hampshire Department of Fish and Game maintains a listing of species occurring in New Hampshire that are state- and federally-threatened and endangered, of special concern in the State, introduced species, and species of greatest conservation need. The species listing includes diadromous fish, freshwater fish, mammals, reptiles, amphibians, mussels, insects, and birds. A recent Natural Heritage Bureau request for threatened and endangered species returned reptiles, plant, and natural community finds in Warner.

5.1 Wildlife Habitat Input Value Scores and Co-Occurrence Results

Wildlife Action Plan

The Wildlife Action plan is a dataset developed by New Hampshire Fish and Game to show areas with the highest quality wildlife habitat. This layer is the most heavily weighted data layer in this category as it represents areas of important habitat better than any other layer. Three distinct categories in this data layer were scored, the highest being “Highest Ranked Habitat in NH” at 14, then “Highest Ranked Habitat in Ecological Region” with 10, and “Supporting Landscapes” scoring 6.



Unfragmented Lands

This dataset developed by CNHRPC breaks Warner into blocks of land unfragmented by roads, development, or human activities. Large areas of land that are not broken by roads or other human disturbances are important for a range of species and thus have higher value than smaller blocks of undeveloped land. In Warner, there are three large blocks that stand out. Two in the Mink Hills region extending into neighboring towns, at over 7,600 and 10,100 acres, and a third block that encompasses Mount Kearsarge at an enormous 22,775 acres. The Kearsarge block is one of the largest contiguous blocks of undeveloped land in this part of the state. The blocks in the Minks are assigned a value score of 2, and the Kearsarge block is assigned a value score of 3. These values are somewhat low because unfragmented lands are a component of the Wildlife Action Plan dataset which is also used in this analysis.



Conservation Land

Conservation lands and a 1,000’ buffer were assigned a value score of 4. Having larger continuous areas of conserved space has a higher total habitat value than multiple fragmented open spaces. Some wildlife species require large areas of land undisturbed by human activities.

Wildlife Habitat Co-Occurrence Results

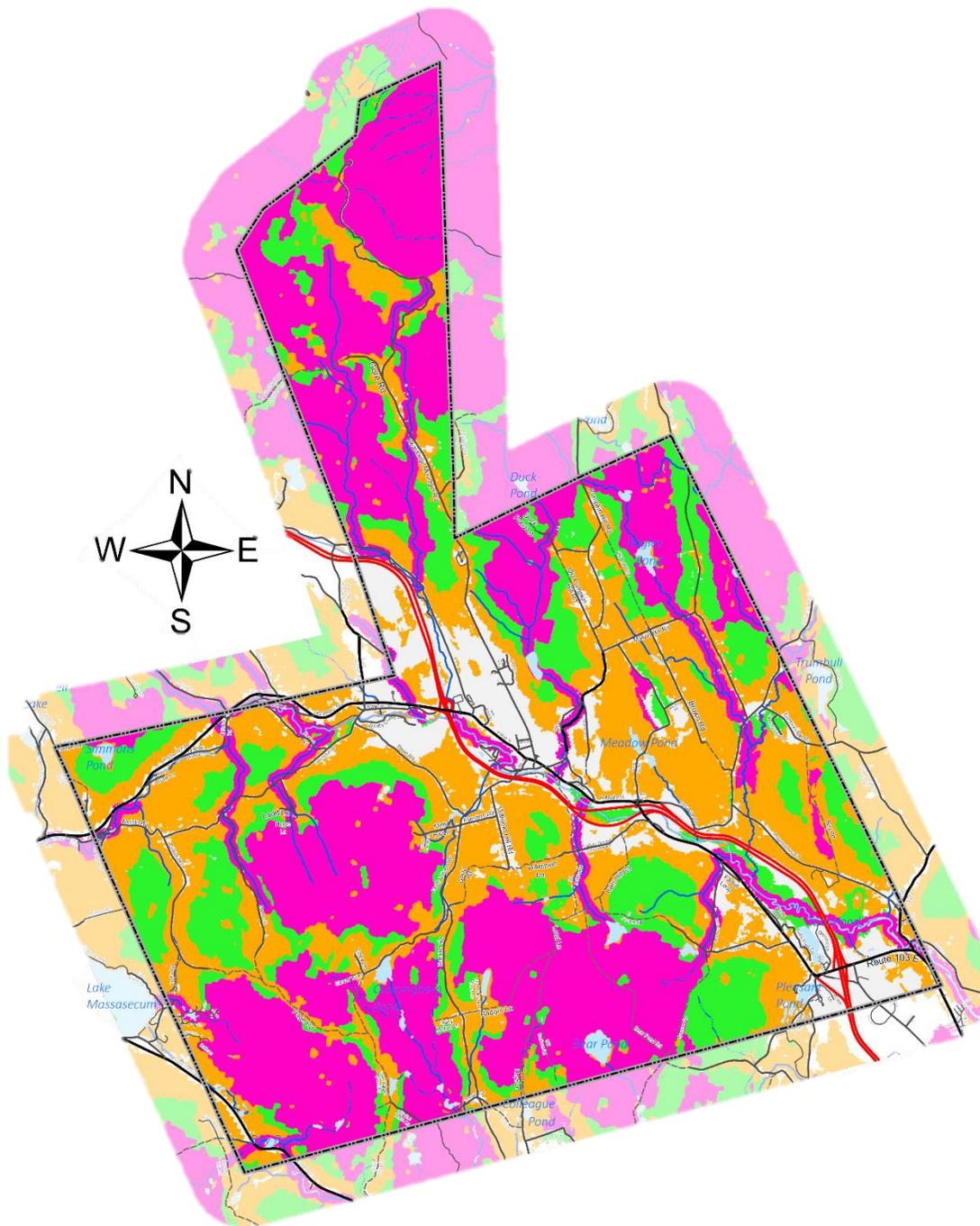
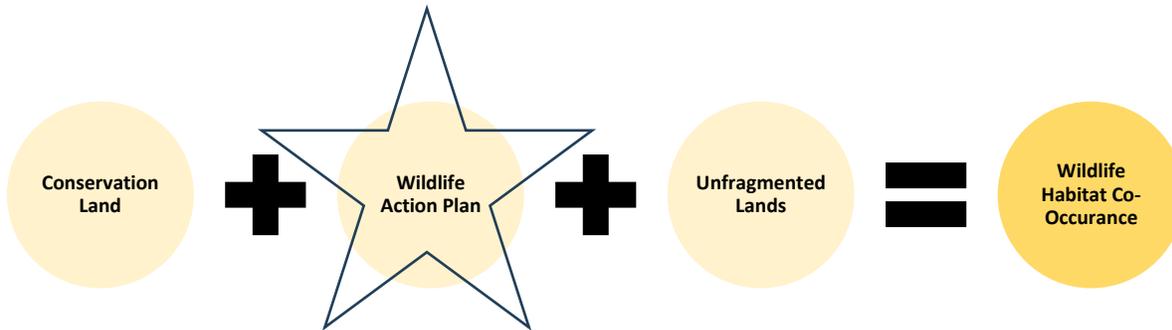
The Wildlife Habitat Co-occurrence results show the highest value habitat in portions of the northern panhandle of Warner in the vicinity of Mount Kearsarge, as well as much of the Mink Hills area. Other areas of high value are scattered elsewhere in town, particularly along waterways including parts of the Warner River, Schoodac Brook, and Willow Brook.

Wildlife Habitat Co-Occurrence Inputs and Output



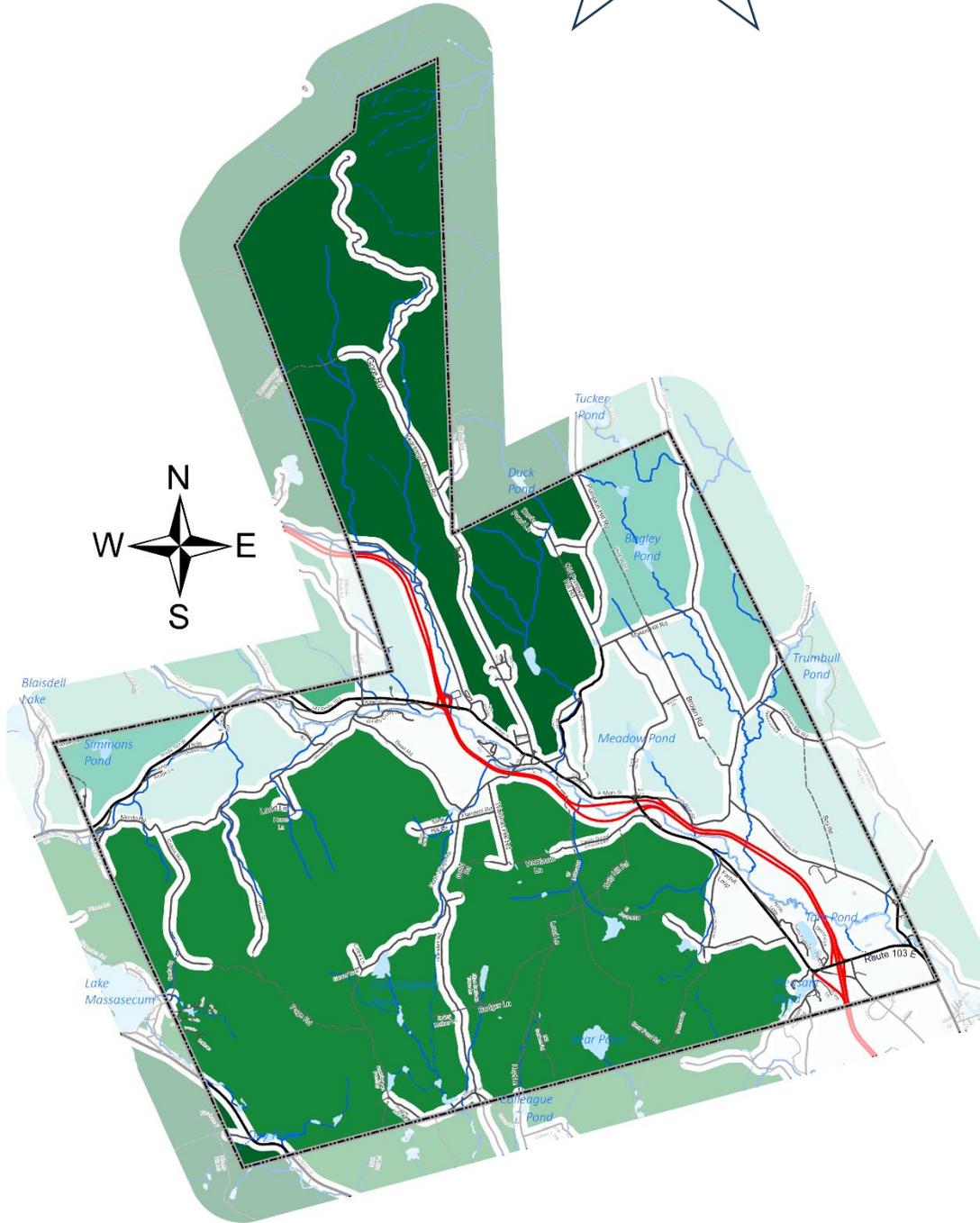
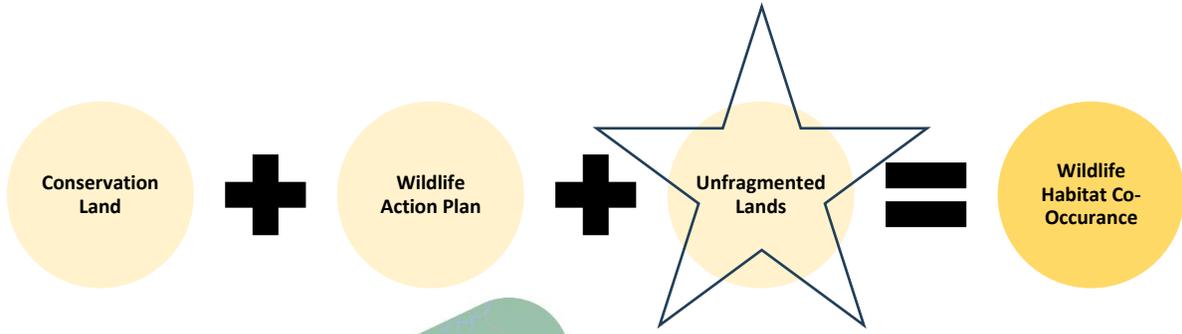
Map 22: Conservation Land and 1000' Buffer

Wildlife Habitat Co-Occurrence Inputs and Output



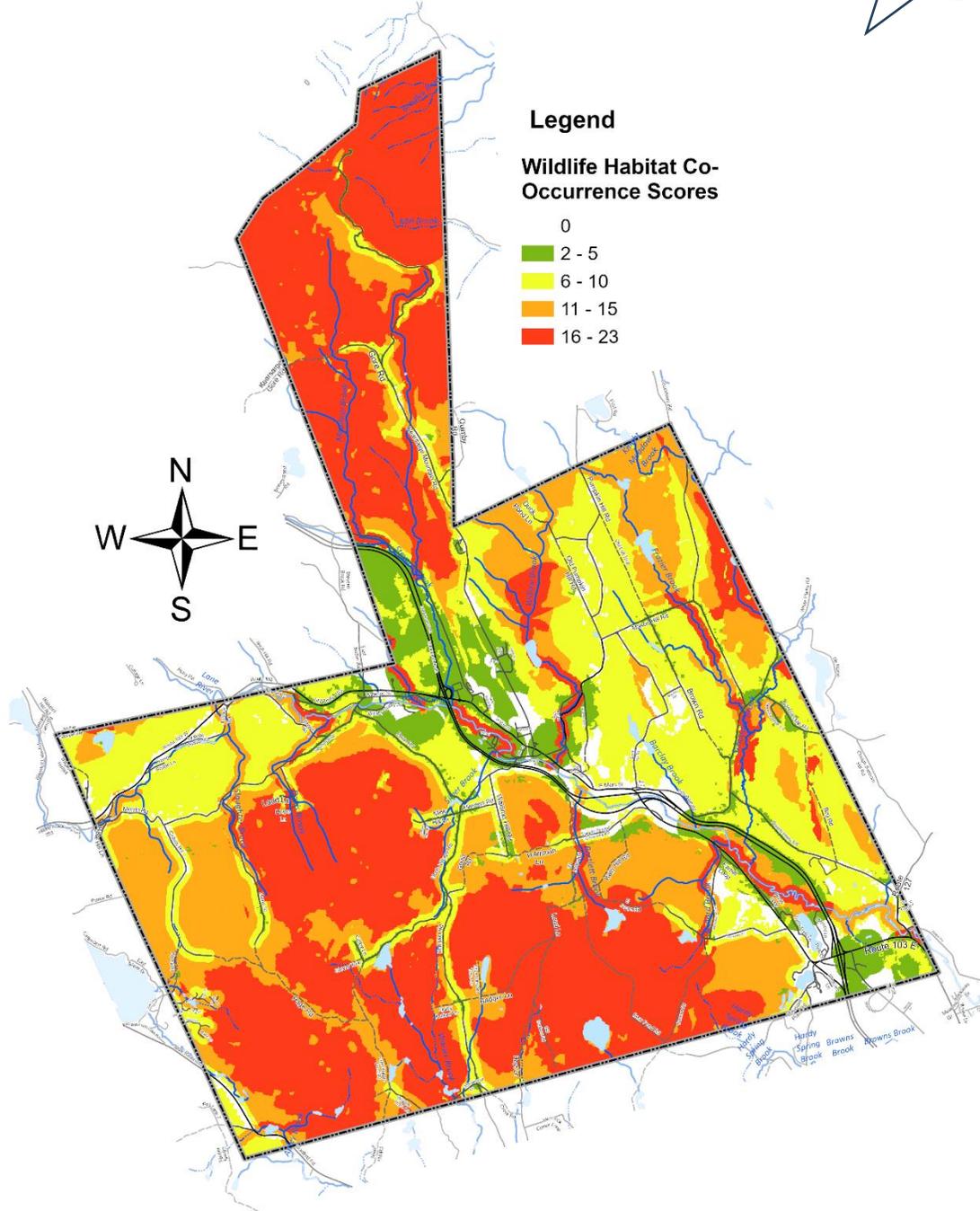
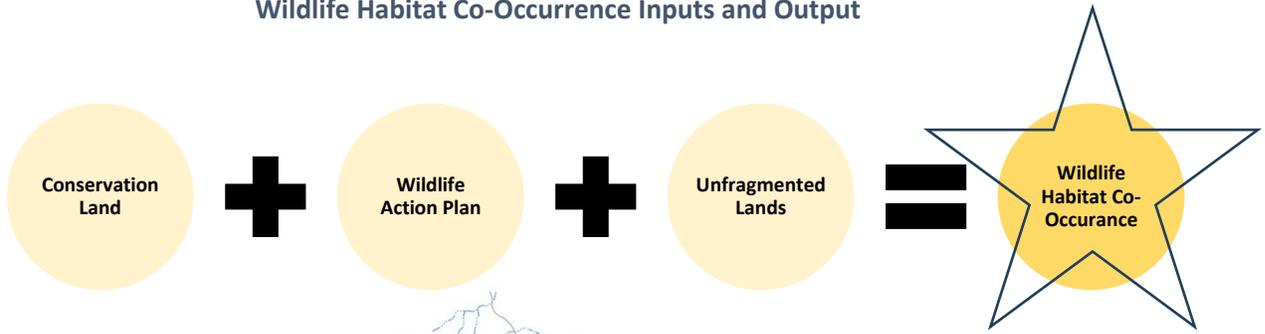
Map 23: Wildlife Action Plan Tiers

Wildlife Habitat Co-Occurrence Inputs and Output



Map 24: Unfragmented Lands

Wildlife Habitat Co-Occurrence Inputs and Output



Map 25: Wildlife Habitat Co-Occurrence Results Map

The Wildlife Habitat Co-Occurrence analysis results are the sum of the values assigned to conservation land buffers, Wildlife Action Plan tiers, and unfragmented lands. Much of the Mink Hills and the area of Mount Kearsarge include high value wildlife habitat. This map makes up a portion of the overall co-occurrence results map (Map 5 on page 16).

5.2 Unfragmented Blocks

The main factor influencing wildlife habitat range is the level of fragmentation on the landscape. Fragmenting features such as roads, residential development, or commercial and industrial activity have been prevalent on the New Hampshire landscape since early settlement years. The location of unfragmented lands, meaning the land blocks not separated by roads, houses, or other human development, was determined for Warner and the surrounding communities.

By conducting a GIS operation of buffering publicly maintained roadways by 500', an unfragmented lands inventory was created. Many of these blocks extend beyond town lines into surrounding communities. See the Unfragmented Lands Map for visual detail.

Most developments in Warner are efficiently concentrated in the village, with other developments mostly along the Route 103 corridor. The northeast part of town features agricultural activity served by local roads that fragment the landscape there. The topography of Mount Kearsarge and the Mink Hills, combined with a dearth of maintained roadways, enables large blocks of unfragmented lands to exist to the north and south of the developed center of town.

The largest unfragmented block includes northern Warner and Mount Kearsarge covering 22,775 acres, making it one of the largest in this part of the state. The large blocks of undeveloped land in the Mink Hills are nearly as impressive, at 10,138 and 7,657 acres. These large blocks in Warner cover more than half the land area of Warner. They are also part of a string of exceptionally large unfragmented blocks including those around Ragged Mountain in Andover, Lowe State Forest in Bradford, and the higher terrain south of Mount Sunapee into Washington. For context, in many nearby communities, unfragmented blocks over 4,000 acres are considered quite large.

**More than half of Warner is contained within the three largest blocks of unfragmented land, encompassing Mount Kearsarge and the Mink Mills.*

5.3 Wildlife Action Plan (WAP) Habitat Types and Tiers

The New Hampshire Wildlife Action Plan (WAP) is a vital component of the Warner NRI. Using the habitats identified in Town, the dominant hemlock-hardwood-pine forests (69% of town) support species such as bats, eagles, songbirds, snakes, moose, turtles, and salamanders. While this habitat type is quite common in New Hampshire, there are few large unfragmented tracts. The Appalachian oak-pine (7.4%) forests host similar species. Covering nearly 78% of Warner's land area, these two forest types also represent essential habitat for owls and large-roaming mammals such as bobcat, moose, fisher, coyote, black bear, deer, and others.

Other notable habitats in Warner include the extensive Floodplain Forest (483 acres) and Northern Hardwood-Conifer forest (2296 acres) at higher elevations of the Minks and Mount Kearsarge, habitats that are more common further north. Species such as bald eagles, peregrine falcons, ruffed grouse, wood thrush, and northern long-eared bat are typical species for this habitat. This habitat type has experienced extensive development pressure in parts of New Hampshire.

The WAP utilized the newest available satellite imagery resources and techniques to determine the locations and acreages of priority habitat areas.

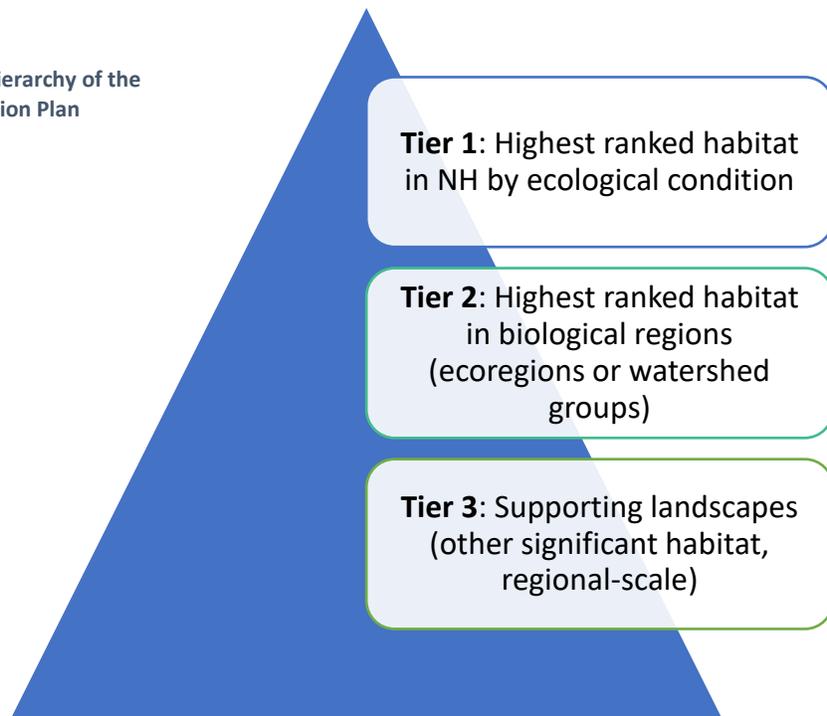
Habitat Distribution, Composition	
Habitat Type	Acres (percentage of all habitats)
Appalachian oak-pine forest	2,627 (7.4%)
Cliff and Talus	125 (0.35%)
Developed Impervious	1,160 (3.3%)
Developed or Barren land	1,333 (3.8%)
Floodplain Forest	483 (1.4%)
Grassland	738 (2.1%)
Hemlock Hardwood Pine	24,642 (69.4%)
High Elevation Spruce Fir	144 (0.4%)
Northern Hardwood Conifer	2,296 (6.5%)
Northern Swamp	5 (0.01%)
Open Water	494 (1.4%)
Peatland	94 (0.3%)
Rocky Ridge	324 (0.9%)
Sand/Gravel	71 (0.2%)
Temperate Swamp	136 (0.4%)
Wet Meadow/Shrub Wetland	830 (2.3%)
Total	35,502 (100%)

Table 10: Habitat types as defined by the NH Wildlife Action Plan (acres % of total)

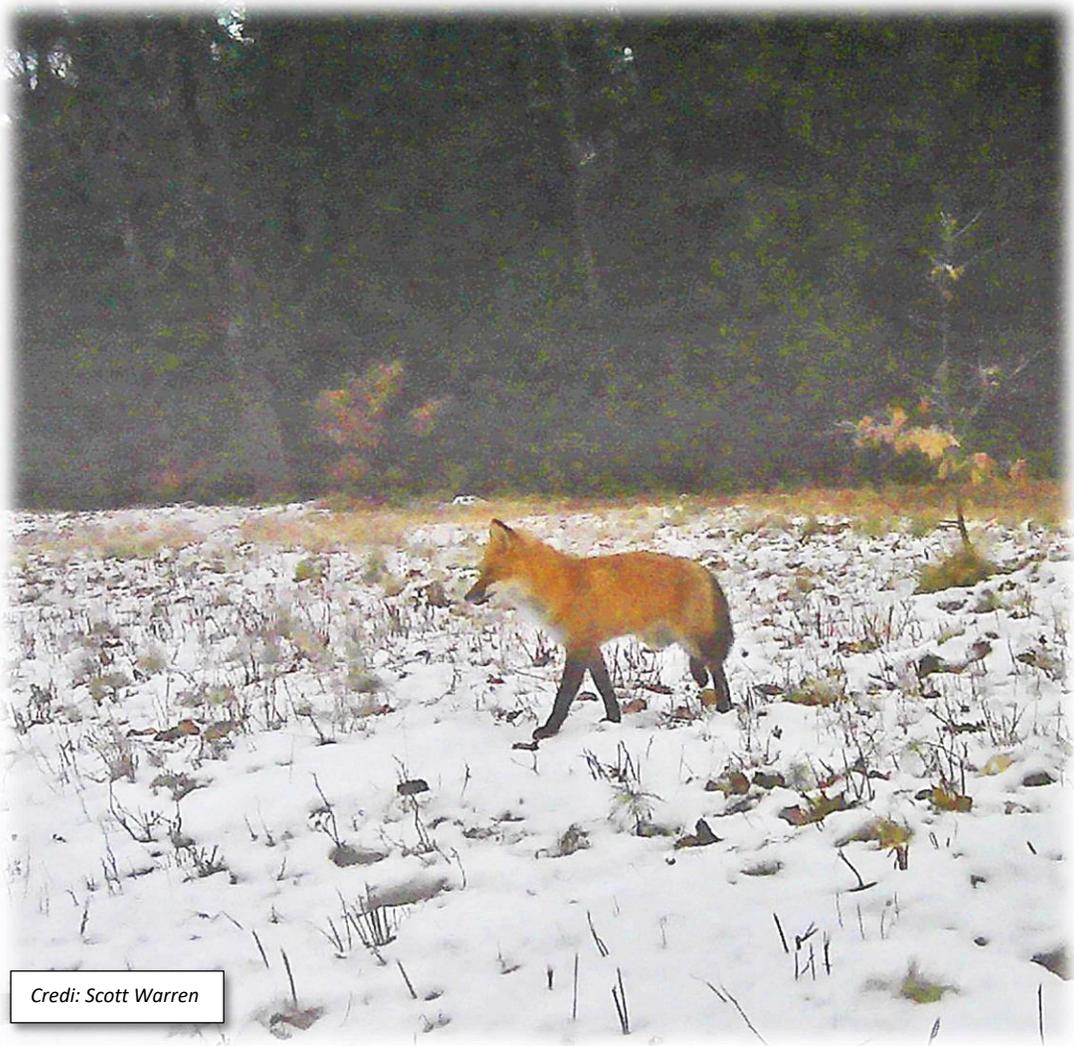
Compared to neighboring towns, Warner has a high percentage of its land area categorized as Tier 1, the highest priority habitat. These areas include large blocks in the Mink Hills, the northern part of town including much of the Mount Kearsarge area, and significant areas in the northeastern part of town, as well as locally along the Warner River and other branches and streams.

The Wildlife Action Plan and supporting information can be found on the NH Fish and Game website.

Figure 4: Tiered hierarchy of the Wildlife Action Plan



Chapter 6 | Conclusions & Recommendations



Credi: Scott Warren

The NRI Maps and data have helped highlight lands that are likely to best meet the Town's conservation priorities and can also be used to locate areas where development would not be detrimental to the natural characteristics of the Town. The details of the natural resources and their contributions to the Town of Warner have led to a series of specialized recommendations.

6.1 Weighted Co-Occurrence Analysis

The Weighted Co-Occurrence Map (Map 6) visually displays the highest priority natural resource locations in the community. The analysis found the most critical locations in Warner to protect for current and future generations include large swaths of the Mink Hills, the northern part of Warner including Mount Kearsarge, and various areas along the Warner River and other streams, including Willow Brook, Stevens Brook, and Schoodac Brook.

The Weighted Co-Occurrence Map (Map 6) also displays existing conservation lands, revealing that the much of the Town's highest natural resource value lands presently have at least some level of protection, though there are several significant gaps. Notable high value conservation areas not now protected include a large block of the Mink Hills in the southwest corner of town, accessible from Henniker and Route 114 between Bradford and Henniker. Geography and topography may have prevented development in this area thus far. The Mink Hills area also has several large properties not conserved, as well as gaps in connectivity between blocks of protected land. Other areas to consider for conservation include multiple smaller areas along the Warner River and other streams where gaps in existing conservation land could be filled.

Additional insights can be made when reviewing the co-occurrence analysis results for specific categories and overlaying the conservation lands layer. The Agriculture Co-occurrence results show that much of the highest value agricultural lands (and active farms) in Warner are not protected. Also, much of the drinking water supply land shown in the Drinking Water Co-occurrence results are also not under conservation, although they do receive a degree of protection through the Groundwater Protection Ordinance.

6.2 Recommendations

The set of recommendations outlined here were developed from the results of this natural resource inventory, but they should not be considered a comprehensive list of all important tasks required to support the Town's natural resources. Additional natural resource related recommendations can be found in the Natural Resources chapter of the Warner Master Plan.

Recommendation 1: Use this Natural Resources Inventory and the Co-Occurrence Analysis to inform decision making on natural resource protections, including future easement and conservation property purchases.

- This NRI and Co-Occurrence Analysis is a tool to help the Conservation Commission and others make more informed decisions regarding the many natural resources in Warner. The Co-Occurrence Analysis Map (Map 8) and the individual category Weighting Maps roughly indicate which lands in Warner provide the highest resource value to the Town. This will help to prioritize the limited time and funding for securing additional conservation lands.

Recommendation 2: Work with the Planning Board and other boards and commissions as appropriate to cooperatively identify priority conservation land, and to identify lands better suited for other community objectives, such as economic development, housing, or community facilities.

- Conservation and natural resource protection are just some of many competing community objectives that every town must manage. At times, alternate uses or development may be desired for meeting these community needs, including housing, recreation, business enterprises, and various economic initiatives.
- It is clear the Conservation Commission should focus on protecting priority conservation land, but it may also play a role in discussing how, where, and to what extent development or other activities should occur. Likewise, all parts of Town government, including the Planning Board should review the Town's Natural Resource priorities to inform decisions on their wide-ranging responsibilities.

Recommendation 3: Vigilantly protect the town’s stratified drift aquifers, particularly near the municipal drinking water wells.

- The high transmissivity aquifers along the Warner River are very well suited to meeting current and future drinking water needs but are susceptible to contamination. The town’s Groundwater Protection Ordinance is an important component of implementing this recommendation. Evaluating and addressing gaps or weaknesses in the Ordinance may be needed to achieve this.

Recommendation 4: Maintain and update this NRI and associated data as needed and consider developing an Open Space Plan to accompany it.

- The natural conditions we see today may not be the same several years from now, and newer and higher quality data become available nearly every year. As such, occasional updates to this NRI are warranted.
- An Open Space Plan is a strategic document that outlines a vision for protecting and managing open spaces like conservation lands, parks, and natural areas. It identifies priorities for land acquisition, conservation, and possibly even recreational access. At its most basic it may assist the Conservation Commission and the Town in implementing strategies to protect natural resources identified in this NRI. It could be broadened to envision a plan to meet community needs for parks and outdoor recreation. Tasks may include additional community outreach and visioning, developing a specific list of properties based on NRI outputs or other information, identifying funding sources, and enhancing collaboration with landowners.

Recommendation 5: The Conservation Commission should continue to strengthen its ties to the Warner Agricultural Committee to support long term sustainability of agricultural lands and businesses.

- The Conservation Commission and Agricultural Commission have a wealth of talents, knowledge, and insights that are varied and complementary. Continued and improved collaboration between bodies can help the community achieve common goals, including preservation of farmland, minimizing environmental impacts of agricultural practices, maximizing the natural value of agricultural land, and preserving and highlighting community heritage.

Recommendation 6: Continue actively participating with the Warner River Local Advisory Committee (WRLAC) as part of the NHDES Rivers Management and Protection Program (RMPP).

- The Warner River and adjacent lands are highlighted in this NRI as a natural feature of predominant importance to the town. The river and associated lands provide drinking water, recreation, wildlife habitat, and flood protection to the community. The Warner River is also one of New Hampshire’s Designated Rivers. The WRLAC, as part of the NH Rivers Management and Protection Program, is a partnership between state government and local citizens, and plays a vital role in protecting the river, their shore-lands, and contributing watersheds.

Recommendation 7: Establish a standing committee or working group dedicated to the stewardship of the Mink Hills.

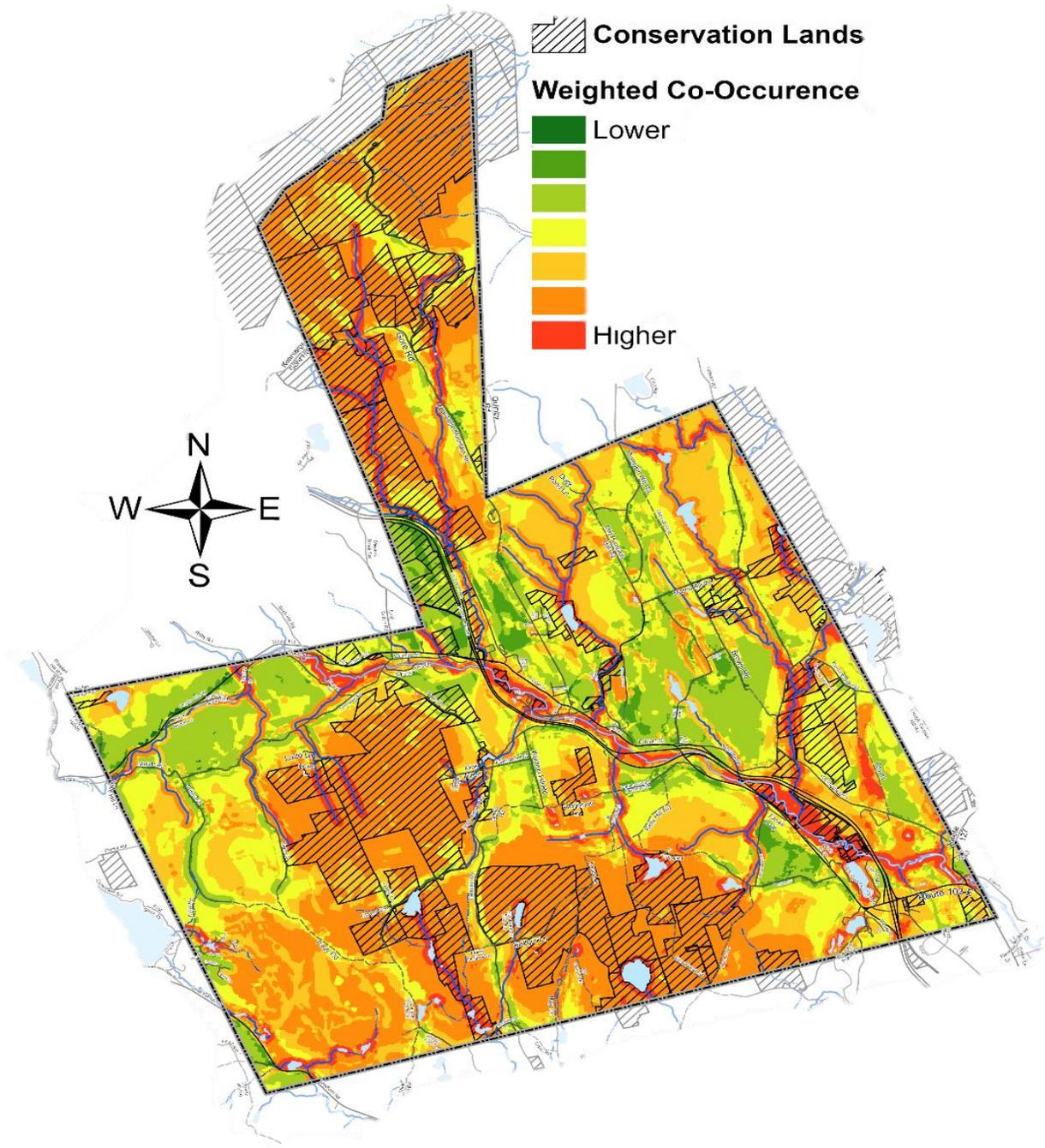
- The Mink Hills in Warner are beloved by many in town, including recreationalists, naturalists, hunters, property owners, and those who enjoy the scenic views. This NRI strongly identifies the area as having a very high natural resource value to Warner and beyond and is identified as a distinct geographical area within the town. While there are many competing interests, most property owners in the Minks share a similar vision of sound stewardship and land preservation. Continued collaboration is needed to discuss and manage differences and to build on commonalities.

Recommendation 8: Routinely consider the anticipated impacts of climate change in all Conservation Commission actions and evaluate how a changing climate may impact conservation needs. Coordinate with others to address climate resiliency and mitigation.

- Each year, more data and resources are available to help communities understand the present and future impacts of climate change. The town must be prepared to adapt to these changes, and ensure the natural community has what it needs to be resilient. In addition, Warner has a role to play in mitigating the effects of climate change through practices and policies that lower emissions and store carbon.



Credi: Doug Allen



Map 26: Weighted Co-Occurrence Results Map

The above map displays the Weighted Co-Occurrence results overlaid with conservation lands. Shades of orange and red represent areas of higher conservation value. These high conservation value areas are locations where multiple natural resources overlap. The natural resources evaluated include those related to drinking water, surface water, agriculture, wildlife habitat, and cultural and recreational