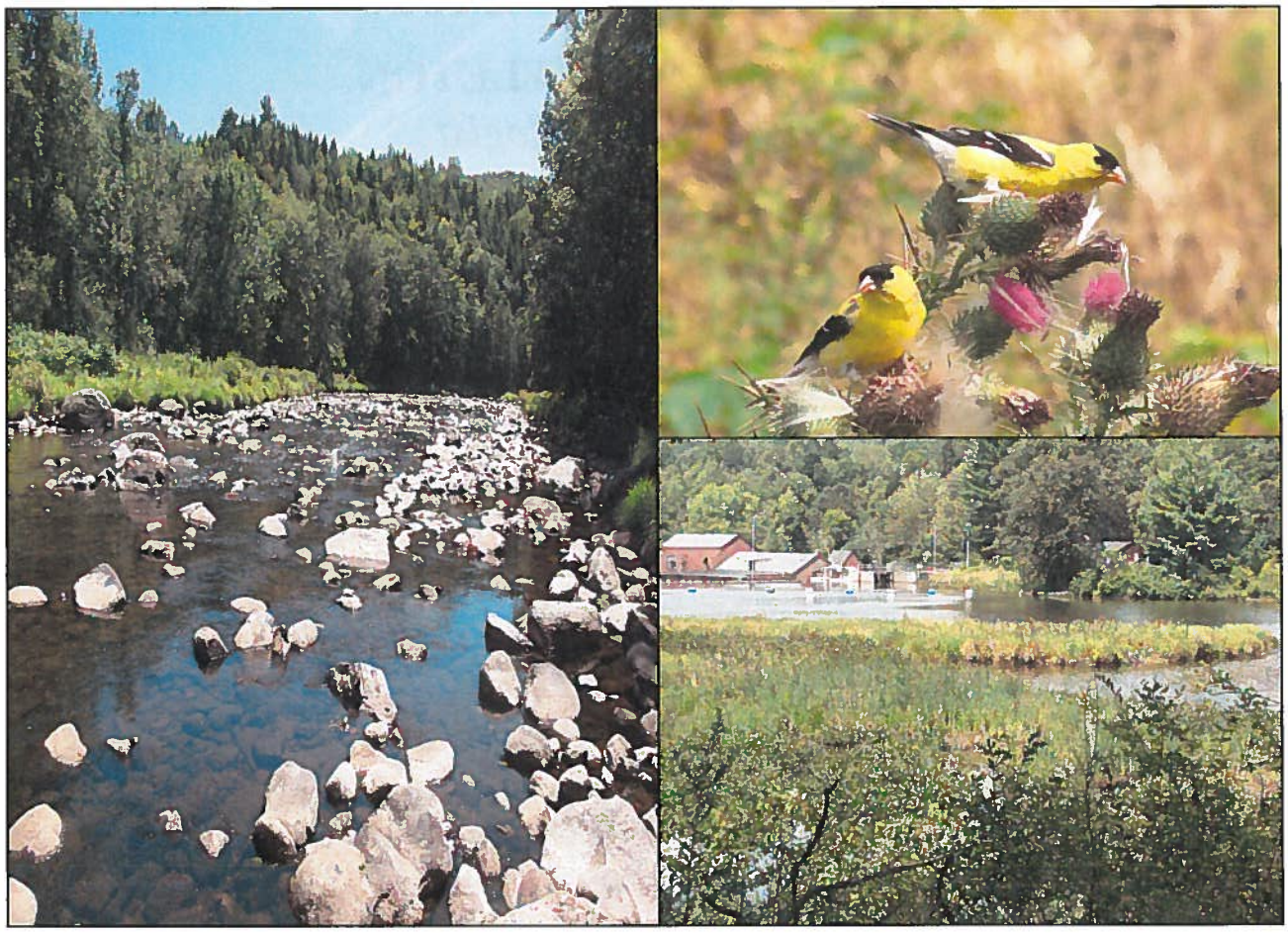
CITY OF CLAREMONT
NATURAL RESOURCES INVENTORY

Wetlands, Wildlife, and the Working Landscape

Prepared for:
City of Claremont Planning and Development
and
Claremont Conservation Commission



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INTRODUCTION

Population Growth and Development

Currently, New Hampshire's population is growing at a rate that is twofold that of the other New England states. The population has doubled in the forty years leading up to the turn of the century in 2000, and there was a rise in population of 17.2% between 1990 and 2004 alone. This rate of growth is followed by VT (10.4%), RI (7.7%), ME (7.3%), MA (6.7%), and CT (6.7%). Furthermore, it has been projected that the state will experience an increase of 23% from 1997 to 2020. New Hampshire's development pressure will tax the state's natural resources if not managed with diligence.

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

Natural Resources and Land Use Planning

One of the first steps in planning for growth and development is to conduct a natural resources inventory (NRI). This effort helps to better understand what natural resources are within a town and where they are located. As such, an NRI is a list and description of the natural elements found within and adjacent to a town (or even a watershed or larger region). These can include such elements as wetlands, aquifers, ponds, rivers, forests, wildlife, plants, soils, and wildlife. These data can be created from existing sources or from field-based assessments to better reflect the extent of natural resources within a community.

New Hampshire statutes mandate that communities shall create an NRI. This is generally the responsibility of the local Conservation Commission, whose purpose is "for the proper utilization and protection of natural resources and for the protection of watershed resources" of the town. In particular, RSA 36-A:2 continues to state that "Such commission shall conduct researches into its local land and water areas [and] ... shall keep an index of all open space and natural, aesthetic or ecological areas within the city or town ... with the plan of obtaining information pertinent to the proper utilization of

such areas, including lands owned by the state or lands owned by a town or city. It shall keep an index of all marshlands, swamps and all other wetlands in a like manner…"

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

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

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

This form of land use planning is not a static directory but one that is ever-changing. It is a vision that should be based on the principles of conservation biology and incorporates the current ecological structure of a given area (such as a town, a watershed, or an entire region). Thus, conservation planning strives to incorporate the socio-economic fabric of our world with that of the ecological structure. This effort can help

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

build more sustainable, more resilient New Hampshire communities into the future as a result of implementing comprehensive land use planning that includes our natural environment and built infrastructure.

The need for this type of informed land use planning is becoming more evident. Ecosystems and their constituents have long been susceptible to long-term degradation from overexploitation and misuse of natural resources. This has led to a precipitous decline in several species, some even resulting in extinction altogether. It has also led to the loss of critical habitats. While the past few decades certainly have seen a positive change in resource management and protection, there has been a distinct rise in conservation planning efforts within the 21st century, especially in New Hampshire.

Statement of Purpose

The Claremont Natural Resources Inventory (NRI) was initiated in June 2012. The overall scope of this project was to develop an enhanced NRI to support the City of Claremont's natural resource protection efforts and provide a basis for informed land use planning. Goals of the project included 1) refined mapping and evaluation of wetlands, 2) assessment of focal species to better understand habitat connectivity, 3) refined mapping of the NH Fish and Game Wildlife Action Plan habitats, 4) identification of other significant ecological features, such as vernal pools, exemplary natural communities, and species of conservation concern, and 5) identification of ecologically significant areas. To help achieve these goals site assessments were conducted on various City-owned lands and roadside surveys. Aerial photography interpretation was also conducted to refine various data, including wetlands and wildlife habitats.

As such, the NRI directly addresses Goal #1 in the Natural Resources chapter of the Claremont Master Plan, as follows:

Goal #1: Natural Resources Inventory

Recommendation: Create an inventory to support the City of Claremont's objectives for natural resources protection and provide a basis for informed land use planning.

Objective 1: Provide a framework document that highlights the natural infrastructure to support numerous facets of municipal planning.

Objective 2: Emphasize providing new natural resources information, as opposed to the dissemination of existing information.

Objective 3: Provide a wetlands component that will lend itself to support a multi-tiered priority process.

A great blue heron hunting amongst the pickerel weed in the Sugar River near the Coy Paper Dam. This area provides good habitat for waterfowl, even during migration.

WATER RESOURCES

Water resources represent some of our most fragile ecosystems and are particularly sensitive to certain types of land use. Water resources comprise a variety of natural features, which include both surface water and groundwater resources. Such features include our streams and rivers, ponds and reservoirs, wetlands, and aquifers. In terms of their importance, these resources provide a variety of ecological functions and societal values, including:

- Water quality maintenance
- Flood control
- Wildlife and fisheries habitat
- Drinking water sources
- Recreation
- Visual quality and aesthetics
- Rare and endangered species habitat and natural communities
- Groundwater recharge and discharge
- Shoreline stabilization
- Educational and scientific value
- Overall biological diversity of Claremont

Surface Water Bodies

Claremont contains a variety of surface water bodies, including rivers, streams, ponds, and reservoirs, that are distributed throughout the City (Map 1). These natural resources were mapped using existing digital data with the exception of reservoirs and ponds, which were refined as part of the wetlands comparative evaluation (discussed below) using aerial photography interpretation and topography (2-foot contour intervals provided by the City). Not only do water bodies provide a multitude of human benefits such as fishing, hunting, boating, swimming, and nature watching, they are also extremely significant for diverse wildlife and plants that depend upon these resources for part or all of their life cycle needs. Generally, major threats to water resources include

potential water quality degradation and habitat loss due to surrounding land uses, including unsustainable forestry and agricultural practices and land conversion associated with various types of developments.

Reservoirs and ponds in Claremont cover approximately 104 acres, including five named water bodies, ranging in size from 4.7 acres to 40 acres (Table 1). These water bodies have been recognized and labeled as such by the NH Dept. of Environmental Services and/or the US Geological Survey. Four of the waterbodies are included on the NH Dept. of Environmental Services Consolidated List of Water Bodies subject to the Shoreland Water Quality Protection Act under RSA 483-B. An additional 75 ponds, totaling 29.8 acres, have also been identified as part of the refined wetlands mapping effort. These are rather small waterbodies (average size = 0.4 acres), ranging in size from 0.4 acres to 4 acres. Most of these ponds appear to be functioning for agricultural purposes or recreation for landowners.

Table 1. Summary of reservoirs and ponds in Claremont.

Water Body Name	Size (acres)
Dole Reservoir	9.2
Rice Reservoir	11.2
Whitewater Brook Reservoir	16.9*
Coy Paper Dam	40
Chapin Pond	12.1^
Unnamed Ponds	29.8

SOURCE: USGS topography, GRANIT hydrogrpahy datasets, NH DES RSA 483-B, and Moosewood Ecological LLC.

Water bodies in **bold type** are jurisdictional designations by NH DES and subject to the Shoreland Water Quality Protection Act under RSA 483-B.

* = 4.7 acres are located within Claremont
^ = 9.3 acres are located within Claremont

Fitch Reservoir is one of three active public water supplies in Claremont. Fitch Reservoir not only provides humans with an important resource but it also attracts various wildlife. Mink, bear, raccoon, deer were observed using the property, as well as a variety of birds, including a vesper sparrow. However, it seems unlikely that this species of conservation concern would be observed in the breeding season due to habitat availability.

Approximately 164 miles of rivers and streams have been mapped in Claremont (Table 2). Fifteen of these water bodies have been identified by the U.S. Geological Survey by name. Of the many rivers and streams, two are included on the NH DES Consolidated List of Water Bodies subject to the Shoreland Water Quality Protection Act under RSA 483-B, including the Connecticut River and Sugar River.

Table 2. Summary of rivers and streams in Claremont.

Water Body Name	Length (miles)
Connecticut River	7.7
Sugar River	10.7
Granby Stream	3.9
Gully Brook	1.6
Hubbard Brook	1.1
Meadow Brook	2.0
Ox Brook	1.5
Quabbinnight Brook	1.9
Ram Brook	0.2
Redwater Brook	7.8
Smith Brook	0.6
Spring Farm Brook	1.5
Stevens Brook	3.4
Walker Brook	4.0
Whitewater Brook	0.4
Other Streams	115.7

SOURCE: USGS topography and GRANIT hydrogrpahy datasets.

Watercourses in **bold type** are jurisdictional designations by NH DES and subject to the Shoreland Water Quality Protection Act under RSA 483-B.

The Sugar River provides multiple recreational opportunities for the community and an excellent habitat that greatly contributes to Claremont's biological diversity. It most likely provides a critical flyway for migratory birds as they disperse along the Connecticut River.

The Shoreland Water Quality Protection Act (RSA 483-B) is a state statute that was prepared to protect water quality for designated public waters. The Act establishes minimum standards for various setbacks from the reference line based on land use within the designated 250-foot buffer. For most new construction, as well as land excavating and filling, a state permit may be required (certain exemptions apply). As such, all great ponds (>10 acres), fourth order streams or higher, and state-designated rivers have been identified by the NH Dept. of Environmental Services as those water bodies that are subject to the Act.

For more details on the Act, as well as certified administrative rules, refer to the NH DES at http://des.nh.gov/organization/divisions/water/wetlands/cspa/index.htm

Wetlands Comparative Evaluation

Wetlands generally include familiar places such as marshes, wet meadows, beaver impoundments, swamps, fens, bogs, and other surface water bodies. As noted above, they perform a variety of ecological functions and values that benefit humans. They also serve as significant habitats for wildlife and plants. In New Hampshire, wetlands are defined by RSA 482-A:2 as "an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soils conditions." They are further defined by three particular elements, including hydrophytic vegetation, hydric soils, and wetlands hydrology. As such, wetlands are regulated by the NH Dept. of Environmental Services Wetlands Bureau as defined in RSA 482-A:2.

To better understand the distribution of wetlands and the functional roles that they perform in our society a city-wide wetlands comparative evaluation was conducted using the Method for Inventorying and Evaluating Freshwater Wetlands in New Hampshire (Stone and Mitchell 2011), also referred to as the "NH Method." The general approach of this method is to evaluate wetlands on the basis of their *functional value*, that is, the value that they hold for human society in improving and maintaining quality of life.

The overall purpose of this evaluation was to provide a better sense of both the location and the characteristics of the wetlands within Claremont. The fact that a *comparative* method was employed suggests that the reader has great latitude in placing a higher or lower value on a particular wetland under scrutiny. As is described below, the intention is to allow for a comparison of wetland *functions*, and not an overall value that a wetland received as a whole. This report serves to engender an understanding of the reasons *why* a particular wetland can serve a particular function better than others, as well as what it uniquely contributes to a given area of the city.

The NH Method arose out of an increasing need to adequately understand and evaluate wetland resources in the state of New Hampshire. Adopted from the Method for Evaluation of Inland Wetlands in Connecticut developed by Al Levere and Alan Ammann, it was initiated and supported by the Wetlands Studies Project of the Audubon Society of New Hampshire under the guidance of Amanda Lindley Stone. A tremendous amount of research and field testing went into both the parent edition in Connecticut, as well as the current methodology used in New Hampshire, which was revised in 2011. The primary objective of the written work was that it be understandable by the general public; however, contrary to many of the current methods of wetland evaluation available to consulting scientists and researchers, this guide has successfully provided a manual of broad appeal for the lay person.

The fundamental tenet of this methodology is that it identifies various functions of wetlands and assigns a value to those functions. For the purpose of this work, a "function" is defined as what the wetland does (e.g., provides wildlife habitat, improves water quality) and a "value" is the evaluation of how important a particular function is. The NH Method is a rapid assessment that asks a set of questions that are answered using field assessments or remote spatial data (e.g., aerial photography) in a geographic information system (GIS). The accuracy of the assessment is dependent on the theoretical knowledge of the observer regarding the abiotic and biotic factors that influence the "field indicators" observed.

The goal of the evaluation was to better understand wetlands as they relate to ecological health, wildlife habitat, water quality, and flood control. As such, eight functions were chosen from the NH Method for the evaluation. These included

Ecological Integrity, Wetland-Dependant Wildlife Habitat, Fish and Aquatic Habitat, Flood Storage, Groundwater Recharge, Sediment Trapping, Nutrient Trapping/Retention/Transformation, and Noteworthiness (which assesses the uniqueness of a wetland). Within each function a select group of questions were chosen that could be answered using remote spatial data in a GIS. Overall, a total of 41 questions were scored for each wetland evaluated.

The National Wetlands Inventory (NWI) that was developed by the US Fish and Wildlife Service is the most readily available existing dataset for mapping wetlands for a particular area. The NWI project began in the late 1970s and complete coverage of the state was completed in 1991. However, the NWI contains various inaccuracies and wetlands have changed over the past 20 years. Other existing data was also used to better understand the extent of wetlands, including USDA hydric soils, 2001 satellite imagery, and refined surface waters provided by the City of Claremont. As with the NWI, these data also have inaccuracies.

A major effort put forth as part of the Claremont NRI was to revise the wetlands data layer to better reflect the true extent of Claremont's wetlands. This revised data was achieved using 2010 aerial photography interpretation in combination with the above existing spatial data sources. Discernible wetlands were mapped as entire systems. No attempt was made to adjust boundaries between the existing Cowardin (1979) system of wetland classification used by the NWI. As part of this mapping process wetlands were field-checked to the extent possible using a combination of roadside surveys and limited on-site assessments of selected properties.

A total of 358 wetlands were mapped, covering approximately 595 acres, or 2% of Claremont (Map 1). The average wetland size was 1.6 acres, ranging from 0.01 acres to 63.9 acres. Nearly 86% of these wetlands were less than 2 acres. As a result there was an additional 145 wetlands mapped, resulting in an increase of approximately 45%.

Of the 358 wetlands, a total of 146 were identified for the comparative evaluation. This level of effort resulted in the evaluation of almost 510 acres of wetlands, or roughly 85% of wetlands coverage in Claremont. Small, human-modified ponds and reservoirs were excluded from the evaluation, as well as wetlands less than half an acre. Using the eight functions noted above each wetland was ranked as having high, moderate, or low

functional value (Table 3 and Map 2). See Appendix A for wetland scores for all functions evaluated.

Table 3. Summary of the wetlands comparative evaluation.

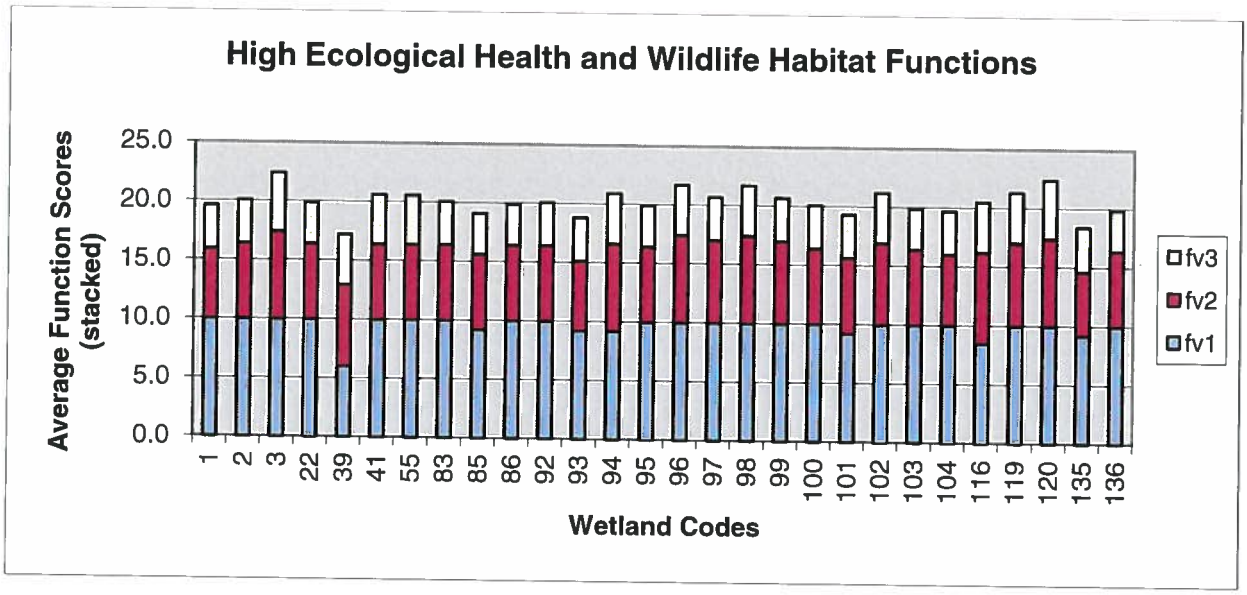
Functional Ranking	Count	Size (acres)	Average (acres)	Maximum (acres)	Minimum (acres)
High Value	37	238.4	5.8	63.8	0.5
Moderate Value	73	215.3	2.6	29.1	0.5
Low Value	36	54.1	1.4	7.4	0.5

SOURCE: Moosewood Ecological LLC (2013).

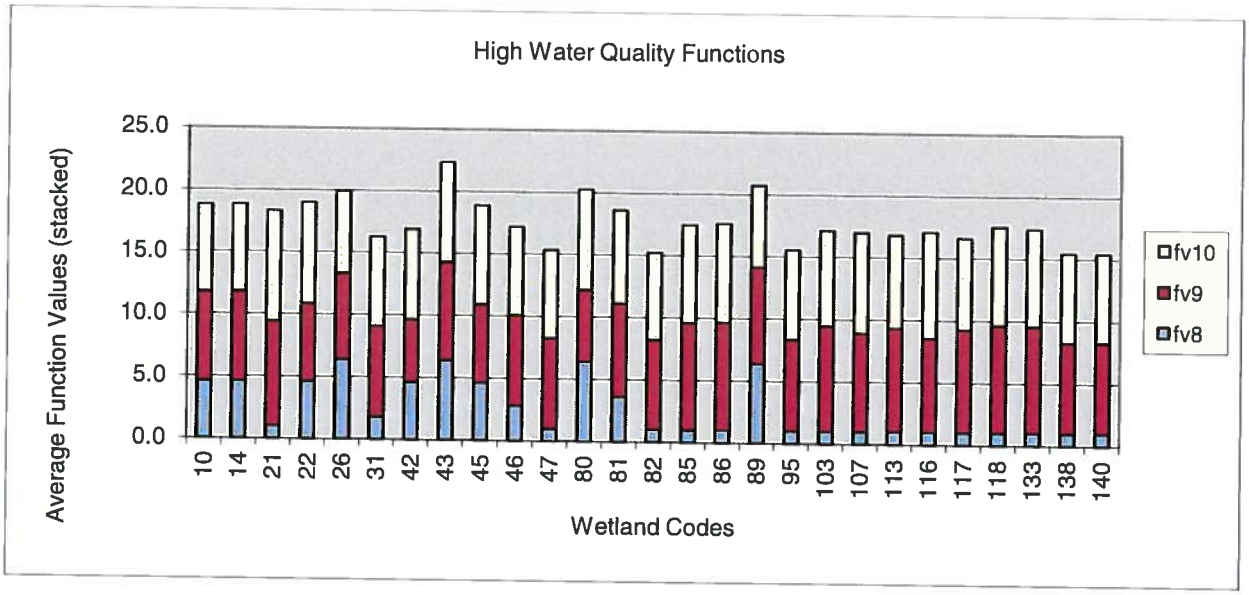
The wetlands functional ranking can be used in a variety of land use efforts. One of the main uses can be to prioritize wetlands for conservation. Wetlands with an overall high value can be evaluated by the City when working with willing landowners for natural resources protection (e.g. conservation easements). Other protection efforts may include land use regulations and the identification of wetland mitigation efforts in the City. Likewise, low value wetlands may offer opportunities for wetlands restoration projects.

While the wetlands ranking includes an overall value for the functions scored high value wetlands can also be identified using a single function or combination of certain functions. The following scenarios demonstrate ways to identify highly valued wetlands based on 1) ecosystem health and wildlife habitat, 2) water quality, and 3) flood control, respectively.

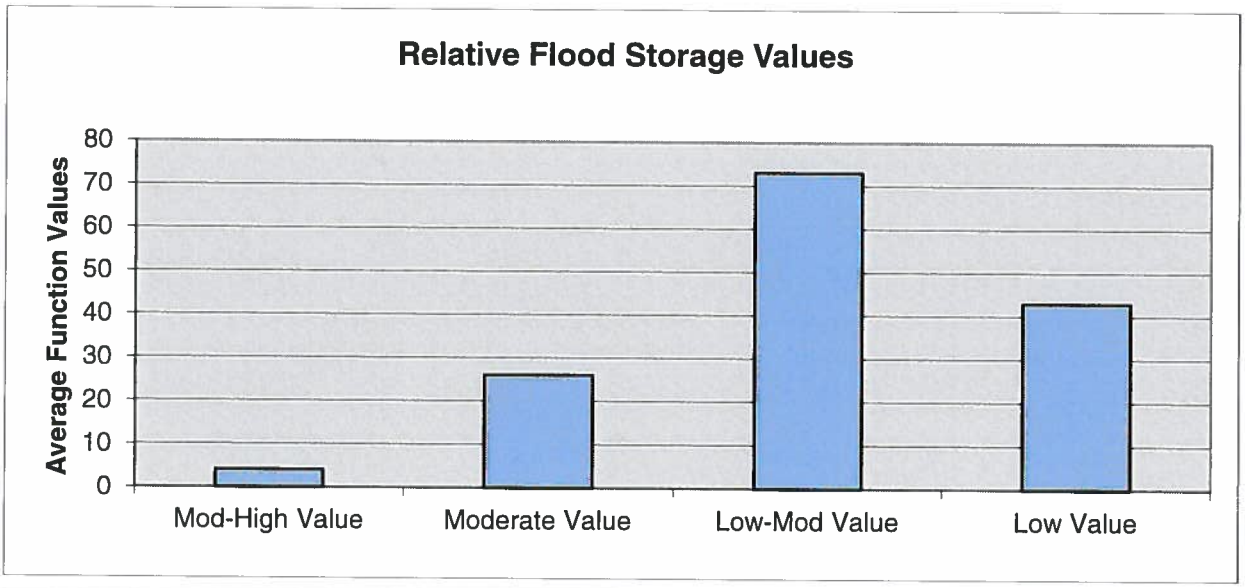
1. If the goal is to better understand those wetlands that exhibit high functionality for maintaining the health of the ecosystem and wildlife habitat values then one could use the scores for Ecological Integrity (functional value 1), Wetland-dependant Wildlife Habitat (functional value 2), and Fish and Aquatic Life Habitat (functional value 3). Based on the comparative evaluation the following graph shows the highest quality wetlands for the combination of these functions.

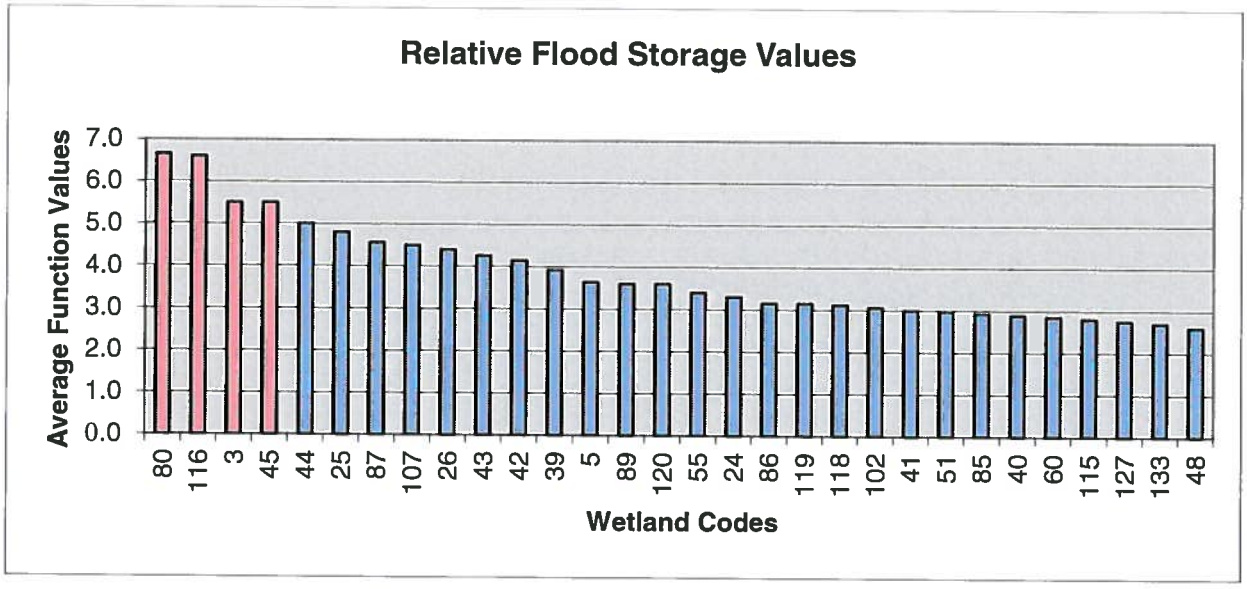


2. If the goal is to better understand those wetlands that exhibit high functionality for maintaining water quality then one could use the scores for Groundwater Recharge (functional value 8), Sediment Trapping (functional value 9), and Nutrient Trapping/ Retention/Transformation (functional value 10). Based on the comparative evaluation the following graph shows the highest quality wetlands for the combination of these functions.



3. If the goal is to better understand those wetlands that exhibit high functionality for flood storage then one could use the scores for Flood Storage (functional value 7). Based on the comparative evaluation the following graphs show the highest quality wetlands for this function. The first graph shows the overall value for all wetlands to help with flood storage, while the second graph shows those wetlands that have moderate-high value (pink) and moderate value (blue) for flood storage.





This large wetland complex was among the highest ranked wetlands in Claremont. It is located on city-owned properties and is bisected by Grissom Lane. It has relatively high functionality for sediment and nutrient trapping and has moderate flood storage capabilities. This wetland complex also contains an exemplary natural community (red maple-black ash swamp).

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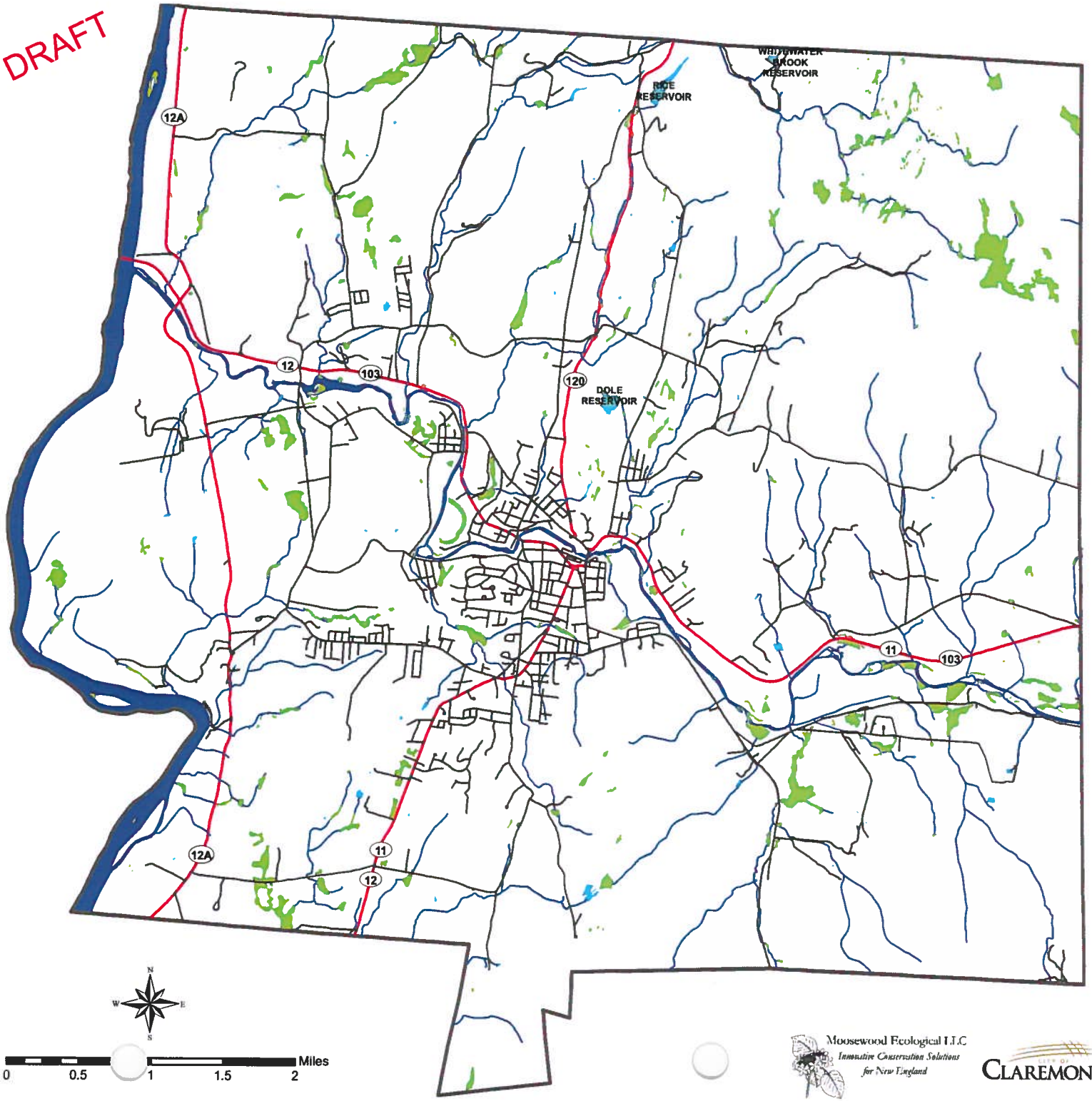

Wetlands and Water Bodies
City of Claremont, NH
Map 1

Legend

- Wetlands
- Ponds and Reservoirs
- Streams
- Rivers

Roadways

- Town Roads
- State Roads

Note: Streams include both perennial (year-round) and intermittent streams.

Data Sources:
Refined wetlands, ponds and reservoirs developed by Moosewood Ecological, 2013, based on 2010 aerial photography, distributed by NH GRANIT. Streams and rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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CLAREMONT

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Map created by UVLSRPC, January 2013

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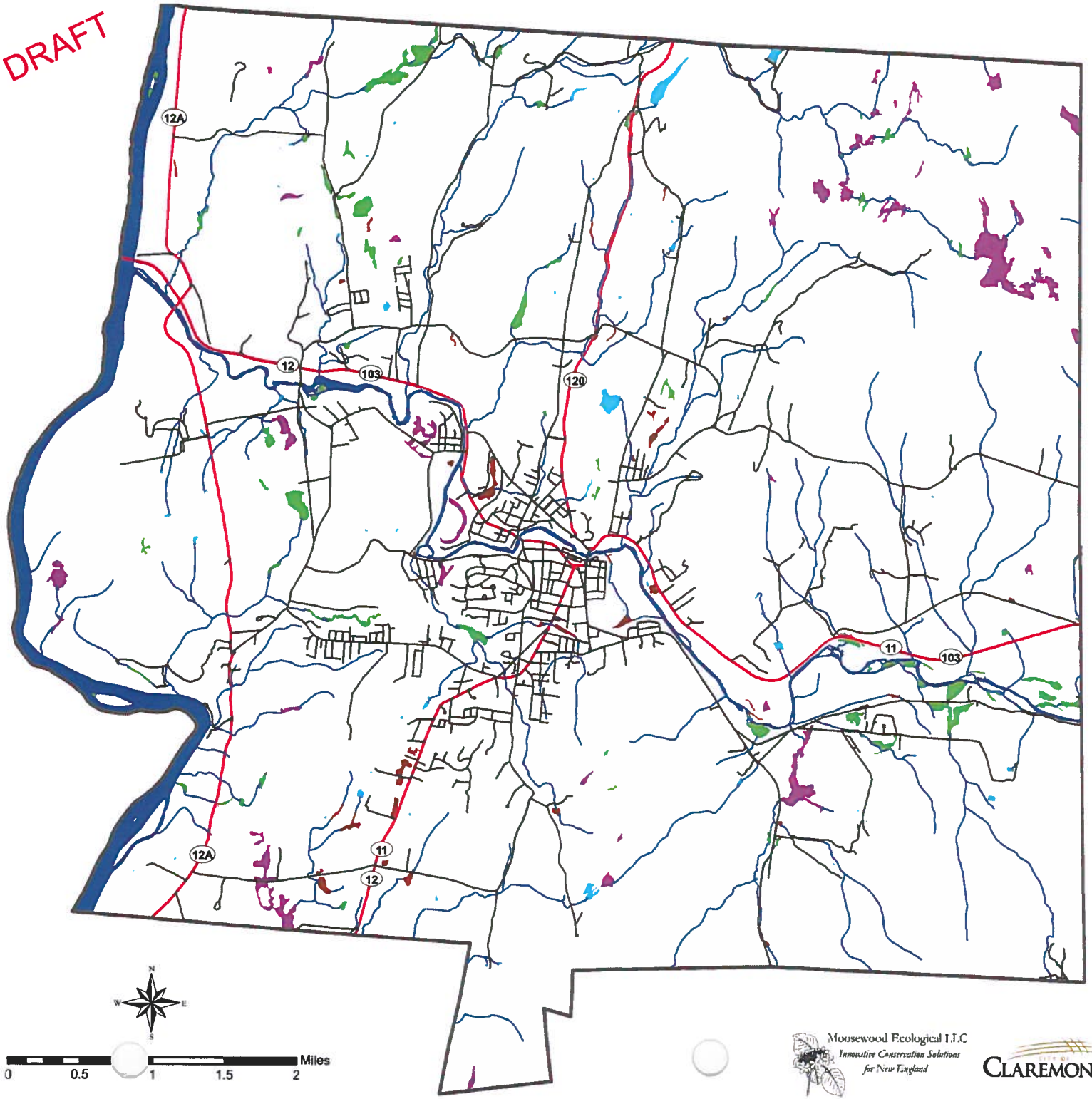

Wetlands Evaluation
City of Claremont, NH
Map 2

Legend

Wetlands

- High Ranking
- Medium Ranking
- Low Ranking
- Ponds and Reservoirs
- Streams
- Rivers

Roadways

- Town Roads
- State Roads

Note: Streams include both perennial (year-round) and intermittent streams.

Data Sources:
Wetlands ranking and refined wetlands, ponds and reservoirs developed by Moosewood Ecological, 2013, based on 2010 aerial photography, distributed by NH GRANIT. Streams and rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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CLAREMONT

UPPER VALLEY LAKE SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

Groundwater Resources - Stratified Draft Aquifers

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

Claremont contains approximately 6,352 acres of stratified drift aquifers (Table 4 and Map 3). The largest contiguous aquifer is located along the Sugar River and Connecticut River, as well as their associated wetlands, totaling 6,198 acres. The other location is found along Redwater Brook.

Aquifers are divided into categories based on *transmissivity*, or the rate at which water moves through an aquifer and is measured in square feet per day (ft^2/day). Therefore, higher rates of transmissivity correspond to a potentially higher yield of groundwater. Most of the aquifers in Claremont have a transmissivity rate of 1,000ft^2/day or less, which corresponds to a potential yield of less than 75 gallons per minute. However, a few smaller areas are predicted to have a much higher yield.

While transmissivity takes into account the quantity of water moving through an aquifer system its does not reflect the quality of the source. To assist in addressing this issue and to identify potential future public water supplies for communities, the NH Dept. of Environmental Services and the Society for the Protection of NH Forests prepared a Potential Favorable Gravel Well Analysis (PFGWA). This technique analyzed stratified drift aquifers, affording the opportunity for town planners and water suppliers to determine quantity and quality constraints on aquifers. In doing so, the PFGWA buffers out all known and potential contamination sources and examines potential well yield to identify the most suitable areas for potential community wells. In effect, this effort is encouraging communities to take proactive measures at protecting their most significant groundwater resources. As such, the higher yielding aquifers along the Connecticut River

and Sugar River have been identified by the PFGWA. It was estimated that these sites could produce approximately 75 to 150 gallons per minute.

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

Groundwater Attribute	Size (acres)	% of Town
Stratified Drift Aquifers	6351.7	22.5
Favorable Gravel Well Analysis		
75 Gallons/Minute	139.5	0.5
150 Gallons/Minute	162.2	0.60

Source: USGS stratified drift aquifers (GRANIT 2000) and NH DES favorable gravel well analysis (2011).

This wetland complex is associated with the Quabbinnight Brook, a tributary of the Sugar River. Surrounded by farmland, it can easily be viewed from Mountain Rd. and Minkler Rd. This wetland is the fourth largest in Claremont. It has relatively high functionality for maintaining water quality and for its flood storage capabilities. It is located over a large stratified drift aquifer and within an area that has been identified as potential site for a future water supply. This was mapped by the NH Dept. of Environmental Services as part of their potential favorable gravel well analysis, which identified areas on a state-wide basis that could possibly serve as a community water source, if needed. This analysis basically assessed aquifers with high yields and good water quality.

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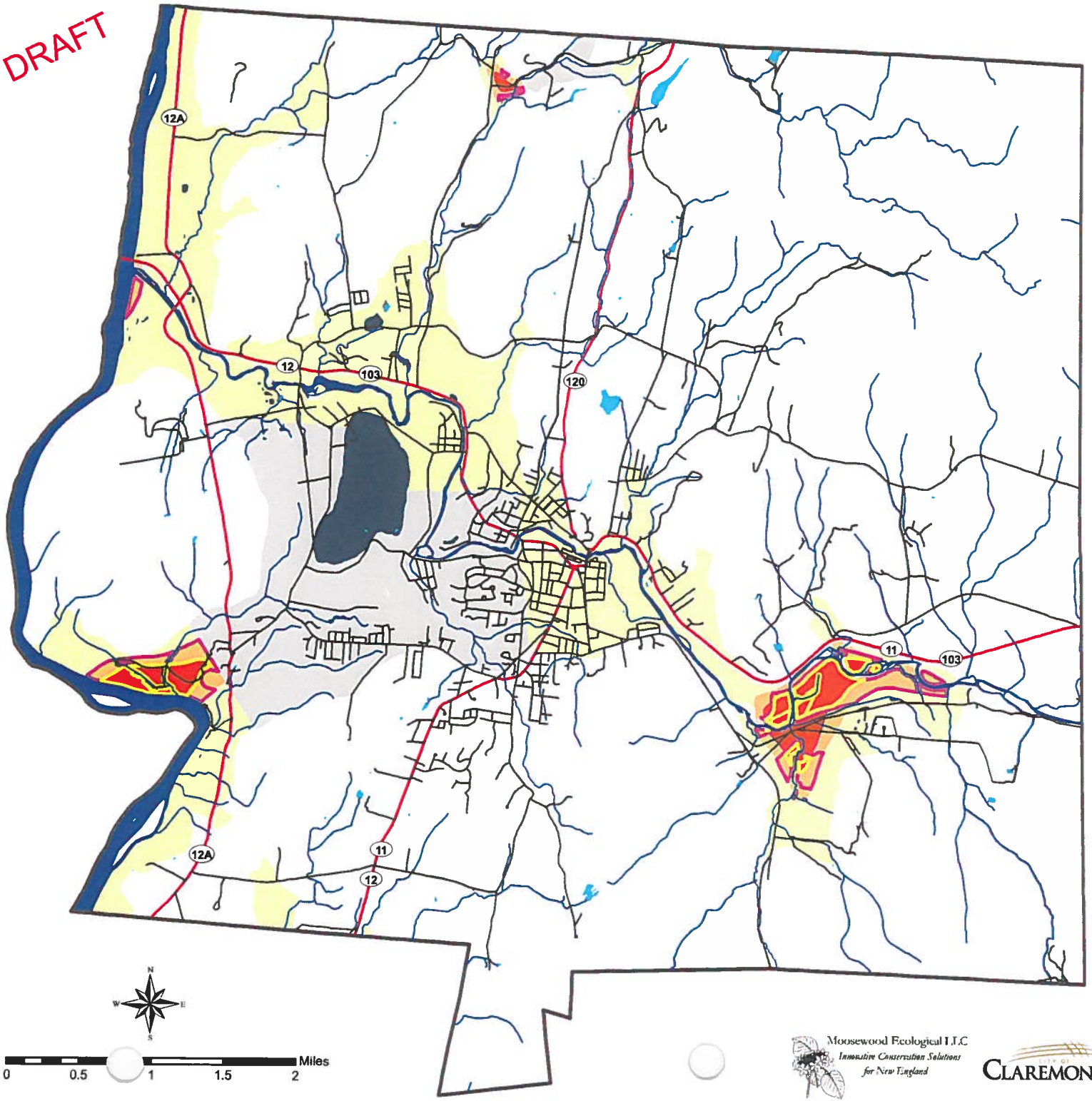

Groundwater Resources
City of Claremont, NH
Map 3

Legend

Potential Community Well Area

- 150 gpm
- 75 gpm

Potential Well Yield of Aquifers

- 150 - 300 gpm
- 75 - 150 gpm
- less than 75 gpm
- non-transmissive
- undefined
- Ponds and Reservoirs
- Streams
- Rivers

Data Sources:
Aquifers mapped by U.S. Geological Survey, 1992. Potentially favorable community well areas, NH Department of Environmental Services, 2011. Streams and rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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CITY OF CLAREMONT

UPPER VALLEY LAKE SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

WILDLIFE RESOURCES

Wildlife Habitats

The NH Fish and Game Department, in cooperation with other agencies, organizations, and individuals, produced the NH Wildlife Action Plan (WAP) in 2005 (habitats revised 2010). This document was designed as a planning and educational tool for federal, state, and municipal governing bodies, conservation commissions, land trusts and other conservation organizations, and private landowners, as well as the general public, to promote the conservation and management of NH's biological diversity. The WAP provides a resource for developing informed land use decisions and land management planning. The intent was to ensure an adequate representation of various wildlife habitats are maintained across our landscape, keeping common species common in NH and working to prevent the loss of our rare and endangered species.

The WAP identified approximately 11 different types of large and medium-scale wildlife habitats for Claremont in their revised habitat mapping in 2010. However, since these habitats were based on models they only *predict* where these habitat types may be present and ground-truthing is essential to better understand the extent of habitats. As such, the WAP habitats were refined based on 2010 aerial photography interpretation in combination with roadside surveys and site assessments on City-owned lands. This resulted in the elimination of certain habitat types and the addition of others. It also represents a more representative effort at understanding the true extent of wildlife habitats located within Claremont.

A total of eight wildlife habitats as recognized by the WAP were mapped for Claremont (Table 5 and Map 4). Habitats that were eliminated included pine barrens, cliffs, and Appalachian oak-pine forests since evidence of these habitat types were not observed. The pine barrens and cliffs were mapped in very discrete areas. As such, there is high confidence that these habitats do not exist in the locations as predicted by the WAP. However, the WAP predicted that Appalachian oak-pine forests were more widespread in the western part of the City. Evidence of this forest type was not present from roadside observations. However, it is possible that it may be present in small patches in the unfragmented block west of Route 12A and south of the confluence of the

Sugar River and Connecticut River. Site investigations within this area would need to be performed to confirm its presence or absence.

Additional habitats recognized but not mapped in the WAP included potential vernal pools and shrublands. These habitats are predicted to be more widespread throughout Claremont and are best mapped during ground-truthing exercises. Mapping of these important wildlife habitats was beyond the scope of the WAP. However, they do recognize their importance for wildlife diversity.

Table 5. Summary of wildlife habitats in Claremont.

Wildife Habitat Type	Size/Count	% of Town
Marsh and Shrub Wetlands	391 acres	1.4
Peatlands	19.4 acres	0.1
Vernal Pools	30 pools	n/a
Floodplain Forests	403.8 acres	1.40
Ponds and Reservoirs	104.2 acres	0.4
Rivers and Streams	164 miles	n/a
Lowland Spruce-Fir Forests	397.6 acres	1.4
Northern Hardwood-Conifer Forests	980.4 acres	3.5
Hemlock-Hardwood-Pine Forests	19254.7 acres	68.2
Ridge or Talus Slopes	155 acres	0.60
Shrublands	226.4 acres	0.80
Grasslands	3146.2 acres	11.2

Source: Refined wildlife habitats (Moosewood Ecological 2013) and NH hydrography (GRANIT 2006).

Vernal pools supply critical habitat for a variety of species. Amphibians such as spotted salamanders and wood frogs need these pools to complete their life cycles. In early spring they emerge from their winter habitats and migrate to vernal pools for breeding. During April and May one can easily view their egg masses, which are usually attached to live plants or twigs just beneath the water surface. After breeding, the adults leave the pools, retreating back to their upland habitats. These egg masses can serve as a critical food supply for wildlife, including the rare Blanding's turtle. Aquatic macroinvertebrates also need vernal pools for survival, such as fairy shrimp and fingernail clams.

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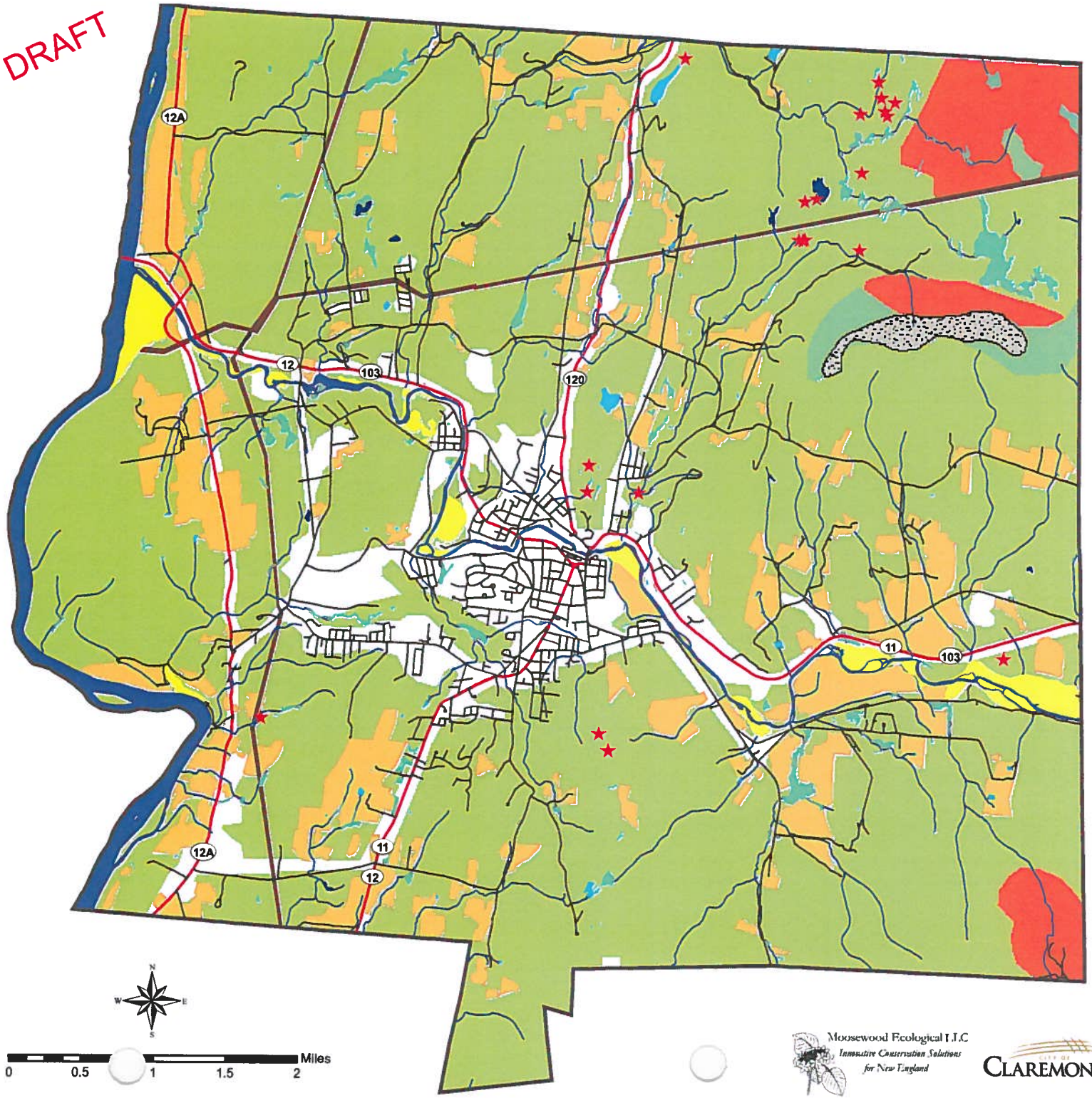

Wildlife Habitat Types
City of Claremont, NH
Map 4

- Potential Vernal Pools
- Peatland
- Wet Meadow/Shrub Wetland
- Floodplain Forest
- Grasslands
- Shrublands
- Rocky ridge or Talus slope
- Lowland spruce-fir
- Northern hardwood-conifer
- Hemlock-hardwood-pine
- Developed land

Data Sources:
Potential vernal pools mapped by Moosewood Ecological, 2013, using 2010 aerial imagery and 2012 field assessments. Wildlife habitat types updated by Moosewood Ecological, 2013, using 2010 aerial imagery and 2010 release of Wildlife Action Plan from NH Fish and Game Department. Streams and rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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CLAREMONT

UPPER VALLEY LAKE SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

Focal Wildlife Assessment

Focal species included bear, bobcat, moose, river otter, mink, beaver, birds of prey, leopard frog, and wood turtle. These species were identified to act as surrogates to better understand connectivity, habitat quality, and long-term viability of wildlife habitats in light of the effects of fragmentation and land use patterns. In essence, it helps to get a sense of the relative ecological integrity, or health, within Claremont.

A total of seven focal species were observed throughout Claremont (Map 5). These included bear, moose, river otter, mink, bald eagle, red-tailed hawk, and sharp-shinned hawk. An additional focal species, beaver, was observed in Cornish on the city-owned Whitewater Reservoir property. Of these, sign of moose was the most frequently documented. Six out of the seven focal species observed were located in the Cat Hole area located in the northeast part of Claremont. The presence of greater species diversity in the area was expected based on the variety of wildlife habitats available within the largest unfragmented block in Claremont.

Sign of moose was observed on four city-owned properties, including Arrowhead Forest, Industrial Area Forest, Cat Hole Road Forest, and Whitewater Reservoir. Sign was most abundant on the latter two properties. They are located within the largest unfragmented block in Claremont, and associated with a much larger forested block (48,723 acres) that extends north and east. Moose require large, remote forests with embedded wetlands and can travel long distances in search of food. The Cat Hole area provides the best, high quality habitat and connectivity for moose with its intact forest communities and diverse concentration of numerous wetlands. The other two areas provide limited habitat for moose but do afford decent connectivity possibilities with areas to the south.

Like moose, bear require large areas of intact forests with diverse wetland complexes. They can serve as an umbrella species, whereas protecting prime bear habitat will also protect habitat for a wide variety of species. Bear sign was observed in the Cat Hole area, which provides excellent habitat and a multitude of food sources. Bear sign was also observed next to Fitch Reservoir.

River otter was only observed in one locale in Claremont, particularly along the Connecticut River. It is suspected that this species is more widespread in Claremont,

including such areas as the wetlands and tributaries in the Cat Hole area and relatively undisturbed parts of Sugar River and other streams. Unlike mink, river otters prefer habitats with little to no human presence, resulting in intact riparian buffers. They are strongly associated with beaver, which was only observed on the city-owned Whitewater Reservoir property in Cornish.

American mink are more tolerable of humans than river otter. Mink tracks were observed at Rice Reservoir, Sugar River at Riverside Park, and along a stream associated with the Industrial Area Forest. If an adequate supply of aquatic wildlife is present mink is expected to be found in most parts of Claremont, especially along well-shaded streams with intact riparian areas.

Three birds of prey were observed throughout the City, including red-tailed hawk, bald eagle, and sharp-shinned hawk. The presence of these species can indicate productive habitat for prey. While red-tailed hawks are more commonly found in more open areas sharp-shinned hawks (known as a woodland hawk) generally reside in larger forested areas. This species was located in the southeast and in the Cat Hole area. The bald eagle was observed scanning the dammed area of Sugar River at the City-owned Twistback property. This area provides good habitat for waterfowl, a favored prey of bald eagles.

Abundant moose sign was found scattered throughout the Cat Hole property, including scat and signs of feeding. These old incisor scrapes were commonly found. Moose will often use their incisors to feed on the living tissue beneath the bark of red maples and striped maples.

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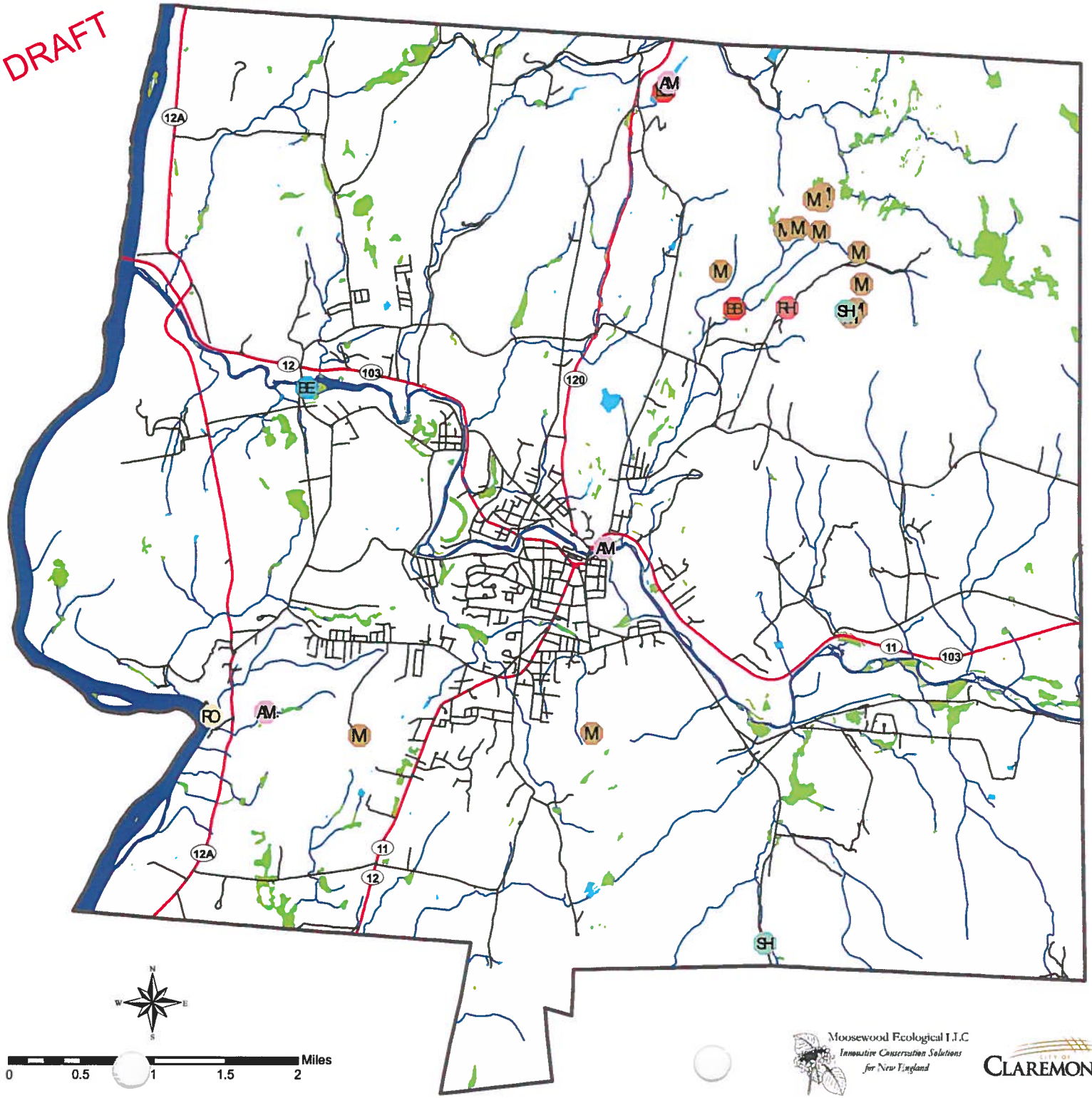

Focal Wildlife Species
City of Claremont, NH
Map 5

Legend

SPECIES

- BE Bald Eagle
- BB Black Bear
- AM American Mink
- M Moose
- RH Red-tailed Hawk
- RO River Otter
- SH Sharp-shinned Hawk
- Wetlands

Data Sources:
Focal wildlife species sightings mapped by Moosewood Ecological, 2012. Refined wetlands, ponds and reservoirs developed by Moosewood Ecological, 2013, based on 2010 aerial photography. Rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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CLAREMONT

UPPER VALLEY LAKE SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

Unfragmented Lands and Habitat Connectivity

Unfragmented lands are defined by the surrounding human infrastructure (roads and developed areas) and can negatively affect species survival rates, including mortality, lowered rates of breeding success, or species loss altogether. The degree of severity of fragmentation depends upon many aspects, such as the size and shape of unfragmented block, the species or community in question, the extent of loss of natural habitats, intensity of human use, and colonization of invasive species.

The NH Wildlife Action Plan (WAP) developed an unfragmented lands analysis. However, this data layer has inherent errors. As such, the unfragmented lands were revised to more accurately reflect Claremont's landscape (Map 6). For the purposes of this project, fragmenting features were defined as 500 feet on either side of existing roadways, including all state and town roads but excluding Class VI roads and trails, as well as private driveways. It is this area within 500 feet of roadways that most developments occur. Unfragmented blocks of land includes a variety of natural habitats such as forests, wetlands, streams, and ponds but also can include human-modified areas such as agricultural lands and shrublands.

Large blocks of unfragmented areas are widely known to support greater biodiversity than smaller blocks. As forest blocks become smaller due to the construction of roadways and developments their biodiversity will generally be reduced. This fragmentation affect has less immediate impact on generalist species or those with small home ranges (such as gray squirrels, raccoon, many amphibians, and small rodents) while affecting and potentially eliminating area-sensitive specialists that need large forested blocks in order to maintain their home ranges and for long-term survival (such as bear, bobcat, moose, some reptiles, wood thrush, and goshawk). Appendix C provides a general list for habitat block size requirements for wildlife to help illustrate this point.

Another function of large landscapes considers wildlife movement and habitat connectivity. By maintaining connectivity between critical habitats it may be possible to provide permanent wildlife corridors within the built environment. Wildlife travel corridors function as areas that one or many species may use to move from one habitat to another. This movement can be based on traveling to various areas for feeding, breeding, nesting, or shelter. Wildlife must be able to travel safely throughout the landscape in

order to meet their biological needs. Many depend upon a variety of habitats for their survival and may utilize many natural features for travel. These may include features such as riparian zones of wetlands, ponds, and streams, ridgelines, utility right-of-ways, and forest patches acting as a safe route between two or more habitats. A variety of wildlife can be associated with these corridors, including otter, muskrat, fox, coyote, bobcat, deer, moose, fisher, mink, and bear.

Wildlife corridors are not only significant for mammals but equally as important for amphibians, reptiles and migratory birds. Both amphibians and reptiles begin to move from their wintering habitats to their respective breeding and nesting grounds in the spring. This is the time of year that most mortality can be noticed as these species travel across roadways in search of suitable habitats. This affect can often be exacerbated as the same individuals must return back to their wintering habitats. Thus, there is a great significance in maintaining habitat connectivity, as well as understanding where these patterns of movement are taking place. This latter point can be a very important educational tool for community education and awareness about corridors across roadways. It can provide a means to adjust transportation patterns to help eliminate potential road mortality.

Based on the assessment of focal species and unfragmented lands in Claremont the Cat Hole area provides the most impressive, high quality habitats to support a wide diversity of wildlife. The presence of bear and moose points to this fact. It is suspected that many other focal species are likely present in this area, including beaver, otter, mink, and wood turtle. Winter mammal tracking can also be used to develop an even better understanding of habitat connectivity and quality, especially when assessing roadways crossings.

Land uses that continue to fragment Claremont's landscape, especially those on the outskirts of the city decreases quality, connectivity and long term viability of wildlife habitats and natural communities. Concentrating developments within the built environment and maintaining large unfragmented blocks can help to maintain connectivity, allowing species to continue to travel from habitat to habitat to meet their life cycle needs. Likewise, the use of appropriate culverts at steam crossings can help to maintain connectivity for aquatic-related species such as otter, mink, turtles, and fish.

The presence and rampant spread of invasive plants also has a major negative effect on habitats and communities. Invasive plants displace native species and decrease the ecological integrity of the landscape. Invasive plants are widespread in Claremont and were observed on all properties visited, as well as many locations along roads. Disturbance associated with developments, previous agricultural lands that have since become reforested, and forestry activities can exacerbate the spread of invasive plants unless managed properly.

The urban area of Claremont and various developments along NH Route 103 act as a major barrier for wildlife movement, inhibiting connectivity for many species. Routes 120, 11/12, and 12A also act as fragmenting features that can disrupt wildlife movement. However, the more rural areas of these roads most likely allow for habitat connectivity although they also contribute to road mortality. Moose and bear associated with the Cat Hole area are most likely moving north and east through the landscape, avoiding the more disturbed parts of Claremont to the south and west. Similarly, wildlife movement in the southeast quadrant of Claremont most likely flows south and east, whereas wide-ranging wildlife most likely will avoid the disturbed areas to the west and north. This does not suggest that you will not see these wide-ranging mammals near more disturbed sites but these areas do not provide for their long-term viability.

In general, the western part of Claremont, particularly between Route 12A and Routes 120 and 11/12 are prohibitive for wildlife movement due to the sheer number of roadways and smaller unfragmented blocks. Thus, habitat connectivity in this area has been negatively impacted. As noted above, this does not suggest that wildlife can't travel though parts of this portion of the City but the long term viability and quality of habitats have been degraded. Clearly, moose and mink are moving through the Industrial Area Forest but it does not provide habitat to sustain productive populations.

The Connecticut River and Sugar River most likely function as corridors for various species, including mink and river otter. However, sign of river otter is likely much less frequently observed along the more heavily disturbed riparian areas of Sugar River. The eastern and western sections of the river provide good habitat for aquatic-related wildlife.

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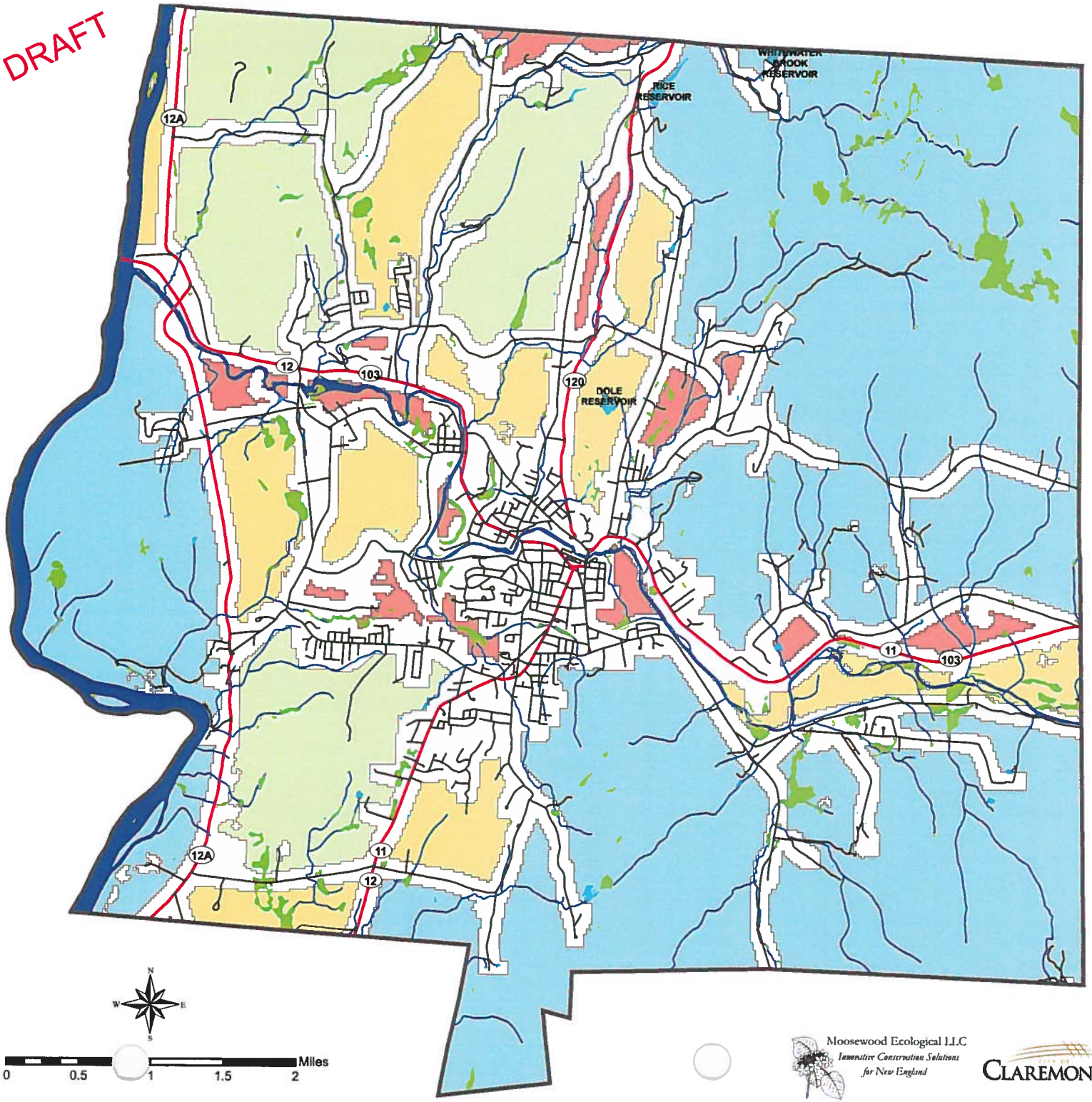

Unfragmented Lands
City of Claremont, NH
Map 6

Legend

Unfragmented Blocks

- < 100 acres
- 100 - 500 acres
- 500 - 1,000 acres
- > 1,000 acres
- Wetlands
- Ponds and Reservoirs
- Streams
- Rivers

Data Sources:
Ecologically significant areas developed by Moosewood Ecological, 2013, based on 2010 aerial photography and site assessments. Unfragmented blocks refined by Moosewood Ecological, sourced from NH Wildlife Action Plan. Refined wetlands developed by Moosewood Ecological, 2013, based on 2010 aerial photography. Streams and rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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CLAREMONT

UPPER VALLEY SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

AGRICULTURAL AND FOREST RESOURCES

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

Important Agricultural Soils

In response to the Farmland Protection Policy Act of 1981[2], agricultural soils were mapped by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Based on a variety of physical and chemical properties (i.e., drainage, texture, hydric regime, pH, erodibility factor), these soils have been identified as being among the most productive lands for many types of farming practices. These include prime farmland soils, farmland soils of statewide significance, and farmland soils of local significance. Each is defined below by the USDA NRCS:

Prime Farmland

- Soils that have an aquic or udic moisture regime and sufficient available water capacity within a depth of 40 inches to produce the commonly grown cultivated crops adapted to New Hampshire in 7 or more years out of 10.
- Soils that are in the frigid or mesic temperature regime.
- Soils that have a pH between 4.5 and 8.4 in all horizons within a depth of 40 inches.
- Soils that have either no water table or have a water table that is maintained at a sufficient depth during the cropping season to allow cultivated crops common to New Hampshire to be grown.
- Soils that have a saturation extract less than 4 mmhoc/cm and the exchangeable sodium percentage is less than 15 in all horizons within a depth of 40 inches.

[2] As defined by the USDA NRCS: "The Farmland Protection Policy Act of 1981 was established to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and to assure that Federal programs are administered in a manner that, to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland."

- Soils that are not frequently flooded during the growing season (less than a 50% chance in any year or the soil floods less than 50 years out of 100.)
- The product of the erodibility factor times the percent slope is less than 2.0 and the product of soil erodibility and the climate factor does not exceed 60.
- Soils that have a permeability rate of at least 0.06 inches per hour in the upper 20 inches.
- Soils, that have less than 10 percent of the upper 6 inches consisting of, rock fragments larger than 3 inches in diameter.

Farmland of Statewide Importance

These soils refer to land that is not prime or unique but is considered farmland of statewide importance for the production of food, feed, fiber, forage and oilseed crops. Criteria for defining and delineating farmland of statewide importance are determined by a state committee chaired by the Commissioner, New Hampshire Department of Agriculture, Markets and Food, with members representing the University of New Hampshire Cooperative Extension, New Hampshire Association of Conservation Districts and the New Hampshire Office of State Planning. The NRCS State Soil Scientist serves on this committee in an advisory capacity. The original criteria were established on June 20, 1983. It was updated on December 7, 2000.

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

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

Farmland of Local Importance

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

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

Important agricultural soils cover approximately 10,096 acres, or roughly 36% of Claremont (Table 6 and Map 7). These soils are widely distributed throughout the town. Prime farmland soils make up about 15% of the total acreage of agricultural soils while farmlands of local and statewide significance total approximately 21% of these soils.

Table 6. Summary of important soils for farm production in Claremont.

Important Soil Type	Size (acres)	% of Town
Prime Farmland Soils	4230.8	15.0
Farmland Soils of Statewide and Local Signficance	5865.2	20.8

SOURCE: GIS Analysis (Moosewood Ecological 2012) of USDA Natural Resources Conservation Service soils.

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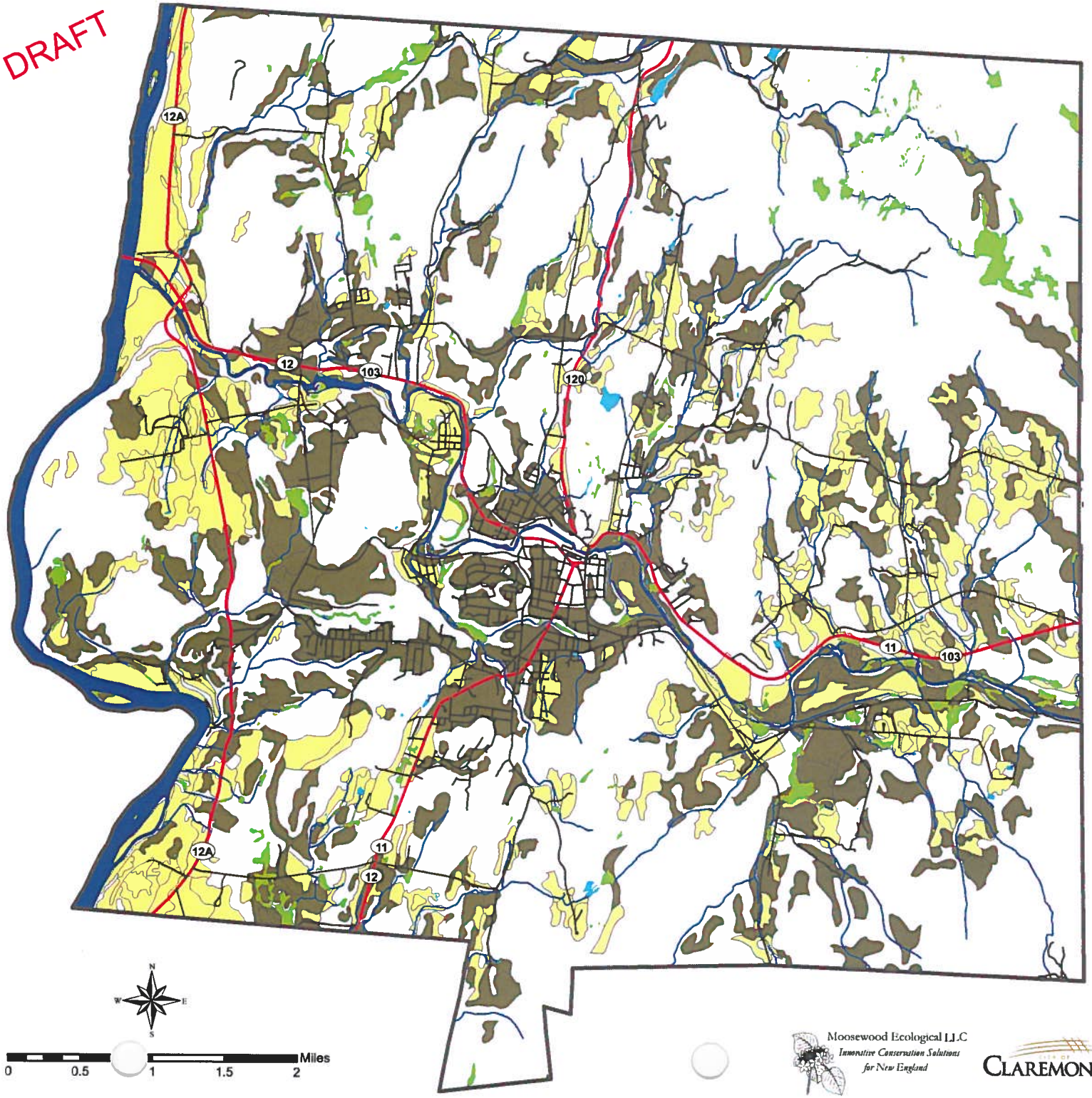

Important Agricultural Soils
City of Claremont, NH
Map 7

Legend

- Prime Agricultural Soils
- Other Agricultural Soils
- Wetlands
- Ponds and Reservoirs
- Streams
- Rivers

Roadways

- Town Roads
- State Roads

Data Sources:
Agricultural soil unit classification from Sullivan County Soil Survey, digitized 2006 and distributed via NH GRANIT. Refined wetlands developed by Moosewood Ecological, 2013, based on 2010 aerial photography distributed by NH GRANIT. Rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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CLAREMONT

UPPER VALLEY-LAKE SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

Important Forest Soils

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

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

Forest Soil Class IA

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

Forest Soil Class IB

The soils in this group are generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. These soils are moderately well and well drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils. Soils in this group have successional trends toward a climax of tolerant hardwoods, predominantly beech. Successional stands, especially those which are heavily cutover, are commonly composed of a variety of hardwood

species such as red oak, red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with white pine, red spruce, balsam fir, and hemlock. Hardwood competition is moderate to severe on these soils. Successful softwood regeneration is dependent upon hardwood control.

Forest Soil Class IC

The soils in this group are outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. White pine, red maple, aspen, and paper birch are common in early and mid-successional stands. Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., hemlock and red spruce. Hardwood competition is moderate to slight on these soils. Due to less hardwood competition, these soils are ideally suited for softwood production. With modest levels of management, white pine can be maintained and reproduced on these soils. Because these soils are highly responsive to softwood production, especially white pine, they are ideally suited for forest management.

Important forest soils represent nearly 16,000 acres, or approximately 57% of Claremont (Table 7 and Map 8). Forest soil groups IA and IB make up the majority of this resource and are most ideally suited for hardwood production. Soil group IC appears to be more restricted to stream drainages where outwash sands and gravels were deposited by glacial activity about 11,000 years ago. Group IC soils types are suited for softwood production, mainly white pine.

Table 7. Summary of important forest soils for timber production in Claremont.

Important Soil Type	Size (acres)	% of Town
Hardwood Production (IA and IB)	13602.1	48.2
Softwood Production IC)	2371.0	8.4

SOURCE: GIS Analysis (Moosewood Ecological 2012) of USDA Natural Resources Conservation Service soils.

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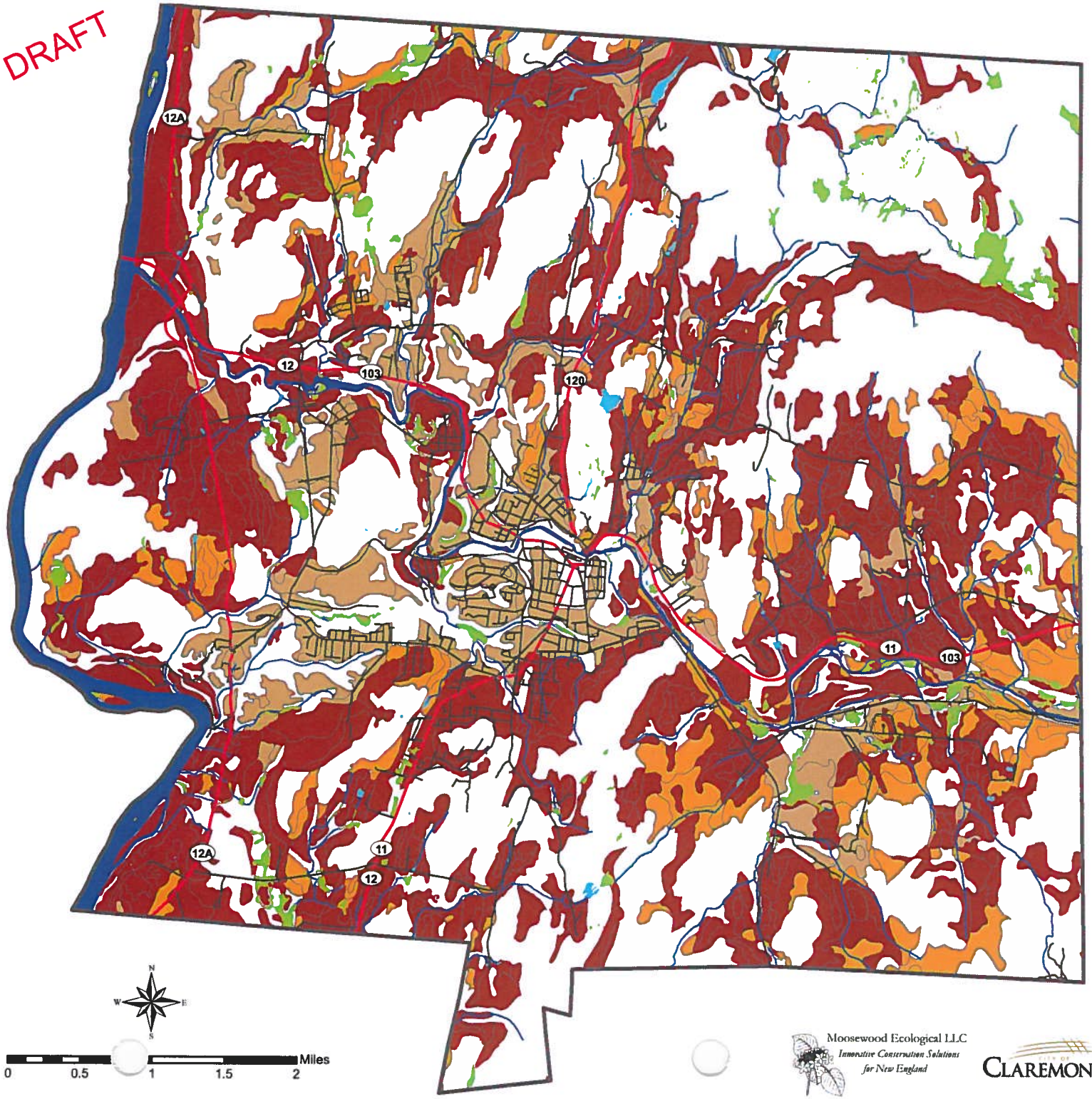

Important Forest Soils
City of Claremont, NH
Map 8

Legend

Forest Soils Groups

- Hardwood (IA)
- Hardwood (IB)
- Softwood (IC)
- Wetlands
- Ponds and Reservoirs
- Streams
- Rivers

Roadways

- Town Roads
- State Roads

Data Sources:
Forest soil unit classification from Sullivan County Soil Survey, digitized 2006 and distributed via NH GRANIT. Refined wetlands, ponds and reservoirs developed by Moosewood Ecological, 2013, based on 2010 aerial photography distributed by NH GRANIT. Rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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CLAREMONT

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UPPER VALLEY LAKE SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

Working Landscape

Claremont's working landscape consists of several active farms and forest lands (Table 8 and Map 9). This helps to provide the community and region with local food and forest products, as well as a source of employment. This data was derived from the tax assessor's database for lands enrolled in the Current Use program. Enacted by the NH General Court in 1973, this program is a taxing strategy that seeks to keep NH's open space undeveloped. This strategy helps to reduce the tax rate of a particular property whereby a tax is calculated based on the income that the land can produce and not taxed at its real estate market value.

Table 8. Summary of properties enrolled in current use as farmland and forest land.

Working Landscape Type	# of Parcels	Size (acres)	% of Town
Farmlands	67	1993.6	7.1
Forest Lands - Managed	20	1393.3	4.9
Forest Lands - Unmanaged	168	6558.9	23.2

SOURCE: City of Claremont tax assessors database (2013).

Landowners in the program are encouraged to keep their land open to the public all year for hunting, fishing, skiing, hiking, and nature observation. Willing landowners that that do not post their property against trespassing receive additional tax savings. Although few properties in the program are posted against trespassing it is not a requirement to keep lands open.

Approximately 35% of Claremont is enrolled in the Current Use program. Most of these are enrolled as forest land. This includes nearly 8,000 acres of managed and unmanaged forests distributed throughout Claremont. Of the total 188 parcels listed as forest lands only 20 currently have management plans. These properties may be eligible for reduced tax assessments if they meet the criteria set forth by the program for good land stewardship.

Agriculture was thriving in Claremont in the early to mid 1800s. However, with the expansion of industries in the city development pressure increased dramatically, whereby changing the land use from farming to more residents and businesses. Today, roughly 7% of Claremont is enrolled as active farmlands. These include a variety of land

use practices, such as corn fields and other row crops for vegetables, hayfields, dairy, and other livestock production. As one drives along Routes 12A and 12/11 one can see many open fields that are used for farming.

Claremont's working landscape and the Current Use program help to maintain open space throughout the city. Many studies have been conducted in NH that compares the cost of services of residential, commercial/industrial, and open space land. These studies have shown that residential development often results in higher community costs (schools, roads, fire and police protection) than revenues generated.

Open space helps to maintain the scenic quality of rural landscapes, provides employment through farming and forestry, and maintains wildlife habitats.

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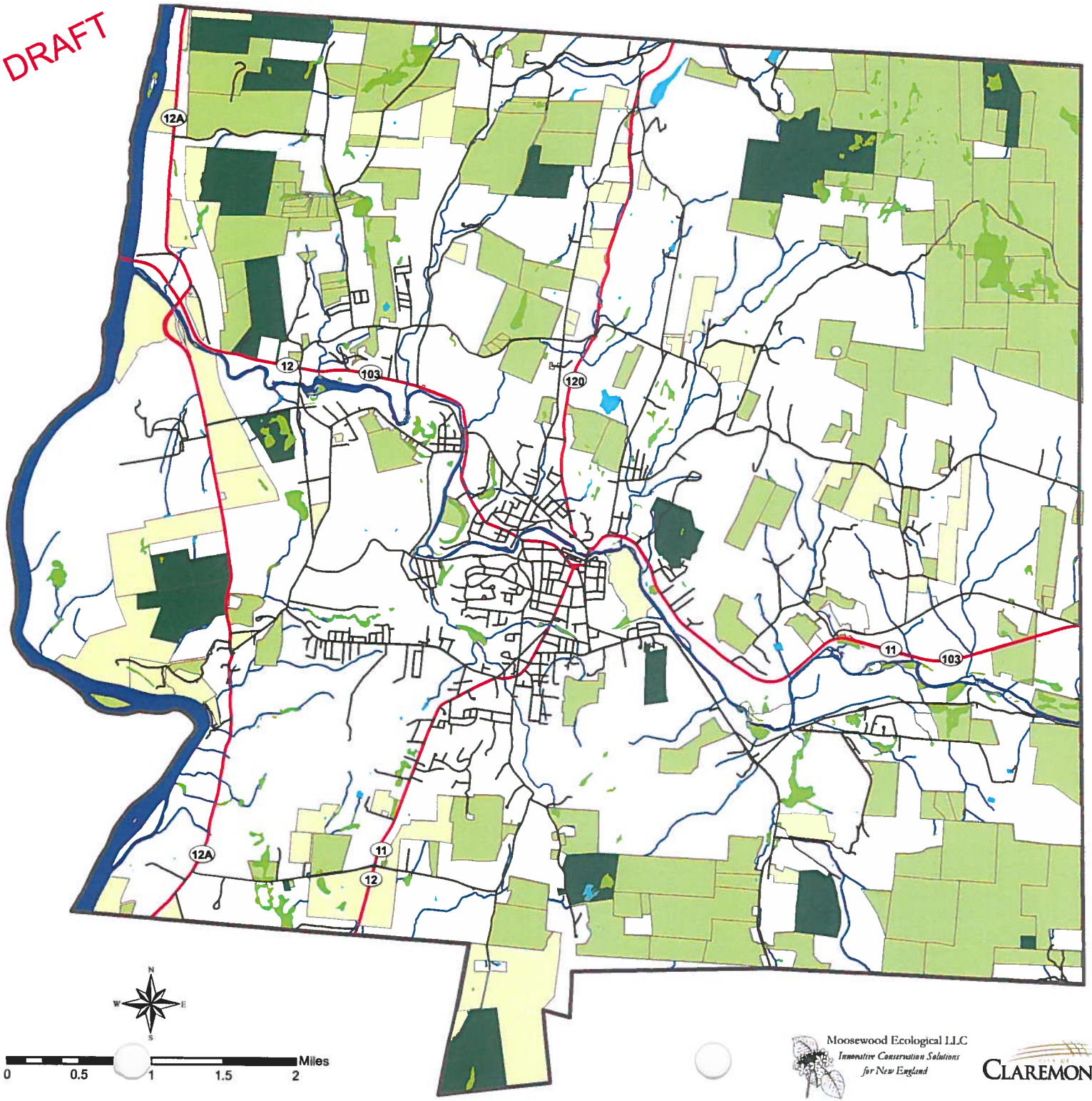

Working Landscapes
City of Claremont, NH
Map 9

Legend

- Farmland
- Forest with Mgmt Plan
- Unmanaged Forest Land
- Wetlands
- Ponds and Reservoirs
- Streams
- Rivers

Note: Farmland and Forestland based on Current Use enrollment; only vacant lots enrolled in Current Use are shown.

Data Sources:
Farm and forestland derived from tax assessing records from the City of Claremont, 2012 - includes only vacant properties enrolled in Current Use. Refined wetlands developed by Moosewood Ecological, 2013, based on 2010 aerial photography. Rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

Disclaimer: Map to be used for planning purposes only. Map not intended for survey purposes. Accuracy of data to be verified by end user. UVLSRPC, Moosewood Ecological, the City of Claremont, NH GRANIT and other data originators or distributors make no claim as to the validity or reliability or to any implied uses of these data.

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Moosewood Ecological LLC
Innovative Conservation Solutions for New England

CLAREMONT

UPPER VALLEY SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

ECOLOGICALLY SIGNIFICANT AREAS

The final outcome of any NRI is the identification of ecologically significant areas (ESAs) within the community. ESAs are those areas in the City that exhibit unique ecological characteristics that deserves special attention in terms of land use. This further provides a basis for informed land use planning, recognizing that some areas have high ecological value based on the various attributes present.

ESAs were identified using a multitude of factors, including landscape-level and site-specific attributes. These included a combination of unfragmented lands, wildlife movement and habitat connectivity, clustering effect of significant habitats that occur in close proximity to one another, presence and distribution of focal species, wetlands of high value, presence and distribution of rare elemental occurrences (rare species and exemplary natural communities; see list of known occurrences in Appendix B), and priorities for conservation developed by the WAP. These landscape-level considerations aid in a more comprehensive approach that recognizes large-scale habitats and ecological processes within the built and natural environments.

As a result of the NRI, 11 ESAs have been identified (Map 10). The map shows the general location of each. These ESAs can serve as a starting point for identifying conservation priorities within Claremont. Below is a brief explanation of the special ecological attributes.

ESA 1 – Cat Hole area

- Largest intact forest associated with a large unfragmented block (48,723 acres) extending beyond Claremont boundary
- Most diverse wildlife habitat aggregation providing excellent habitat connectivity
- Largest high ranked wetland complex (high functionality for ecological integrity and wildlife habitat, maintaining water quality, high flood storage value)
- Largest aggregation of high ranked wetlands
- High quality headwater streams to Redwater Brook
- Numerous sign of multiple focal species (moose, bear, mink, red-tailed hawk, sharp-shinned hawk, grouse)

- Largest intact hardwood forest
- Identified in WAP as containing highest ranked habitat

ESA 2 – Grissom Lane wetland complex

- 2nd largest high ranked wetland complex (high functionality for sediment and nutrient trapping)
- Exemplary natural community: red maple-black ash swamp
- Wetland complex provides habitat connectivity to lands to the north where focal species (moose and mink) were observed

ESA 3 – Unity Road wetland complex

- 3rd largest high ranked wetland complex (high value for maintaining water quality and flood storage)
- Large aggregation of grasslands
- Identified in WAP as containing highest ranked habitat
- Located in association with highest yield aquifer for potential water supply

ESA 4 – Sugar River east

- Largest intact wetland complex
- Large aggregation of grasslands adjacent to floodplains
- Identified in WAP as containing highest ranked habitat
- Located in association with highest yield aquifer for potential water supply

ESA 5 – Southeast corner

- Large intact forest associated with a large unfragmented block (13,471 acres) extending beyond Claremont boundary
- Diverse forested habitats providing habitat connectivity to the south and east
- High quality headwater streams
- Focal species present (sharp-shinned hawk)

ESA 6 – Arrowhead Forest area

- Large intact forest associated with a large unfragmented block (5,490 acres) extending beyond Claremont boundary
- Presence of focal species
- Diverse habitats providing habitat connectivity to the south
- Presence of 3 high ranked wetlands

ESA 7 – Connecticut River north

- Large aggregation of grasslands adjacent to Connecticut River
- Identified in WAP as containing highest ranked habitat
- Prime agricultural soils currently being farmed

ESA 8 – Twistback area

- Presence of focal species (bald eagle)
- Waterfowl migratory stopover area
- Intact forest buffer along Sugar River
- Diverse wildlife habitats providing habitat connectivity along Sugar River
- High ranked wetland with high value for maintaining water quality and flood storage
- Identified in WAP as containing highest ranked habitat

ESA 9 – Sugar River west

- Intact forest buffer along Sugar River
- Diverse wildlife habitats providing habitat connectivity along Sugar River
- Identified in WAP as containing highest ranked habitat
- Exemplary natural community – sycamore floodplain forest

ESA 10 – Connecticut River south

- Largest intact forest buffer along Connecticut River
- Large unfragmented block
- Diverse wildlife habitats providing habitat connectivity along Connecticut River
- Large aggregations of grasslands
- Identified in WAP as containing highest ranked habitat
- Presence of 40 known rare species and exemplary natural communities
- Presence of 2 high ranked wetlands (both exhibiting excellent ecological integrity and wildlife habitat; one with high flood storage function)

ESA 11 – Sugar River downtown

- Floodplains present providing habitat connectivity along Sugar River
- High quality ranked wetland with moderate flood storage value

This active porcupine den was observed in the spruce-fir forest at the Cat Hole property. In the center of the photograph are multiple fresh, tan-colored scats. Porcupines often deposit a pile of scat at the entrance to their dens, making it obvious to determine who is living there.

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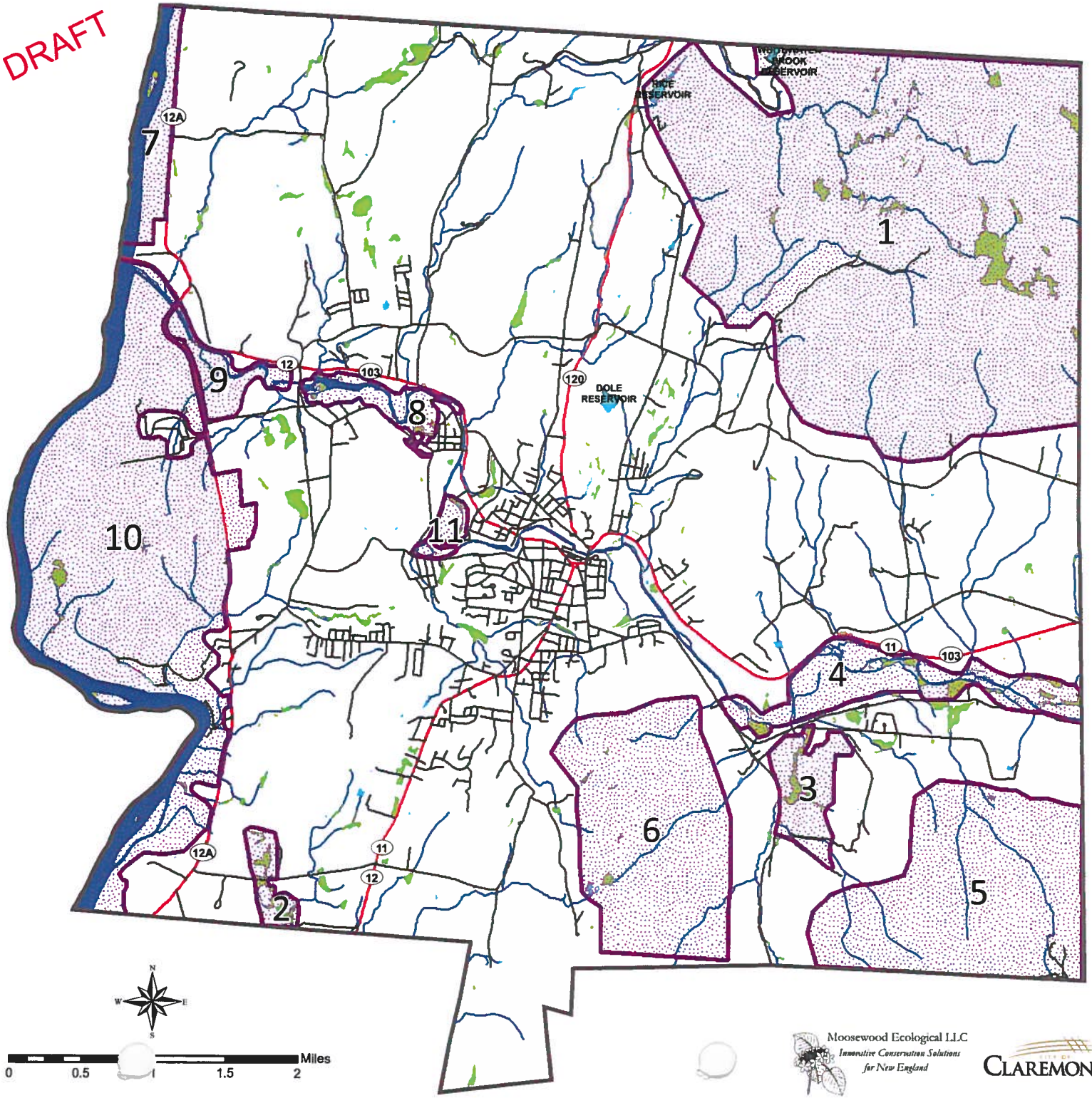

Ecologically Significant Areas
City of Claremont, NH
Map 10

Legend

Ecologically Significant Areas
1. Cat Hole Area
2. Grissom Lane Wetland Complex
3. Unity Road Wetland Complex
4. Sugar River East
5. Southeast Corner
6. Arrowhead Forest Area
7. Connecticut River North
8. Twistback Area
9. Sugar River West
10. Connecticut River South
11. Sugar River Downtown

Wetlands

Ponds and Reservoirs

Streams

Rivers

Data Sources:
Ecologically significant areas developed by Moosewood Ecological, 2013, based on 2010 aerial photography and site assessments. Unfragmented blocks refined by Moosewood Ecological, sourced from NH Wildlife Action Plan. Refined wetlands developed by Moosewood Ecological, 2013, based on 2010 aerial photography. Streams and rivers from New Hampshire Hydrography Dataset, 2006, US Geological Survey, distributed by NH GRANIT. Roadways from the City of Claremont. Town boundary adjusted to Claremont tax map by UVLSRPC, original data from NH GRANIT.

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Moosewood Ecological LLC
Innovative Conservation Solutions for New England

CLAREMONT

UVLSRPC
UPPER VALLEY LAKE SUNAPEE REGIONAL PLANNING COMMISSION

Map created by UVLSRPC, January 2013

RECOMMENDATIONS

The information provided herein, including the various maps, can be used when considering the adoption of various land use planning techniques. The data used to develop such information represents the most current, readily available data to better understand Claremont's natural resources. As such, there are some basic guidelines that the city can use to promote innovative and informed land use planning.

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

The following general recommendations have been provided based on the findings of the project. These are considered as the next actions steps that Claremont could consider as they proceed with community land use planning.

1. Consider establishing an Open Space Committee as part of the Conservation Commission to help oversee conservation planning efforts in the City

2. Prepare a parcel-based GIS ecological assessment model to rank parcels according to their natural resource values. This affords the opportunity to better understand and compare the conservation value of individual parcels throughout the town.

3. Develop a comprehensive Conservation Plan that incorporates recommendations for land conservation, regulatory and voluntary actions, community outreach and education, financial planning, and conservation strategies for ecologically significant habitats/areas and species of greatest conservation concern. This plan should build upon the priorities described above while incorporating more detailed and refined data, such as the parcel assessment model. The plan should incorporate several avenues for biodiversity conservation and not just land protection alone. For example, it should identify opportunities for long-term monitoring of and land management strategies for species of conservation concern, as well as potential restoration of degraded habitats. Finally, an action plan should be included that identifies what should be addressed, by whom, when and how for the next five and ten years.

4. Incorporate the Claremont NRI into the city's Master Plan. This provides a vision for the town from which adaptive land use planning can be adopted.

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

6. Continue to work with adjacent communities on similar conservation initiatives of common interest. It would be helpful to meet with the Conservation Commission

within each of the adjacent communities to build strong relationships and create open lines of communication, as well as to inform these communities about Claremont's conservation planning efforts.

7. Continue with community outreach and landowner education regarding Claremont's natural resources and conservation planning.

Claremont has a wide range of natural resources that host a diversity of species. These include ecologically significant areas such as high quality and unique examples of wildlife habitats, exemplary natural communities, rare and endangered species habitats, and Claremont's large unfragmented forests. Claremont also boasts significant natural resources that are vital for the working landscape. These include active farmlands and important soils, which signify specific areas as providing the most productive lands for agriculture and timber production. As such, the Claremont NRI was created to better understand where these significant natural resources are located and to devise a list of ecologically significant areas to help guide conservation planning efforts.

Planning for the protection of biological diversity is an ongoing process as more is learned from scientific research and the effects of land use. Fortunately, today land use planners are better equipped with various tools to assist with informed decision making. One such tool is the Claremont NRI. As such, this report should be viewed as a work in progress. It should be reviewed and updated every 5-10 years to reflect new data, including on-site assessments, additional conservation lands, new regulatory policies, and regional conservation priorities as the natural and developed landscape evolves over time.

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APPENDIX A

WETLANDS RANKING RESULTS

Wetland Code	Size (acres)	Average Scores For Each Function							
		1	2	3	7	8	9	10	12
1	1.5	10.0	5.9	3.7	1.4	1.0	4.5	6.5	30.0
2	1.7	10.0	6.4	3.7	1.4	2.8	3.7	6.5	40.0
3	9.9	10.0	7.4	5.0	5.5	1.0	7.3	6.0	30.0
5	24.4	3.2	4.1	1.2	3.6	2.8	6.7	7.6	20.0
6	0.8	4.7	3.3	0.5	1.4	2.8	6.3	6.9	10.0
7	1.1	6.8	5.5	3.5	1.0	1.8	5.4	6.6	10.0
8	1.3	6.2	4.0	1.2	1.4	4.6	5.5	6.7	20.0
9	1.6	6.8	4.0	1.3	1.2	2.8	3.6	6.2	20.0
10	1.0	6.8	3.1	1.2	0.8	4.6	7.2	7.0	30.0
11	4.4	6.8	5.1	2.0	2.3	4.6	3.9	6.6	20.0
12	3.2	5.3	3.4	2.8	1.6	2.8	3.7	6.3	20.0
13	0.6	10.0	6.0	3.5	0.6	1.8	7.1	6.9	20.0
14	0.9	2.3	2.6	0.5	0.9	4.6	7.2	7.0	30.0
15	1.3	4.6	4.6	2.0	2.0	1.0	7.4	6.1	20.0
16	4.3	3.8	3.2	1.2	2.2	1.0	6.4	7.1	0.0
17	2.2	3.8	3.6	2.8	1.4	1.0	4.5	5.2	10.0
18	0.9	4.7	2.7	1.2	0.7	1.0	4.3	5.0	10.0
19	1.0	7.0	3.6	1.2	1.1	1.0	4.4	3.9	10.0
20	2.5	6.2	3.5	1.2	1.8	1.0	4.6	4.1	10.0
21	2.6	2.5	2.6	0.5	2.0	1.0	8.4	8.9	20.0
22	1.9	10.0	6.4	3.5	1.2	4.6	6.2	8.1	20.0
23	1.7	6.2	4.5	2.0	2.0	1.8	6.4	7.1	10.0
24	6.9	4.0	3.8	2.8	3.3	4.6	3.1	3.1	20.0
25	11.8	5.3	3.9	0.7	4.8	3.6	6.2	7.7	20.0
26	9.0	7.5	5.6	3.5	4.4	6.4	6.9	6.6	20.0
27	1.3	3.8	2.8	0.7	1.5	2.8	5.5	6.8	10.0
28	0.5	5.3	2.9	0.5	0.9	1.0	7.2	7.0	0.0
29	0.7	4.8	5.3	4.2	0.7	2.8	6.1	5.4	20.0
30	4.6	6.8	5.5	2.0	1.5	1.0	3.5	5.0	10.0
31	1.6	8.3	6.3	3.5	1.4	1.8	7.3	7.2	10.0
32	0.8	7.7	5.2	3.5	1.2	1.0	6.2	6.9	10.0
33	2.4	7.7	5.5	4.2	2.1	1.0	7.4	4.9	20.0
34	1.0	8.5	5.3	1.3	0.7	1.0	3.5	6.1	10.0
35	9.1	6.8	6.1	2.7	2.1	1.0	5.6	4.7	20.0
36	4.9	3.8	3.8	2.7	2.3	1.0	6.5	7.2	10.0
37	2.0	7.7	4.6	1.2	1.6	1.8	6.3	7.0	0.0
38	1.6	4.7	2.9	0.7	1.6	1.8	4.5	6.5	10.0
39	29.1	6.0	6.9	4.3	3.9	1.8	4.0	5.7	20.0
40	3.2	8.3	5.1	4.3	2.9	2.8	3.0	5.2	10.0
41	2.7	10.0	6.4	4.2	3.0	1.0	6.8	5.2	10.0
42	7.6	6.0	3.4	0.7	4.1	4.6	5.0	7.3	20.0
43	3.9	3.2	2.2	2.3	4.3	6.4	7.9	8.0	20.0
44	7.1	4.7	5.3	2.0	5.0	3.6	7.2	5.8	30.0

Wetland Code	Size (acres)	Average Scores For Each Function							
		1	2	3	7	8	9	10	12
45	10.6	3.8	4.2	2.7	5.5	4.6	6.3	8.0	40.0
46	0.7	3.8	2.3	0.5	1.2	2.8	7.2	7.1	20.0
47	0.6	6.8	4.1	3.5	1.2	1.0	7.2	7.1	10.0
48	7.4	3.2	2.2	0.7	2.6	6.4	5.7	5.8	20.0
50	0.8	6.0	2.4	1.2	0.8	6.4	5.4	2.0	10.0
51	7.8	6.2	3.5	2.0	3.0	2.8	4.8	6.9	10.0
52	1.6	6.8	3.1	0.7	1.4	1.8	3.7	6.3	10.0
53	1.6	6.0	3.4	1.3	1.4	1.8	3.7	6.3	10.0
54	4.0	3.8	3.3	2.2	2.0	2.8	4.6	6.6	10.0
55	3.8	10.0	6.4	4.2	3.4	1.0	6.9	5.3	20.0
56	0.5	10.0	6.0	3.5	0.5	1.0	7.1	6.9	20.0
57	1.4	8.3	5.3	3.7	1.2	1.0	3.4	4.9	10.0
58	0.5	8.3	5.3	3.5	0.7	1.0	6.1	6.7	10.0
59	0.7	3.2	2.7	0.5	0.9	4.6	5.4	6.6	20.0
60	1.9	3.2	3.2	0.7	2.9	4.6	4.0	6.7	10.0
61	0.5	4.7	2.9	1.3	0.8	3.6	2.6	4.6	20.0
62	2.8	3.8	2.3	1.3	2.2	4.6	4.6	6.7	10.0
63	1.7	2.5	2.2	1.2	2.0	2.8	6.4	4.8	10.0
64	1.1	7.5	5.2	3.5	1.4	1.0	6.3	6.9	10.0
65	0.6	9.2	5.9	3.5	0.6	1.0	6.1	6.7	10.0
66	0.6	3.2	2.2	1.2	1.0	2.8	5.4	5.4	0.0
67	3.5	4.5	3.8	1.2	1.8	1.0	6.4	7.1	10.0
68	0.9	4.5	2.8	1.2	0.8	1.0	6.2	6.7	10.0
69	2.6	6.2	3.5	1.2	1.7	1.0	6.3	7.0	10.0
71	2.1	3.8	2.8	1.3	2.1	1.0	3.8	6.5	10.0
72	0.5	3.8	2.3	1.3	0.5	1.0	4.5	6.3	10.0
73	0.8	4.5	2.8	1.3	1.4	1.0	2.9	6.1	10.0
74	0.7	4.5	3.3	2.7	0.9	1.0	5.4	6.6	10.0
75	2.8	3.2	2.7	1.3	1.8	1.8	4.6	6.6	10.0
76	0.6	3.7	3.2	2.8	0.6	1.0	4.5	6.3	10.0
77	0.5	3.7	3.2	2.7	0.5	6.4	4.3	5.0	30.0
78	1.1	4.5	3.3	2.7	1.2	4.6	6.2	6.9	30.0
79	1.3	6.0	3.4	2.7	1.0	2.8	5.4	5.4	20.0
80	24.3	3.7	4.6	3.5	6.7	6.4	5.7	8.1	30.0
81	1.4	3.2	3.2	0.5	2.5	3.6	7.5	7.5	30.0
82	0.7	8.3	5.3	2.7	0.9	1.0	7.2	7.0	0.0
83	1.6	10.0	6.4	3.7	1.2	1.0	2.8	6.0	20.0
84	0.5	7.5	4.6	2.8	0.5	1.0	2.7	5.8	10.0
85	2.7	9.2	6.4	3.5	2.9	1.0	8.6	7.9	20.0
86	7.4	10.0	6.4	3.5	3.2	1.0	8.6	7.9	30.0
87	20.6	4.5	5.2	2.8	4.6	5.4	5.1	6.8	40.0
88	0.7	3.8	3.2	1.6	0.9	5.4	5.4	4.1	30.0
89	4.4	2.3	3.6	1.2	3.6	6.4	7.7	6.6	30.0
90	5.1	4.5	4.3	2.8	2.3	3.6	4.7	6.7	20.0
91	4.0	2.5	4.6	1.3	2.1	4.6	4.8	6.7	30.0
92	1.4	10.0	6.4	3.7	1.1	1.0	3.6	6.2	30.0
93	1.0	9.2	5.9	3.7	1.0	1.0	3.6	6.1	20.0
94	7.2	9.2	7.4	4.3	2.2	1.0	2.8	5.0	30.0
95	0.9	10.0	6.4	3.5	1.6	1.0	7.3	7.2	20.0

Wetland Code	Size (acres)	Average Scores For Each Function							
		1	2	3	7	8	9	10	12
96	2.1	10.0	7.4	4.3	1.4	1.0	3.5	5.0	20.0
97	0.5	10.0	7.0	3.7	0.5	1.0	1.7	3.3	30.0
98	5.4	10.0	7.4	4.3	2.1	1.0	2.8	5.0	30.0
99	2.5	10.0	7.0	3.7	1.4	1.0	2.7	4.8	30.0
100	5.8	10.0	6.4	3.7	2.0	1.0	3.8	6.5	30.0
101	2.4	9.2	6.4	3.7	1.4	1.0	3.7	6.3	30.0
102	3.9	10.0	6.9	4.3	3.1	1.0	3.0	5.3	30.0
103	1.4	10.0	6.4	3.5	2.2	1.0	8.4	7.7	30.0
104	0.5	10.0	6.0	3.5	0.5	1.0	5.3	6.5	20.0
105	0.6	10.0	6.0	3.5	0.7	1.0	7.1	7.0	20.0
106	1.5	10.0	6.0	3.5	1.4	1.0	6.3	6.9	10.0
107	4.9	4.7	2.9	1.2	4.5	1.0	7.9	8.1	30.0
108	3.1	8.3	5.3	2.0	2.0	1.0	3.8	6.5	30.0
109	3.7	7.7	6.2	2.0	2.1	1.0	4.8	6.7	30.0
110	2.1	8.3	6.7	2.7	1.8	1.0	2.8	4.9	40.0
111	1.2	5.3	2.9	0.5	1.5	1.0	6.3	7.0	0.0
112	0.6	3.8	2.8	1.2	0.7	1.0	7.1	7.0	10.0
113	1.4	8.3	5.8	3.5	1.7	1.0	8.3	7.5	10.0
114	1.7	10.0	6.0	3.7	1.2	1.0	3.6	6.2	20.0
115	3.3	10.0	6.0	3.5	2.8	1.0	6.6	7.3	10.0
116	63.8	8.5	7.7	4.3	6.6	1.0	7.5	8.5	30.0
117	1.9	9.2	5.9	3.5	1.2	1.0	8.2	7.4	20.0
118	3.5	8.5	5.8	3.5	3.1	1.0	8.6	7.9	20.0
119	9.3	10.0	7.0	4.3	3.2	1.0	4.8	2.5	10.0
120	5.2	10.0	7.4	5.0	3.6	1.0	6.7	6.3	20.0
121	0.6	7.5	6.2	3.5	0.9	1.8	6.2	6.8	20.0
122	0.6	5.3	4.5	1.3	0.9	4.6	3.4	3.6	30.0
123	1.4	6.2	4.6	2.8	1.4	4.6	3.7	5.0	40.0
124	1.6	6.2	4.6	2.8	1.5	4.6	3.7	5.1	40.0
125	2.6	5.3	4.9	2.8	1.8	4.6	3.8	5.1	40.0
126	1.5	5.3	4.9	2.8	1.5	4.6	3.7	5.1	40.0
127	6.6	4.7	4.3	2.0	2.8	4.6	6.6	6.1	40.0
128	0.6	4.7	4.9	1.3	1.5	3.6	4.5	4.0	30.0
129	0.6	3.8	4.8	0.7	0.9	3.6	4.4	5.1	30.0
130	0.5	3.2	3.7	2.2	0.4	2.8	2.7	5.8	20.0
131	1.5	6.2	4.6	2.2	1.5	3.6	4.7	5.3	20.0
132	0.9	5.3	4.5	2.2	1.0	4.6	4.6	5.2	30.0
133	4.8	2.7	2.2	0.5	2.7	1.0	8.5	7.8	20.0
134	1.2	2.5	2.2	0.7	0.8	1.0	5.4	6.5	10.0
135	1.4	9.2	5.4	3.8	1.4	1.0	6.3	6.9	10.0
136	0.5	10.0	6.4	3.5	0.5	1.0	6.1	6.7	20.0
137	0.7	5.3	3.9	3.5	0.7	1.0	3.5	6.1	0.0
138	0.7	3.8	2.3	1.2	1.4	1.0	7.3	7.2	10.0
140	1.5	4.5	3.7	2.7	1.4	1.0	7.3	7.2	10.0
141	2.3	7.7	5.2	2.2	1.8	1.8	4.8	5.4	30.0
142	2.1	8.3	5.3	3.5	1.9	1.0	6.4	7.1	0.0
143	0.5	8.5	6.3	2.2	0.6	1.8	4.5	5.0	30.0
144	1.3	5.2	4.2	2.7	1.3	4.6	2.9	2.5	30.0
145	0.6	5.3	4.5	2.8	0.8	3.6	2.8	2.4	30.0

Wetland Code	Size (acres)	Average Scores For Each Function							
		1	2	3	7	8	9	10	12
146	0.5	6.8	4.6	2.8	0.6	1.8	1.7	2.1	30.0
147	0.5	6.8	4.6	2.8	0.6	1.8	1.7	2.1	30.0
148	2	6.8	4.6	2.0	1.6	1.8	3.7	5.1	30.0
149	0.5	6.8	5.1	2.2	0.6	4.6	2.7	2.3	30.0
150	0.5	6.8	5.1	2.2	0.6	4.6	2.7	2.3	30.0

APPENDIX B

KNOWN RARE SPECIES AND EXEMPLARY NATURAL COMMUNITIES

Rare Elemental Occurrence	Rarity Rank
Natural Communities	
Rich mesic forest	
Temperate circumneutral cliff	
Calcareous riverside seep	
Circumneutral riverbank outcrop	
Silver maple-wood nettle-ostrich fern floodplain forest	
Red maple-black ash swamp	
Sycamore Floodplain Forest	
Plants	
Beaked Sanicle	S2
Bladdernut	S2
Climbing Fumitory	S1
Cluster Sanicle	S1
Dwarf Ragwort	S2
Garber's Sedge	S2
Ginseng	S2
Golden-fruited Sedge	S2
Great St. John's-wort	S1
Green Dragon	S1
Hairy Rock Cress	S1
Hairy-fruited Sedge	S1
Incurved Umbrella Sedge	S1
Jesup's Milk Vetch	S1/F1
Kalm's Lobelia	S2
Large-flowered Bellwort	S1
Northern Waterleaf	S2
Showy Orchis	S2
Siberian Chives	S1
Stickseed	S1
Birds	
Bald Eagle	S2
Common Nighthawk	S1
Reptiles	
Wood Turtle	SC
Invertebrates - Mollusks	
Dwarf Wedge Mussel	S1/F1

Source: NH Natural Heritage Bureau database (2012) and Moosewood Ecological LLC (2012).

S1 - State Endangered

S2 - State Threatened

SC - Special Concern

F1 - Federal Endangered

APPENDIX C

HABITAT BLOCK SIZE REQUIREMENTS FOR WILDLIFE

Habitat Block Size Requirements For Wildlife

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

CITY OF CLAREMONT
NATURAL RESOURCES INVENTORY

Wetlands, Wildlife, and the Working Landscape

Prepared for:
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and
Claremont Conservation Commission

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Cover photographs – Left: Sugar River; Top Right: American goldfinch; Bottom Right: Wetlands along the Sugar River at the Coy paper Dam.