

Boscawen NRI Executive Summary and Co-Occurrence Analysis Discussion

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 Boscawen over the long term. This NRI identifies, prioritizes, and maps these resources. This will help inform land conservation priorities and other practices that help sustain these natural resources and the benefits they bring.

This Natural Resources Inventory includes an inventory of natural resources and a weighted co-occurrence analysis. The inventory maps and describes a multitude of natural resources in Boscawen, including water resources, agricultural resources, cultural and recreational resources, and habitat resources. The NRI document contains discussion on a range of natural resource features and their contributions to the town of Boscawen. The Town of Boscawen Master Plan **Natural Resources Chapter** contributed to this portion of the NRI.

The weighted co-occurrence analysis is an attempt to assign relative value to the resources and subsequently the lands that support them. Each of the identified natural resource “layers” were assigned a score that identified its relative importance to the Town of Boscawen as a natural resource. This valuation was based on information gleaned from results of a public survey, knowledge and experience from the Conservation Commission, best practices, and advice from experts in the field. Finally, these scored or “weighted” layers were overlaid on top of each other in a co-occurrence mapping exercise. Natural resources with a higher value to the town were given a greater weight, and resources with a relative lower value were given a lower weight. The resulting map highlights which areas of town support the highest value of natural resources. The NRI document and its recommendations are largely based on the inventory and the co-occurrence results.

The Conservation Commission was highly involved in this process and reviewed and refined the maps, analysis, and recommendations. The NRI Survey was distributed online via Survey Monkey and was also available in print to obtain the public’s opinions on the importance of various resources.

Co-Occurrence Weighting and Maps

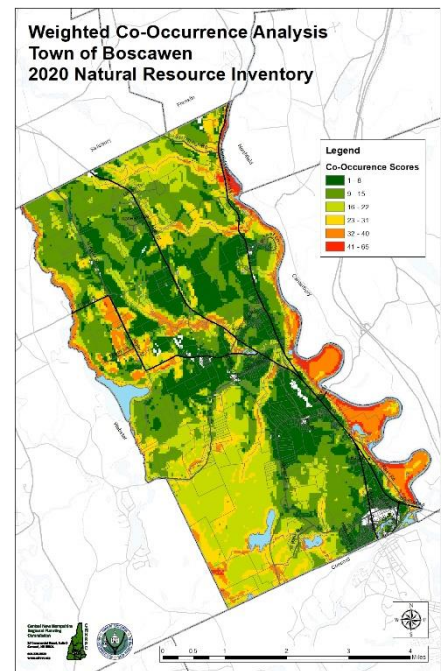
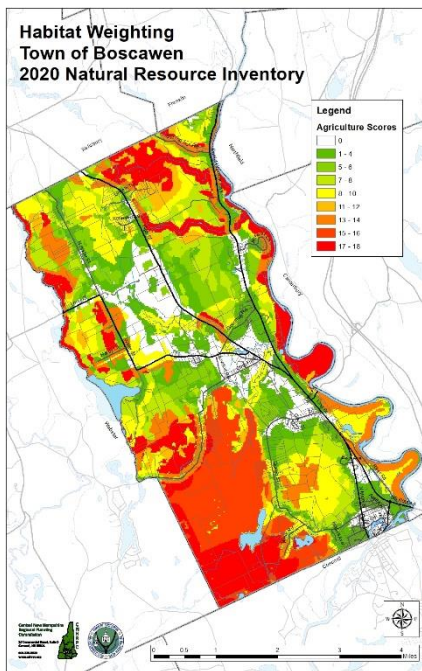
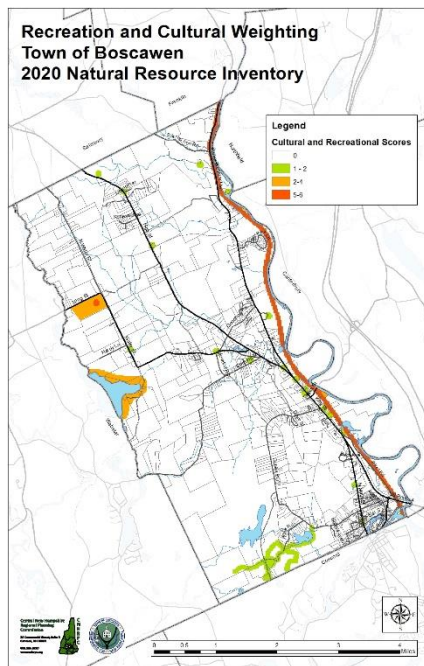
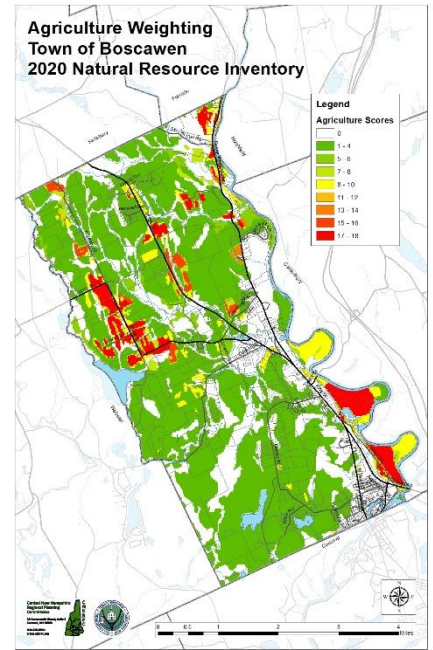
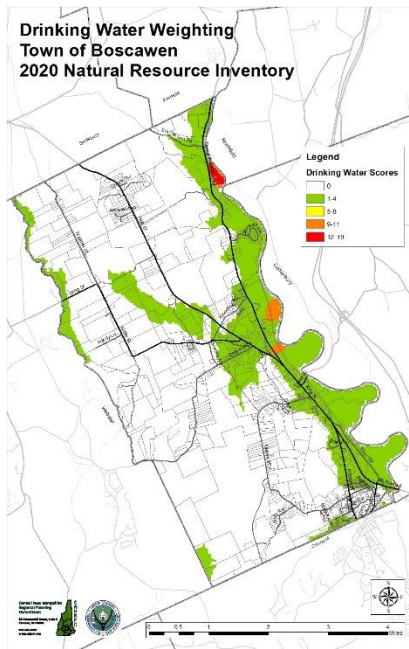
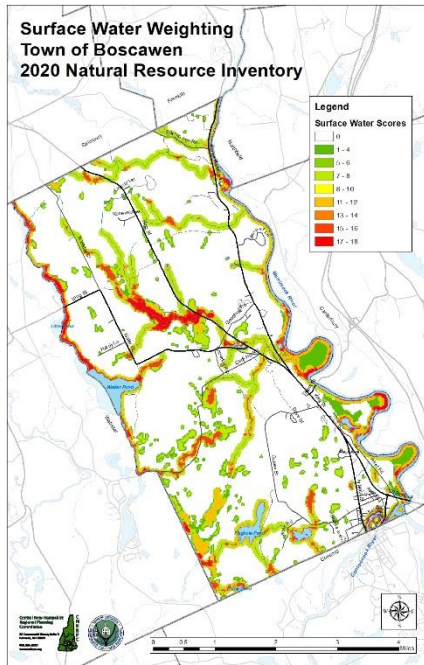
Each natural resource data layer has been assigned a value score, shown in the table below. The data layers and value scores in this table are the inputs for the GIS based co-occurrence analysis maps. A higher score indicates a higher natural resource value to the town, and a lower score a lower relative value. These scores were assigned based primarily on public input from the community survey, plus experience and knowledge from the Conservation Commission. Minor adjustments to the values were made based on research and best practices.

Data Layer	Value Score
Agricultural Lands	8
Farm Soils – Prime	8
Farm Soils – Statewide Importance	5
Forestry Soils – Group IA and IB	2
Agriculture Category Total:	23
Conservation Land Buffer 1000’	4
Wildlife Action plan Highest Ranked Habitat in NH	10
Wildlife Action plan Highest Biological Habitat in Region	5
Wildlife Action plan Supporting Landscapes	3
Unfragmented Blocks 2,000-5,000 acres	3
Unfragmented Blocks >5,000 acres	6
Wildlife Habitat Category Total:	31
Recreational Trails 200’ Buffer	2
Public Input Additions	4
Historic and Cultural Sites Buffer 300’	2
Viewshed/Scenic Lands High Promontory	0
Viewshed/Scenic Lands Lowlands	0
Cultural and Recreational Category Total:	8
Public Water Supply Buffer 500’	10
Stratified Drift Aquifers (all)	4
Stratified Drift Aquifers Transmissivity >1000 sq ft/day	5
Drinking Water Category Total:	19
Wetlands	3
Wetlands and Wetland Buffer 100’	4
Floodplains 1% Annual Flood Risk (100-year)	4
Waterbodies (3+ acres), Rivers, Streams, Buffers 300’	8
Surface Waters Category Total:	19

Total:

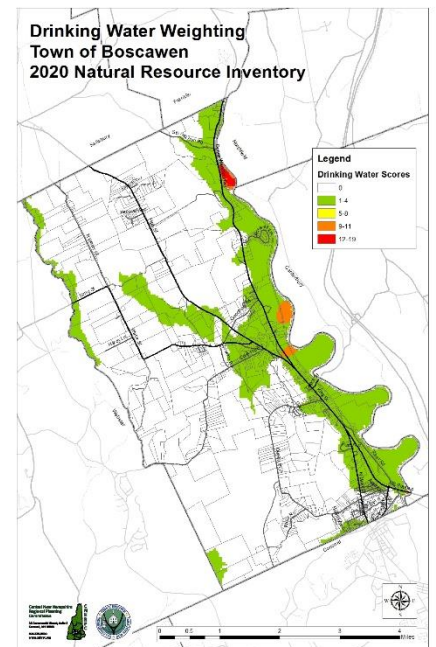
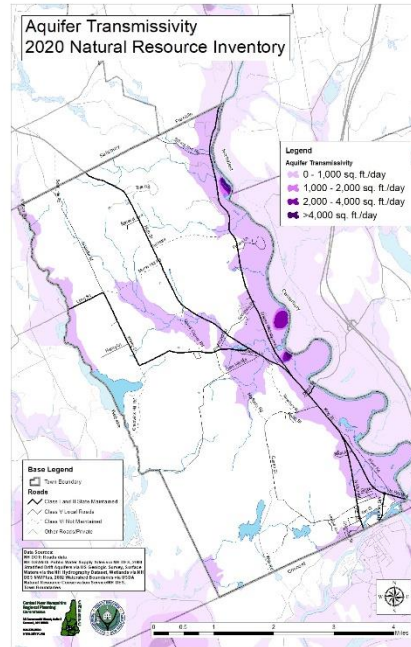
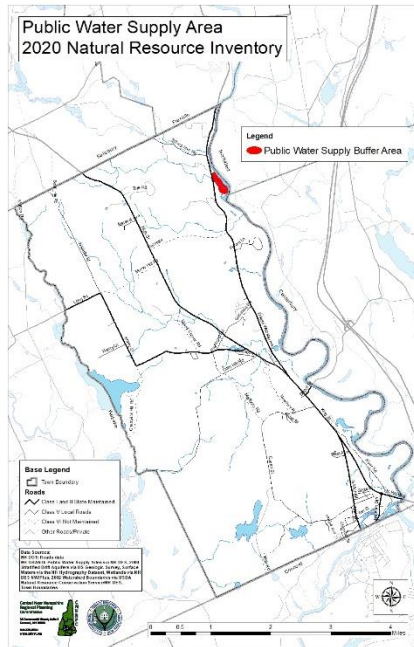
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Note that the natural resource data layers are divided into five categories: Surface Water; Drinking Water; Agriculture; Scenic, Historic, and Recreation; and Wildlife Habitat. A co-occurrence weighting map was created for each of these five categories, as well as for a final co-occurrence map that includes all data inputs. The results map for each category plus the combined results are shown below, with details for each category discussed in the next sections.



Drinking Water Input Value Scores and Co-Occurrence Results

Public Water supply Buffer 500': A 500' buffer around the town's public water supply wells was assigned the highest value score of any data layer (10). These wells provide municipal drinking water for a significant portion of the town's residents and businesses.



Aquifers: Groundwater Aquifers provide water that feeds into rivers, streams, and lakes, but also are the source of water for drinking water wells. The town has many private drinking water wells, as well as larger public water supply wells. These wells require healthy and clean groundwater. Groundwater aquifers are needed for existing water quality and safety for present and future drinking water needs. All aquifers were assigned a value of 4 points, plus an additional 5 points for aquifer areas with the highest transmissivity (those that can move more water).

Drinking water Co-Occurrence Results: The highest value lands for drinking water coincides with the highest value aquifers, specifically in the vicinity of the public water supply wells. A more detailed analysis of drinking water resources may be prudent for analyzing the current and future drinking water needs of the town, however this analysis shows areas where land conservation efforts are likely to preserve drinking water resources.

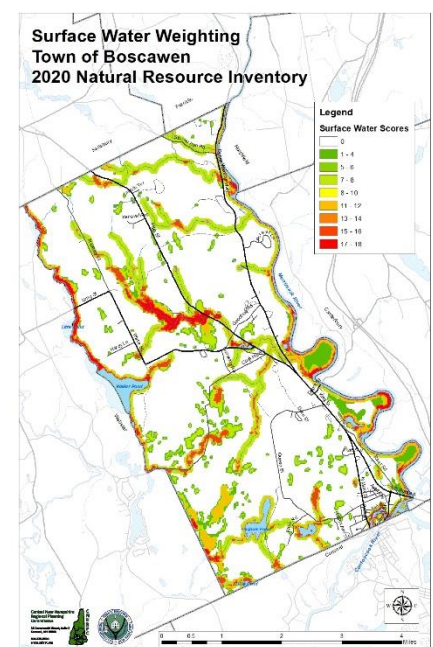
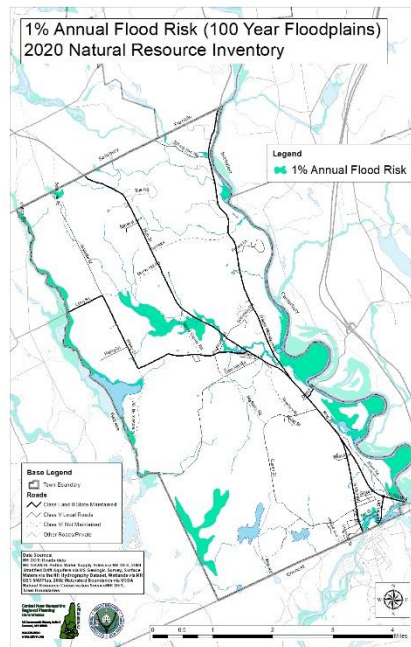
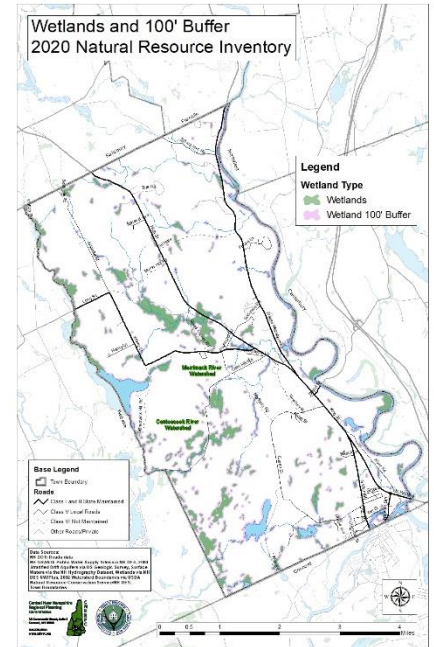
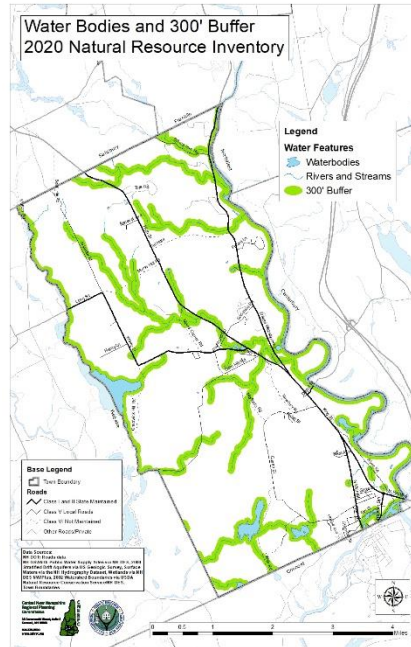
Survey results and common sense both show safe and secure drinking water resources are critically important to the Town of Boscawen. The category is worth a total of 19% of the total scores for the town. The individual input data layers are scored very highly.

Surface Waters Input Value Scores and Co-Occurrence Results

Water Bodies 300' Buffer: This layer includes all rivers, streams, and water bodies (lakes and ponds) greater than 3 acres, plus a 300' buffer around them. This layer scores an 8. Water bodies have a number of habitat, ecological, hydrological, and cultural values to the town of Boscawen.

Wetlands and 300' Buffer: The National Wetlands Inventory of wetlands are assigned a value score of 3, with areas within a 300' buffer of wetlands scoring an additional 4. Wetlands are important for clean surface waters, mitigating floods, and provide critical habitat for wildlife.

Floodplains: Areas with a 1% annual flood risk, also known as the 100 year floodplain, were assigned a value score of 4. Protecting floodplains can help reduce flood damage during floods by keeping development out of flood prone areas. Floodplains also absorb and distribute floodwaters, helping reduce the severity of flooding downstream. This data layer is from FEMA Digital Flood Insurance Rates (DFIRM) data.



Surface Water Co-Occurrence Results: The co-occurrence results of the Surface Water related layers highlights Tannery Brook and its associated wetland complex, Beaverdam Brook and its wetlands along the Webster town line north of Walker Pond, and the Merrimack River.

Survey results and Conservation Commission discussions indicated that clean healthy bodies of water were important to the town of Boscawen, particularly the Merrimack River. The Surface Waters category makes up 19% of the total co-occurrence score for Boscawen.

Agriculture Input Scores and Co-Occurrence Results

Farm Soils: The Merrimack County Soils Survey identifies various soil types that are considered the best soils for agricultural purposes. Soils categorized as “Prime Farmland Soils” were scored 8 points, and “Soils of Statewide Importance” 5 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.

Agricultural Land: The Central NH Regional Planning Commission maintains a Land Use layer for the town of Boscawen, where all land is categorized into various land uses, from residential, to commercial, to agricultural. The Agricultural lands layer used in this analysis is derived from this land use layer, and includes any agricultural land, maintained fields, and orchards in the town of Boscawen.

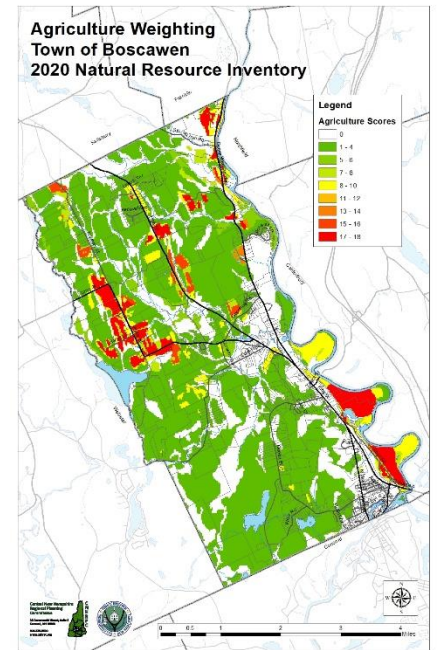
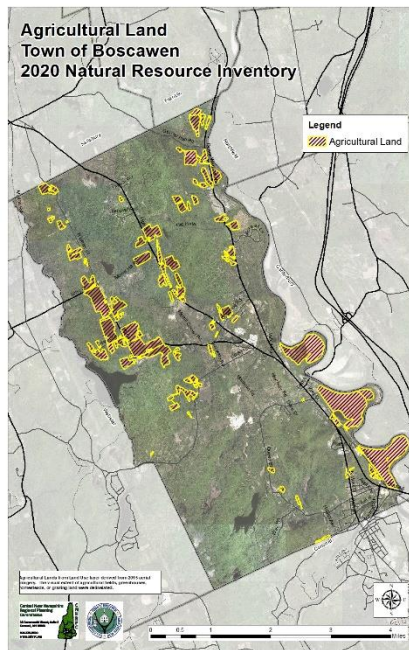
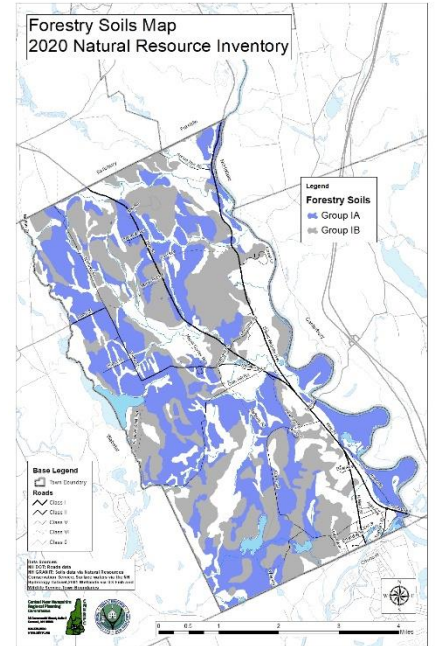
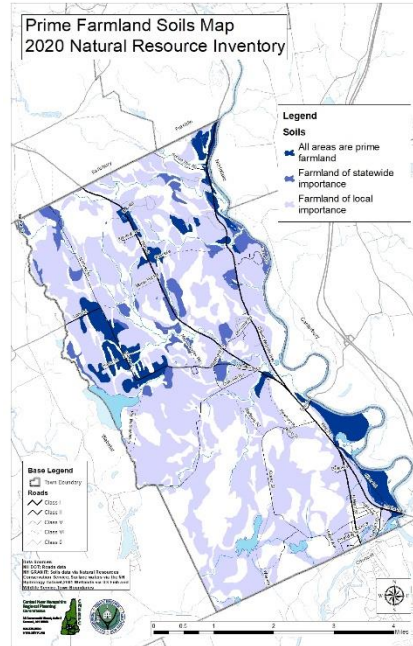
Agriculture Co-Occurrence

Results: The co-occurrence results of the Agricultural related layers highlights areas along Water Street, along the Merrimack River near King and River Streets, as well as a number of smaller areas in the northern half of Boscawen. These lands are likely to have a strong agricultural value and should be targeted for conservation if preserving agriculture and agricultural lands is a goal.

In the **Agriculture Weighting**

Map, the highest value agriculture lands are located within the Merrimack River intervale, along Water Street and North Water Street, at the Merrimack County Farm, and along High Street. These are for the most part locations of existing agricultural operations.

Survey results and Conservation Commission discussions revealed that agriculture, active farmland, and farms were very important to the town of Boscawen. The agriculture category makes up 23% of the total co-occurrence score for Boscawen.

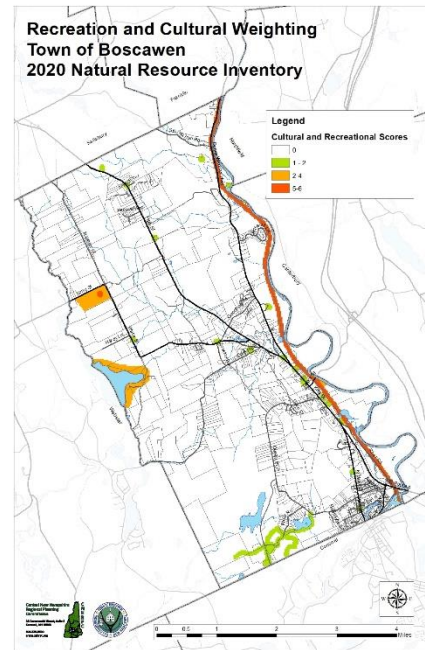
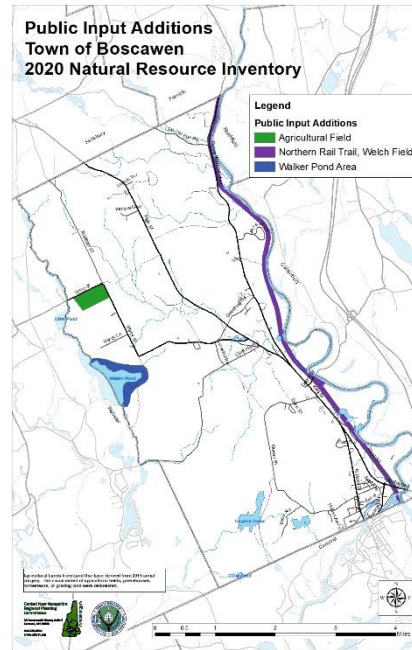
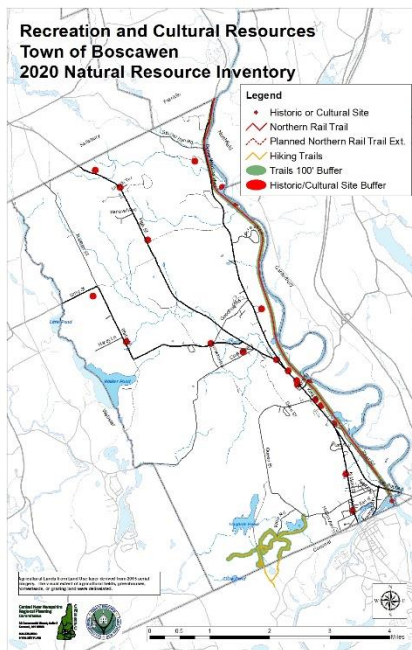


Cultural and Recreational Resource Input Value Scores and Co-Occurrence Results

Recreational Trails 200' Buffer: The Survey and Conservation commission feedback indicated trails are highly valued by Boscawen Residents. The Northern Rail Trail in particular received many mentions in the Survey. A complete inventory of trails was not available, and only public trails were included in this analysis. A 200' buffer from these trails were assigned a value score of 2.

Historic and Cultural Sites buffer 300': The presence of historic or cultural sites often contributes to appeals to conserve properties. A database of historical and cultural sites was developed and reviewed, based on lists created by the Town in past planning documents and exercise. A 300' buffer from these sites was included in the analysis and assigned a value score of 2.

Public Input Additions: After reviewing the survey, a few areas of town were identified as being particularly important. This included an agricultural field off Water Street, the area around Walker Pond, the Northern Rail Trail, and Jamie Welch Memorial Field. A data layer was developed to delineate these areas and was assigned a value score of 4.



Scenic Views and Vistas: For multiple reasons, this analysis did not directly include scenic views and vistas. First, it was difficult to determine areal coverage of a viewshed with accuracy. Attempts to draw one appeared arbitrary, and sophisticated viewshed analysis were beyond the scope of this project. It was difficult to identify and score which particular views and which aspects of a view was prized. Second, it appeared that scenic values came into play through other categories. For

example, agriculture was highly prized by Boscawen residents in part because of the scenic views the fields offer. Third, the areas that appeared to have the highest scenic value were already scored very highly on the co-occurrence map. Scenic views were valued by residents based on the survey, but appeared less prominent than other categories. For these reasons, a basic scenic views and map was created, but were not included in the co-occurrence analysis.

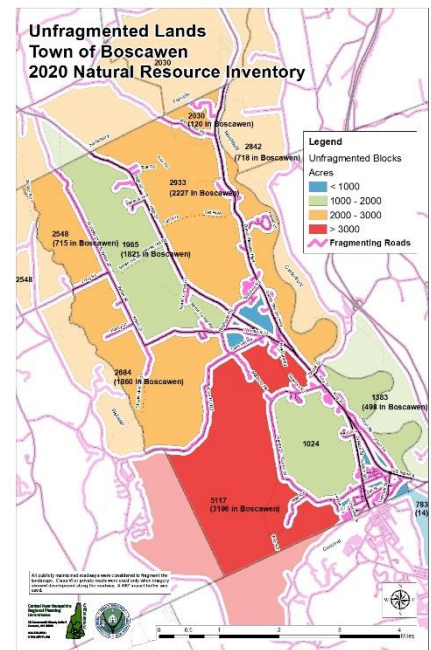
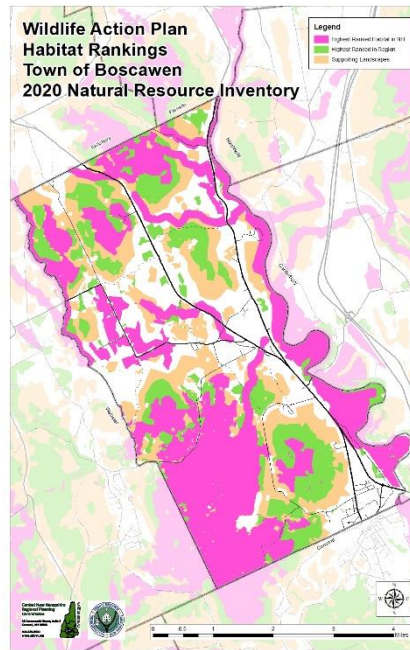
Cultural and Recreational Co-Occurrence Results: The co-occurrence results of the Cultural and Recreational layers highlight the areas specifically identify as important in the Survey and the historic and cultural sites in town. It has a relatively small impact on the final co-occurrence scoring and map as compared to four other natural resource categories (Agriculture, Groundwater, Surface Water, and Wildlife Habitat).

The **Recreation and Cultural Resources Weighting Map** helps highlight areas that contribute to the town's recreational and cultural qualities. Survey results and Conservation Commission discussions indicated that while scenic, recreational, historic, and cultural significance was important to the Town, it was more of a contributing factor rather than a primary driver in determining priorities for land conservation. The category makes up 8% of the total co-occurrence score for Boscawen.

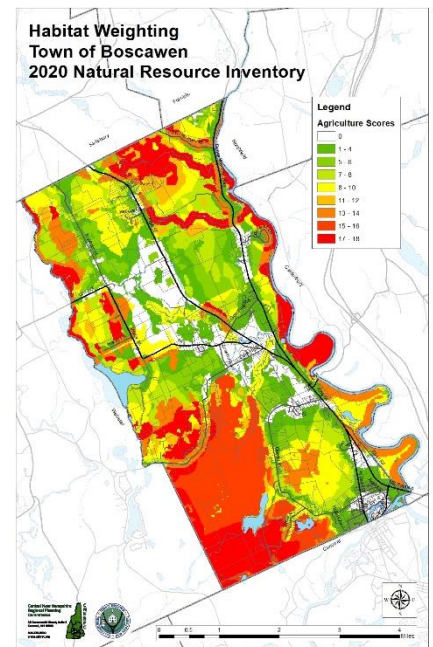
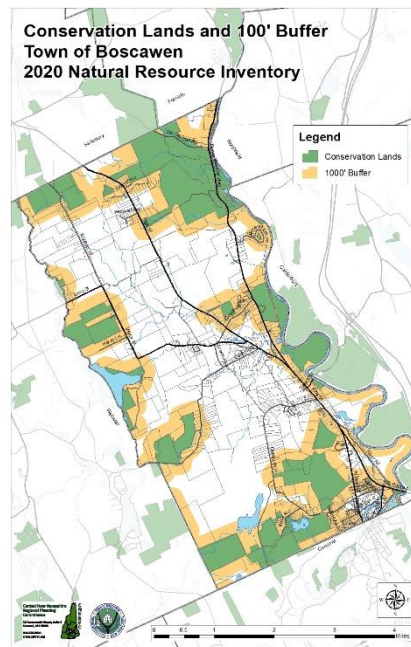
Wildlife Habitat Input Value Scores and co-Occurrence Results

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 different categories in this data layer are used, the highest being "Highest Ranked Habitat in NH" (10), then "Highest Ranked Habitat in Ecological Region" (5), and "Supporting Landscapes" (3). More information on the Wildlife Action Pplan dataset can be found in the at the NH Fish and Game website.

Unfragmented Lands: This dataset was developed by CNHRPC to break the town of Boscawen into blocks of land unfragmented by roads, development, or human activities. Large areas of land that are not broken up by roads or other human disturbances are important for a range of species and thus have a higher value than smaller blocks of undeveloped land. The unfragmented lands layers includes a 500' impact buffer from all roads. Unfragmented blocks with 5000 acres or more were assigned the highest value score (6), and blocks between 2000-5000 were assigned a lower score (3). Boscawen is unique in that it has unusually large areas of unbroken landscapes when compared to neighboring communities.



Conservation Land Buffer 1000': Lands adjacent to existing conservation land 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 co-occurrence results of the wildlife habitat related layers shows

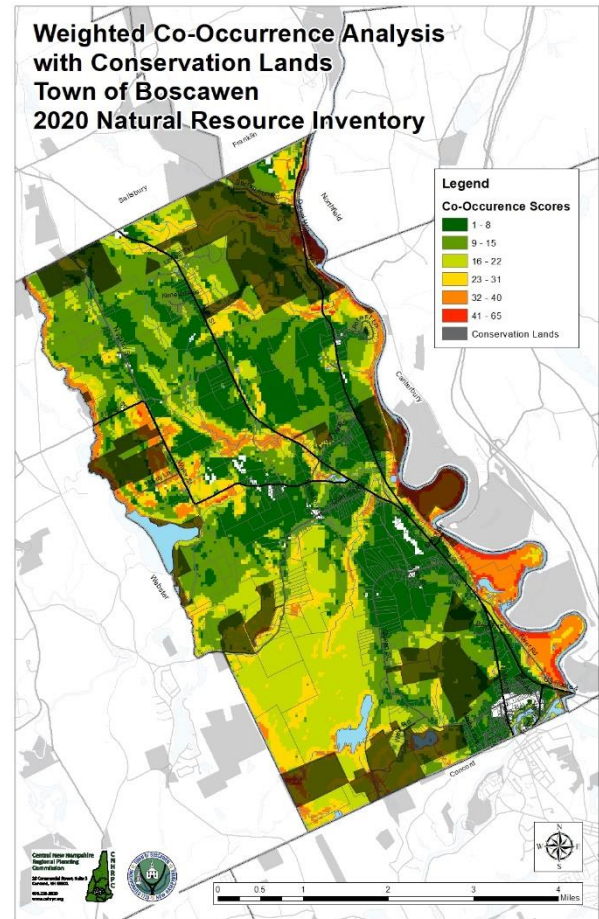
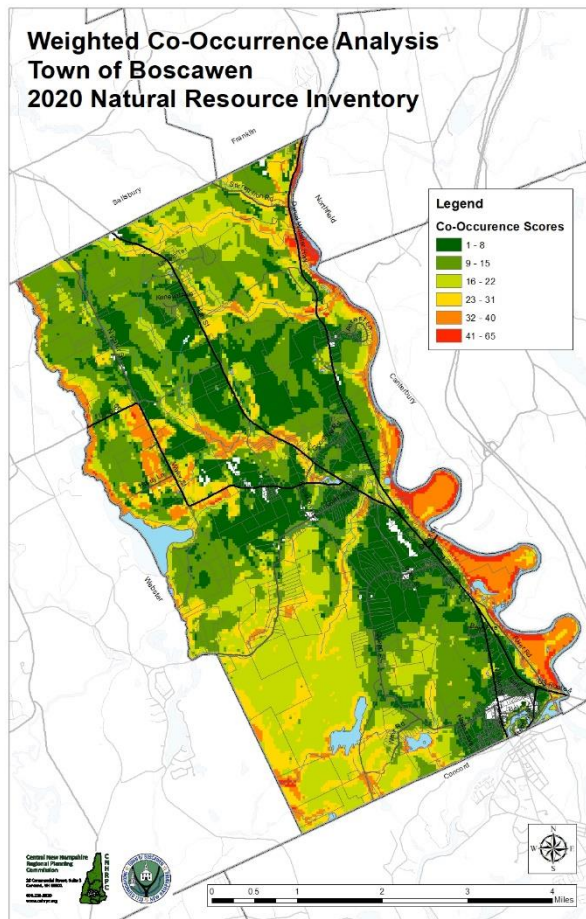
high habitat value lands in the large, unbroken block of land in the southwest corner of Boscawen, an area of north-central Boscawen, along the portions of the Merrimack River, and along streams

including Glines Brook and others. Areas in reds and oranges on the map show the areas of the higher habitat value, where the higher scored data inputs coincide.

Wildlife Habitat was deemed a very important to the town of Boscawen in the Survey and by Conservation Commission members, and so the Wildlife Habitat category makes up 31% of the total co-occurrence score for Boscawen.

Weighted Co-Occurrence Map

The **Weighted Co-Occurrence Map** includes inputs for each of the above categories, and visually displays the highest priority natural resource locations in the community, based on the communities natural resource values. The most essential locations in Boscawen to protect for future generations include the drinking water wells, the Merrimack River corridor and intervals, Tannery Brook, Beaverdam Brook, Cold Brook, locations along Water Street, and a large block of unfragmented land in the town's southwest corner. When overlaid with existing conservation lands,



it is revealed that much of the lands that support the highest natural resource value to the town are not presently conserved.