NATURAL RESOURCE INVENTORY
SUMMARY REPORT

WEARE, NH

PRODUCED IN COOPERATION WITH THE TOWN OF WEARE
CONSERVATION COMMISSION

KANE & INGRAHAM, 2011

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(Verdant Trail – Charles & Ethel Eastman Conservation Area)

(Photographs provided by John Ciampi and Andy Fulton, cover from December 2009 ice storm)

AUTHORS

This natural resource inventory project, including all report content and map design and production, was created by Christopher Kane and Peter Ingraham over the course of 2008 and 2009 (and completed in 2011 following WCC review) for the use of the Town of Weare, NH. No portion of this report or any maps may be reproduced in whole or in part without the express permission of the Town of Weare.

ASSUMPTIONS AND LIMITATIONS OF PROJECT

The information contained in this report is based principally on stock geographic information systems (GIS) data publicly available from federal and state agencies. While the reader can expect these data to have a high level of spatial, temporal, and content accuracy, these data are meant for broad-scale planning purposes and have not been field verified in the town of Weare. This report and the accompanying maps can be considered a "coarse-filter" evaluation of Weare's resources. Any land management or conservation activities initiated as a result of this planning effort should involve some level of "on the ground" evaluation to confirm the findings of this report at the site scale and identify features not mapped here.

DISCLAIMER

Every reasonable effort has been made to maintain a high level of quality in developing this natural resource inventory report and the accompanying large-format maps ("The NRI"). However, the Town of Weare, Christopher Kane, and Peter Ingraham ("The Producers") make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, or suitability of the data described or displayed in The NRI. The Producers do not assume any liability associated with the use or misuse of this information. The information depicted in The NRI is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or property conveyance purposes. In addition, the resources described and mapped in The NRI are subject to alteration by natural and human influences, and thus this project is a static representation of the natural resources in Weare, one that will benefit from periodic updates.

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EXECUTIVE SUMMARY

This Natural Resource Inventory study aims to categorize, catalogue, and map the rich natural and cultural resources of Weare, NH as a basis for natural resource management and conservation planning. The study was commissioned in 2008 by the Weare Conservation Commission and funded by the Town. This summary report is accompanied by eight large format maps which illustrate the various resources studied.

Existing Town documents including the Master Plan, Zoning Ordinance and Open Space Ordinance, as well as regional planning documents that relate to conservation were reviewed and summarized. Mapped resources were treated according to the following six categories with eight accompanying maps:

- Wildlife and Ecology (Unfragmented Lands map, Wildlife and Ecological Features map)
- Water Resources (Water Resources map)
- Soils (Soils map)
- Historic and Cultural Features (Base map, Historic and Cultural map)
- Scenic Resources (Scenic Areas map)
- Conservation Priorities (Co-occurrence Model map)

An unfragmented lands analysis was conducted, and the resulting blocks were assigned place names. There are currently still extensive unfragmented areas in Weare, especially preferred for wildlife habitat diversity. Three large portions of blocks over 3,500 acres in size, and all or portions of four unfragmented blocks between 2,000 and 3,500 acres still exist in the town. Within this matrix of undeveloped lands, numerous important habitat types exist, as mapped in the NH Fish & Game Department's Wildlife Action Plan (WAP). Examples of six WAP Patch Scale Priority Wildlife Habitats occur in Weare: Large Grasslands, Peatlands, Marsh and Shrub Wetlands, Rocky Ridge – Talus Slopes, floodplain Forests and Pine Barrens. According to the WAP 7% of the town is designated "highest ranked habitat in NH", and 21% is mapped as "highest ranked in biological region" by condition.

Weare lies entirely within the Merrimack River Basin, that includes portions of the Lower Contoocook River and Piscataquog River watersheds. Sections of the North Branch Piscataquog River and Middle Branch Piscataquog River have been designated significant on a statewide basis by the New Hampshire Rivers Management and Protection Program. A total of 1,638 mapped wetlands, ponds and lakes are scattered across the landscape, including seven water bodies classified as Great Ponds: Daniels Lake, Everett Dam Lake, Ferrin Pond, Mount William Pond, Perkins Pond Marsh, Riverdale Dam, and Weare Reservoir. The town has several large areas of intact stratified drift aquifer, including some near Weare Center, and in the Southeast part of town. 34% of the area of these aquifers are protected by land conservation.

Weare also has significant areas of productive agricultural and forest soils. 1,385 acres are classified as Prime Soils, the highest rating for productivity. 1,302 acres are classified as Soils of State-wide Significance, and 9,233 acres are classified as Soils of Local Significance. 19% of these soils areas are currently in protected by land conservation. 35,115 acres in Weare are ranked as productive forest soils, and 30,801 of these acres are ranked as IA, IB or IC soils, the most productive rating tier.

An inventory of 144 recognized historic and cultural features in Weare was compiled and mapped. Feature types included cemeteries, railroad stations, churches, mill sites, school houses and sites, store sites and tannery sites. A scenic view analysis was also conducted, using 25 locations with scenic views selected by local citizens. By overlaying the views from these locations, areas that are visible from multiple viewpoints, and therefore especially prominent were identified and mapped.

As a way of considering all resource features together, a co-occurrence analysis was performed to view them spatially in combination. A co-occurrence analysis incorporates all of the resources mapped as part of this study in a single model, thus simplifying the process of selecting potential conservation priorities. Numerous areas had high scores in the model and deserve further consideration or study as potential conservation priorities. The Melvin Valley unfragmented block scores especially high, as do the Peaselee Meadow Brook and Ferrin Pond blocks which contain few fragmenting features.

The town of Weare is truly blessed with exceptional natural resources – abundant lakes, rivers and streams, productive farm and forest land, high-quality drinking water supplies, diverse wildlife habitat, and spectacular scenic vistas. This study has documented these resources and many more. Thanks to the foresight of earlier generations, much of what makes Weare special has been permanently protected for the benefit of those that will follow. This study will help to inform and support further land conservation efforts.

1. INTRODUCTION

Background and Justification

The Weare Conservation Commission, in its role as advocate for natural resources on behalf of the Town, recognized the need for current natural resource data for the entire town displayed at a scale sufficient for meaningful interpretation for conservation planning. Cognizant of the technical advances in both digital spatial data and the mapping software applications to utilize it, the Town approved funding for the production of a series of new maps to display the extent and location of its critical resources. In 2008 the Town secured the services of Kane & Ingraham, Conservation Consultants, to produce the map series, along with a summary report that would together constitute a new natural resource inventory of the town, which the present report comprises.

The Natural Resource Inventory

In the past two decades, the natural resource inventory has become a critical tool for the collection, synthesis, display and interpretation of data relating to the natural resources of an area, be it at the property scale, town scale, regional scale or larger. Essentially a compilation of resource information tied to location, it can take many forms, depending on the needs of the sponsor. By displaying the known resources of an area on a variety of maps, the various component resources that exist at a location can be comprehended at once, and decisions that impact resource use are better informed.

Mandates for Natural Resource Planning and Protection

New Hampshire law grants to municipalities certain authority and responsibility through their planning boards and conservation commissions to catalogue their local natural resources and take actions toward their protection. The following are excerpts from New Hampshire State Statute that relate to local board purview of natural resources.

NH RSA 674:2:d (Master Plan)

"A natural resources section which identifies and inventories any critical or sensitive areas or resources, not only those in the local community, but also those shared with abutting communities. This section provides a factual basis for any land development regulations that may be enacted to protect natural areas. A key component in preparing this section is to identify any conflicts between other elements of the master plan and natural resources, as well as conflicts with plans of abutting communities. The natural resources section of the master plan should include a local water resources management and protection plan as specified in RSA 4-C:22."

NH RSA 36-A:2 (Conservation Commissions)

"Such commission shall conduct researches into its local land and water areas and shall seek to coordinate the activities of unofficial bodies organized for similar purposes, and may advertise, prepare, print and distribute books, maps, charts, plans and pamphlets which in its judgment it deems necessary for its work. It shall keep an index of all open space and natural, aesthetic or ecological areas within the city or town, as the case may be, with the plan of obtaining information pertinent to 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 wet lands in a like manner, and may recommend to the city council or selectmen or to the department of resources and economic development a program for the protection, development or better utilization of all such areas."

A natural resource inventory of an entire municipality is an important planning tool in New Hampshire for carrying out the duty conferred upon Conservation Commissions by RSA 36-A:2. Originally in the form of hand-drawn paper maps and supplemented with written reports, the powerful technology now available through geographic information systems (GIS) and the growing number of datasets appropriate for its use, has made large scale Natural Resource Inventories a very sophisticated and comprehensive tool for natural resource planning.

Building on Previous Work

Reference works, studies, web-based resources, Town documents including the Master Plan, Town Ordinances, plans and other documents all contributed to this NRI. Numerous discussions and personal communications with the Conservation Commission and other members of the Weare public and staff informed various parts of the project, and helped greatly with the completion of this project. A complete list of sources can be found in Appendix A. The following are excerpted highlights from the various Town documents that pertain to natural resources, providing an established justification for embarking on this natural resource inventory study, and a context for further study.

2005 Weare Master Plan Update by Southern New Hampshire Planning Commission

In 2003 and 2004 a Community Profile was conducted by UNH Cooperative Extension through meetings and a survey mailer to ascertain the interests and concerns of the residents of Weare, and to derive statements of their vision for the community. 315 surveys were returned, representing 9.6% of households/postal addresses, and these form the basis of the results, which were incorporated into the March 24, 2005 Weare Master Plan Update.

The following natural resource priorities were posed to the respondents to rank in importance:

Resource Protection Category	Responded as Very Important
Protect drinking water supply	89.90%
Protect aquifers	90.20%
Protect surface water (lakes and ponds)	73.70%
Protect rivers/streams through riparian buffers	80.60%
Identify and protect prime wetlands	72.00%
Protect floodplains and reduce flood hazards	67.80%
Protect hillsides and steep slopes (> 25 percent)	62.00%
Ban ridgeline development	66.20%
Protect views of hills and mountain sides	69.40%
Preserve forestland by conservation easements	73.30%
Protect open space by fee simple purchase	64.20%
Preserve high quality prime agricultural lands	70.90%
Protect wildlife corridors/habitats by greenways	79.50%
Preserve historic buildings, lands and cultural sites	68.00%

Survey responses indicated a particularly strong concern for the protection of open space and drinking water resources, as well as the protection of productive agricultural lands, the Piscataquog River, and trail corridors. The survey also asked respondents what areas in town were most important to protect from development, and the most

common responses were the areas around Lake Horace, Ferrin Pond, Candle Wood, Mount Misery, Melvin Valley, Mt. William and Mt. William Pond, Concord Stage Road/Sugar Hill and Clough State Park. Aquifers, active agricultural fields, wetlands, potential water supply lands, and snowmobile trail connections were also identified generally as important to protect.

(Ferrin Pond – Southwest Weare)

Select Vision Statements (from Master Plan)

Weare residents desire:

- A rural but vibrant community with open space, natural beauty, county atmosphere and small town character.

- A town with an attractive and flourishing Town Center enhancing its existing satellite and historic villages.

- A town that values its environment, open space, clean water and natural beauty and seeks to protect these resources through managed growth and land use planning.

Select Goals and Objectives Relating to Natural Resources and Community Character (from Master Plan)

- Create a Future Land Use Map

- Review the Town's current cluster housing provisions to look for ways to encourage housing affordability while protecting open space and enhancing the rural character of the community.

- Develop a review procedure for large commercial and "big box" development now before this becomes and issue in the future.

- Encourage "smart growth" through infill and mixed development while protecting Weare's natural resources and community character.

- Protect and maintain Weare's natural features, including surface water resources and shorelines, aquifers, drinking water supplies, wetlands, floodplains, hillsides and steep slopes, forested lands, open space, agricultural lands, prime farmland soils, wildlife corridors and conservation lands.

- Minimize the negative impacts of over-development on sensitive open space, wildlife corridors, working forests and farms, aquifers, rivers, watersheds, steep slopes, and viewsheds.

- The Town should recognize and support plans, programs and regulations, which will protect the open space and drinking water supplies.

- The Environmentally Sensitive Areas Map contained within the Master Plan should be used as a guide when reviewing site plan and subdivision proposals.

- The Conservation Commission should seek the donation/acquisition of conservation easements from willing landowners and continue to purchase priority open space areas through use of the Current Use Tax penalty funds and bond referendums as necessary.

- The Planning Board and Conservation Commission should schedule a joint meeting to review the progress of the Town's Open Space Plan.

- The Conservation Commission should identify priority conservation lands that might be acquired by the Town through tax liens or other means.

- The Planning Board should evaluate the effectiveness of the Town's existing Rural Conservation Overlay District, Wetlands Zone Land Planning Ordinance, Aquifer Protection Ordinance, and Floodplain Development Ordinance in protecting these resources.

- The Town should continue to support the Piscataquog Watershed Association and the Piscataquog Local River Advisory Committee's efforts in Weare as they promote local river corridor management plans and programs.

- The Conservation Commission should identify and develop protection strategies for Weare's prime wetlands.

- The Planning Board and Conservation Commission should consider designating prime agricultural areas and encouraging owner participation in voluntary land conservation transfer of development rights programs.

Select Implementation Actions (from Master Plan)

- Identify priority conservation lands that could be donated [or] acquired by the Town. Seek appropriate funding sources to protect these lands.

- Evaluate effectiveness of Town's Rural Conservation Overlay District, Wetlands Land Planning Ordinance, Aquifer Protection Ordinance and Floodplain Ordinance in protecting these resources.

- Establish and adopt shoreline protection standards in Town's Zoning Ordinance.

- Designate prime agricultural areas and encourage landowners to participate in land conservation programs.

- Evaluate feasibility of establishing a local transfer of development rights program to protect farmlands, prime wetlands and other valuable resources.

- Identify and develop strategies to protect Weare's prime wetlands.

Protecting the Rural Character and Natural Environment of the Community (from Master Plan)

Weare has a long tradition of concern about the natural environment and the rural character of the community as expressed in the Town's previous master plans. Much of this work is still relevant today. This master plan effort confirmed that protecting the rural character and natural environment of the community remains an important priority for the residents of Weare. The following natural features have been identified as being significant and important priority protection areas that warrant special protection. These areas include but are not limited to:

- Farmland Soils
- Steep Slopes
- Wetlands
- Rivers, Lakes and Shorelines
- Aquifers

- Floodplains
- Forest Resources
- Open Space/Land Conservation

Weare Zoning Ordinance (2008)

The 2008 Weare Zoning Ordinance contains several articles that specifically address natural resources.

Zoning Ordinance Article 28. Wetlands Zone Land Planning Ordinance

This ordinance is intended to protect public health, safety and welfare as it pertains to lands that qualify as wetlands, as defined. Structures, inappropriate land uses, alteration, and introduction of toxic or harmful substances are restricted by this ordinance. Its intent is also to protect sensitive and unique natural areas, wildlife habitat and travel routes, existing water supplies and aquifers. Nature trails and appropriate recreation are allowed, as is cultivation and harvesting of crops and forestry if generally accepted best management practices are followed.

(Exempt From Zoning – Beaver Activity on Island in Lake Horace Marsh)

A 50 foot setback from the jurisdictional wetland boundary reference line applies for all new buildings. A 25 foot minimum-width buffer of undisturbed natural (or planted) vegetation is required to be maintained. In forested areas no more than 50 percent of the basal area may be removed in any 10 year period.

Zoning Ordinance Article 29. Aquifer Protection Ordinance

The intent of this ordinance is that existing and potential groundwater supplies should be protected, conserved and managed for the benefit of present and future generations, for the protection of their health, general welfare and future growth and economic development, by ensuring future availability of clean drinking water. The applicable aquifer areas are shown on a 1977 USGS survey authored by Jon Cotton. The ordinance applies to the direct recharge area in excessively drained soils directly over the aquifers (definitions apply).

No more than 10% of a new lot in an aquifer zone may be covered by impervious material. Disposal or storing of solid or hazardous waste, subsurface petroleum products, road salt, junk automobiles or salvage, or industrial discharge of processed waters are prohibited. Single or two-family residences, conservation practices, passive outdoor recreation and trails for this purpose, maintenance of existing structures (without expansion of impervious surfaces) are allowed. Farming, gardening and forestry are allowed provided materials such as manure, fertilizers, etc. are not allowed to cause groundwater contamination. Effluent disposal system design requirements are also specified.

Zoning Ordinance Article 30. Rural Conservation Overlay District (RC)

This special overlay district applies to areas within the Rural Agricultural (RA) Zoning District for the purpose of encouraging land uses that conserve and protect the natural resources, preserve and enhance the rural character of the town, and retain open spaces, while allowing for reasonable residential growth. It strives to reduce density of development on important agricultural soils to help keep them in productive use. It intends to protect unique and unusual natural areas and their wildlife and natural features and resources from inappropriate development, and to avoid Town expenditures for services in remote, inaccessible areas of the town.

Minimum lot size in all areas under this overlay district is doubled from that of the underlying district, cluster development density requirements apply, and preservation of prime agricultural soils is urged.

Zoning Ordinance Article 30-A. Mt. Dearborn Road Historic Area Overlay District

This very specific and defined district applies (additional to the RA District) for the purpose of preserving scenic, historic and open space values. It is defined as the area within 1,200 feet on both sides of the centerline of the whole length of Mt. Dearborn

Road, excepting several specified lots and all cemeteries. No development may occur in this district except by special exception (as further defined).

Zoning Ordinance Article 30-B. Clinton Grove Historic Overlay District

This overlay district, superimposed over the Clinton Grove Village District in its entirety except lot 404-167, is similar in purpose and intent to Article 30-A, with the additional intent of promoting compatibility and harmony of architectural styles and land uses, and promoting civic pride and appreciation of the rural beauty of Weare. In this district, no new building shall be allowed unless by special exception, with the Zoning Board of Adjustment taking into account the purpose and intent of this district. Considerations for approval include the overall architectural design and effect to include the appearance of all building details and treatments, as well as driveways and landscaping (further defined). Further restrictions apply, including instances of partial building removal, maintenance and repair, and signs, etc.

Zoning Ordinance Article 31. Floodplain Development Regulations

This article pertains to all areas designated as "special flood hazard areas" by the Federal Emergency Management Agency (FEMA) in its 2005 flood insurance study of the town (updated September 2009). The intent of these regulations is to prevent or minimize damage to life and property, and damage to the environment that may result from inadequate standards for building in flood prone areas. Pursuant to these regulations, a special building permit is required for new construction or significant improvements. It addresses standards for building materials and practices, water supply and wastewater disposal, building elevation, anchoring of structures and materials, and flood-proofing. All first floor elevations must be at or above the established 100 year flood elevation for the building area. It also stipulates an approval process for watercourse alterations.

Weare Open Space Plan (2002)

Adopted as a part of the 2005 Master Plan update, the Open Space Plan includes a set of eight small-format (10 x 7.5 inch) maps that display the natural resources and land uses in the town. A list of 17 Goals and Key Actions to achieve them was also developed, along with a set of Open Space Priorities. All Goals, and select Key Actions, as well as a summary of the Open Space Priorities is provided below.

Goals and Select Key Actions

Goal 1: Ensure that the Citizens of Weare continue to be fully involved in the Open Space Planning activities for the Town.

Goal 2: Preserve and protect Weare's natural environment, open spaces and resource base through sound management practices.

Key Actions:

- Boards: Does any land within the development proposal lie within an existing or potential interconnected open space area?

- How will this development add to the existing open space network?

- What is the quality of the open space: is it passive or active, accessible to residents, include trails for walking, biking or other recreation?

- How does the development fit with other criteria listed in this Open Space Plan?

Goal 3: Sustain the scenic vistas, visual character, and the quality of life in Weare.

Key Actions:

- Scenic vistas and other visual qualities in Weare serve an important purpose for residents and visitors in the community. The Conservation Commission should establish an ongoing task force to identify important scenic qualities in Weare and rank them according to the need or desirability for preservation. This will have an important impact on the quality of life within the community.

Goal 4: Maintain and expand the landscape-based recreational and educational opportunities.

Key Actions:

- Update the 1994 Weare Recreation section in the Master Plan to identify outdoor recreation activity needs, and to set priorities for land acquisition associated with recreational needs. Open space may also be used in educational opportunities for Weare students and residents. Consider the use of existing open space for these educational opportunities.

- Encourage the development and maintenance of recreational trails within the town.

Goal 5: Protect the town's historic sites and archeological resources.

Key Actions:

- In cooperation with the Weare Historical Society, the Town should incorporate into this Plan a method for inventory of historic sites, and possible methods for conservation and protection, such as an Historic

District. The Town should consider updating the Historic Features section of the Weare Master Plan during the next Master Plan Update.

(An Historic Stone Box Culvert – Mountain Rd.)

Goal 6: Provide for the preservation of farmland and foster agricultural viability.

Goal 7: Promote the permanent preservation and appropriate management of woodlands and forests.

Goal 8: Promote an awareness of the relationship between the appropriate use of land and structures and the need to preserve open space.

Key Actions:

- Education is an extremely important part of any attempt to develop and implement an open space program. For residents to be fully aware of the incremental impacts that structures have on the land, they must be aware of the alternatives that are available which will help conserve open spaces. Establish an education program that will alert residents to this open space plan, and help make them fully aware of the consequences that land

development has on their community, and how they can work to preserve open land corridors.

Goal 9: Ensure that new development is accomplished in a manner that is appropriate and consistent with Weare's small town and rural character.

Goal 10: Protect natural areas such as wetlands, aquifers, aquifer recharge areas, groundwater, wildlife habitat, water quality, ponds, streams, timber resources, mineral deposits and steep slopes.

Key Actions:

- The Town of Weare should present a clear vision for the future, limit growth to priority development areas, and minimize the impact of residential development to preserve the natural landscape. Appropriate regulations should be developed to indicate where these areas are located.

- Conduct a wetlands ranking assessment to determine which wetlands are important to preserve.

Goal 11: Encourage protection in open space of 50% of land being developed.

Key Actions:

- Include regulations in appropriate ordinances that encourage 50% of land within a development to be preserved as open space with conservation easements and/or ownership by a homeowner's association, where possible.

Goal 12: Preserved open space within proposed developments shall be designed, whenever possible, to be contiguous and interconnecting with adjacent open space.

Key Actions:

- Include regulations in appropriate ordinances that encourage developers to designate open space contiguous to other existing or planned open space areas if the potential for connection exists.

Goal 13: Promote the development of a linked open space network including pedestrian, equestrian, and OHRV trails for use by the community.

Key Actions:

- Incorporate language within appropriate ordinances that specifies what a developer should be encouraged to do when his/her proposed development

lies within a potential area that could be linked with other open space areas. This may include dedication of open space that will link these areas together.

Goal 14: Increase the public's awareness of their role in protecting natural resources.

Key Actions:

- Educate residents to encourage the preservation of public access and natural buffers for rivers and wetlands whenever possible.

Goal 15: Encourage the cooperation and coordination of groups having interests and concerns associated with outdoor recreation.

Goal 16: Acquire, develop and maintain additional land for the open space and active recreational needs of Weare's population.

Key Actions:

- To fulfill its Open Space Plan goals and objectives, the Town could employ potential implementation methods and should submit proposals for grants through state and federal grant programs.

- The Town should review municipal land holdings and place conservation restrictions on those properties that are of scenic, historic, cultural, ecological, or recreational significance and that are seen as a priority. This will ensure that these properties are protected in perpetuity.

- A Capital Improvement Program should include provisions for the acquisition of priority open land and important natural resources.

Goal 17: Work with area land trusts and non-profit conservation organizations such as the Society for Protection of New Hampshire Forests, the Audubon Society of New Hampshire, the Trust for Public Land, and other agencies whenever possible when purchasing and / or protecting open space land in Weare.

Open Space Priorities

Open space areas and the resources they contain, were prioritized into three categories: highest, medium and lowest priority.

Highest Priority

- Steep Slopes greater than 15%
- Wetlands
- Wetland Buffers

- Floodplains
- Aquifers
- Hydric Soils (very poorly and poorly drained soils)
- Surface Waters (Ponds, Streams, Lakes, etc.)
- Riparian Corridors
- Forest Blocks (Unfragmented Land Areas) greater than 2,000 acres
- Prime/High Quality Agricultural Land
- Historic Properties/Sites (mill and dam sites, villages, buildings, parks, farmsteads, fields, cemeteries)
- Greenways
- Recreational Resource Lands in close proximity to villages
- Wildlife Habitat Areas

Medium Priority

- Land which provides an access or link to a proposed greenway
- Forested Blocks (Unfragmented Land Areas) 500 to 2,000 acres

Lowest Priority

- Forested Blocks (Unfragmented Land Areas) 250 to 500 acres

Specific geographic areas were also identified as priorities for protection in the plan:

- Extended portions of the Piscataquog River shoreline which are not currently developed and which will help link existing conservation sites
- Railroad rights-of-way
- Corridors extending from Federal lands to Mount William for wildlife and recreation areas
- Preservation and linkage of large tracts of land in southwest Weare and north-central Weare

Regional Planning Documents

The South, Middle and North Branches of the Piscataquog River were studied and ultimately nominated for designation under the Rivers Management Protection Program. As a part of this program, all designated rivers are the focus of a management plan. The Piscataquog River Management Plan was written in1999 and updated in 2009 by the Piscataquog River Local Advisory Committee. The plan is intended to provide recommended guidelines to the towns for the protection of the rivers by which they are served. The designated sections of the Piscataquog in Weare are as follows:

- North Branch of the Piscataquog River from the outlet of Deering Lake Dam in Deering 6.25 miles to the Abijah Bridge in Weare (Classified as Natural river)

- From the outlet of Lake Horace in Weare 8 miles to the Everett Dam flowage in Weare. Additionally, from the outlet of the Everett Dam in Weare 8 miles to the river's confluence with the South Branch in Goffstown. (Classified as Rural river)

Introduction to Weare

Located in Hillsborough County, Weare occupies the boundary of two eco-regions: Hillsborough Inland Hills and Plains to the west, and Gulf of Maine Coastal Plain to the east. Elevations of the town range from approximately 100 meters (328 ft.) to 360 meters (1,181 ft.). The entire town is situated in the Merrimack River Basin, and is largely drained by branches of the Piscataquog River.

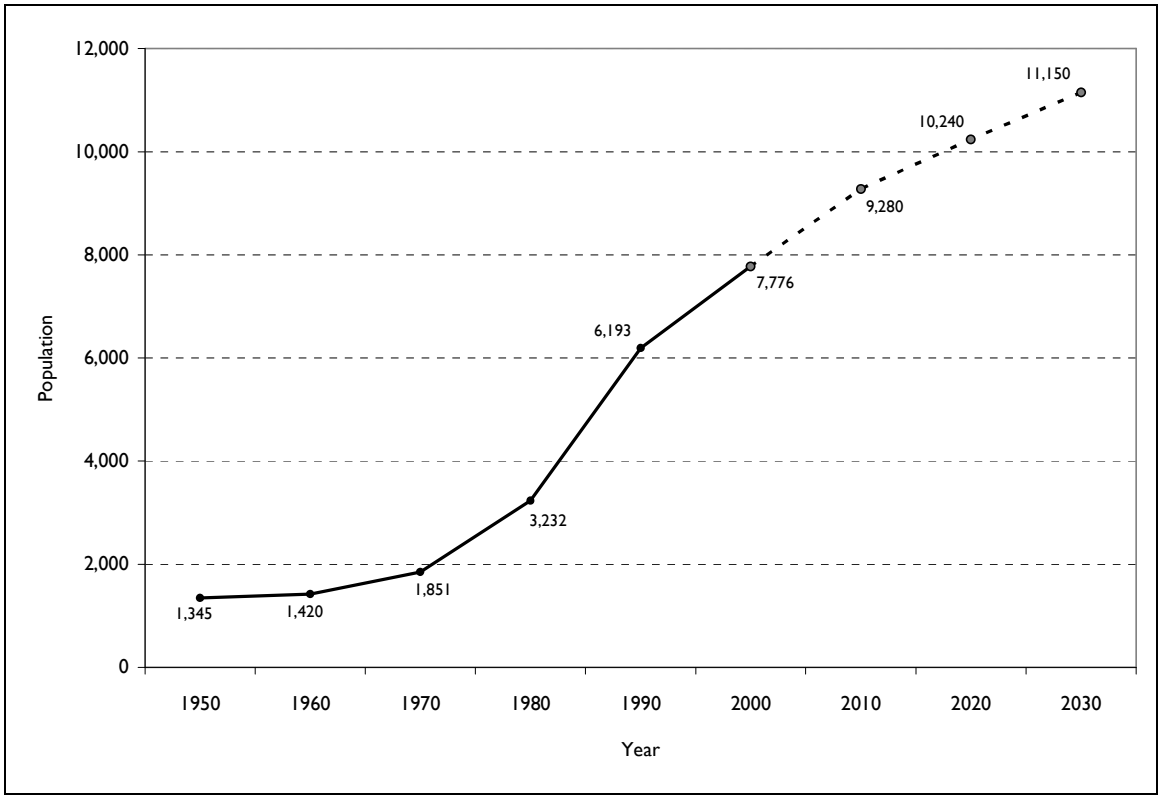

Figure 1: Population Growth in Weare, NH
Source: SPNHF, 2005, NH OEP 2007

Weare's population has grown substantially since the mid-twentieth century. According to the NH Office of Energy and Planning, the population grew by 7,935 people - a 590% increase from 1950 to 2010 (see Table 1: Population Growth and Projection for Weare,1950 to 2030). This population growth rate has clear implications for the impacts of land conversion, pollution, resource degradation and other environmental impacts. In New Hampshire, for each single family home built, approximately 1.4 acres

of land is developed[1]. As Figure 1 and Table 1 indicate, Weare's population is predicted to grow further by approximately 19% between 2010 and 2030.

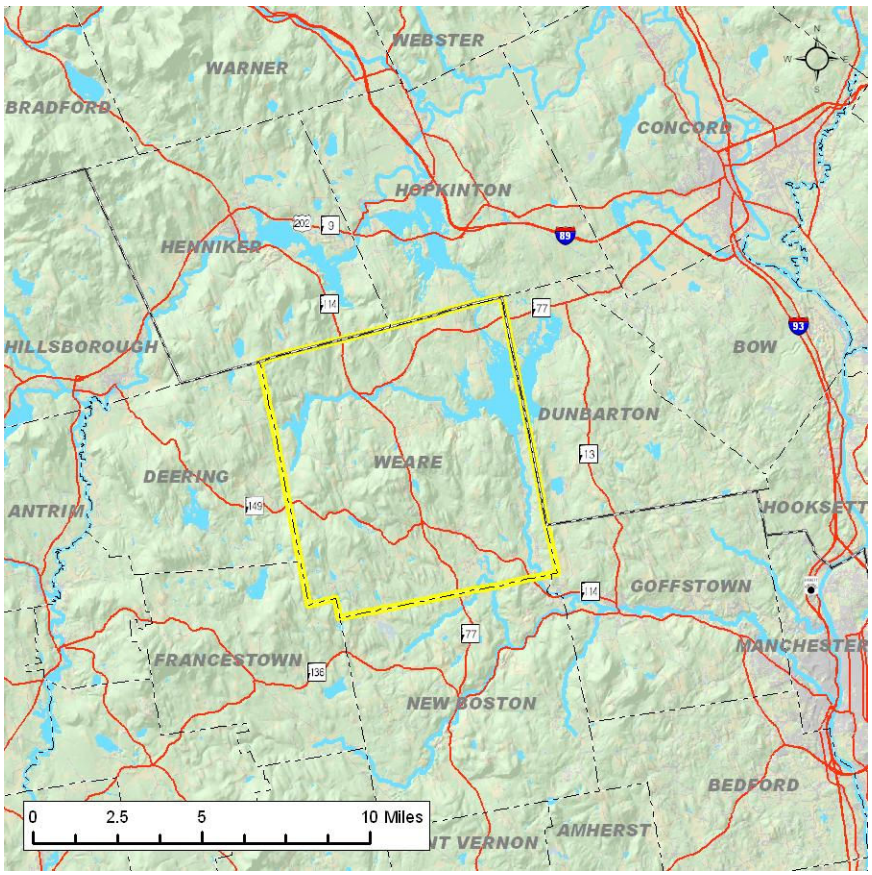

Figure 2: Weare, NH and Environs

Base Map

The first map for this report, the Base Map provides a photographic aerial view of the town and its immediate surroundings. If a picture is worth a thousand words, an aerial photograph of an entire town must be worth many volumes. The daily view of the earth available to humans is one from the ground, looking more-or-less laterally to the immediate surrounding landscape. However, when seen in its entirety at once from the point of view of over 1,000 ft. in the air, a town takes on a completely different appearance. Parts of the town previously viewed independently on the ground, and connected by linear views of connecting roads are suddenly seen to interrelate spatially in a very different way.

Any photograph is by definition a "snapshot" of its subject in time and space. The 2008 imagery shown on the accompanying map presents a very accurate view of Weare is it appears today. As well as the recent changes that have left their mark on the town,

[1] *New Hampshire's Changing Landscape*, Society for the Protection of NH Forests, 2005

signatures of the more gradual changes that have taken place on the landscape over the last 100 years or so are still quite visible even today. Open agricultural lands, developed areas, gravel pits, wetlands and water bodies stand out in sharp relief against the backdrop of the otherwise forested background of the town. Settlement patterns that show clusters of residences and the associated farmlands are still clearly visible, especially in North Weare, Weare Center, and the other village centers. More recent residential and seasonal development is clearly seen as well, most notably near several lakes and ponds, in concentrated subdivisions, and along major and minor roads.

The accompanying aerial base map combines a composite of the 2008 USDA NAIP Digital Color Orthophoto Quads with and overlayment of the five base layers: roads, town and county boundaries, wetlands (including water bodies), streams, and conservation lands. The resolution of the photography is approximately 1 meter, represented by pixels that depict a color value of 1 square meter in area on the ground. The photography was taken in leaf-on condition with no snow cover. A reduction of the Base Map is included in Appendix C of this report.

Table 1: Population Growth and Projection for Weare,1950 to 2030

Year	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2,010**	**2,020**	**2,030**
Population	1,345	1,420	1,851	3,232	6,193	7,776	9,280	10,240	11,150
Increase		75	431	1,381	2,961	1,583	1504	950	910

General Explanation of Maps

Eight large-format maps were created as part of this project, and these maps and the analyses that are associated with them form the basis for the Natural Resource Inventory. The maps are as follows:

- Aerial Photo Base Map
- Wildlife and Ecology
- Unfragmented Lands
- Water Resources
- Soils
- Historic and Cultural Features
- Scenic Areas
- Co-occurrence Model

A reduction of each large-format map is included in Appendix C of this report. All maps for this project were produced at a scale of 1:20,000 and cover the full extent of the town of Weare. All maps also include a half-mile (2,640 feet). buffer extending into adjoining towns to provide context for the natural and cultural features, protected lands, unfragmented blocks and conservation planning. The full size map format is 36" x 44", with the exception of the Co-occurrence Model map, which is 36" x 48".

All maps associated with this project were produced with GIS technology and data. "GIS", short for geographic information system, is a powerful tool designed to utilize computer hardware, specialized software, and digital geographic data for the capture, management, analysis and display of many forms of information that is geographically referenced. Virtually any kind of data that is associated with a geographical location or area can be used to gain perspectives of the data in a new way. The particular GIS software environment used for this project is ArcGIS 9.2, created by Environmental Systems Research Institute (ESRI).

Three forms of data are utilized by GIS. Map data supply spatial information associated with objects: attribute data in table form supply numerical and descriptive information associated with objects; image data that allow simultaneous viewing of static photographic; and map images such as aerial photography with the other forms of data.

Most data used in this project are stock public data compiled from a variety of sources and made available through NH GRANIT, the statewide clearinghouse for an array of GIS geospatial data and services. Original sources of data include NH Fish & Game Dept., NH Department of Transportation, the US Geological Survey, NH Department of Environmental Services, and USDA Natural Resource Conservation Service, to name a few.

In some instances custom datasets were created by the authors from local information, including new roads and scenic viewpoints, in a process known as digitizing. All data used in GIS must be in digital form. Custom data is created at the computer in a format that is compatible with the system, in the form of points, lines or polygons. These spatial data are then associated with text and numerical data as needed and available. New data thus created can be utilized and edited by subsequent users of GIS for planning and other purposes.

The details relative to the sources, units, formats, creators, parameters and other aspects of the data are encapsulated in metadata documents included with the data. Metadata for the GIS files used in this project, including the sources of the data, are presented in Appendix B.

NH GRANIT

The New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) is a cooperative project whose purpose is to create, maintain, and make available a statewide geographic data base serving the information needs of state, regional, and local decision-makers. A collaborative effort between the University of New Hampshire and the NH Office of Energy and Planning, the core GRANIT System is housed at the UNH Institute for the Study of Earth, Oceans, and Space in Durham. It includes a geographic database, and hardware and software used to build, manage, and access the database, along with a staff of experts knowledgeable in geographic information systems, image processing, and computer analysis. In addition to database development and maintenance, the GRANIT staff offers a range of application

development, training, and related technical services to GIS users in the state and the region.

The GRANIT approach to a statewide GIS depends upon the cooperative efforts of a host of agencies, collaborating on various elements of database design and construction as well as application development. The collaboration occurs formally through the NH GIS Advisory Committee, and informally through daily interactions between the growing body of GIS users in the state and the region. GRANIT was the primary source for geographic data for this project.

Map Components: Base Layers

All maps in this Natural Resource Inventory, with the exception of the Tax Parcel and Zoning overlay, include the following common "base layers":

Town and County Boundaries as provided by GRANIT are based on 1:24,000 USGS topographic maps. Towns and USGS do not always agree as to the exact location of town boundaries. Tax maps that include a portion of the Weare town boundary do not always coincide with the USGS town boundary, as sources vary. On all maps, the USGS town boundary has been displayed and is used for town-wide calculations, but in cases where conservation lands are shown along town boundaries, the tax map lines are generally followed. Town and county names are displayed on all maps.

Roads data are provided by GRANIT and are produced and maintained by NH DOT. Data include State highways, Town roads, private roads, and un-maintained roads including class 6 roads and jeep trails. In a few cases the DOT classification was erroneous or incomplete, and roads were added, removed, and/or reclassified to improve accuracy. Road name labels are displayed on all maps.

Surface Waters (lakes, ponds, rivers, and streams) based on United States Geological Survey (USGS) data and Wetlands based on National Wetlands Inventory (NWI) data (produced by US Fish and Wildlife Service) are provided by GRANIT. Streams are displayed as either perennial or intermittent, and all wetlands are displayed the same regardless of type. Where lakes, ponds, or streams have a place name associated with them, this is also displayed on all maps.

Conservation and Public Lands (ConsLand) as provided by GRANIT (2009 release) are labeled by name. Additional parcels were added to this layer as information became available from partner organizations including The Nature Conservancy, the Society for the Protection of NH Forests, The Monadnock Conservancy, and the Weare Conservation Commission. Lands included in this data layer include privately-owned tracts with legally binding restrictions for conservation use (such as conservation easements or deed restrictions), lands owned by federal, state, and local agencies, and conservation properties held in fee by private organizations such as the Society for the Protection of New Hampshire Forests. Town-owned properties are also displayed with conservation lands. However these publicly-held lands do not necessarily qualify as true conservation lands unless legally restricted in some fashion.

The ConsLand data for the town of Weare were used to calculate the percentage of protection for each natural resource in the report. For instance, the Wildlife Action Plan mapped 40 peatlands, a total of 180 acres in Weare. Consland mapping shows that 69 acres, or 38% of these peatlands occur inside existing conservation lands. Level of protection by area for each resource is based on this calculation approach.

2. WILDLIFE AND ECOLOGY

Habitat for wildlife provides food, shelter, water and space for animal species to survive and thrive in the natural environment. Every species has unique habitat requirements and preferences. Virtually all portions of the landscape provide some form of wildlife habitat from time to time, yet some habitat areas are disproportionately important either to a particular species, or to a diversity of species. Unfortunately, many of these important habitat types are relatively uncommon to begin with, and some are disappearing due to conversion or alteration by humans. Uncommon wildlife species often depend on unusual habitat, making conservation of these habitats especially important. The Wildlife Action Plan described below makes connections between these species and the communities they are associated with. It also has mapped areas where they are predicted to occur.

Landscape Context and Unfragmented Lands

Unfragmented Lands Analysis

Large undeveloped areas are recognized for their significance as intact biological habitat and for general open space values. These undeveloped areas are without maintained or regularly used roads. They contain natural land cover types such as forest, wetlands and surface waters, as can also contain (though far less frequently) agricultural lands and other unimproved human-disturbed areas such as gravel pits.

Fragmentation primarily from road use has a well-documented influence on wildlife, both by direct death or injury from vehicles, and by more environmental effects such as noise, and terrain and light disturbance. Certain migrant songbird species and several species of larger mammals are known to avoid areas with significant fragmentation, while conversely being attracted to large unfragmented areas. Consideration of the fragmentation that can result from unplanned development and guiding such development to areas that will have less fragmenting impact can result in the conservation of these important areas.

The determination of unfragmented areas in this project was developed using roads data. A 500 foot buffer along regularly traveled (i.e. ecologically fragmenting) roads was created for this analysis, to account for all typical existing or future house lots and related structures, and a disturbance area along maintained roads. This buffer was then removed from the landscape resulting in areas unfragmented by roads and their associated development.

Class 6 and some Class 5 Town roads (those considered by the Conservation Commission to be non-fragmenting), private driveways and trails were not included as fragmenting features for this analysis. As natural features of the landscape, water bodies and streams were also not considered fragmenting elements for the purposes of this analysis.

Blocks of unfragmented lands do not stop at political boundaries, and thus the analysis considered blocks that occur in Weare that in several cases also extend into neighboring towns. For this analysis, unfragmented blocks were calculated on the basis of total size regardless of political boundaries. Acreages in these other towns are included in the calculation and ranking. The Unfragmented Lands Map is included in Appendix C in this report.

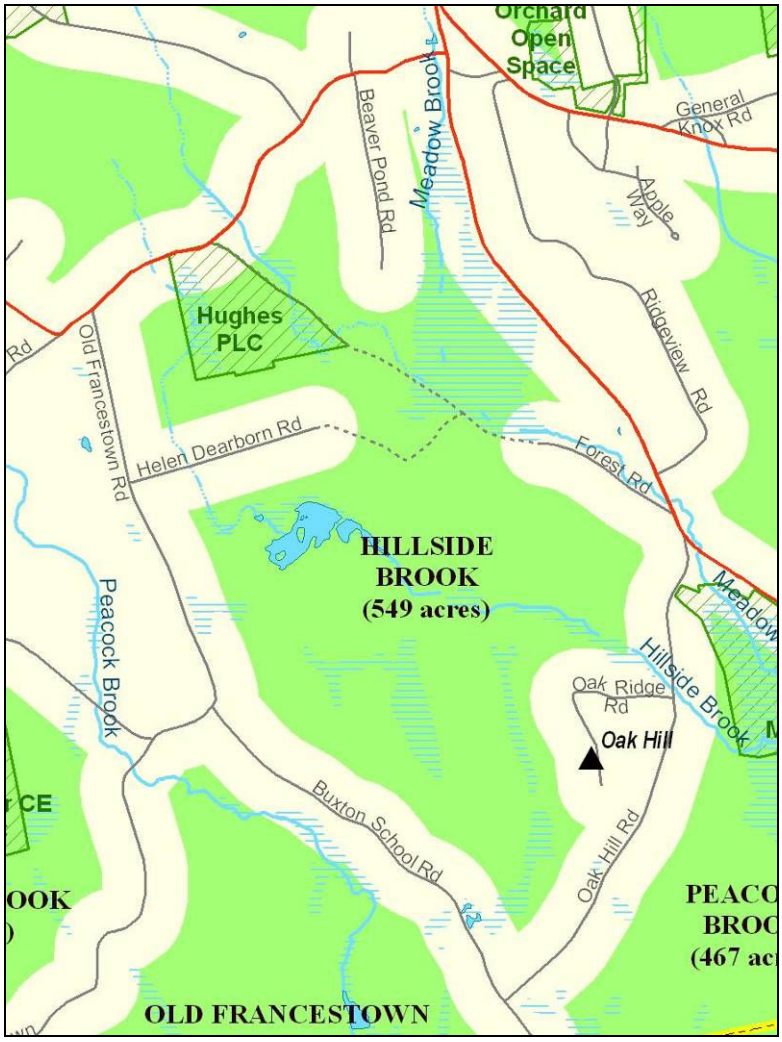

Figure 3: Hillside Brook Unfragmented Block

Significant Unfragmented Lands in Weare

A minimum threshold of 100 acres, and upper thresholds of 500 acres, 1,000 acres, 2,000 acres, and 3,500 acres were established in classifying the blocks. All blocks were assigned names for ease of reference, based on a place name within each block. Please refer to Figure 4 and Table 2 for the names and sizes of each block.

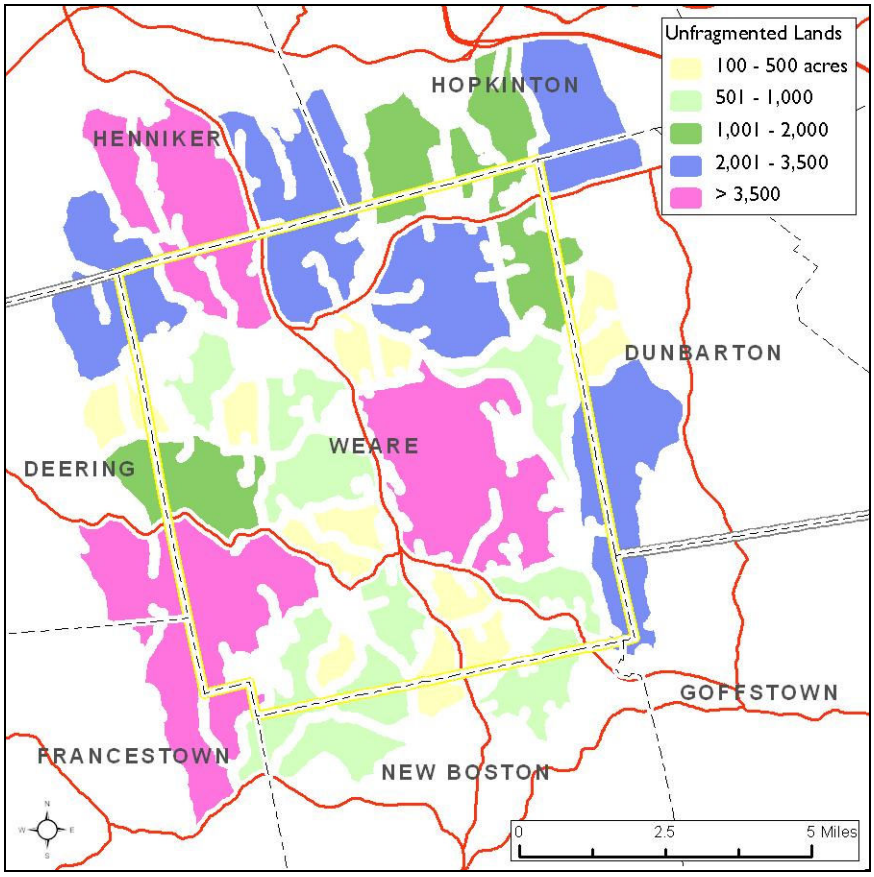

Figure 4: Unfragmented Lands, Regional Context

There are currently still extensive unfragmented areas in Weare. There is one entire unfragmented block in the over 3,500 acre category (Melvin Valley, 4,281acres) and significant portions of two others in this largest category: Chipmunk Hills - 957 acres of 3,530 total acres; and Ferrin Pond - 2,380 acres of 5,505 total acres.

Unfragmented blocks of the 2,000 acres to 3,500 acres range are also well represented in Weare. The entire Peaselee Meadow Brook (2,235 acres) block occurs in Weare. Portions of three other blocks in the category also occur in Weare: Rattlesnake Hill – 1,289 of 3,154 total acres; Kuncanowet Hills – 862 acres of 3,194 total acres; Vincent State Forest – 561 acres of 2,317 total acres; and One Stack Brook – 13 of 2,156 total acres.

Portions of four blocks in the 1,001 to 2,000 acre category also occur in Weare: Toby Hill – 1,256 acres of 1,759 total acres; Choate Brook – 890 acres of 1,057 total acres;

Burnt Hill – 198 acres of 1,263 total acres; and Sugar Hill – 189 acres of 1,219 total acres.

Status of Land Protection in Unfragmented Land Blocks

The comprehensive natural resource protection that land conservation provides makes it a good measure of the status of the protection of resources generally in an unfragmented area.

As Table 2 illustrates, some of the unfragmented areas in Weare are well protected, while others currently have little or no protection. 8 of the 34 unfragmented areas mapped are either completely un-protected, or have less than 10% of their area in conservation or public lands. Note that these acreage and percent values for level of land protection represent that of the entire area of each unfragmented block, which in many cases includes area in neighboring towns.

Burnt Hill – largely protected (77%), conservation extending into Hopkinton

Melvin Valley – very large, relatively unprotected (13%)

Choate Brook and Everett Lake – very well conserved (83%, 74%) in ACOE properties

Rattlesnake Hill – fairly well conserved (40%) with contiguous large tracts

Vincent State Forest – 70% protected by state forest

Peaselee Meadow Brook – almost 39% protected, but by two non-contiguous tracts

Table 2: Unfragmented Lands in Weare and their Land Protection Status

Unfragmented Area Name	Total					Weare					
	Total Acres	Protected		Un-Protected		Weare Acres	% in Weare	Protected		Un-Protected	
		acres	%	*acres*	%			*acres*	%	*acres*	%
Barnard Brook	329	173	53%	156	47%	9	3%	9	100%	-	0%
Breed Brook	556	122	22%	434	78%	556	100%	122	22%	434	78%
Burnt Hill	1,263	978	77%	285	23%	198	16%	190	96%	9	4%
Candlewood Hill	5,511	1,296	24%	4,215	76%	2,386	43%	701	29%	1,685	71%
Center Brook	294	-	0%	294	100%	294	100%	-	0%	294	100%
Chevy Hill	326	214	66%	112	34%	326	100%	214	66%	112	34%
Chipmunk Hills	3,530	349	10%	3,181	90%	957	27%	199	21%	758	79%
Choate Brook	1,057	880	83%	177	17%	890	84%	726	82%	164	18%
Currier Brook	207	54	26%	153	74%	207	100%	54	26%	153	74%
Dudley Brook	184	67	36%	117	64%	75	41%	1	2%	73	98%
East Weare	163	-	0%	163	100%	163	100%	-	0%	163	100%
Everett Lake	815	604	74%	211	26%	815	100%	604	74%	211	26%
Ferrin Pond	5,511	1,296	24%	4,215	76%	2,386	43%	701	29%	1,685	71%
Griffin Hill	914	121	13%	793	87%	186	20%	-	0%	186	100%
Hillside Brook	549	34	6%	515	94%	549	100%	34	6%	515	94%
Hoit Mill	502	195	39%	307	61%	502	100%	195	39%	307	61%
Kuncanowet Hills	3,194	1,237	39%	1,957	61%	862	27%	100	12%	762	88%
Meadow Brook	312	-	0%	312	100%	308	99%	-	0%	308	100%
Melvin Valley	4,283	565	13%	3,718	87%	4,283	100%	565	13%	3,718	87%
Mine Hill	938	236	25%	701	75%	938	100%	236	25%	701	75%
Mount Dearborn	335	61	18%	274	82%	335	100%	61	18%	274	82%
Odiorne Hill	313	7	2%	305	98%	313	100%	7	2%	305	98%
Old Francestown Road	651	169	26%	482	74%	316	48%	3	1%	313	99%
One Stack Brook	2,156	804	37%	1,352	63%	13	1%	-	0%	13	100%
Peacock Brook	467	75	16%	392	84%	229	49%	41	18%	188	82%
Peaslee Meadow Brook	2,235	878	39%	1,357	61%	2,235	100%	878	39%	1,357	61%
Poor Farm	934	87	9%	847	91%	497	53%	87	18%	410	82%
Rattlesnake Hill	3,154	1,247	40%	1,907	60%	1,289	41%	573	44%	716	56%
Stark Brook	272	179	66%	93	34%	2	1%	2	100%	-	0%
Sugar Hill	1,219	892	73%	327	27%	189	16%	123	65%	66	35%
Tavern Village	327	-	0%	327	100%	327	100%	-	0%	327	100%
Toby Hill	1,759	131	7%	1,628	93%	1,256	71%	131	10%	1,124	90%
Vincent State Forest	2,317	702	30%	1,615	70%	561	24%	367	66%	193	34%
Weare Reservoir	558	123	22%	436	78%	558	100%	123	22%	436	78%
Total	47,134	13,777	29%	33,356	71%	25,011	53%	7,049	28%	17,961	72%

NH Wildlife Action Plan

In the most comprehensive and sophisticated study yet undertaken in New Hampshire for wildlife habitat mapping and conservation planning, the New Hampshire Fish & Game Department unveiled its Wildlife Acton Plan (WAP) in late 2006. Recently updated and subject to continuous refinement, it is an important tool for towns and organizations to use in planning the conservation of high quality and/or imperiled wildlife habitat, rare plant habitat and exemplary natural communities and systems. Data from this recent project has become available for this project and is featured prominently.

The WAP project worked with habitat groupings at three scales: broad-scale (matrix forests and sub-watershed groupings), patch scale (priority habitats such as grasslands and peatlands) and site scale (documented occurrences of rare and uncommon species and natural communities). Mapped data is available for viewing and use only at the broad and patch scale levels.

WAP Patch Scale Priority Wildlife Habitat Areas

The Wildlife Action Plan used predictive modeling to estimate where examples of significant habitat groupings would occur in New Hampshire. Field surveys are recommended by the WAP to verify the accuracy of the predictive model mapping on the ground. See Table 3 for acreages and the level of current protection.

Table 3: WAP Patch Scale Priority Wildlife Habitats in Weare

WAP Patch Habitat	Total Acres	Areas in Weare	Protected		Not Protected	
			Acres	%	*Acres*	%
Large Grasslands	1,419	16	128	9%	1,225	91%
Peatlands	180	40	69	38%	111	62%
Marsh and Shrub Wetlands	1,581	143	475	34%	936	66%
Rocky Ridge - Talus Slopes	16	6	4	26%	12	74%
Floodplain Forest	1,357	2 groupings	691	51%	665	49%
Pine Barrens	46	12	36	80%	9	20%
Total	4,360		1,403	32%	2,957	68%

WAP Large Grasslands

Large grasslands are typically created and maintained by humans, but they provide critical habitat for a variety species. Grasslands have become uncommon in New Hampshire as forests gradually reclaim what were once extensive agricultural areas during the 18th, 19th, and early 20th centuries, and as fire suppression has prevented most wildfires.

Large grasslands are especially important for wildlife diversity with several species occurring only in the very largest of grasslands areas. To reflect this, the WAP mapped grassland areas that have at least 10 hectares (24.7 acres) of continuous area that are

dominated by grasses, forbs, and sedges, and with little shrub or tree cover (generally less than 10%). These areas are generally active or recently abandoned farm fields. Grasslands can include agricultural fields, airports, landfills, meadows, or heathlands. Northern harrier, upland sandpiper, purple martin, eastern meadowlark, grasshopper sparrow, horned lark, vesper sparrow, northern leopard frog and wood turtle are all uncommon species that depend on grassland habitat in New Hampshire.

State-wide, grasslands are relatively under-protected, with about 8% under land conservation. In Weare, 16 areas are mapped by the WAP as Grassland habitat, a total of 1,419 acres. Of these areas, significant examples occur near Weare Center, East Weare and Tavern Village.

WAP Peatlands

Due to their chemistry and hydrology, peatlands are wetland that accumulate slowly decomposing vegetative matter as peat. Peaty wetlands form due to limited or no groundwater input and thus have poor nutrient content and acidic water. "Quaking" bogs are one particularly familiar, yet uncommon examples of a type of peatland. Peatlands are often isolated in basin settings, or occupy the quiet end of larger wetlands or shallow ponds. This habitat grouping category contains many dozens of natural wetland community types, a number of which are rare in NH. Rare plant species are often associated with peatlands. Associated uncommon wildlife species of note include ringed boghaunter dragonfly, palm warbler, spruce grouse, mink frog, ribbon snake and northern bog lemming.

Peatlands are relatively uncommon in Weare, and most are relatively small, ranging in size from 0.3 to 27.7 acres. Of the 40 peatlands totaling 180 acres mapped by the WAP in Weare, only four (10%) are over 10 acres in size, and 24 (60%) are under five acres.

Several significant peatland examples do occur in Weare, however. A collection of three fairly large peatlands are situated on or near the Brown Farm property east of Weare Center. A network of two peatlands is found in Felch Farm Town Forest in north-central Weare. Two peatland complexes are located near Tavern Village in the south portion of Weare - one to the east and one to the west, with other isolated peatlands scattered across the town.

(Beaver-Flooded Peatlands – Bartlett / Ferrin Pond Town Forest, SW Weare)

WAP Marsh and Shrub Wetlands

This large habitat group includes dozens of natural wetland community types. These open wetlands are dominated by herbaceous vegetation or short (less than 3 meters) woody vegetation (i.e. shrubs) and include three broad habitat types: wet meadows, emergent marshes, and scrub-shrub wetlands. Significant wildlife species associated with these areas include ringed bog-haunter dragonfly, American black duck, American bittern, American woodcock, northern harrier, osprey, pied-billed grebe, common moorhen, great blue heron, least bittern, rusty blackbird, sedge wren, Blanding's turtle, spotted turtle, eastern red bat, New England cottontail, and silver haired bat. Often thought to be safe from development due to State wetlands laws, these habitats are susceptible to impacts from the surrounding uplands, as well as from surface source waters.

As is the case with most of the State, marsh/shrub wetland habitat is common and widespread in Weare. 143 areas comprising 1,581 acres of this broad habitat grouping occur in Weare. The great majority of these areas are relatively small, with 72% of them less than ten acres in size. Especially significant marsh areas are associated with branches of the Piscataquog River in the west, south and east portions of the town, Meadow Brook to the south, Peaselee Meadow Brook in north-central Weare, and Choate Brook in northeastern Weare. Numerous other isolated marsh/shrub wetlands,

wetland complexes, and marsh/shrub wetlands associated with lakes and ponds are well distributed across the town.

(Note: A discussion of other wetland types as mapped by the US Fish and Wildlife Service in the National Wetlands Inventory and by the USDA Natural Resource Conservation Service can be found in the Water Resources chapter of this report.)

WAP Rocky Ridge – Talus Slopes

This habitat group includes two distinct types. Rocky ridge and summit outcrops are characterized by thin soils and dry, nutrient poor settings. Talus slopes are steep and rocky and range from open to barren to woodland. Situated primarily at the upper elevations of the higher mountains, and at the base of steep cliffs, bedrock and loose bedrock fragments compose the primary substrate. 25 natural plant communities are known to occur state-wide in areas mapped as rocky ridge – talus slope. Melissa arctic butterfly, black racer, timber rattlesnake, common nighthawk, peregrine falcon, black bear and bobcat, are important wildlife species known to associate with this habitat in New Hampshire.

In Weare, this habitat type is uncommon. The most significant example is situated at the summit of Mt. William, where 11.5 acres of rocky ridge habitat occurs. Five other much smaller examples, all under two acres occur on the highlands south, west and north of Everett Lake near the Dunbarton border, especially on the east flank of Raymond Cliff. Such a significant collection of talus/ridge areas in this confined and relatively unfragmented area may be particularly well-suited to wide-ranging species such as bobcat.

WAP Floodplain Forests

Floodplain forests develop in lowlands that are subject to regular, seasonal flooding along rivers and larger perennial streams. Represented by several specific natural communities, they can be dominated by tree species such as silver maple *(Acer saccharinum)*, green ash *(Fraxinus pennsylvanica)* and cottonwood *(Populus deltoides)* that are adapted to the extremes of inundation and drawdown that take place in floodplains. Floodplain forests can provide important habitat for uncommon wildlife species. Red-shouldered hawk, veery, cerulean warbler, American redstart, chestnut-sided warbler, Baltimore oriole, beaver, mink, river otter, wood turtle, Blandings turtle and spotted turtle all depend on such habitat.

Many floodplain forest areas have been cleared and converted to agriculture, as these easily worked and rock-free fine alluvial soils tend to be highly suitable for this use. Primarily for this reason, intact examples of this habitat are much less common than they once were. In Weare, floodplains have been mapped extensively by the WAP, as groupings of multiple related flood areas near major streams. The largest of the two mapped floodplain groupings is situated along the North Branch Piscataquog River from Weare Reservoir east to Everett Lake near the Dunbarton border, totaling 896 acres. The other grouping of floodplain areas, totaling 461 acres in area, also occurs along the

course of the North Branch Piscataquog River, where it flows south from Everett Lake to the New Boston border.

WAP Pine Barrens

This habitat is characterized by very well to excessively-well drained sandy soils, and an abundant presence of pitch pine *(Pinus rigida)*, scrub oak *(Quercus ilicifolia)*, other Appalachian oaks, and other tree and shrub species adapted to periodic fire. Such conditions usually arise on outwash and deltaic deposits that are remnants of the last glacial period, and usually occur in or near valleys of medium to large rivers. The topography of such areas tends to be fairly flat with, rocks and bedrock being scarce. The combination of proximity to population areas and their suitability for development have caused the great majority of these habitat areas in New Hampshire to be converted to human uses.

The biodiversity value of pine barrens is exceptional, especially for butterflies and moths, and plants. The Concord pine barrens have been shown to support 726 species of moths and/or butterflies, four of which globally imperiled, and 37 of which are endangered or threatened in New Hampshire. Several species of uncommon to rare reptile, amphibian, bird and mammal species also depend on pine barrens as prime habitat. These species may include frosted elfin butterfly, Karner blue butterfly, Persius duskywing, smooth green snake, eastern box turtle, Fowler's toad, common nighthawk, eastern towhee, whip-poor-will, and New England cottontail.

Pine barren habitat is very uncommon in Weare. 12 areas are mapped in the town by the WAP, but 10 of these (83%) are under three acres in size. Local examples of this habitat are mapped by the WAP primarily along the Choate Brook drainage in the northeastern part of Weare, with the largest example by far being 30 acres in size. Two smaller areas also are located in the southeast part of town in the Piscataquog River drainage.

WAP Matrix Forest Model

The assemblage of tree species that dominate a given area can be defined by forest type. Numerous classification systems of forest type exist, each developed with specific goals in mind. For this study, we have used the Matrix Forest model created as part of the WAP. The NH Fish and Game Department, working with The Nature Conservancy and the NH Natural Heritage Bureau, mapped areas predicted to support any of five large, inclusive forest groupings. This data model estimates climax forest type, *i.e.* the broad forest type which would eventually occur given total recovery from human disturbance based on abiotic site factors (such as slope, aspect, elevation, latitude, or soil type). Included in each matrix forest type are smaller-scale natural communities (*i.e.* patch scale habitats). The two matrix forest types that occur in Weare are described below, and are summarized by area and protection level in Table 4.

Table 4: WAP Matrix Forest Types in Weare

WAP Matrix Forest Type	Total Acres	% of Weare	Protected		Not Protected	
			acres	%	*acres*	%
Appalachian Oak - Pine	15,209	40%	3,179	21%	12,031	79%
Hemlock - Hardwood - Pine	16,773	44%	4,061	24%	12,694	76%
Total	31,982	83%	8,552	27%	29,922	94%

Appalachian Oak-Pine Matrix Forest

Occurring in a southerly distribution relative to other forest types in New Hampshire, this matrix forest type reaches its northern extent in southeastern, southwestern and far western New Hampshire in association with warmer and drier conditions and often in fire-influenced landscapes. Major canopy species include the "Appalachian" oaks such as white and black oaks, as well as red oak and white pine. This matrix forest type is considered at risk, largely because it tends to occur in populated areas exposed to impacts from infrastructure, development and intensive land use. Uncommon wildlife species known to associate with this matrix forest type include black racer, Fowler's toad, Eastern hognose snake, timber rattlesnake, smooth green snake, American woodcock, bald eagle, wild turkey, whip-poor-will, eastern pipistrelle, eastern red bat and wood thrush.

Appalachian Oak-Pine Matrix Forest is especially common in Weare, accounting for 15,209 total acres, or 40% of the area of the town. It is well- distributed in the town, but is especially prominent in the southeast portion of town, where well-drained and thinner soil conditions prevail.

Hemlock-Hardwood-Pine Matrix Forest

These forests are often considered a transitional zone between northern hardwood - conifer forests and Appalachian oak - pine forests. Major canopy species may include hemlock, red oak, white pine or red maple. These forests are likely to succeed to hemlock and beech over the long term. By far the dominant matrix forest type in this part of New Hampshire, it is quintessentially familiar to all who live and visit New Hampshire. This forest type is suitable for popular game species including moose, white-tailed deer, wild turkey and black bear. Wildlife species of concern in NH associated with this habitat type include: timber rattlesnake, northern goshawk, veery, Coopers hawk, cerulean warbler, eastern pipistrelle, eastern red bat, northern myotis, silver haired bat and bobcat.

In Weare, Hemlock-hardwood-pine is the most common matrix forest type, representing 16,773 acres or 44% of the total area of the town. It is distributed widely, being especially predominant in the northeast and southwest parts of Weare.

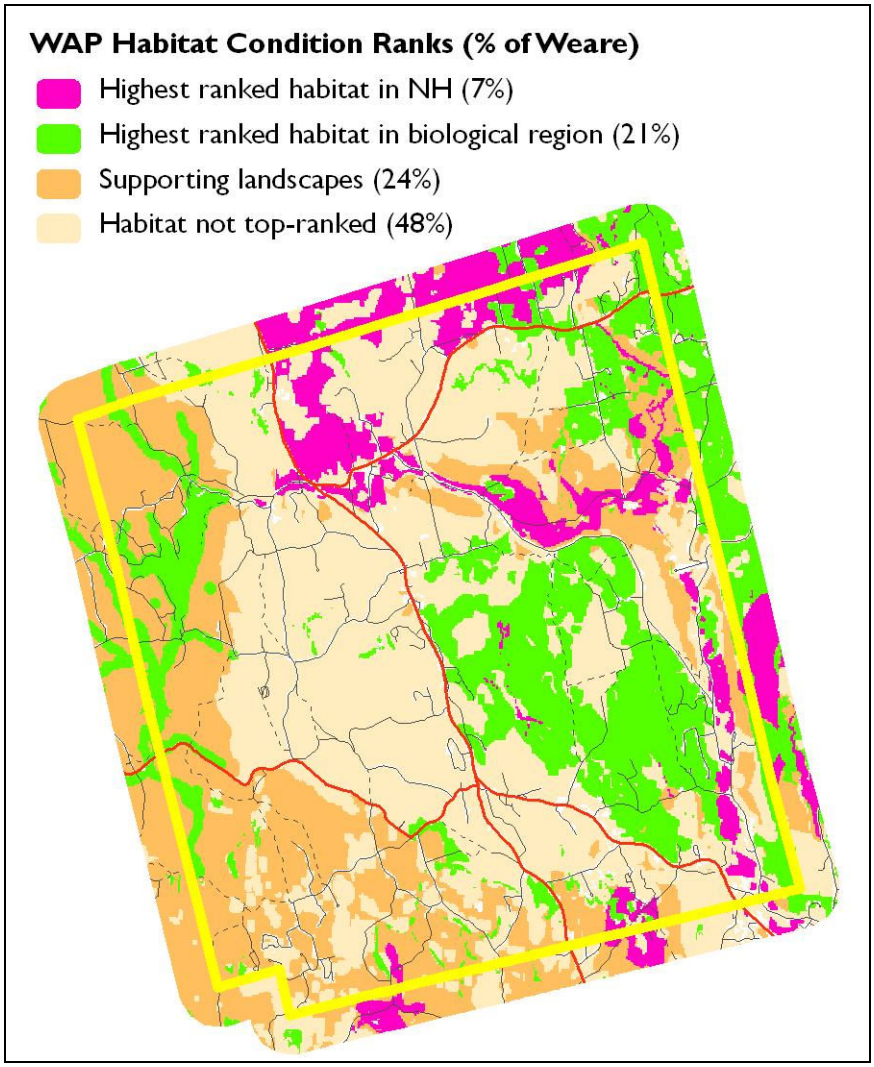

Figure 5: WAP Habitat Condition in Weare

Ranking of Wildlife Habitat by Condition

With the goal of setting priorities for conservation of important wildlife habitat in New Hampshire, the Wildlife Action Plan identified areas of the state with unusually pristine, influential, diverse or extensive examples of "exemplary" habitat. These areas were, in turn, ranked by condition on both sub-state regional and statewide levels, resulting in a tier of priority areas for conservation.

Figure 5, above, illustrates the excerpt from this rank mapping that shows what priority areas occur in the Weare study area. In Figure 5 areas in purple indicate Tier 1 Habitat: *Highest Rank Habitat by Condition in New Hampshire*. Green areas indicate Tier 2 Habitat: *Highest Rank Habitat by Condition in Biological Region*. Salmon-colored areas indicate Tier 3 Habitat: *Supporting Landscapes* that include top-ranking condition streams and lakes, large forest blocks or statewide significance, or specific animal, plant and natural

community occurrences identified as critically imperiled. Beige colored areas are not top ranked.

All told, 50% of the town area, or 19,209 acres are ranked as important habitat at the landscape level. 2,518 acres of Tier 1 - *Highest ranked habitat in NH*, are mapped in Weare (shown in Figure 5 in purple). A large concentration of this ranked habitat extends from the Chase Village/North Weare area (Including portions of the Eastman Conservation Area), easterly along the North Branch Piscataquog River to Everett Lake, and then southerly along the river to the New Boston town line. Two other smaller concentrations straddle the New Boston border – one south of Daniels Lake, and the other near an un-named pond. A third area of Tier 1 habitat extends into Weare from Hopkinton to the north, just west of Choate Brook and north of Rte. 77.

Extensive areas of Tier 2, *Highest ranked habitat in biological region* also occur in Weare, most notably the very large block east of Mt. William Pond (Including most of Melvin Valley) and South Weare, the northeast corner of the town, and the riparian zones associated with Weare Reservoir and its source streams. In all, 20% of the town (7,785 acres) is ranked as Tier 2 habitat by condition.

Tier 3 habitat is also well represented in Weare. These "supporting landscapes" extend beyond the Tier 1 and Tier 2 areas especially the entire western side of town, and the gaps between Tier 1 and Tier 2 habitat areas in the eastern part of town.

Rare and Uncommon Species and Natural Communities

Rare and uncommon plant and animal species have been documented in the town of Weare, and this data is maintained by the New Hampshire Natural Heritage Bureau of DRED, in cooperation with the New Hampshire Fish & Game's Non-Game and Endangered Wildlife Program. Generalized information on the presence of these species and communities is available from the Natural Heritage Bureau. According to the Bureau's "Rare Plants, Rare Animals and Exemplary Natural Communities in New Hampshire Towns", the species and natural communities/systems listed in Table 5: Documented Rare Plants, Animals, and Natural Communities in Weare are now or were at one time documented to exist in the town of Weare. The specific location of these rare species and communities is not available for this study due to data release policies of the NH DRED. See Table 5, below, for explanations of rarity codes.

Table 5: Documented Rare Plants, Animals, and Natural Communities in Weare

Importance value	Species or Community Name	Listing status		# Reported, last 20 years	
		Federal	State	Town	State
Natural Communities - Terrestrial					
**	Appalachian oak - pine rocky ridge	-	-	2	14
**	Mesic Appalachian oak - hickory forest	-	-	1	6
**	Red oak - black birch wooded talus	-	-	1	4

**	Red oak - ironwood - Pennsylvania sedge woodland	-	-	2	12
Natural Communities – Palustrine Wetlands					
**	Black gum - red maple basin swamp	-	-	1	28
**	Circumneutral hardwood forest seep	-	-	1	5
**	Medium level fen system	-	-	2	58
Plants					
**	American Cancerroot (*Conopholis americana*)	-	T	1	24
**	Small Whorled Pogonia (*Isotria medeoloides*)	T	T	1	49
Vertebrates - Birds					
	Great Blue Heron (Rookery) (*Ardea herodias*)	-	-	H	38
Vertebrates - Reptiles					
**	Blanding's Turtle (*Emydoidea blandingii*)	-	E	3	119
**	Northern Black Racer (*Coluber constrictor constrictor)*	-	T	2	22
**	Wood Turtle (*Glyptemys insculpta*)	-	-	4	114
Invertebrates - Mollusks					
**	Brook Floater (*Alasmidonta varicosa*)	-	E	1	31

Listed: E = Endangered; T = Threatened;
Historical: H = Documented more than 20 years before publication of source report
Importance Values: **** = Highest importance
*** = Extremely high importance
** = Very high importance
*= High importance
These flags are based on a combination of (1) how rare the species or community is and (2) how large or healthy a particular example is. Please contact the Natural Heritage Bureau at (603) 271-2214 to learn more about approaches to setting priorities.
Source: New Hampshire Natural Heritage Bureau. 2006

Riparian Zones

Riparian zones are areas adjacent to surface waters that provide a transition to upland areas, and wetland context for these waters. Where they are undisturbed, these zones are important for the water quality services they provide by the filtration of off-site erosion materials and nutrients, shade from excessive solar in-stream heating, flood water storage, contributions of beneficial organic (especially woody) debris, and most germane to this chapter, wildlife habitat. The ecological systems that are incorporated within riparian zones make them worthy of consideration for conservation.

Riparian areas are hotspots for wildlife. They provide foraging and nesting opportunities, and are critical movement corridors for species dependent on streams and their environs. They are preferred habitat for the following species among many others: Northern two-lined salamander, Fowlers toad, Blandings turtle, ribbon snake, wood duck, red-shouldered hawk, Eastern screech owl, barred owl, red-bellied woodpecker, pileated woodpecker, veery, cerulean warbler, river otter, mink, and all species of bat in New Hampshire.

To capture the ecological value of riparian zones, they are mapped here as 300 foot buffers along both sides of all perennial streams, and along the shore of lakes and ponds. They can be seen on the Wildlife Habitat map as meandering brown-hatch strips bordering all significant water features in the town. 9,466 acres of riparian buffer zones were derived and mapped in Weare, in total equivalent to 25% of the total town area. As the Wildlife map illustrates, this network of riparian zones is very extensive across the entire town, and connections are common. See Table 6 for details on significant riparian areas in Weare.

Table 6: Riparian Areas in Weare

Watershed Name	Total Acres	Protected		Not Protected	
		Acres	*%*	*Acres*	*%*
Everett Lake	3,607	1,509	42%	2,097	58%
Hopkington-Everett Reservoir	151	84	56%	67	44%
Middle Branch Piscataquog River	3,449	531	15%	2,918	85%
Upper Piscataquog River	1,019	386	38%	633	62%
Weare Reservoir	1,240	133	11%	1,107	89%
Total	9,466	2,645	28%	6,822	72%

(See Map 4: Water Resources for USGS-designated watershed boundaries)

Early Successional Forests and Open Lands

In the 1830's, the landscape of New Hampshire looked very different than it does today. The majority of the forest cover had been converted to agricultural uses, providing extensive habitat for those species that favored such open areas. Times have changed, and now following more than a century of wide-spread pasture and field abandonment, the forest has in large part once again become the dominant land cover. However, numerous species still require open lands for their survival, and such areas have become increasingly uncommon, as old fields are left to go fallow, and former agricultural fields are converted to residential and commercial uses.

Diversity of wildlife is enriched by the retention of active agriculture and the incidental habitat it provides. Wildlife species typically associated with active agriculture rely on open habitat and also benefit to some degree from the crops and byproducts of farming. Many of the uncommon species are the same as those identified by the Wildlife Action Plan for the Grassland Priority Habitat, including northern harrier, upland sandpiper, purple marten, eastern meadowlark, horned lark, grasshopper sparrow, vesper sparrow, northern leopard frog, and wood turtle.

A custom dataset of early successional lands in Weare was produced for this report. This involved the interpretation of current color aerial photography, and digitizing of early successional areas according to the different habitat types and their current condition. Please refer to Table 7 for definitions and acreages of open lands in Weare.

Table 7: Early Successional Forest and Open Lands in Weare

Open Lands / Early Successional Forest Class	Habitat Type	Habitat Definition	Acres
Open	Old Pasture	Abandoned fields with <50% tree/shrub coverage	249
(open fields and abandoned agricultural lands with 0 to 50% canopy cover)	Meadow	Natural or minimally managed open fields	164
		Open Total	413
Early Successional Forest	Old Field	Old fields with >50% but <100% tree/shrub cover	98
	Early Successional	Old fields / clear cuts with 100% sapling tree cover (<2 meters)	236
(young forest and selectively harvested forest)	Advanced Early Successional	Young forest (>2 meters)	11
	Mixed age	Selectively harvested mature canopy (<75% canopy closure)	1,706
		Early Successional Forest Total	2,051
Actively Managed	Hay Fields	Active agricultural use: hay fields, pasture	668
	Row Crops	Active agricultural use: row crops	111
(active agricultural and other intensively managed lands)	Orchard	Tree (>2 meters) fruit farming (e.g. apple, pear)	20
	Utility Line Right-of-Way	Utility line clearings	68
		Actively Managed Total	868
Disturbed	Active Gravel Pits	Active gravel / sand / clay extraction	160
(open sites where the majority of topsoil has been removed)	Old Gravel Pits	Revegetating or reclaimed gravel / sand / clay pits	11
		Disturbed Total	171
Open Lands / Early Successional Forest Total			3,502

NOTE: This classification scheme does not include wetlands (these are mapped as part of the National Wetlands Inventory and the Wildlife Action Plan habitats) nor does it include open lands directly associated with development such as lawns or public open space like parks, golf courses, or cemeteries. The minimum mapping unit is approximately one acre.

The majority of Weare is currently forested, but early successional habitat in Weare is fairly well represented, totaling 3,502 acres, or 9% of the town's total area. Most of these acres are not coincident with the WAP Large Grassland Habitat areas, due in part to many of them being smaller than the 25 acre threshold for large grasslands, but also because early successional habitat as mapped includes other land cover types, such as active and abandoned sand/gravel pits, residual forestry areas, very old fields and power line corridors.

3. WATER RESOURCES

Watershed Context

Municipal, County and State boundaries in and of themselves are irrelevant or non-existent from the standpoint of plants and animals, and the physical landscape and elements that interact and co-exist with humans. However, delineations of the landscape that are based on real physical characteristics have meaning and utility, and can reflect the differences that are observable at various scales. One such delineation that has utility is that of watersheds.

All of the terrestrial portions of the earth are a part of a watershed. Watersheds exist at an almost infinite range of scales, from the tiniest tributary stream that does not show on any map, to major continent-draining rivers. Terms are applied to the different scales of a drainage unit, which are in effect nested.

In some instances the dividing lines between major drainage basins form real biological boundaries for the organisms and natural systems that occur there. In other instances, watershed boundaries are more useful to indicate subtler distinctions, such as likely concentrations and routes of migrating wildlife, or nutrient cycles reflective of forest condition. Regardless of their application, watersheds are a convenient and physically definable way to parse the landscape into smaller units. The question becomes one of scale and what might be more useful for a particular purpose.

Hydrologic Unit Code Drainages

The U.S. Geological Survey has developed a scaled delineation approach that has coded all drainages in the United States. This numbering scheme is called the Hydrologic Unit Code (HUC). This hierarchical approach to classification of drainage units uses a set of digits that represents a certain level in the system. The more digits used to refer to a drainage, the finer the delineation within the system. Under this cataloguing system a six-digit code is a basin (for instance the Merrimack River Basin), eight digits represent a sub-basin, 10 digits represents a "watershed" and 12 digits a sub-watershed. Although the term watershed can be used to describe any drainage at any scale, in the HUC system only a 10 digit hydrologic unit is called a "watershed".

On Map 4, HUC 12, or 12-digit sub-watershed level boundaries are displayed as bold dotted blue lines. For convenience and easy recognition the watersheds are also referred to by a name associated with a significant waterbody within the watershed. The HUC12 sub-watershed divisions are labeled on the accompanying map on both sides of the divides with the name of the watershed drainage. The map lines delineate the various sub-divisions of watersheds by indicating divisions between adjacent watersheds. Thus, the boundaries always follow the highest points of the terrain that separate adjacent drainages. To interpret the watersheds on this overlay, it is best to view it with the underlying streams and surface waters showing on another map, and with topographic contours.

Table 8: HUC12 Sub-watersheds in Weare

Watershed (HUC10)	Sub-watershed (HUC12)	Acres	% of Weare
Lower Contoocook River	Hopkinton Lake	13	0.03%
	Hopkington-Everett Reservoir	1,093	3%
Piscataquog River	Everett Lake	14,902	39%
	Weare Reservoir	4,271	11%
	Upper Piscataquog River	3,943	10%
	Middle Branch Piscataquog River	14,241	37%

Drainage Perspective for Weare

The entirety of Weare lies within the Merrimack River Basin. The dividing boundary between the Merrimack and Contoocook Sub-basins (HUC 8 level) crosses the northeastern corner of Weare. Land north of this boundary drains toward the Contoocook River, and is included in the Contoocook Sub-basin, while the rest of Weare is in the Merrimack Sub-basin. Weare's portion of the Merrimack Sub-basin is occupied by the Piscataquog River Watershed. This Watershed is further subdivided into the Everett Lake, Weare Reservoir, Upper Piscataquog River, and Middle Branch Piscataquog River Sub-watersheds. Please refer to Table 8: HUC12 Sub-watersheds in Weare and Map 4: Water Resources for a display of the hierarchy and acreages of these sub-watersheds.

Lakes and Ponds

Lakes and ponds provide many benefits to the public, as well as to their natural constituents. Public benefits include recreational activities such as fishing, swimming and boating. Lakes and ponds also provide habitat for aquatic plant and animal species which depend on them solely for survival, but also for many other species of animals that rely on this resource for at least a portion of their life cycle. The level of most lakes and ponds in New Hampshire is controlled by established dams, and such is the case in Weare.

Lakes and Ponds in Weare

Weare has a variety of lakes and ponds that provide numerous ecological and recreational services. A brief introduction to the five largest lakes and ponds in Weare follows. Table 9 displays acreages of these water bodies.

Lake Horace or Weare Reservoir (323 acres) is the largest and deepest waterbody in town. It is an impoundment of the North Branch Piscataquog River and supports a number of residences on its shores.

Everett Lake (140 acres) is a segment of the North Branch Piscataquog River that is impounded by Everett Dam, a flood control project of the US Army Corps of Engineers,

which monitors and controls the lake level (see Appendix D for a description of the creation and operation of Everett Lake). Recreational access is provided by entry to Clough State Park. Recent flooding has damaged some of the amenities at this park, however.

Mt. William Pond has a number of residences nearby, but its water quality is good enough to qualify it as a designated trout pond by NH Fish & Game, which stocks it.

Ferrin Pond is also a designated trout pond, but is fundamentally different than the other ponds mentioned here. Its level is not controlled by a dam. It is relatively remote, its shores are entirely wild and undeveloped, and the land surrounding the pond is entirely conservation land.

Daniels Lake (100 acres) in the south part of Weare is dam controlled, and has extensive bordering wetlands. Its primary source is Otter Brook, and if drains a short distance to the Middle Branch Piscataquog River.

(Aerial view of Ferrin Pond (top) and two un-named wetlands)

Perkins Pond Marsh and Riverdale Dam are very heavily vegetated and contain little open water. Riverdale Dam is located on the North Branch Piscataquog River in the southeastern corner of Weare.

Lake characterization data sheets for these water bodies containing location, topography, morphology, bathymetry, land use, and fishery information are provided in

Appendix E. The data sheets were prepared by the New Hampshire Fish and Game Department. Also provided in Appendix E are a map and aerial photograph of the Perkins Pond Marsh and the associated New Hampshire Fish and Game Wildlife Management Area.

Table 9: Lakes and Ponds in Weare (Great Ponds)

Great Pond	Acres
Daniels Lake	100
Everett Dam	140
Ferrin Pond	15
Mount William Pond	33
Perkins Pond Marsh	55
Riverdale Dam	33
Weare Reservoir	323

Source: DES Consolidated List of Waterbodies Subject to RSA 483-B,
The Comprehensive Shoreland Protection Act – Revision Date 7/1/08.

Recreational Access

Public boating and fishing access is provided to Weare's larger lakes and ponds.

Lake Horace is accessible for trailered boats at a ramp at the north end of the lake. The ramp and a public beach are located within Chase Park and are managed by the Weare Parks and Recreation Commission.

Clough State Park provides beach access, and two launch points for non-petroleum-powered boats to access Everett Lake. (In 2009 the park was unstaffed but was vehicle accessible.)

Mt. William Pond is accessible for non-petroleum-powered, trailered boats. The public gravel access ramp is off Rte. 114 on the west side of the pond.

Ferrin Pond has remote fishing access and carry-in boat access via a walking trail. It is a stocked trout pond only accessible on foot.

Daniels Lake has carry-in boat access off Rte. 114 at the north end of the lake.

Rivers and Streams

Values of Rivers and Streams

Streams and rivers provide wildlife habitat in the form of direct support for aquatic species, and also as corridors of travel to a variety of species. They also provide recreational opportunities for fishing, swimming and boating. Water quality of flowing

waters is largely dependent on the condition of the surrounding landscape, as well as the condition of ground and surface water inputs. As water sources for lakes and ponds, it is important that streams and rivers be preserved in their natural state to the greatest extent possible. Forestry, agricultural, commercial and residential activities all have the potential to degrade water quality.

Rivers and Streams in Weare

Many of the upper reaches of streams in Weare are in un-developed, relatively pristine condition. While most of the stretches of streams in Weare are single tributaries to larger streams or water bodies, several are of a higher order. Stream order is determined by the number of tributaries contributing to a stream. Thus, a 1st order stream has no tributaries. A 2nd order stream is made when two 1st order streams combine. A 3rd order stream is made up of 2 or more 2nd order steams, and so on. There are no streams larger than 4th order in Weare (Table 11). Certain regulations apply to areas adjacent to 4th or higher order streams, including forestry laws and the Comprehensive Shoreland Protection Act, which is explained later in this chapter.

(Buxton Brook – at Mountain Road, SW Weare)

There are a total of 121 miles of streams and rivers in Weare, including flow lines through connected lakes and ponds. 20.8 miles of these are classified as intermittent

streams. Most streams are unnamed, presumably due to their smaller size. 16 streams and rivers are named, however. Table 10 lists the named streams in Weare.

Table 10: Named Streams in Weare

Barnard Brook
Breed Brook
Buxton Brook
Center Brook
Choate Brook
Currier Brook
Dudley Brook
Hillside Brook
Huse Brook
Meadow Brook
Middle Branch Piscataquog River
Otter Brook
Peacock Brook
Peaslee Meadow Brook
Piscataquog River
Stark Brook

Piscataquog River

The Piscataquog River is an icon of the region, and is intimately intertwined with the character and history of Weare. A source of water power in earlier times, it now provides high-quality fishing opportunities, and important wildlife habitat and scenic values. Weare is situated in the heart of the Piscataquog watershed, and thus land use and land protection in the town are of considerable importance to the river and all the communities downstream that benefit from it.

Table 11: 4th Order Streams in Weare

4th Order Segment	Segment Description	Stream Miles
Piscataquog River, North Branch	...From the Outlet of Deering Lake Dam in Deering to the confluence with the South Branch in Goffstown (omitting Lake Horace and Everett Flood Control Area).	17.6
Piscataquog River, Middle Branch	Middle Branch - From the outlet of Scobie Pond in Francestown to the confluence with the South Branch in New Boston.	1.3

Source: New Hampshire Department of Environmental Services. Revised 7/1/2008. DES Consolidated List of Waterbodies Subject to RSA 483-B, The Comprehensive Shoreland Protection Act – Revision Date 7/1/08.

The Piscataquog River is comprised of three major branches: the South Branch, Middle Branch and North Branch. The three tributaries converge in west Goffstown to create the Piscataquog River proper, which flows easterly into Manchester, and ultimately empties into the Merrimack River. The great majority of the entire length of the North Branch flows easterly and then southerly through the town, connecting numerous riparian wetland natural communities and Lake Horace and Everett Lake along the way. A portion of the Middle Branch also passes through the town from the south, before returning southerly into New Boston.

Status of Protection of Surface Waters in Weare

Comprehensive Shoreland Protection Act

The Comprehensive Shoreland Protection Act (CSPA) specifies distances from certain significant bodies of water in which some activities are limited or prohibited. A State Shoreland Permit is required for some activities within the shoreland protection area. The purpose of the act is to protect public waters by intercepting surface runoff, wastewater flow, subsurface flow, and groundwater flow by minimizing the effects of nutrients, sediment, organic matter, pesticides and other pollutants, and by moderating water temperature. All 4th order and higher streams, designated rivers, and lakes and ponds are subject to the CSPA.

(Mt. William Pond)

See Table 9 and Table 11 for a list of water bodies in Weare that are subject to the CSPA. It should be noted that CSPA enforcement is variable and should not be relied upon solely as a mechanism for shoreland protection.

Wetlands Laws of the State of New Hampshire

The State of New Hampshire Wetlands Bureau has jurisdiction over all wetlands, defined as "an area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include, but are not limited to, swamps, marshes, bogs and similar areas." This includes swamps, marshes, bogs, wet meadow, lakes, ponds, streams and any other area that meets the three parameters for being a wetland under the U.S. Army Corps of Engineers Wetlands Manual of 1987, and includes intermittent streams with flow sufficient to create a defined channel. Activities that affect jurisdictional wetlands require a permit from the New Hampshire Wetlands Bureau. A wetlands delineation performed by a certified Wetland Scientist is generally required to determine the extent of wetlands proposed to be impacted, and depending on the size of proposed impact, different regulations apply. Forestry activities are subject to special regulations for temporary impacts from stream crossings, for instance. Conservation Commissions in New Hampshire are responsible for and entitled to review permits for activities within their borders.

The New Hampshire Rivers Management and Protection Program

The New Hampshire Rivers Management and Protection Program (RMPP) was established in 1988 following enactment of the Rivers Management and Protection Act by the NH Legislature. With the purpose of protecting the most significant rivers of the state, to date the program has designated 15 river sections for protection, including the North Branch of the Piscataquog River in Weare.

The RMPP classifies rivers according to a matrix of condition, impacts and proximity to developed areas. For each river classification, state law establishes specific protection measures related to dams and hydroelectric energy facilities, proposed channel alterations, protected instream flows, interbasin water transfers, siting of solid and hazardous waste facilities, water quality, and recreational use of the river. Local river corridor management plans make recommendations regarding the use and conservation of shoreline and adjacent lands associated with the river corridor.

RMPP Designated Rivers in Weare

Most of the Piscataquog River was designated segments designated by the RMPP in July 1993, including the great majority of its length in Weare.

North Branch Piscataquog River:

- designated as a "natural river" from the Deering Dam to where it is crossed by Abijah Bridge Road in Weare.

- designated as a "rural river" from the outlet of Lake Horace Dam to the Everett Dam flowage (approximately at the boundary of the ACOE property)

- designated as a "rural-community" river from the outlet of Everett Dam to the mouth of the North Branch, and from the NH Highway Route 13 to the mouth of the South Branch;

Middle Branch Piscataquog River:

- designated as a "natural river" from the outlets of Scobie Pond to the mouth, a portion of which flows through the south part of Weare.

Under RSA Chapter 483, natural rivers are defined as "free-flowing rivers or segments characterized by the high quality of natural and scenic resources. River shorelines are in primarily natural vegetation and river corridors are generally undeveloped. Development, if any, is limited to forest management and scattered housing."

Under RSA Chapter 483 rural rivers are "those rivers or segments adjacent to lands which are partially or predominantly used for agriculture, forest management, and dispersed or clustered housing...", etc.

Under RSA Chapter 483, rural-community rivers are defined as "those rivers or river segments which flow through populated areas of the state and which possess actual or potential resource values. Such rivers have some residential or other building development near their shorelines, are readily accessible by road or railroad, and may include some impoundments or diversions."

Wetlands

Value of Wetlands

Wetlands in general are a common feature of the New Hampshire landscape. They are so common, that it is easy to overlook the many ways that they benefit people. The services that wetlands provide are often referred to as functions.

These functions include benefits to drinking water, as aquifer recharge areas, sediment capture and control, and nutrient cycling to lock up excess nutrients such as nitrogen and phosphorus. They help minimize and prevent shoreline erosion by stabilizing the banks of lakes streams, and allow for storm and flood water storage to buffer the effects of flooding during high-water events. They provide critical habitat during at least a part of the life cycle of many animal species, and are hotspots of plant and animal biodiversity. They also provide more obvious contributions to the quality of life we enjoy in New Hampshire, including distant scenic views of wetlands and surrounding hills, as well as hunting and fishing opportunities.

(Dustin Brook Headwaters - Beaver Pond in North Weare)

These functions, and the human values they equate to are provided virtually free by our numerous wetlands. Destruction or serious alteration of wetlands diminishes their effectiveness in supporting a healthy and safe community and high quality of life. Wetlands deserve to be protected as much as possible, whether by force of law or by means of (wet)land protection.

Classification of Wetlands

Table 12: NWI Wetlands in Weare displays the variety of wetlands that occur in Weare according to the classification of wetlands developed by Lewis Cowardin and others according to a suite of common characteristics such as the dominant vegetation type, the depth of the water, the composition of the wetland bottom, and a variety of other traits. This National Wetlands Inventory or "NWI" is a map series based on this classification of wetlands, published by the U.S. Fish and Wildlife Service in 1979 in recognition of the need for a consistent and standardized approach to wetland classification. This was followed by a major mapping project, which by 2001 had produced an enormous map series scaled to 1:58,000, showing wetlands and deepwater habitat areas of over 90% of the lower 48 states. Wetlands were mapped primarily using aerial photo interpretation of 1985 and 1986 aerial photos. The maps were subsequently digitized and made publicly available.

Table 12: NWI Wetlands in Weare

Wetland Category	Wetland Type	Total acres	Count	Protected		Not Protected	
				Acres	%	*Acres*	%
Marsh	Marsh	538	146	263	49%	275	51%
	Marsh / scrub-shrub	221	34	68	31%	153	69%
	Marsh / woodland	12	4	2	16%	10	84%
	Total Marsh	771	184	333	43%	439	57%
Scrub-shrub	Scrub-shrub, broad-leaved deciduous	427	263	126	30%	301	70%
	Scrub-shrub, broad-leaved evergreen	28	7	26	93%	2	7%
	Scrub-shrub, mixed	2	1	-	0%	2	100%
	Total Scrub-shrub	457	271	152	33%	304	67%
Swamp	Swamp, broad-leaved deciduous	257	153	72	28%	185	72%
	Swamp, dead trees	15	4	-	0%	15	100%
	Swamp, mixed	19	5	6	31%	13	69%
	Swamp, needle-leaved evergreen	215	70	74	35%	141	65%
	Total Swamp	507	232	153	30%	354	70%
Open water (does not include lakes, ponds, or rivers)	Beaver pond	142	110	44	31%	98	69%
	Open water / aquatic vegetation	247	154	79	32%	168	68%
	Total Open Water	388	264	123	32%	266	68%
Grand Total		2,123	1,638	760	36%	1,363	64%

The NWI Classification considers all water bodies wetlands. All wetlands belong to one of five major wetland Systems: Lacustrine (lakes and ponds); Riverine (rivers and streams); Marine (deep water saltwater environments); Estuarine (shallow tidal-influenced saltwater wetlands) and Palustrine (everything else such as marshes, swamps, shallow ponds, etc). Within each System, Classes and Sub-Classes further subdivide wetlands according to common attributes. Each individual mapped wetland are assigned a code representing its System, Class and Subclass. For the purposes of this project, the codes have been translated to their equivalent wetland type names.

Wetlands in Weare

Lacustrine, Riverine and Palustrine wetlands systems all occur in Weare. As lacustrine and riverine systems are treated elsewhere in this report, the wetlands displayed in Table 12: NWI Wetlands in Weare are all in the palustrine system – marshes, swamps and shallow water bodies. Marshes, broad-leaved deciduous scrub-shrub wetlands, broad-leaved deciduous swamps and needle-leaved evergreen swamps are the most common types in Weare. Woodland marshes, mixed scrub-shrub wetlands and swamps with mixed cover type and with a prominent component of dead frees are the least common. Each of these types supports a different suite of plant and animal species.

Some types are unusual, however and as such may be worthy of particular note for conservation. For example, swamps with numerous standing dead tree snags, especially in isolated wetlands are required habitat as rookeries for the great blue heron.

(North end of Lake Horace)

Prime Wetlands

Prime wetlands are designated by a municipality according to the requirements of RSA 482-A: 15 and Chapter Env-Wt 700 of the DES administrative rules. The municipality chooses to evaluate the wetlands within its boundaries. Typically, the evaluation method used is *Method for Comparative Evaluation of Nontidal Wetlands in New Hampshire* (1991) or *Method for the Evaluation and Inventory of Vegetated Tidal Marshes in New Hampshire* (Coastal Method, 1993). Field and "desktop" data are used for the evaluation process. The municipality evaluates the functions and values of the identified wetlands.

Once the community has selected wetlands to designate as prime, the municipality holds a public hearing before the residents of the community vote on the designation. Once the municipality approves the wetlands for designation as prime, the municipality provides to the DES Wetlands Program a copy of the study and tax maps with the designated prime wetlands identified. DES reviews the submission from the municipality to ensure that it is complete and in accordance with Env-Wt 702.03. Once the submission is considered complete, the Prime Wetlands RSA will apply to any future projects that are in or within 100 feet of a prime wetland the rules and law that are

applicable. All projects that are in or within 100 feet of a prime wetland are classified as major projects.

Weare has officially designated Lake Horace Marsh and Perkins Pond as prime wetlands. A map indicating the location of Weare's Prime Wetlands is provided in Appendix F.

(Lake Horace Marsh – Weare Prime Wetlands)

Ground Water

Aquifers

Aquifers are underground repositories of drinking water. Virtually all portions of the landscape are capable of transmitting and storing some volume of water, but so-called "high-yield" or stratified drift aquifers are composed of coarse-grained sands and gravels and are reliable, high-capacity source areas for drinking water. As such, they should be targets for protection to preserve their potential as reliable, high-volume drinking water sources. Land use in high-quality aquifer areas can adversely affect groundwater, as pollutants may taint them to the point of making them unsuitable as drinking water sources.

(Lake Horace Marsh – Weare Prime Wetlands)

Aquifer data was generated by a cooperative program of the United States Geological Survey (USGS) and the NH Department of Environmental Services (DES) utilizing remote landscape analysis and limited site-specific reconnaissance techniques including seismic refraction surveys and test well drilling. Aquifers are ranked in terms of transmissivity, or the rate at which water percolates through a standardized area of substrate. In this case, the data represent a prediction of the potential amount of water that a given aquifer area may allow to be transmitted through itself per day, expressed in feet square per day. Potentially favorable gravel well areas are high-transmissivity locales.

Map 4, Water Resources displays the aquifers in Weare. The Stratified Drift Aquifers layer is displayed on the map as variably shades of pink to violet to purple according to transmissivity; ≤1,000, ≤2,000, ≤4,000 or ≤8,000 ft^2 / day. Table 13 displays acreages and protection level of these aquifer areas.

The Water Resources map indicates the probable locations of high yield aquifers in Weare. A ribbon of aquifer follows the course of the North Branch Piscataquog River on its passage through the town. Other lobes extend from the North Branch Piscataquog River southward to Weare Center, and northward into the town from

New Boston in the Daniels Lake area. Other lobes expand in several directions from the Everett Lake basin.

Especially high transmissivity areas (>2,000 ft^2 per day) are located around Duck Pond just south of Weare Center, in a zone directly north and west of Daniels Lake, in the center of the North Branch Piscataquog River corridor, and in an elongated zone northeast of Weare Center.

Table 13: High-Yield Aquifers in Weare

Maximum Transmissivity in ft^2 per day	**Total Acres**	**Protected**		**Not Protected**	
		Acres	*%*	*Acres*	*%*
1,000	4,407	1,562	35%	2,845	65%
2,000	620	150	24%	470	76%
4,000	39	2	5%	36	95%
Total	5,065	1,714	34%	3,351	66%
Potentially Favorable Gravel Well Areas	985	462	47%	523	53%

Potentially Favorable Gravel Well Areas (PFGWA)

PFGWA's are aquifer areas that are predicted based on landscape position, substrate and other physical characteristics to be potentially favorable areas for the withdrawal of drinking water. To map PFGWA's, potential and known contamination sources are excluded from mapped aquifers through GIS analysis. Thus, remaining aquifer areas are estimated to be free from potential contamination and therefore suitable for the siting of wells. For this project, only the PFGWA's that are predicted to produce more than 150 gallons/minute were mapped.

In Weare, PFGWA'a are mapped in very limited areas in association with aquifers rated at 2,000 ft^2 or more per day. They occur near Duck Pond, northeast of Weare Center, north of Daniels Lake, and on the eastern side of the North Branch Piscataquog River near the Dunbarton line. These areas are important to consider in town planning for new municipal drinking water supplies.

Existing Public Drinking Water Supplies

In Weare, most public drinking water supplies withdraw underground water (or groundwater) from wells drilled into fractured bedrock. Public water supplies are displayed on Map 4: Water Resources as blue asterisks. These are surrounded by wellhead protection areas (WHPA's), shown as orange buffers. WHPA's, are designated by the DES, and are meant to protect areas with influence on drinking water quality. WHPA's are delineated based on DES source water protection priorities; radii for bedrock supply wells are based on intake volume; gravel wells are based on production volume contingent radii and limited to high yield aquifer areas; and surface

water intakes are based on partial watershed delineations. Development in WHPA's is restricted in hope of maintaining the public drinking water supply well water quality.

Table 14: Well Head Protection Areas in Weare

Name	Well Location	# of Wells
Center Wood Elementary School	Weare	2
Collins Landing	Weare	2
Country Kids Childcare	Weare	1
Daniels Lake Development	Weare	1
Granite State Telephone	Weare	1
John Stark Regional High School	Weare	3
Kuncanowet Hills Mobile Home Park	Weare	1
South Weare Water Association	Weare	3
Sugar Hill Manor Mobile Home Park	Weare	3
The Rising Generation	New Boston	1
Weare Middle School	Weare	2
Weare Town Offices	Weare	1

21 Well Head Protection Areas are mapped in Weare, representing 12 entity locations, six of which have multiple wells, and thus overlapping WHPA's. Five locations are in support of schools, four are for residential developments, one is for a business, one is a local water district, and one is for municipal use (Table 14). Additional WHPA's may be identified in the 2010 Weare Source Water Protection Plan (prepared by the Southern New Hampshire Planning Commission subsequent to the preparation of this NRI).

Known Groundwater Hazards and Point Pollution Sources

The NH Department of Environmental Services maintains a database of documented known or potential hazards to groundwater and point pollution sources. All the sites mapped have a file at DES with information about the nature of the site, history and status of remediation and monitoring. They are mapped for Weare primarily to flag them for the Town as they plan for future land uses and protections. Detailed current information about groundwater hazard areas is available at the DES OneStop website: http://www2.des.state.nh.us/OneStop.

FEMA 100-Year Floodplain

Areas prone to flooding are mapped by the Federal Emergency Management Agency (FEMA) in co-operation with NH GRANIT. Mapped areas include the 100-year floodplain, *i.e.* any area with a 1% probability of flooding in any given year.

Significant flood zones occur along the North Branch Piscataquog River, especially around Everett Lake, and upstream of Lake Horace. The Daniels Lake and Meadow Brook drainages also have significant flood zones associated with them, as do most major streams. Weare was the subject of a study by the Federal Emergency Management Agency (FEMA) in 2005 for the purposes of providing flood insurance to property owners in mapped flood zones, an effort in cooperation with the Town of Weare.

4. SOILS

Values of Soils

The settlement patterns, land use history and ecology of the town of Weare have been determined in large part by the character and placement of its soils. The soils underlying the town today originated as mineral materials either deposited directly from glacial ice by sub-glacial accretion or glacial ablation (till), transported and deposited by meltwater streams (outwash sand and gravel), or transported and deposited by winds (loess) at the end of the last Ice Age, approximately 14,000 years ago. Altered over time by moisture, the addition of organic materials and chemical oxidation/reduction, they provide a diverse substrate to today's activities and processes both natural and cultural. Productive soils are a legacy that is essentially non-renewable and as such deserve special protection.

Soils are classed by the Natural Resources Conservation Service (NRCS) according to many criteria and for various purposes including construction, forestry and agriculture. In this study, special attention was paid to significant agricultural soils and important forest soils. As the foundation of much of the historical economy of the town, and as a continuing source of both private and public revenue, commercial activities in large measure depend on these especially productive soils for their success. Soils cannot be practicably replaced or recreated once they are degraded or removed, and thus the conservation of the soils themselves, as well as the land on which they occur, should be an important consideration for the town.

Important Agricultural Soils in Weare

The Farmland Protection Policy Act of 1981 was established to ensure that federal programs are compatible with state and local efforts to limit the conversion of farmland to other uses. The states and counties followed suit shortly thereafter by bestowing their own designations on state and locally important soils. The soil classes mapped in New Hampshire and available from the GRANIT GIS data system are prime farmland soils, soils of statewide importance, and soils of local importance.

Prime Farmland

These superior agricultural soils are deep and arable, with the ability to sustain commonly grown cultivated crops 7 or more years out of 10. These soils are suitable for a variety of agricultural uses, and are of the highest quality designation. The USDA

Land Use Policy of 1983 established the prime farmland soils designation and describes these highest quality soils as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Prime farmland is available for use as cropland, pastureland, rangeland, forest land, or other land but not urban built-up land or water. It has the soil quality, growing season, and moisture supply needed to produce economically sustainable high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

Soils of Statewide Importance

These soils are deemed significant for the production of food, feed, fiber, forage and oilseed crops in New Hampshire. Determination of statewide importance ranking is made by a state committee with representatives of the Department of Agriculture, Markets and Foods, UNH Cooperative Extension, NH Association of Conservation Commissions and the NH Office of State Planning (now the Office of Energy and Planning). Originally established in 1983, the criteria for designation were updated in 2000.

Soils that are not otherwise designated prime farmland must meet the following criteria for inclusion in the Statewide Importance ranking:

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

Soils of Local Importance

Soils of Local Significance are soils that are not otherwise designated prime, unique or of statewide importance that are deemed by each of the County Conservation District Boards as being locally important for the production of food, feed, fiber and forage. In Merrimack County these are:

- 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.

Table 15: Important Agricultural Soils in Weare

Agricultural Soil Class	Total Acres	Protected		Not Protected	
		Acres	*%*	*Acres*	*%*
Prime farmland	1,385	150	11%	1,236	89%
Farmland of statewide importance	1,302	139	11%	1,163	89%
Farmland of local importance	9,233	1,938	21%	7,296	79%
Total	*11,921*	*2,226*	*19%*	*9,695*	*81%*

Source: Natural Resources Conservation Service Soil Survey 2001

Protection of Important Agricultural Soils in Weare

Significant areas of Prime Soils occur in several locations in Weare, including Weare Center, the Peaselee Meadow Brook area, on Bart Clough Road, and Old Francestown Road among others. These highly productive soils, 1,385 acres of which occur in Weare, are especially important for conservation. Currently only 11% of these irreplaceable soils are protected by conservation restrictions or public ownership. Farmland of Statewide Significance also occurs in many locations, including Oak Hill Road, Dudley Brook Road, General Knox Road and Colby Road. Of the 1,302 acres of this highly productive soils class in Weare, only 11% are protected currently. Farmland of Local Significance is very widespread across the town, totaling 9,233 acres. These acreages for extant important forest soils do not reflect recent land use changes or conversions that have taken place in the town, therefore actual acreages of usable and intact soils will be less.

Important Forest Soils in Weare

Values of Forests

Taken together, forest and wetlands are the dominant natural land cover types of New Hampshire. Forests alone account for over 80% of the total land cover of the state. The character and ecology of the state is in large measure that of its forests and wetlands. Soils are intimately associated with forests and wetlands, both determining the structure and composition of the plant communities they support, and being altered themselves over time by the communities on which they depend. The economy of the state is also linked to its forests and wetlands, as growth gradually reduces productive forest cover while at the same time isolating jurisdictional wetlands in an increasingly built environment.

Values of Forest Productivity

The economic benefits of forestlands to the state of New Hampshire are well known. Towns in New Hampshire traditionally derive revenue from the timber tax collected from timber sales, and the harvest, sale and utilization of wood products all contribute to the job base of the state. Keeping forest land in productive use provides an economically viable alternative to more intensive uses such as residential development. Forest land offers additional benefits as well, including preservation of rural character,

wildlife habitat, water quality protection, recreational opportunities, hunting and fishing access, and scenic enjoyment, among others.

Soils are the basis of productive forestland, but not all soils are created equal in their capacity to grow forests. Areas with soils that are classed by the NRCS as more productive than others for their suitability to support some of the most economically valuable species, such as sugar maple, white pine and red oak are especially important to preserve. NRCS Important Forest Soil Groups are designations under which numerous particular soils units are grouped according to common traits such as moisture, depth of soil, and soil texture.

Table 16: Important Forest Soils of E. Hillsborough County, NH

Group	Definition
IA	• Deeper, loamy textured, moderately well, and well-drained soils • Soils are more fertile and have the most favorable soil moisture relationships • Favors stands of shade tolerant hardwoods, i.e., beech and sugar maple • Successional stands frequently contain a variety of hardwoods such as beech, sugar maple, red maple, white birch, yellow birch, aspen, white ash, and northern red oak in varying combinations with red and white spruce, balsam fir, hemlock, and occasionally white pine.
IB	• 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 • Favors stands of tolerant hardwoods, predominantly beech • Successional stands are commonly composed of a variety of hardwood species such as red maple, aspen, paper birch, yellow birch, sugar maple, and beech, in combinations with red spruce, balsam fir, and hemlock
IC	• 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 • Successional trends on these coarse textured, somewhat droughty and less fertile soils are toward stands of shade tolerant softwoods, i.e., red spruce and hemlock. Balsam fir is a persistent component in many stands, but is shorter lived than red spruce and hemlock • White pine, red maple, aspen, and paper birch are common in early and mid-successional stands • These soils are ideally suited for softwood production
IIA	• This diverse group includes many of the same soils as in groups IA and IB with physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness • Usually, productivity of these soils is not affected by their physical limitations • These soils are diverse and not easily classified with respect to forest type
IIB	• Generally poorly drained and low productivity • Productivity of these poorly drained soils is generally less than soils in other groups • Favors stands of shade tolerant softwoods, i.e., spruce in the north and hemlock further south; red maple is common on these soils further south.
NC	• These soils are either so variable or have such a limited potential for commercial production of forest products they have not been considered

Note: Only Classes IA, IB and IC were mapped and analyzed for this project.

Important Forest Soil Groups

Some soils are especially suitable for the growth of forests, but the species of trees they excel at growing varies by soil type. A woodlot that grows superior white pine will not necessarily be as productive for northern hardwoods for instance. This has not gone unnoticed by the humans who depend on forests for their livelihood. It is the particular soils that underlay a woodlot that, in large measure, can make it better than another for the production of certain high-quality wood products. The majority of soil areas in New Hampshire have been mapped and classified according to their relative productive capacity to grow trees. Six classes of productive qualities were developed by the NRCS for this purpose. Each of the 10 counties in the state has its own particular classification: eastern Hillsborough County's six classes are explained in Table 16, and quantified in Table 17.

Important Forest Soils in Weare

Weare is blessed with considerable highly productive forest soils. 91% of the town's area contains one of these productive soils. IA soils, most suitable for growing sugar maple and other high-quality hardwoods is especially common in a patchwork of areas in the southwestern half of the town. IB soils, which favor the growth of softwoods such as white pine, are the least common type in Weare, and are generally restricted to the courses of the North Branch Piscataquog River, and the Daniel Lake area. IC soils, highly suitable for the growth of beech and mixed hardwoods generally predominate in the eastern and southeastern parts of the town.

Table 17: Important Forest Soil Groups in Weare

Important Forest Soil Group	Total Acres	Protected		Not Protected	
		Acres	*%*	*Acres*	*%*
IA	11,011	1,814	16%	9,197	84%
IB	17,015	3,553	21%	13,462	79%
IC	2,775	1,008	36%	1,767	64%
IIA	1,527	432	28%	1,095	72%
IIB	2,787	577	21%	2,210	79%
Total	*35,115*	*7,383*	*21%*	*27,732*	*79%*

Source: Natural Resources Conservation Service Soil Survey 2001

Hydric Soils

Hydric soils were formed under conditions of saturation, flooding, or ponding for a long-enough period during the growing season to develop anaerobic conditions in the upper part. These soils are sufficiently saturated or inundated long enough during the growing season to support the growth and reproduction of vegetation that predominates in hydric conditions (hydrophytic or wetland vegetation).

The (NRCS) Soil Survey Division staff in its 1993 Soil Survey Manual identified seven natural drainage classes for soils in the United States. They are, from drier to wetter: excessively drained, somewhat excessively well drained, well drained, moderately well

drained, somewhat poorly drained, poorly drained, and very poorly drained. The two classes at the wetter end of this spectrum are normally associated with wetlands and hydrophytic vegetation. The Soil Survey Manual includes the following generalized descriptions of these soil classes:

> Poorly drained: Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow-depth. Free water at shallow depth is usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these.
>
> Very poorly drained: Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

Hydric Soils in Weare

Hydric soils are mapped widely in Weare, usually in the same locations as the wetlands that they underlay. However, due to differing methodologies and scale differences in the underlying data, hydric soils units mapped by NRCS do not always align precisely with the USFWS NWI wetlands (see Water Resources chapter). Reference to both hydric soils and NWI wetlands will provide a more comprehensive understanding of the location and extent of wetlands in Weare.

Map Display of Soils in Weare

The Soils Map (Map 5) displays three designations of soils: hydric soils (dark blue hatch), important agricultural soils (two shades of brown), and important forest soils (shades of green and tan). It should be noted that the soils mapping precision is limited to units of about 3 to 5 acres or larger, and is for the most part based on the soil material that existed prior to residential and commercial development. Thus, some areas that are mapped as important productive soils may be altered and degraded today, making them less suitable for productive use.

5. HISTORIC AND CULTURAL FEATURES

Values of Historic and Cultural Resources

Every town or city has its own unique history and story, contributing to a shared sense of community, and of place and time. This legacy is continually being added to, and this accumulation of local experience and knowledge can enrich the lives of the inhabitants. Over time, certain features will endure and be celebrated, while others will change and gradually disappear. In an effort to record what are recognized to be the most important of these features, this Chapter identifies and maps many of them. Open space provides a context for the historical, cultural and natural features in Weare, and much of this open space has been preserved by conservation easements, fee ownership or other means. These Conservation and Public Lands help to maintain the rural character of the town, and are included in this Chapter as cultural resources.

Sources of Information

This Chapter combines locally-collected information with existing datasets to display the location of features deemed to be historically or culturally important by the Town. As existing location GIS data on most of these features was unavailable, features of historical or cultural significance were newly digitized, and combined to create a new data layer. Additional information was solicited from knowledgeable Weare citizens to add recent and additional local information on features and locations, and these were incorporated into the maps and report.

The exceptional pair of histories written about the town were the primary source of information. Recognizing the need and importance of documenting the early years of the town, a committee was convened in 1882 with the goal of publishing a history of Weare. At that year's town-meeting, five hundred dollars was appropriated to continue the collection of information, publicize the project, and fund the initial phases of writing. William Little was hired to compile and write the extensive 1,064 page history, which was published in 1888, and subsequently reprinted in facsimile in its entirety. The second history of Weare, written by Helen E. Dearborn and published in 1959, extending the earlier historical accounts, that ended in 1888, into the second half of the twentieth century.

Another major source for the historical and cultural features displayed on the GIS map was the map produced in 1888 by Collins, Peaslee and Dearborn of the original historical committee. Drawn by G. C. Patten, it is a geographic accompaniment to the 1888 Town History, showing an extensive collection of cultural features, along with roads, waterbodies, wetlands and heights of land in the context of the original grid of ranges and range ways.

The new GIS layer created for this project shows historic and cultural features of various kinds, including public buildings, schools, old school and mill sites, churches, cemeteries, tannery sites and railroad stations. Conservation Lands and Public Lands,

which appear as base layers on most maps are also addressed here in recognition of the cultural resources that they provide and protect.

Notable Historical Weare Footnotes

Pine Tree Riot

In 1722 under the rule of King George I, the English Parliament enacted a law reserving all mast pines for the British Navy, and making it an offense for an American colonist to cut any white pine over 12 inch diameter without a royal license. Fines of from £5 to over £50 were issued to those who took these "King's pines" unlawfully, but at first enforcement of the law was lax. When New Hampshire Governor John Wentworth came to office in 1766, he quickly recognized the revenue potential of enforcing this law, and appointed log deputies to inspect lumber mills in search of illegally cut pine logs.

One such finding in 1772 involved numerous logs at four mills in Weare: Richard's mill, Peaslee's mill, Dow's mill and Clement's mill. These logs were thus claimed for the crown and an auction for their sale for its benefit was advertised. The enforcement of this matter fell to the county sheriff Benjamin Whiting. News of his intentions preceded, however, and a large band of disguised and enraged locals apprehended him and his deputy at their inn, disarmed and beat them, and sent them and their horses on their way.

The authorities were quick to respond, sending two regiments of soldiers to Weare to capture the perpetrators, who by then had fled to the woods. Ultimately several of the attackers were brought to court, and received a very light fine of twenty shillings a piece from a sympathetic judiciary. The incident serves as an early, local expression of the resentment of the colonists against imperial oppression that would lead ultimately to the revolution a few decades later.

Clinton Grove Academy

The early history of the Quakers in New England had a connection to Weare. The first seminary operated by Quakers in New Hampshire was founded in 1834 and named Clinton Grove Academy after an important supporter of the Erie Canal, DeWitt Clinton. Located in what is now known as North Weare, the academy operated more-or-less continually as a private high school until it burned in 1872. A new academy was constructed in 1874, and from 1877 to 1938 was utilized by the town as a district school. It later served as a center of church and civic activities.

Historical & Cultural Map

Map 6 in Appendix C of this report displays the results of the inventory of historic and cultural features. Table 18 below lists all the historical and cultural features that were mapped for this project. The numbers correspond to the feature numbers on the map. The dates listed indicate the date that the feature was known to be completed in the case of a building or structure, and the date the feature was first used, in the case of a

cemetery. A total of 144 historic or cultural features were mapped as point symbols representing the feature type. The full list of feature types is:

- Cemetery
- Church
- Fairground
- Foundation
- Location
- Mill or shop
- Mill site
- Railroad station
- School house
- School house site
- Store site
- Tannery site
- Town building site

(Old Cellar Hole in Bartlett / Ferrin Pond Forest – John Bartlett Homestead?)

Table 18: Historic Features

Feature #	Feature Name	Year	Feature Type
1	Spofford-Kimball Mill Site	1835	mill site
2	school house site		school house site
3	school house		school house
4	Sugar Hill Cemetery	1779	cemetery
5	school house site		school house site
6	John Stark Regional High School		school
7	Straw-Rowell Mill Site	1768	mill site
8	mill or shop		mill or shop
9	Morrison Mill Site	1836	mill site
10	Muzzy Cemetery	1782	cemetery
11	mill or shop		mill or shop
12	Sugar Hill School		school house
13	Benjamin Felch Tomb	1840	cemetery
14	school house site		school house site
15	No. Weare Station		railroad station site
16	mill or shop		mill or shop
17	Rockland school house		school house site
18	mill or shop		mill or shop
19	store or store site		store site
20	tannery site		tannery site
21	mill or shop		mill or shop
22	tannery site		tannery site
23	Collins Cemetery	1834	cemetery
24	steam mill site		mill site
25	John Gillet grave site		cemetery
26	church		church
27	John Chase Mill Site	1846	mill site
28	Dow-Peaslee Burying Ground	1840	cemetery
29	school house	1855	school house
30	church		church
31	mill or shop		mill or shop
32	Shaw Mill Site	1818	mill site
33	store or store site		store site
34	mill site		mill site
35	tannery site		tannery site
36	school house site		school house site
37	mill or shop		mill or shop
38	Amos Chase Mill site	1836	mill or shop
39	Holy Cross Episcopal Church		church
40	Silas Peaslee Mill Site	1770	mill site
41	Paige-Peaslee Mill Site	1790	mill site
42	Robiestown Mill Site	1752	mill site
43	Caldwell Mill Site	1770	mill site
44	Hogg Mill site		mill site
45	East Weare Station		railroad station site

Feature #	Feature Name	Year	Feature Type
46	Fair Grounds		fair grounds
47	Friends North Cemetery	1780	cemetery
48	Mount Pleasant Cemetery		cemetery
49	church		church
50	mill site		mill site
51	Center Woods Elementary School		school
52	East Weare Cemetery	1788	cemetery
53	school house site		school house site
54	mill site		mill site
55	mill site		mill site
56	school house site		school house site
57	Weare Bible Baptist Church		church
58	Osborne Mill Site	1826	mill site
59	church		church
60	store or store site		store site
61	mill site		mill site
62	school house site		school house site
63	Pine Grove Cemetery	1868	cemetery
64	church		church
65	Weare Center		location
66	school house		school house
67	Center Square Cemetery		cemetery
68	The Pound	1803	foundation
69	Weare Public Library		town building
70	store or store site		store site
71	Philbrick Mill Site	1809	mill site
72	store or store site		store site
73	Weare Town Offices		town building
74	steam mill or site		mill site
75	Weare Middle School		school
76	mill or shop		mill or shop
77	Elijah Dow Cemetery	1840	cemetery
78	mill site		mill site
79	Everett Station		railroad station site
80	Town House Site		town building site
81	school house site		school house site
82	tannery site		tannery site
83	school house site		school house site
84	Friends New South Cemetery	1850	cemetery
85	school house site		school house site
86	school house site		school house site
87	cemetery		cemetery
88	Friends South Meeting House		church
89	Friends South Old Cemetery		cemetery
90	mill site		mill site
91	Tobie Yard Cemetery		cemetery

Feature #	Feature Name	Year	Feature Type
92	Peletiah Gove Mill Site	1830	mill site
93	school house site		school house site
94	Dunlap Mill Site	1850	mill site
95	Samuel Osborn Sr. graveyard		cemetery
96	mill site		mill site
97	Whittaker Cemetery	1825	cemetery
98	Philbrick Cemetery	1806	cemetery
99	store site		store site
100	Hadley Mill Site 1	1812	mill site
101	Tristram Johnson Mill Site	1810	mill site
102	Benjamin Perkins Cemetery	1818	cemetery
103	Hadley Mill Site 2	1812	mill site
104	Whiting Mill Site	1815	mill site
105	Oil Mill Cemetery	1810	cemetery
106	Corliss Mill Site	1820	mill site
107	school house		school house
108	school house		school house
109	Hadley Cemetery	1820	cemetery
110	school house site		school house site
111	Hillside Cemetery		cemetery
112	church		church
113	Elizabeth Yarrow Worthley grave		cemetery
114	mill site		mill site
115	Worthley Burying-Ground	1849	cemetery
116	Site of first settler's cabin		foundation
117	Saunders Mill Site		mill site
118	Hoit Mill Site	1832	mill site
119	Worthen Mill Site	1795	mill site
120	school house		school house
121	Squires Gove Mill Site		mill site
122	cemetery		cemetery
123	Weed Mill Site		mill site
124	Mudget Burying-Ground		cemetery
125	Elijah Gove Cemetery		cemetery
126	Wells Currier Cemetery		cemetery
127	Bailey Mill Site		mill site
128	mill site		mill site
129	school house		school house
130	Joseph Wilson Tomb	1850	cemetery
131	mill site		mill site
132	Corliss Cemetery		cemetery
133	school house		school house
134	Martin Mill Site	1756	mill site
135	David Buxton Burying-Ground	1863	cemetery
136	Phineas Stone Mill site	1803	mill site
137	Tuttle Mill Site	1790	mill site

Feature #	Feature Name	Year	Feature Type
138	George Mill Site		mill site
139	Buxton and Philbrick Cemetery	1806	cemetery
140	school house		school house
141	Poor Farm Cemetery	1838	cemetery
142	Cram Mill Site (2)	1845	mill site
143	Cram Mill Site (1)	1840	mill site
144	Moses Philbrick Mill Site	1867	mill site

6. Scenic Resources

Values of Scenic Features and Views

New Hampshire is often recognized for its exceptionally unique scenic qualities. While definitions of such intangible qualities as scenic value and rural character are elusive, most would agree that they are intrinsic to the region and contribute to the sense of place that inspires so many. Scenic resources per se are fundamentally different from the other resources addressed in this report. While clearly dependent on the physical world, they are also difficult or impossible to quantify. The scenic analysis (which sounds like a contradiction in terms) that is presented in this chapter offers one attempt to quantify the relative potential scenic value of certain areas of Weare.

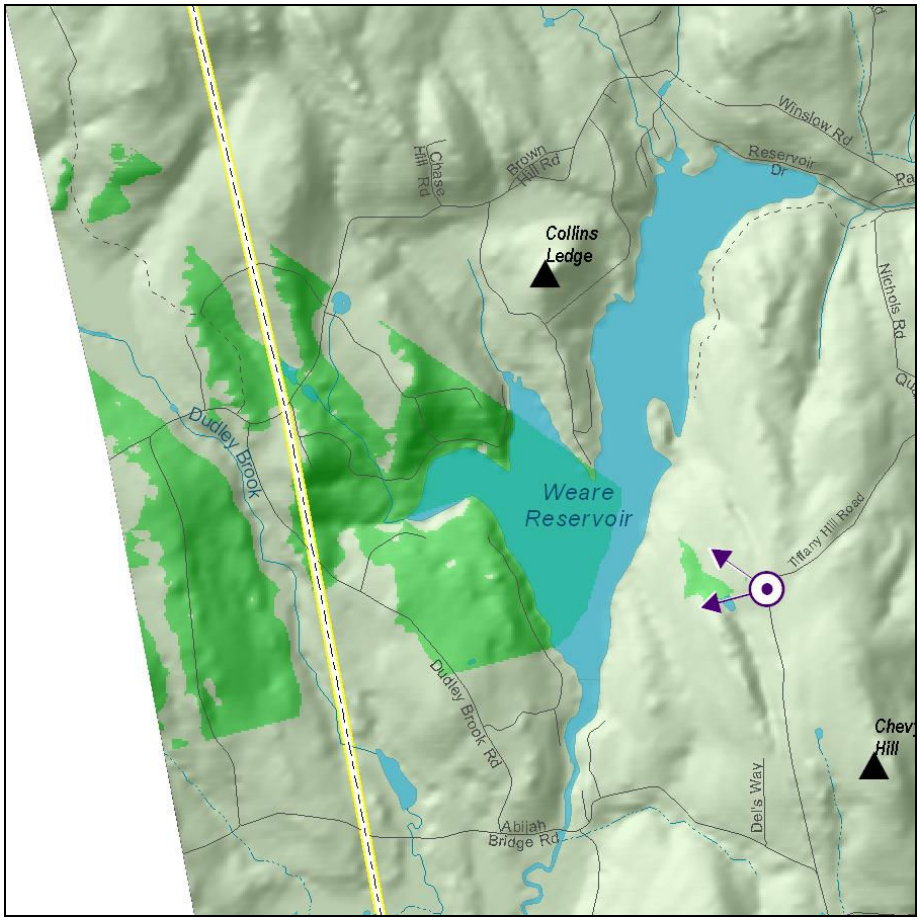

Figure 6: Scenic Viewsheds

Scenic Analysis

The preservation of rural character is frequently cited as a goal of open space plans in New Hampshire. While "rural character" as a term is not strictly defined, we often think of the quintessentially New England sights like picket fences, steepled churches, slate gravestones, old farms, and (most apropos to this natural resource inventory) as

important parts of the aesthetic natural/cultural landscape. The point of this Chapter is to map, measure and interpret Weare's aesthetic landscape according to scenic viewsheds.

To do this, members of the Weare Conservation Commission selected notable scenic viewpoints and vistas available from public roads and locales (see Table 19, below). While the selection of scenic vistas is a subjective process, commission members generally chose points with a landscape view (i.e. beyond the immediate surroundings of the local setting) that included primarily natural features like hills/mountains, lakes/wetlands, or fields/meadows.

(A Large Beaver Pond on Buxton Brook in South Weare)

These points were mapped along with the extent and direction of the view. Based on this information and the shape of Weare's topography, we calculated the viewshed for each point (Table 19). Each calculated viewshed was incorporated into a scenic areas analysis model which for any given locale indicates the number of viewpoints from which that locale can be seen.

The scenic areas analysis is shown on Map 7 in Appendix C. The model results are displayed here in shades of magenta – areas with lighter shades (pale pink) can be seen from fewer places while darker shades (purple) can be seen from many locations.

Table 19: Scenic Viewpoints

Viewpoint	Location	Dominant Direction
1	Bart Clough Road	SSW
2	Bart Clough Road	NNE
3	Roosevelt Drive	W
4	Wallingford Road	ESE
5	Weaver Place	ESE
6	Weaver Place	S
7	Sugar Hill North	SSW
8	Sugar Hill Road and Route 77	S
9	Route 77	WSW
10	Route 114	NNW
11	Route 77 and Gould Road	SW
12	Colby Road	SE
13	Colby Road	WSW
14	Barnard Hill Road	SSW
15	River Road	NNW
16	Pine Hill Road wetland	E
17	Flanders Memorial Road	NNW
18	Flanders Memorial Road	SSE
19	Tiffany Hill Road	W
20	Tiffany Hill Road	W
21	Abijah Bridge	SSW
22	Grandview Drive	E
23	Abijah Bridge	S
24	Dudley Brook Road	SSW
25	Mount Dearborn Road	SSW

7. CONSERVATION PRIORITIES

Existing Conservation and Public Lands

Weare has 65 properties that either are restricted for conservation-related uses ("conservation lands") or are held in fee by the Town or other governmental subdivisions that may or may not be technically restricted for conservation purposes ("public lands"). According to a GIS calculation, there are 8,553 acres of conservation/public lands in the town. This constitutes 22.2% of the total 38,463 acre area of the town. The largest contiguous block of protected lands is the Hopkinton-Everett Flood Control Reservoir properties in the northwest corner of the town, that extend into the neighboring towns of Dunbarton and Hopkinton. Other significant protected areas include Vincent State Forest (406 acres in Weare) that straddles the Weare/Deering town line, and the extensive network of conservation lands along the north town boundary, most notably the Eastman Conservation Area (581 total acres) and Felch Farm Town Forest (695 acres) protected by the Town, and the Greentree Land & Timber Company (333 acres in Weare) conservation easements protected by the Society for the Protection of New Hampshire Forests.

(Inscribed Boulder – Eastman Conservation Area, North Weare)

Table 20: Conservation and Public Lands

Protecting Agency / Organization	Protection Type	Conservation Area Name	# of Parcels	Acres
Weare	Conservation Easement	Brook Shire Easement	8	80
		Brown Farm	1	99
		Collins Ledge Easement	1	147
		Duck Pond Easement	4	77
		Fessenden Woods Easement	1	28
		Hawkes Easement	1	66
		High Rock Easement	1	57
		Hoit Mill Easement	2	59
		Kingsbury Timber Corp. Easement	1	108
		Orchard Open Space Easement	1	27
		River Ridge Easement	2	51
		Rolling Hills Easement	5	21
		Siciliano Easement	1	14
		Wigsten Easement	1	81
		Wilson Easement	1	82
	Total Weare Conservation Easement		31	996
	Fee-owned	Alex	2	97
		Bartlett Brook Town Forest	1	128
		Chevy Hill Town Forest	1	176
		Chicoine	1	28
		Dustin Brook Headwaters Conservation Area	4	75
		Dustin Meadow	1	72
		Eastman Conservation Area	4	598
		Felch Farm Town Forest	2	695
		Ferrin Pond	12	45
		Gooch	2	8
		Grauer	2	20
		Poor Farm Town Forest	4	189
		Russell Tract	2	11
		Tobey Hill Road	1	59
		Town of Weare, map 407, lot 127	1	13
		Town of Weare, map 407, lot 156	1	13
		Town of Weare, map 407, lot 157	1	12
		Town of Weare, map 407, lot 160	1	11
		Town of Weare, map 407, lot 161	1	11
		Town of Weare, map 410, lot 11	1	39

Protecting Agency / Organization	Protection Type	Conservation Area Name	# of Parcels	Acres
		Town of Weare, map 410, lot 244	1	26
		Town of Weare, map 410, lot 5	1	25
		Town of Weare, map 410, lot 56	1	9
		Townes Open Space	1	11
		Wood Family Forest	1	266
	Total Weare Fee-owned		51	2,635
	Total Weare Protected		82	3,631
NH Dept. of Resources & Economic Dev. (DRED)	Fee-owned	Clough State Park	1	95
		Piscataquog State Forest	2	163
		Vincent State Forest	1	406?
	Total DRED Fee-owned / Protected		4	887
NH Fish & Game	Fee-owned	Perkins Pond WMA	1	305
Piscataquog Land Conservancy	Conservation Easement	Breed Brook Easement	1	97
		Coon Easement	1	11
		Doscher Easement	1	31
		Dow-Sizemore Wildlife Preserve	1	10
		Walker Easement	1	110
	Total Piscataquog Land Conservancy Easement		5	260
	Fee-owned	Barnard	1	3
		Baron	1	25
		Colburn Parcel	1	58
		Hughes	1	43
		Millimet	1	62
	Total Piscataquog Land Fee-owned		5	191
	Total Piscataquog Land Conservancy Protected		10	451
Society for the Protection of NH Forests	Conservation Easement	Greentree Land & Lumber Company	4	333
		King#3	1	90
		The Marshall Fund	1	42
		Tiffany	1	112
		Toll	1	138
	Total SPNHF Conservation Easement		8	714
	Fee-owned	Buxton Forest	1	107
		Elizabeth Simons Preserve	1	118
		Zephaniah Breed Forest	1	53
	Total SPNHF Fee-owned		3	278
	Total SPNHF Protected		11	991
US Dept. of Defense, Army Corps of Engineers	Flowage Easement	Hopkinton-Everett Flood Control Reservoir	20	656
	Fee-owned	Hopkinton-Everett Flood Control	2	7,810

Protecting Agency / Organization	Protection Type	Conservation Area Name	# of Parcels	Acres
		Reservoir		
	Total US DoD ACE Protected		22	8,466
Wildlife Land Trust	Conservation Easement	Ciampi Easement	1	14
Total			131	14,745

(Open Woods – Felch Farm Town Forest, North Weare)

Acreages shown in
Table 20: Conservation and Public Lands below are calculated by GIS from the boundary information provided by GRANIT, with additional updates provided by the Weare Conservation Commission. In some cases calculated acreages may vary from those acreages that are stated by deeds or surveys. In instances where conserved properties cross town lines, the acreage values displayed in the table account for only the property acres in Weare.

(Waterfalls - Dustin Brook Headwaters Conservation Area, North Weare)

Co-occurrence Model and Analysis

Introduction and Rationale

Given limited funding, time, and volunteer hours, conservation action must be strategically focused to optimize resource protection. The co-occurrence analysis process helps to do that by focusing conservation action on resource-rich locales and by maximizing the number of resources protected per acre. This process represents a data-reduction technique where all of the mapped resources are combined in a single model; it assigns high value to areas where there is significant coincidence of natural resources. Contributing resources were included based on discussion and decision-making of Weare Conservation Commission members and support the commission's conservation goals and objectives.

Co-occurrence Method

Important natural resources were mapped and overlaid such that at any point the value of coincident resources is summed. Areas with the most coincident resources score higher than those areas with fewer coincident resources. Thirty mapped resources were included in the model.

In addition to the main co-occurrence model, sub-models were developed for four resource categories: scenic, soils, water, and wildlife (resources are listed by category in Table 21: Co-occurrence Model Factors)

Following the development of a resource factors list, the Conservation Commission members were each asked to rank the importance of every factor to them. A numeric value was assigned by each of them independently to every factor, for a total of 100. The results were then averaged to arrive at the group values shown in the right column in Table 21. These "weighted" values were assigned to each resource factor in the model, and the model run accordingly.

Table 21: Co-occurrence Model Factors

Category	Factor	Value
Wildlife	Riparian zones (300' buffer)	4.8
	WAP Floodplain forests	1.5
	WAP Grasslands	1.0
	WAP Marshes	2.3
	WAP Peatlands	1.0
	WAP Ridge / talus	3.0
	WAP Pitch pine forest	1.3
	WAP Hemlock/hardwood/pine	2.3
	WAP Appalachian oak / pine	2.0
	Unfragmented Lands - 100-500 acres	2.3
	Unfragmented Lands - 500-1,000 acres	5.0
	Unfragmented Lands - 1,000-2,000 acres	6.5
	Unfragmented Lands - 2,000-3,500 acres	7.5
	Unfragmented Lands - >3,500 acres	8.3
	Wildlife subtotal	*48.5*
Water	Wetlands and 100' Buffers	7.3
	High-yield Aquifers	5.0
	Potentially Favorable Gravel Well Areas	4.3
	Flood Insurance Rate Zones (100-year floodplains)	1.8
	Wellhead Protection Areas	3.3
	Public Water Supplies (buffered on Sanitary Radii)	3.5
	Water subtotal	*25.0*
Scenic	Scenic viewpoints (buffered)	1.5
	View-Shed - 1 point	1.5
	View-Shed - 2 points	2.0
	View-Shed - 3-6 points	2.8
	Scenic subtotal	*7.8*

Category	Factor	Value
Soils	Prime farmland soils	5.0
	Farmland soils of statewide importance	4.8
	Farmland soils of local importance	3.5
	Important forest soils - Class IA	1.8
	Important forest soils - Class IB	1.8
	Important forest soils - Class IC	2.0
	Soils subtotal	*18.8*
TOTAL		**100**

Figure 7 displays a chart showing the acreage of all co-occurrence values and what percentage of the area of each is conserved. The chart bars represent the full range of multiple resources across the town as displayed in the Co-occurrence model, grouped into five quantiles by area, from least resources to most resources. The bars also illustrate the percentage of each quantile that currently under land conservation.

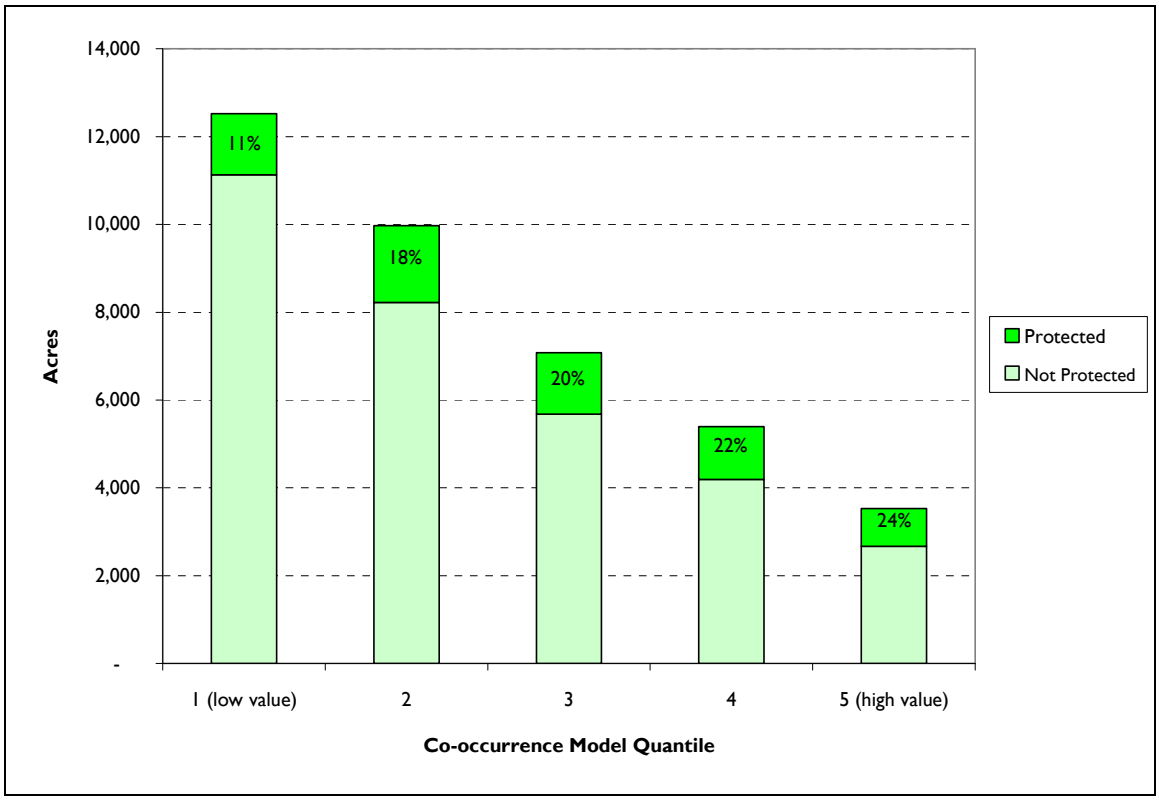

Figure 7: Co-occurrence Values by Conservation Status

For example, quantile 1 (low value) represents about 12,500 acres of the town, and 11% of these areas are protected. Interestingly, 24% of the highest "value" resource areas are currently protected, with proportionately fewer for successively lower value quantiles. However, this is actually a function of the actual protection acreages being very similar between quantiles. This chart illustrates how successful land protection has been in actually protecting high value resource areas.

(Chipmunk Falls, Dustin Brook Headwaters Conservation Area)

Conclusions of Analysis

The results of the analysis (including the sub-models) are shown on Map 8 in Appendix C. The results of this analysis show at a glance the areas of town with the highest number of combined important resources; places with high value (where many resources co-occur; likely conservation priorities) are shown in darker shades, and places with low value (where few resources occur; not conservation priorities) are shown in lighter shades. Inset maps at the bottom margin of the map, below the main model, show sub-models that display the totals for all four of the resource groups separately.

The model as shown on Map 8 clearly display the highest scoring areas as associated with large water bodies, major stream courses, and large wetlands. The lowest scoring areas tend to occur along road corridors in otherwise upland areas, especially where roads are more densely congregated. The Melvin Valley block scores especially high, and is consistently showing moderate to strong coincidence of resources. Taken as a whole, the Peaselee Meadow Brook and Ferrin Pond blocks also score high with few fragmenting features.

The heterogeneous nature of the co-occurrence mapping result does not lend itself well to a simple listing of high, medium and low value blocks. However, by referring to the sub-models, the viewer can start to determine how different resource groupings contribute to the total model scoring of a specific location. The results of this analysis, when used in concert with the other resource maps and other considerations, will help reveal areas of the town that may be designated as priorities for conservation. Please refer to Map 8 for more detailed results and other high scoring areas.

The co-occurrence process is a helpful addition to any natural resource inventory – it is visually appealing and simple to use. However, the reader should bear in mind certain limitations of the co-occurrence analysis. First, the technique is very good at identifying resources which happen to overlap, however, it is not good at identifying locales where two resources are adjacent (but not overlapping). For instance, using the co-occurrence approach, a parcel with a wetland in a riparian area would be more important than a wetland complex with a marsh – peatland association whereas in reality, the wetland complex may provide more conservation value (exemplary habitat).

Second, the technique is limited in terms of its ability to identify areas where a single very important resource exists (unless that resource is assigned a very high number and "outweighs" its neighbors, defeating the "multiple factor" advantage of the model to a certain extent).

Because of these issues, the reader should bear in mind that the co-occurrence model is neither perfect nor the only tool that should be used to determine future conservation priorities; it is one tool among many that should be applied along with conservation expertise and common sense.

8. CONCLUSIONS

The town of Weare is truly blessed with exceptional natural resources – abundant lakes, rivers and streams, productive farm and forest land, high-quality drinking water supplies, diverse wildlife habitat, and spectacular scenic vistas. This study has documented these resources and many more. Thanks to the foresight of earlier generations (and in the case of the Army Corp Floodway due to the malevolence of nature), much of what makes Weare special has been permanently protected for the benefit of those that will follow.

The summaries of the documentation of natural resources contained in this natural resource inventory will aid the Town of Weare in the establishment of priorities for protecting these resources and the lands and waters where they are located. These results will also guide the development of mechanisms, financial capacity, and strategies for engagement with property owners to achieve this end.

Recommendations

Providing a comprehensive baseline evaluation of the town's natural resources, completion of this NRI enhances Weare's ability to conduct well-founded pro-active conservation planning. Recommendations for next steps to protect Weare's natural resources include the following:

- Conduct field surveys targeted at documenting rare species and natural communities known or suspected of occurring in Weare.

- Conduct field surveys to verify location, extent and quality of priority habitats identified and mapped by Wildlife Action Plan.

- Conduct a review of existing Town ordinances and regulations to determine where these could be revised, amended or enhanced to make them as consistent as possible with each other and with the findings of this report, and supportive of the stated Town goals for natural resource protection.

- Refer to regional land conservation studies for guidance on what areas in Weare may be regionally important for conservation.

- Map the remaining actively managed agricultural lands in Weare so that these can be considered in future conservation planning.

- Pursue development of a conservation plan for Weare that builds on this natural resource inventory and plans for the proactive protection of Weare's critically important natural resources

APPENDICES

Appendix A: Sources

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Appendix B: Metadata

Metadata is incorporated with the GIS data included with this NRI project (see project geodatabase: data/data.gdb as well as /metadata). We include here an explanation of the processing steps used to create five custom datasets as additional metadata.

Unfragmented Lands

To create the unfragmented lands dataset, the following geoprocessing steps were used:

1. Regularly traveled roadways were selected using the following selection set: "SC_LEGEND" = 'Local' OR "SC_LEGEND" = 'State'. NOTE: Private and unmaintained (class VI) roads were assumed to be non-fragmenting and were not used for this analysis. Certain roads were reclassified as part of this analysis to be non-fragmenting based on the judgment of the Weare Conservation Commission.
2. Selected roads were buffered 500 feet
3. Buffer polygons were then erased from the surrounding landmass (Base/clipper feature class)
4. Remaining polygons were converted to single part polygons
5. Polygons smaller than 100 acres were deleted
6. Unfragmented areas were classified by acreage as follows
   - 100 – 500 acres
   - 501 – 1,000
   - 1,001 – 2,000
   - 2,501 – 3,500
   - >3,500
7. Unfragmented areas that had some portion of their area within Weare were named based on the most significant geographic feature within the block based on USGS topographic map features.

Riparian Areas

To create riparian areas, the following geoprocessing steps were used:

1. All streams (nhhd_flowline feature class) were buffered 300'
2. All surface waters (nhhd_water feature class) were buffered 300'
3. The results from steps 1 and 2 were combined using the union tool
4. The result of step 3 was dissolved to result in a single part final polygon dataset

Early Successional Forest and Open Lands

This feature class represents open land and early successional forest. It includes open lands such as old fields, pastures, meadows, hay fields, row crops, orchards, young forests, mixed age forest, and gravel pits (among others). The classification scheme does not include wetlands (these are mapped as part of the National Wetlands Inventory and the Wildlife Action Plan habitats) nor does it include open lands directly associated with development such as lawns or public open space like parks, golf courses, or cemeteries. Features were digitized at approximately 1:10,000 from 2008 USDA

National Agricultural Imagery Program aerial orthophotos; the minimum mapping unit is approximately one acre.

Potentially Favorable Gravel Well Areas

A 150 gallon/minute analysis was used for this Natural Resource Inventory. Stratified drift aquifer data were selected to isolate minimum transmissivity of 2,000 foot^2/day. Known and potential contamination sources buffered 1,000 feet (U400des.shp, provided by NH DES) were used to erase aquifer data. Buffered roads and surface waters (hyt4nnn.shp, provided by NH DES) were used to erase aquifer data as well. The resulting feature class (pfgwa) represents areas unlikely to be contaminated and transmissive enough for a 150 gallon/minute well. For further information, please refer to the DES technical manual, A Guide to Identifying Potentially Favorable Areas to Protect Future Municipal Wells in Stratified-Drift Aquifers, NH Department of Environmental Services, Publication NHDES-WD-99-2. Additional information can be found in the NH DES Factsheet, "Using Stratified-Drift Aquifer Maps to Plan for Potential Future Community Wells", Publication WD-DWGB-22-12 (also contained in project metadata; see "nh_des_pfgwa_dwgb-22-12.pdf")

Scenic Areas Analysis

The scenic areas analysis model was calculated as follows:

- Weare Conservation Commission members selected 25 scenic viewpoints to review in the field (see Table 12 in Chapter 6, Scenic Resources)
- They visited each point and recorded an ID#, the location, the azimuth of the leftmost limit of the view (left azimuth) and the azimuth of the rightmost limit of the view (right azimuth), and any other additional notes
- Each viewpoint was marked on a paper map
- Viewpoints were digitized on screen using aerial photography based on the marked location (see Scenic_Points feature class in Data.gdb/Scenic)
- Using ArcGIS Spatial Analyst, viewsheds were calculated for each point (where left and right azimuths corresponded to the optional parameters AZIMUTH1 and AZIMUTH2 respectively)
- The resultant integer viewshed grids included following values
    - 1 = within viewshed
    - 0 = not in viewshed
- The 26 viewshed grids were then summed to arrive at the final scenic areas analysis model
- Values in the final model are equal to the number of overlapping viewsheds at the given grid cell

Co-occurrence Analysis

The co-occurrence model was generated according to the following geoprocessing steps:

1. Each input resource was clipped to the study area (see base/study_area feature class)

2. Each input resource was assigned a value field based on input from the delphi process (see Table 22: Co-occurrence Model Factors, page 78). Fields were assigned as shown in the following table:

Resource	**Value Field**
Scenic viewpoints (buffered)	SC_PTS
View-Shed - 1 point	SC_VS01
View-Shed - 2-3 points	SC_VS03
View-Shed - 4-11 points	SC_VS11
Important forest soils - Class IA	SO_F1A
Important forest soils - Class IB	SO_F1B
Important forest soils - Class IC	SO_F1C
Prime farmland soils	SO_PF
Farmland soils of statewide importance	SO_SI
High-yield Aquifers	WA_AQ
Flood Insurance Rate Zones (100-year floodplains)	WA_FIRZ
Wetlands and 100' Buffers	WA_NWI
Potentially Favorable Gravel Well Areas	WA_PFGWA
Public Water Supplies (buffered on Sanitary Radii)	WA_PWS
Wellhead Protection Areas	WA_WHPA
Riparian zones (300' buffer)	WI_RIP
Unfragmented Lands 100 - 500 acres	WI_U0500
Unfragmented Lands 500 - 1,000 acres	WI_U1000
Unfragmented Lands 1,000 - 2,500 acres	WI_U2500
Unfragmented Lands 2,500 - 5,000 acres	WI_U5000
Unfragmented Lands 5,000 - 10,000 acres	WI_U9999
WAP Matrix Forest: Appalachian oak / pine	WI_WAPAO
WAP Floodplain forests	WI_WAPFF
WAP Grasslands	WI_WAPGR
WAP Matrix Forest: Hemlock / hardwood / pine	WI_WAPHH
WAP Marshes	WI_WAPMA
WAP Matrix Forest: Northern hardwood / conifer	WI_WAPNH
WAP Peatlands	WI_WAPPE
WAP Ridge / talus	WI_WAPRT
WAP Matrix Forest: High and low elevation spruce / fir	WI_WAPSF

3. All resources were combined with the study area feature class using the union tool
4. The resulting union (see co-occurrence/model feature class) was used as the final model for display and analysis
5. Five fields were added to the model feature class as follows:
   "MODEL" – model value
   "SCENIC" – scenic submodel value
   "SOILS" – soils submodel value

"WATER" – water submodel value
"WILDLIFE – wildlife submodel value

6. Model fields were calculated as follows:

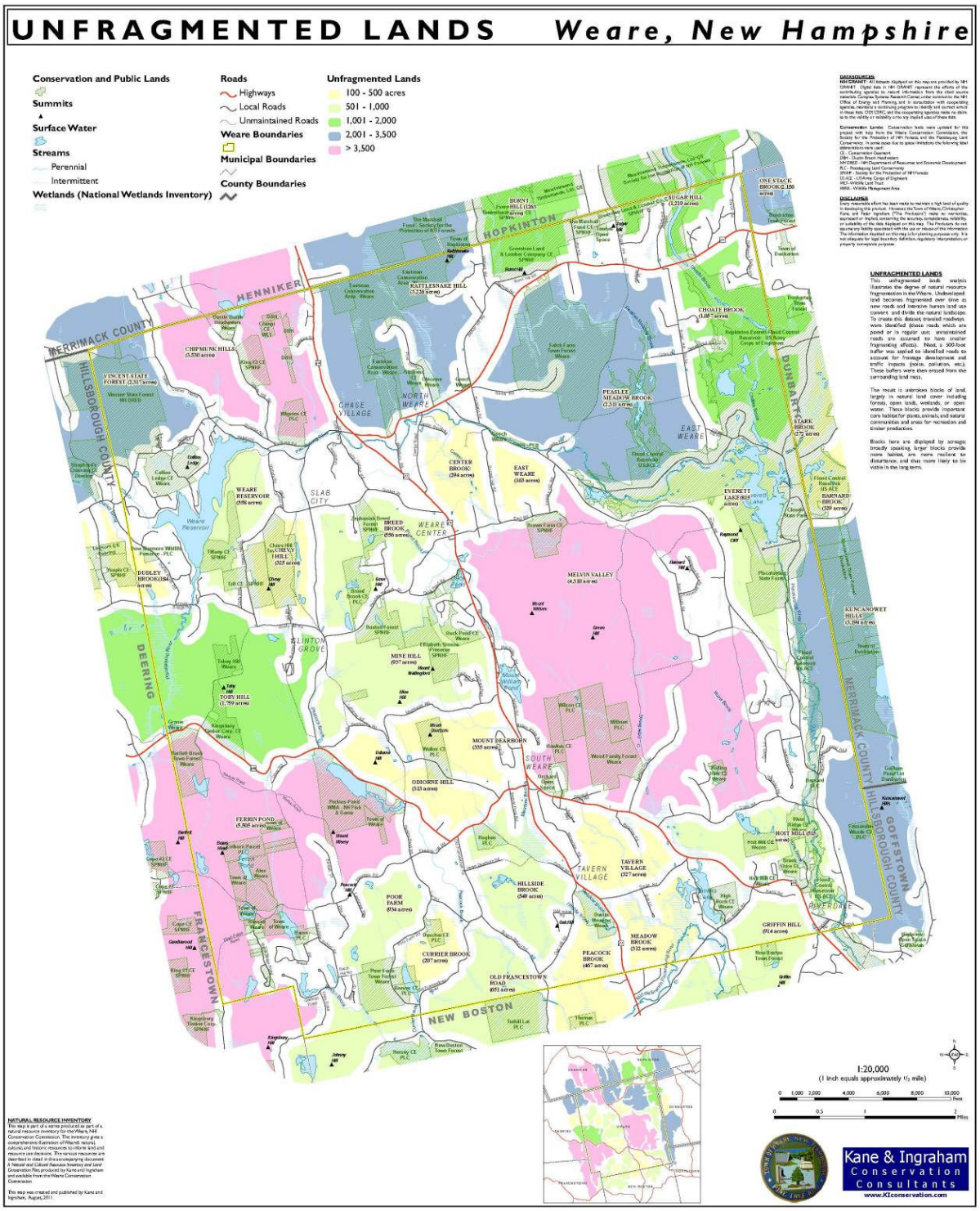
Model / Submodel Field	**Calculation**
"MODEL" (the sum of all resources)	[SC_PTS] + [SC_VS01] + [SC_VS03] + [SC_VS11] + [SO_F1A] + [SO_F1B] + [SO_F1C] + [SO_PF] + [SO_SI] + [WA_AQ] + [WA_FIRZ] + [WA_NWI] + [WA_PFGWA] + [WA_PWS] + [WA_WHPA] + [WI_RIP] + [WI_U0500] + [WI_U1000] + [WI_U2500] + [WI_U5000] + [WI_U9999] + [WI_WAPAO] + [WI_WAPFF] + [WI_WAPGR] + [WI_WAPHH] + [WI_WAPMA] + [WI_WAPNH] + [WI_WAPPE] + [WI_WAPRT] + [WI_WAPSF]
"SCENIC" (the sum of all scenic resources)	[SC_VS01] + [SC_VS03] + [SC_VS11] + [SC_PTS]
"SOILS" (the sum of all soil resources)	[SO_F1A] + [SO_F1B] + [SO_F1C] + [SO_PF] + [SO_SI]
"WATER" (the sum of all water resources)	[WA_AQ] + [WA_FIRZ] + [WA_NWI] + [WA_PFGWA] + [WA_PWS] + [WA_WHPA]
"WILDLIFE" (the sum of all wildlife resources)	[WI_RIP] + [WI_U0500] + [WI_U1000] + [WI_U2500] + [WI_U5000] + [WI_U9999] + [WI_WAPAO] + [WI_WAPFF] + [WI_WAPGR] + [WI_WAPHH] + [WI_WAPMA] + [WI_WAPNH] + [WI_WAPPE] + [WI_WAPRT] + [WI_WAPSF]

Appendix C: Maps

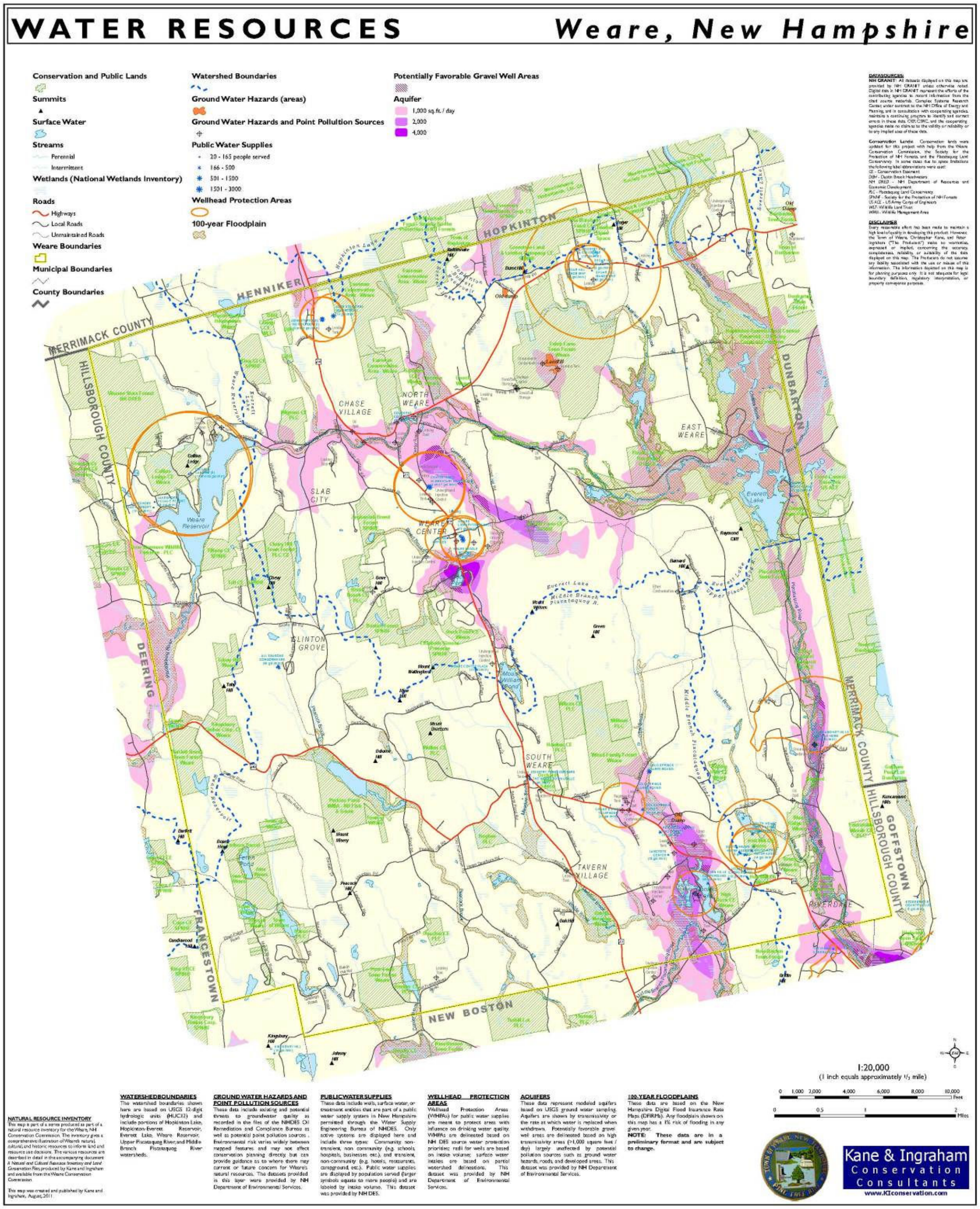
Map 1: Base Map

Map 2: Wildlife & Ecological Features

Map 3: Unfragmented Lands



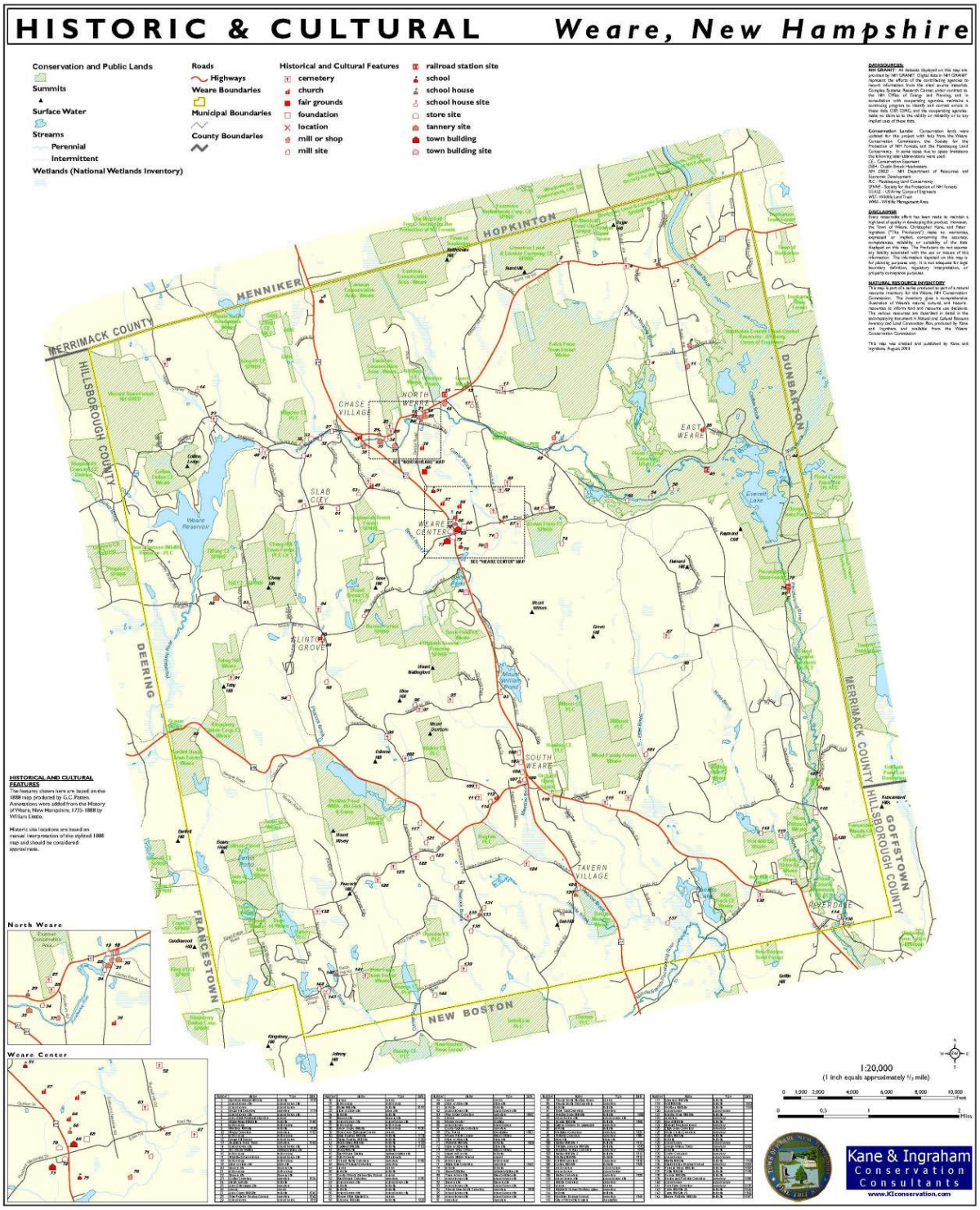
Map 4: Water Resources



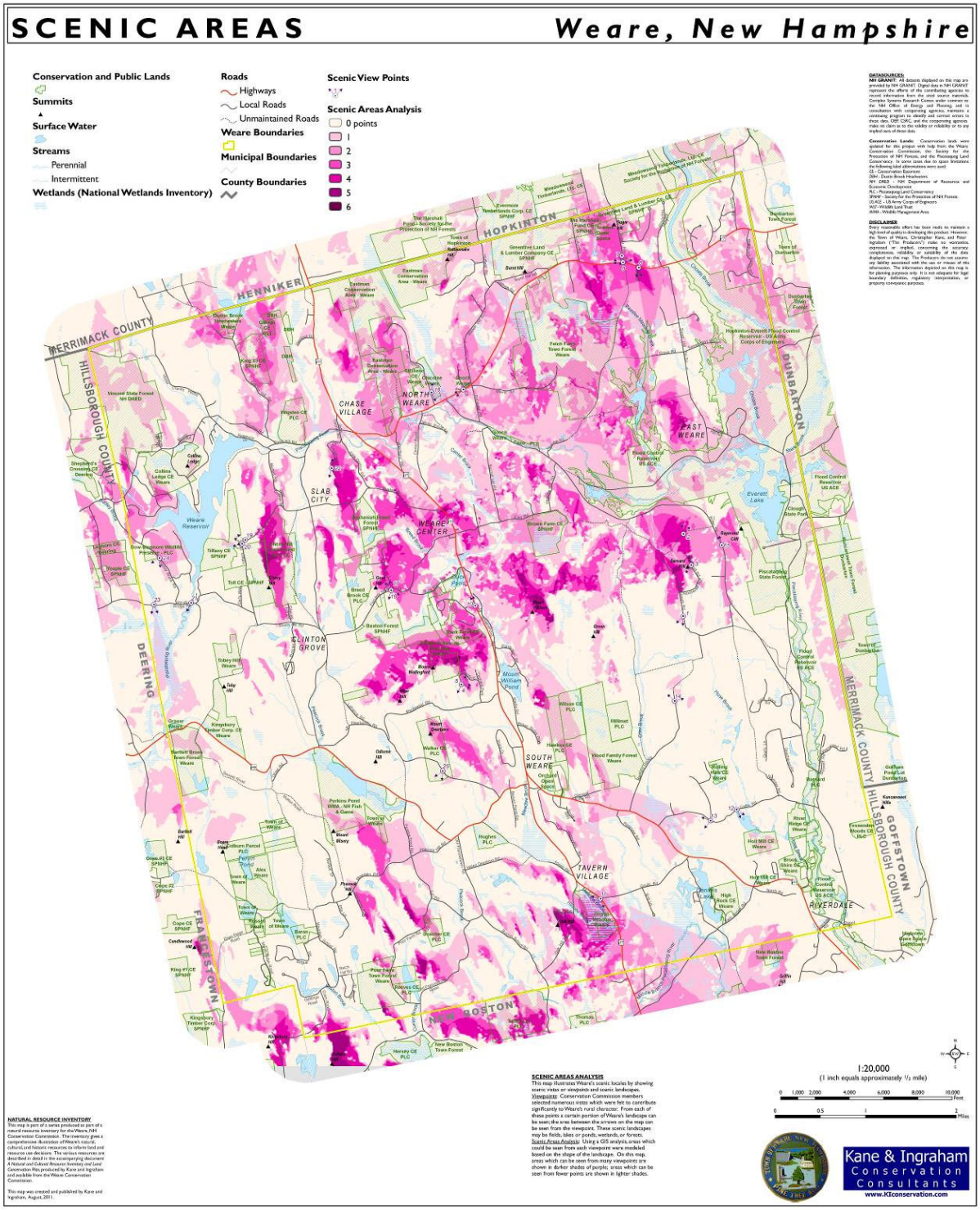
Map 5: Soils

SOILS
Weare, New Hampshire
Conservation and Public Lands
Summits
Surface Water
Streams
Perennial
Intermittent
Roads
Highways
Local Roads
Unmaintained Roads
Weare Boundaries
Municipal Boundaries
County Boundaries
Hydric Soils
Agricultural Soils
Prime farmland
Farmland of statewide importance
Farmland of local importance
Forest Soils
IA - favorable for sugar maple / hardwoods
IB - favorable for beech / hardwood
IC - favorable for softwood production
HENNIKER
HOPKINTON
DUNBARTON
MERRIMACK COUNTY
HILLSBOROUGH COUNTY
DEERING
FRANCESTOWN
NEW BOSTON
GOFFSTOWN
CHASE VILLAGE
NORTH WEARE
SLAB CITY
WEARE CENTER
BENTON GROVE
SOUTH WEARE
SAWYER VILLAGE
Weare Reservoir
Everett Lake
1:20,000
(1 inch equals approximately 1/3 mile)
Feet
Miles
Kane & Ingraham
Conservation
Consultants
www.KIconservation.com

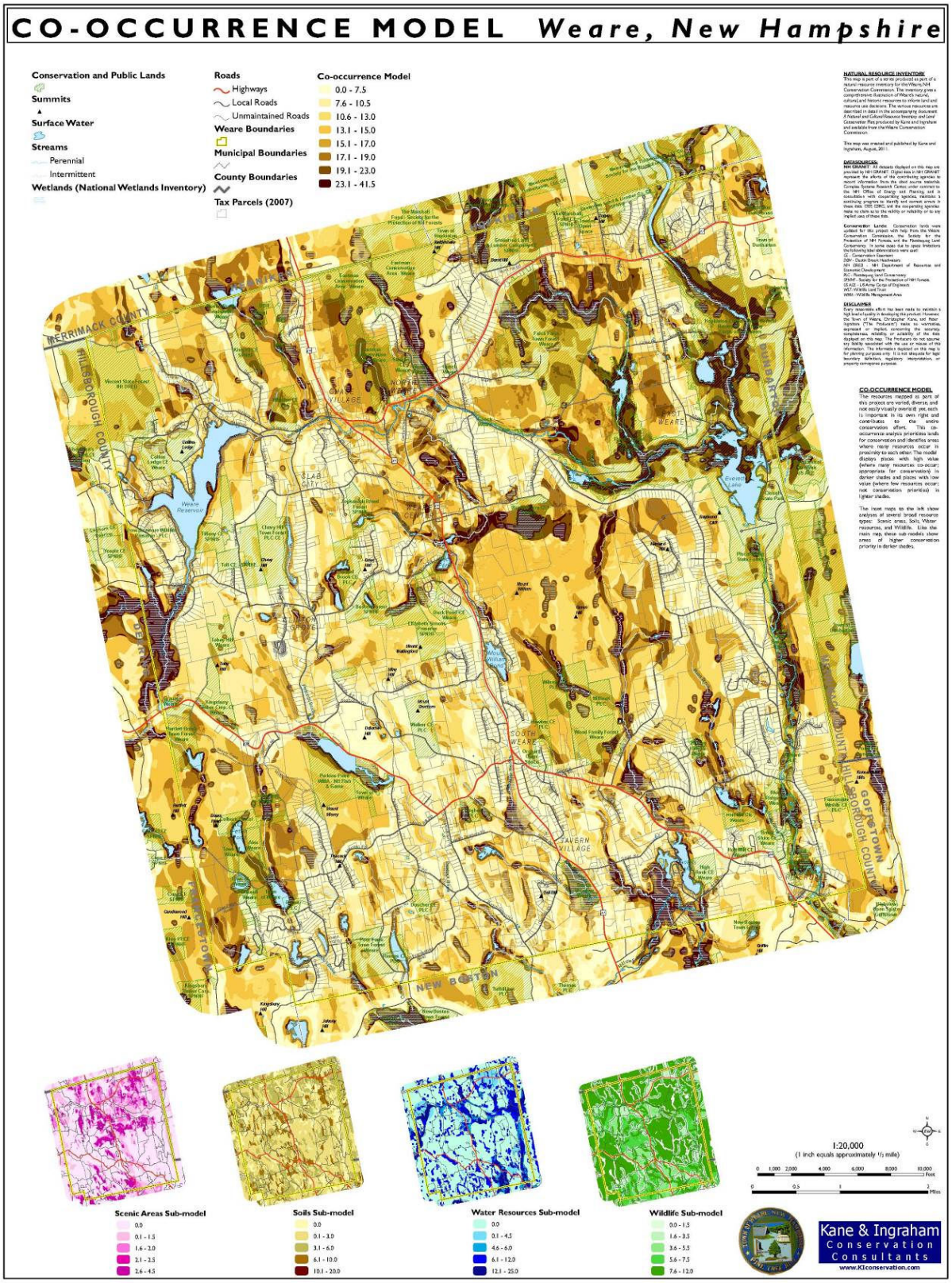
Map 6: Historic and Cultural



Map 7: Scenic Areas



Map 8: Co-occurrence Model



Appendix D. Hopkinton – Everett Lakes Description by Army Corps of Engineers

The dam at Hopkinton Lake, located on the Contoocook River in Hopkinton, and the dam at Everett Lake, located on the Piscataquog River in Weare, are connected by a two-mile long canal and in moderate to severe flooding are operated as a single flood damage reduction project. From Concord, the dam at Hopkinton Lake can be reached by traveling on U.S. Route 89 north to Route 9 (and 202) west to Route 127 north. From Manchester, the dam at Everett Lake can be reached by taking either Route 114 west through the Riverdale section of Goffstown, then right along River Road for about five miles, or the Everett Turnpike to Route 101 west to Route 114 west to Route 13 north.

The Hopkinton-Everett Lakes project provides flood protection to residential, commercial, and industrial property downstream on the Contoocook and Piscataquog rivers, which are tributaries of the Merrimack River. Hopkinton Lake protects the communities of Concord (including the Contoocook and Penacook sections), Boscawen, Canterbury, and Bow, while Everett Lake protects Manchester (including the Riverdale section) and Goffstown. Operating in conjunction with other Corps dams in the Merrimack River Basin, the project also helps protect major industrial centers along the Merrimack River, including Nashua and the Massachusetts communities of Lowell, Lawrence, and Haverhill.

In November 1927, New England rivers and streams, including the Merrimack River and its tributaries, went on a rampage. The resulting floods claimed several lives and caused serious flood damage. Less than nine years later, in March 1936, the worst flood in three centuries inundated the eastern and central United States. In New England, floodwaters claimed 24 lives, left 77,000 people homeless, and caused damage in New Hampshire and Massachusetts estimated at $36 million ($350 million in today's dollars).

As a result of this devastation, New Hampshire and Massachusetts soon initiated a comprehensive plan to reduce the Merrimack River Basin's disastrous flooding potential. In June 1938, Congress approved the construction of the Hopkinton Everett dams as part of a coordinated system of flood control for the basin. When completed, the Hopkinton-Everett Dams would provide assurance that the horrors of the 1927 and 1936 floodwaters would not ravage communities in central and southern New Hampshire and northern Massachusetts. In September 1938, barely three months after Congress approved the project, the basin again suffered crippling flood losses when the most powerful hurricane ever to hit the region slammed into the northeast, overflowing riverbanks and causing widespread destruction. This storm served as a reminder that devastating floods could strike at any time and wreak havoc with lives and property.

Despite all good intentions, roadblocks soon appeared. One major problem revolved around reimbursement from Massachusetts to New Hampshire to compensate for the economic losses New Hampshire would incur by storing floodwaters behind the proposed dams.

It wasn't until 1957 that the state legislatures of New Hampshire and Massachusetts established the Merrimack River Valley Flood Control Commission, which cleared these roadblocks and smoothed the way for the project's construction. An interstate compact was approved and the Corps initiated design studies. Construction of the dams began in November 1959 and was completed in December 1962 at a cost of $21.5 million. The work included relocating portions of Routes 9, 202, 114, and 127; utilities; an abandoned railroad; and four cemeteries.

Hopkinton Lake consists of an earthfill dam with stone slope protection 790 feet long and 76 feet high; three gated square concrete conduits, each measuring 11 feet high and 11 feet wide, with two conduits 124 feet long and the third 128 feet long; and a spillway excavated in rock. The spillway at Hopkinton Lake is unusual in that instead of being located adjacent to the dam as most spillways are, it is located about 1.8 miles east of the dam. The spillway, situated across Cressy Brook, has a concrete weir 300 feet long with a crest elevation 21 feet lower than the top of the dam. Everett Lake consists of an earthfill dam with stone slope protection 2,000 feet long and 115 feet high; a gated circular concrete conduit eight feet in diameter and 350 feet long; and a spillway excavated in rock with a concrete weir 175 feet long. The weir's crest elevation is 17 feet lower than the top of the dam.

The project also has four earthfill dikes with stone slope protection (two at each dam) totaling 16,300 feet in length. At Hopkinton Lake, Dike One is located on Elm Brook, about .25 mile east of the dam, and is 5,220 feet long with a maximum height of 66 feet. Dike Two, located adjacent to the spillway across Cressy Brook about 1.8 miles east of the dam, has a length of 4,400 feet and a maximum height of 67 feet. At Everett Lake, Dike Three, located on Stark Brook about five miles north of the dam near the intersection of Routes 13 and Winslow Road, is 4,050 feet long with a maximum height of 50 feet. Dike Four, located on Route 77 about five miles north of the dam and .5 mile west of Dike Three, is 2,630 feet long with a maximum height of 30 feet.

The features that distinguish the dams at the Hopkinton-Everett Lakes project from other Corps-built dams in New England are two canals that act in conjunction to divert the floodwaters of the Contoocook River stored behind the dam at Hopkinton Lake to the flood storage area behind the dam at Everett Lake. During minor and moderate flooding, there is enough flood storage area behind the dam at Hopkinton Lake to store the floodwaters from the Contoocook River, and there is enough storage area behind the dam at Everett Lake to hold back floodwaters from the Piscataquog River. However, when major flooding occurs, there is not enough land behind the dam at Hopkinton Lake to hold the large volume of floodwaters from the Contoocook River. If not held back, these floodwaters would race downstream and threaten lives and property. There is, however, enough land behind the dam at Everett Lake on the Piscataquog River to

hold not only potentially damaging floodwaters from the Piscataquog River, but also the excessive floodwaters from the Contoocook River that the dam at Hopkinton Lake cannot contain. The two canals act together to direct Contoocook River floodwaters from behind the dam at Hopkinton Lake to the flood storage area behind the dam at Everett Lake.

Canal I is located about .25 mile upstream of the dam at Hopkinton Lake and diverts water from the Contoocook River into Elm Brook Pool, situated behind the dam. The earthen canal is lined with rock and is approximately 4,000 feet long and 120 feet wide. Canal II is situated roughly halfway between the two dams; it is this canal that connects the flood storage area behind the dam at Hopkinton Lake with the flood storage area behind the dam at Everett Lake, allowing the two dams to function as a single unit. This canal has a total length of 10,400 feet (about two miles), of which 8,400 feet was cut in earth with a width of 160 feet. The upper 2,000 feet of the canal is Drew Lake, a natural body of water with a width roughly the same as the rest of the canal. During major flooding, floodwaters pass from the Contoocook River to Canal I to Elm Brook Pool, then pass into Canal II to Everett Lake.

Most flooding on the Contoocook River is either minor or moderate and does not require the transfer of excessive floodwaters through the canals. Since the project's completion in December 1962, the diversion of Contoocook River floodwaters from behind the dam at Hopkinton Lake to the flood storage area behind the dam at Everett Lake has occurred only seven times, the last in April 1987 when the combined reservoir area of the two dams was filled to 95 percent of capacity, its highest level ever.

The flood storage area behind Hopkinton Lake totals 3,700 acres and extends about 8.5 miles upstream through Henniker to the Contoocook Valley Paper Company. This acreage includes areas that are normally empty and areas that have permanent bodies of water. Some of the larger bodies of water behind the dam at Hopkinton Lake include the 220-acre permanent pool on the Contoocook River, which has a maximum depth of 14 feet; the 456-acre Elm Brook Pool; the 47-acre Drew Lake, which makes up the upper 2,000 feet of Canal II; and two lakes, approximately 87 and 35 acres respectively, located within the confines of Stumpfield Marsh. The flood storage area behind Everett Lake totals 2,900 acres and extends westerly up the Piscataquog River in Weare; northerly up Choate Brook, which lies mostly in Weare with a small portion lying in Dunbarton; and northerly up Stark Brook in Dunbarton. This acreage includes a 130-acre permanent pool with a maximum depth of 15 feet. Together, the flood storage areas behind both dams can hold 52.6 billion gallons of water, which would cover approximately 8,000 acres (12.5 square miles). This is equivalent to 6.8 inches of water covering its drainage area of 446 square miles. The lakes and all associated project lands cover 9,945 acres.

The Hopkinton-Everett Reservoir area offers the public a wide variety of recreational opportunities. At Hopkinton Lake, the recreational area situated behind the dam, known as Elm Brook Park, offers boating, a boat ramp, and swimming on a 300-foot-long beach. Elm Brook Park also has 130 picnic tables and 62 fireplace grills; four picnic shelters; a

.5-mile-long nature trail; horseback riding over several miles of project roads; cross-country skiing; snowmobiling on designated trails; an open field for ball playing and other sporting activities; drinking water, and sanitary facilities. Other recreational activities popular at Elm Brook Park include canine field trials, which test a dog's temperament, skill, and ability for tracking, hunting, and guarding, and the flying of radio-controlled model airplanes.

The Corps has issued a license to the New Hampshire Department of Resources and Economic Development (DRED) to conduct a forestry and fish and wildlife management program on 3,282 acres of land at Hopkinton Lake. As a result, Hopkinton Lake offers excellent fishing and hunting opportunities. The various bodies of water behind the dam, including Elm Brook Pool, Drew Lake, and the two lakes at Stumpfield Marsh, offer what many consider to be some of the best bass fishing in the state. There is also year-round fishing in these areas for self-sustaining perch, pickerel, and brown bullhead. Ice fishing is permitted. Hunters will find state stocked pheasant, as well as ruffed grouse, quail, duck, and geese. In addition to the good fishing and hunting available at Stumpfield Marsh, this 700-acre area (including approximately 122 acres of water and 578 acres of woodlands) provides a waterfowl nesting area for species such as wood duck, mallard, hooded merganser, and black duck. One of the few blue heron rookeries in the state is located in Stumpfield Marsh, which lies undisturbed, as it was before the Hopkinton-Everett dams were built.

Stumpfield Marsh is part of the land that is licensed by the Corps to DRED, but the marsh area itself is managed in cooperation with the Fish and Game Department. The Corps also leases about 13 acres of land at Hopkinton Lake to New England College in Henniker for baseball, football, soccer, field hockey, and outdoor basketball.

At Everett Lake, the Corps has issued a license to DRED to conduct a forestry and fish and wildlife management program on 2,957 acres of land. Another 50 acres of land are leased to DRED to operate Clough State Park, which offers 110 wooden and 60 concrete picnic tables; two picnic shelters; about 80 fireplace grills; swimming on 900 feet of beach; boating for canoes, sailboats, and rowboats (boats with motors are prohibited); a boat ramp; an open field for ball playing and other sporting activities; drinking water; and sanitary facilities. About 15-20 miles of old roads at Everett Lake, including old Route 77, Bassett Mill Road, and the lower end of Sugar Hill Road, provide cross-country skiing trails and designated trails for snowmobiling.

Everett Lake offers good year-round fishing for self-sustaining bass, pickerel, and brown bullhead. The state stocks brook, brown, and rainbow trout in the Piscataquog River, which empties into Everett Lake. The 19-acre Stark Pond Waterfowl Marsh Area, which lies on reservoir lands and is managed by DRED, offers fishing for self-sustaining perch, pickerel, and brown bullhead. There is in-season hunting for state-stocked pheasant, as well as ruffed grouse, woodcock, bear, deer, and rabbit.

Appendix E. N.H. Fish & Game Department Maps of Lakes and Ponds in Weare

For regulation information, please refer to the NHFGD Freshwater Fishing Digest.

Contact: NHFGD Region 4 (Southwest NH), Keene
E-mail: reg4@wildlife.nh.gov Phone: 603-352-9669

WEARE RESERVOIR
Weare

FISHERY: Warmwater ACRES: 268
TROPHIC LEVEL: MESO
AVG DEPTH: 14 MAX DEPTH: 32
SPECIES: RT,BT,SMB,LMB,ECP,HP,BC
ADDITIONAL INFO:
ACCESS: paved ramp, Chase Park, N end Town residents only

Contact NH Dept of Safety, Marine Patrol Bureau for information regarding waterbody restrictions (603) 293-0091

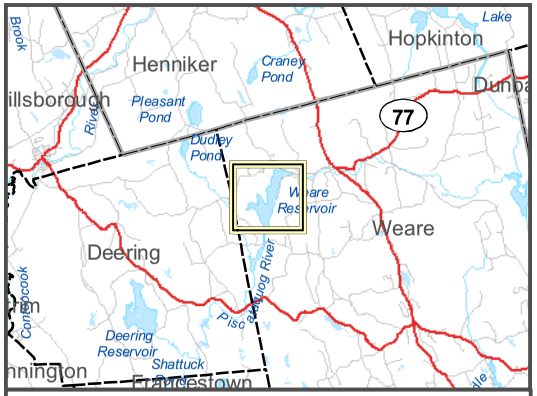
Public Water Access site (State, Federal, or Road-to-Public-Water)

- Canoe/cartop
- Shorebank
- Ramp
- Bathymetric contour (feet)

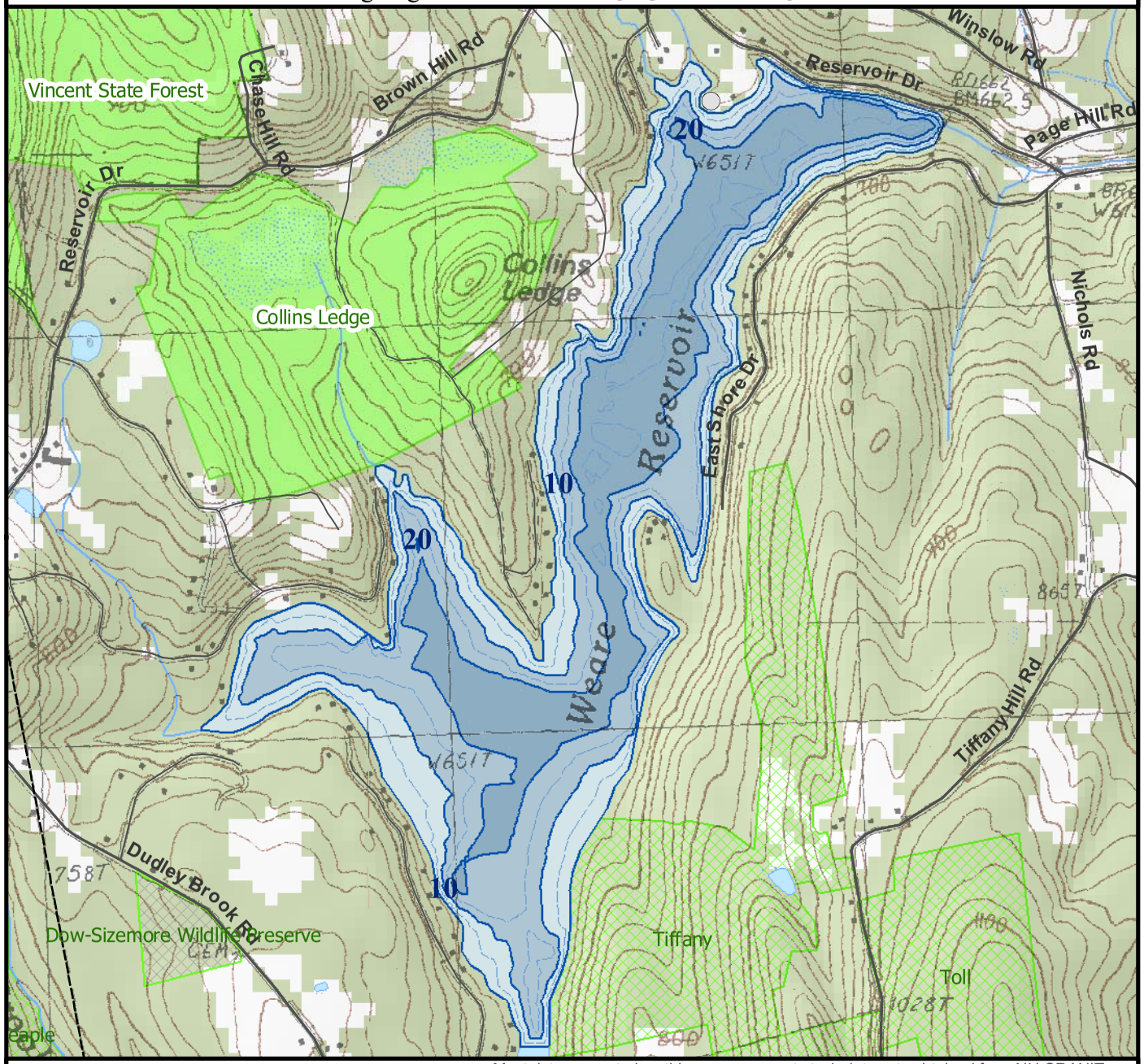
Bathymetry provided by the NH Department of Environmental Services, Watershed Mgt Bureau

- Town boundary
- Primary Route
- Road or Street
- Trail or other
- Stream or Shoreline
- Surface Water
- Wetland
- Conservation Land
- Restricted Access Conservation

Cleared
Forest
Contour
Building
Source: USGS



Directions: Rt 114 to Page Hill Rd to Reservoir Dr



Most data presented on this map represent stock data sets obtained from NH GRANIT, Complex Systems Research Center, UNH. CSRC, NHOEP, NHFGD and the cooperating agencies make no claim as to the validity or reliability or to any implied uses of these data. NOT FOR NAVIGATION.

For regulation information, please refer to the NHFGD Freshwater Fishing Digest.

Contact: NHFGD Region 4 (Southwest NH), Keene
E-mail: reg4@wildlife.nh.gov Phone: 603-352-9669

DANIELS LAKE
Weare

FISHERY: Warmwater	**ACRES: 37**
TROPHIC LEVEL: MESO	
AVG DEPTH: 4	**MAX DEPTH: 10**
SPECIES: AE,BBH,CSF,CWS,YBH	
ADDITIONAL INFO:	
ACCESS: No public access	

Contact NH Dept of Safety, Marine Patrol Bureau for information regarding waterbody restrictions (603) 293-0091

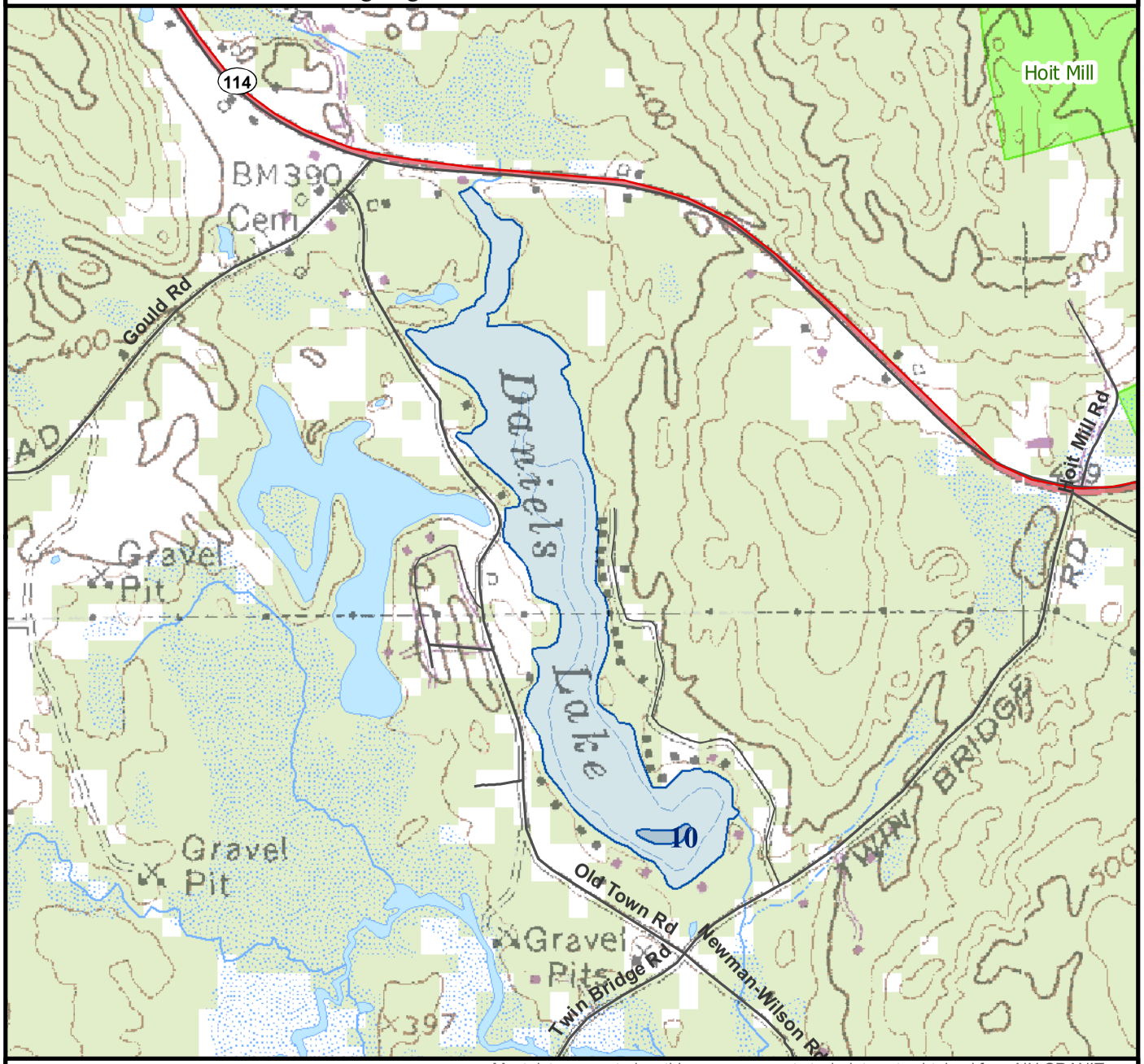
Public Water Access site (State, Federal, or Road-to-Public-Water)

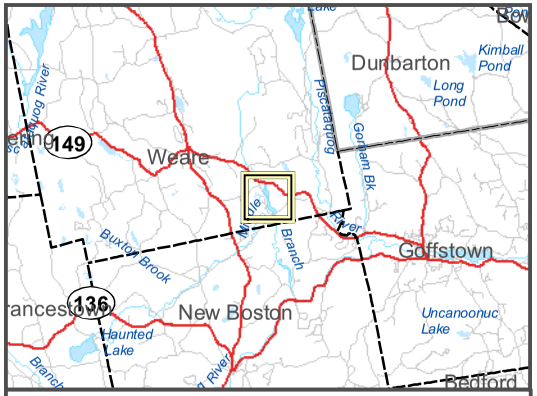
- Canoe/cartop
- Shorebank
- Ramp
- Bathymetric contour (feet)

Bathymetry provided by the NH Department of Environmental Services, Watershed Mgt Bureau

- Town boundary
- Primary Route
- Road or Street
- Trail or other
- Stream or Shoreline
- Surface Water
- Wetland
- Conservation Land
- Restricted Access Conservation

Cleared
Forest
Contour
Building
Source: USGS





Directions:

N
0 500 1,000 Feet
0 0.1 0.2 Miles

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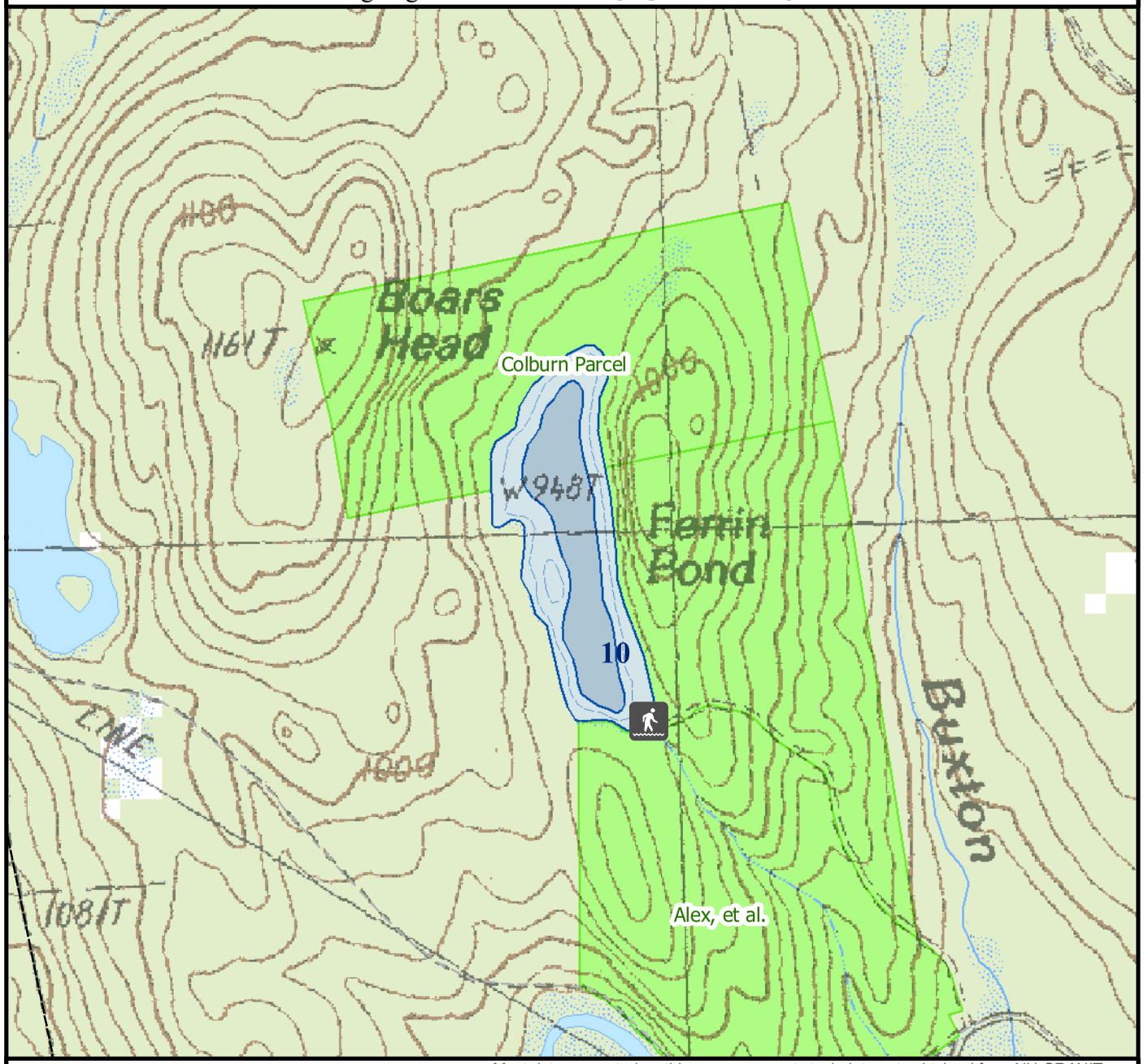
For regulation information, please refer to the NHFGD Freshwater Fishing Digest.

Contact: NHFGD Region 4 (Southwest NH), Keene
E-mail: reg4@wildlife.nh.gov Phone: 603-352-9669

FERRIN POND
Weare

FISHERY: Coldwater	**ACRES: 18**
TROPHIC LEVEL: MESO	
AVG DEPTH: 8	**MAX DEPTH: 11**
SPECIES: BT, LMB	
ADDITIONAL INFO: No motorboats; Trout waters	
ACCESS: Ferrin Pond Remote Access	

Contact NH Dept of Safety, Marine Patrol Bureau for information regarding waterbody restrictions (603) 293-0091



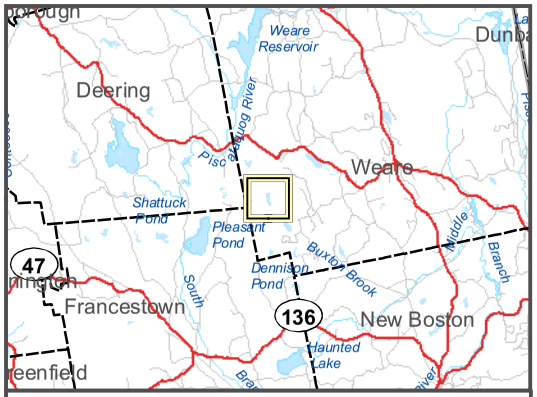
Public Water Access site (State, Federal, or Road-to-Public-Water)

- Canoe/cartop
- Shorebank
- Ramp
- Bathymetric contour (feet)

Bathymetry provided by the NH Department of Environmental Services, Watershed Mgt Bureau

- Town boundary
- Primary Route
- Road or Street
- Trail or other
- Stream or Shoreline
- Surface Water
- Wetland
- Conservation Land
- Restricted Access Conservation

Source: USGS



Directions: Rt 149 to Peacock Hill, 1.8 mi to Mountain Rd, 1st dirt road on R

N 0 500 1,000 Feet
0 0.1 0.2 Miles

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For regulation information, please refer to the NHFGD Freshwater Fishing Digest.

Contact: NHFGD Region 4 (Southwest NH), Keene
E-mail: reg4@wildlife.nh.gov Phone: 603-352-9669

EVERETT POOL
Weare

FISHERY: Warmwater ACRES: 148
TROPHIC LEVEL: MESO
AVG DEPTH: 6 MAX DEPTH: 18
SPECIES: BBH,ECP,LMB,SMB,YP
ADDITIONAL INFO: No petroleum powered motors
ACCESS: Clough State Park Boat Ramp

Contact NH Dept of Safety, Marine Patrol Bureau for information regarding waterbody restrictions (603) 293-0091

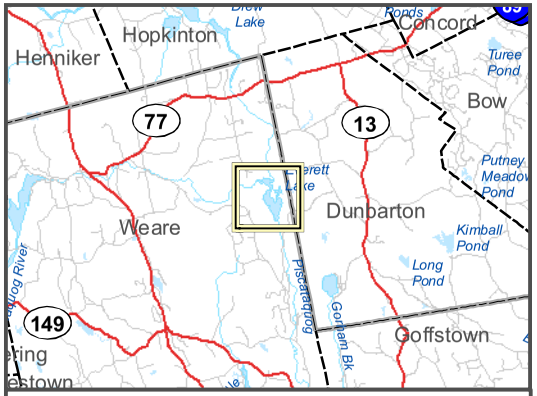
Public Water Access site (State, Federal, or Road-to-Public-Water)

- Canoe/cartop
- Shorebank
- Ramp
- Bathymetric contour (feet)

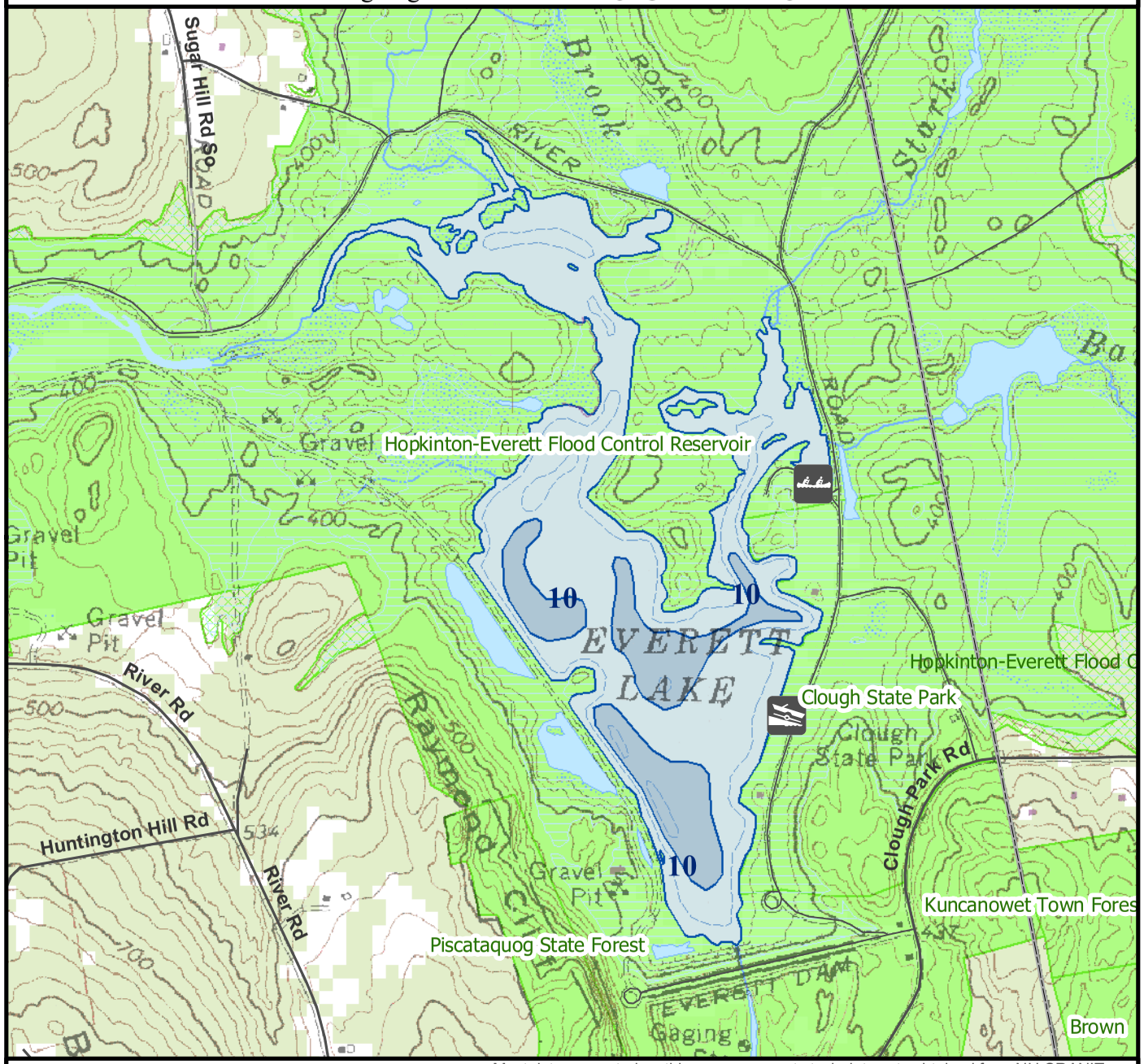
Bathymetry provided by the NH Department of Environmental Services, Watershed Mgt Bureau

- Town boundary
- Primary Route
- Road or Street
- Trail or other
- Stream or Shoreline
- Surface Water
- Wetland
- Conservation Land
- Restricted Access Conservation

Cleared
Forest
Contour
Building
Source: USGS



Directions: Rt 13 to River Rd, Clough State Park



N
0 500 1,000 Feet
0 0.1 0.2 Miles

Most data presented on this map represent stock data sets obtained from NH GRANIT, Complex Systems Research Center, UNH. CSRC, NHOEP, NHFGD and the cooperating agencies make no claim as to the validity or reliability or to any implied uses of these data. NOT FOR NAVIGATION.

For regulation information, please refer to the NHFGD Freshwater Fishing Digest.

Contact: NHFGD Region 4 (Southwest NH), Keene
E-mail: reg4@wildlife.nh.gov Phone: 603-352-9669

MOUNT WILLIAM POND
Weare

FISHERY: Coldwater	**ACRES: 32**
TROPHIC LEVEL: MESO	
AVG DEPTH: 14	**MAX DEPTH: 27**
SPECIES: EBT,RT	
ADDITIONAL INFO: No petroleum powered motors; Trout waters	
ACCESS: gravel ramp, parking	

Contact NH Dept of Safety, Marine Patrol Bureau for information regarding waterbody restrictions (603) 293-0091

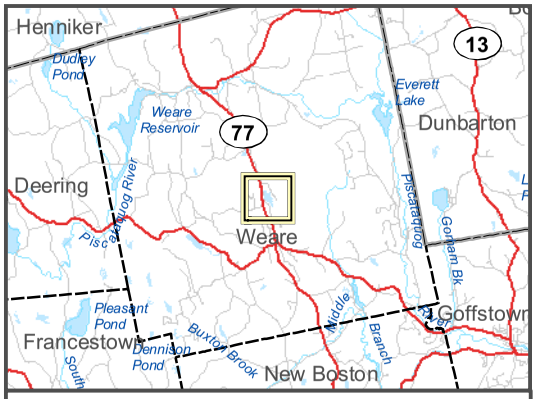
Public Water Access site (State, Federal, or Road-to-Public-Water)

- Canoe/cartop
- Shorebank
- Ramp
- Bathymetric contour (feet)

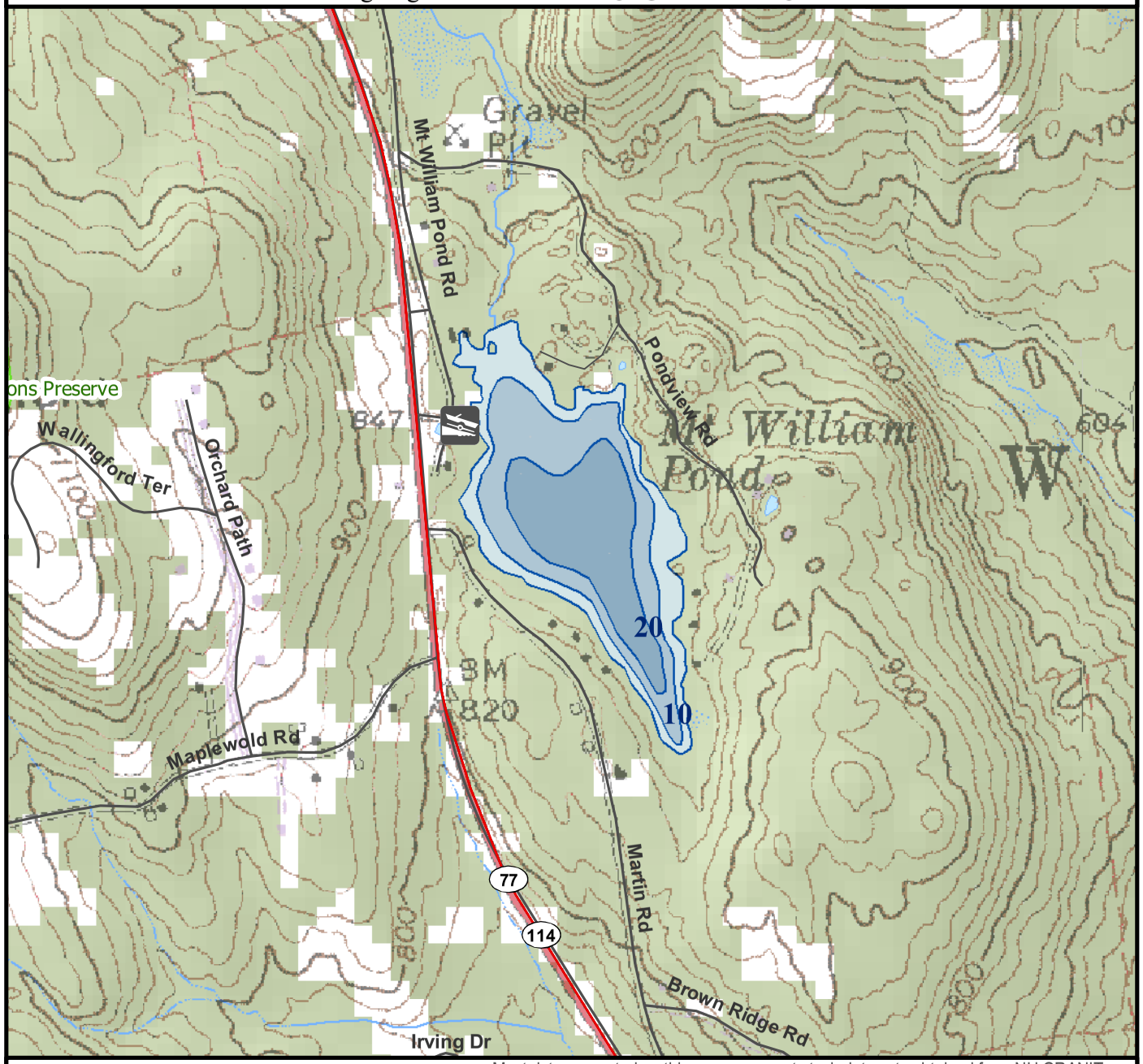
Bathymetry provided by the NH Department of Environmental Services, Watershed Mgt Bureau

- Town boundary
- Primary Route
- Road or Street
- Trail or other
- Stream or Shoreline
- Surface Water
- Wetland
- Conservation Land
- Restricted Access Conservation

Cleared
Forest
Contour
Building
Source: USGS



Directions: Rt 77/114 to Mt William Pond Rd



N
0 500 1,000 Feet
0 0.1 0.2 Miles

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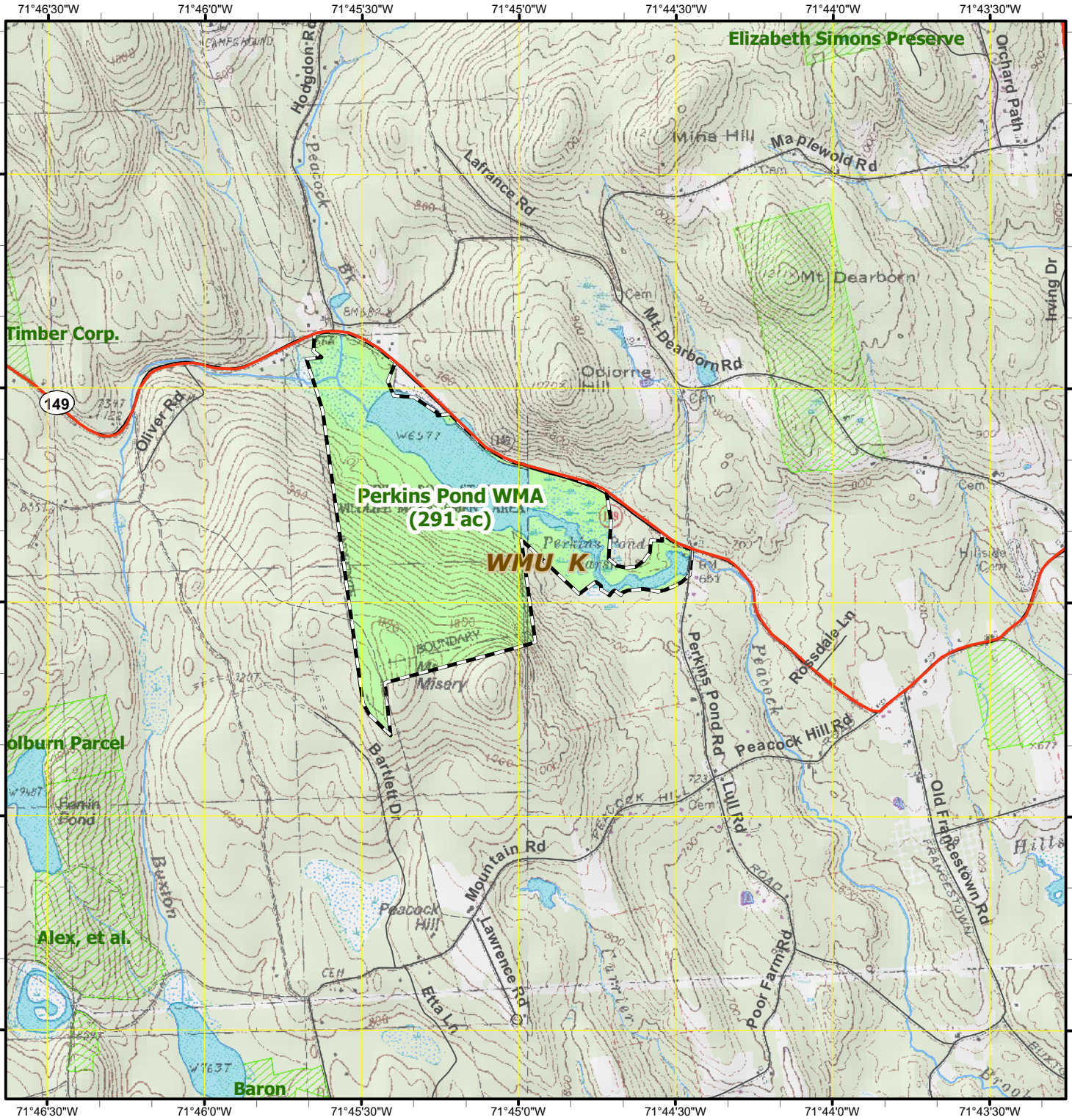
NH Fish and Game Department Wildlife Management Areas

Perkins Pond WMA (town: Weare, wmu: K)



Not all conservation land is open to hunting and NHFGD highly recommends that each hunter personally contact landowners whenever possible and seek permission to hunt.

For further information, please contact:
NH Fish and Game Department, Wildlife Division
11 Hazen Dr, Concord NH 03301-6500
603-271-2461 Email: wildlife@wildlife.nh.gov

N
W E
S

0 0.2 0.4 Miles

LOCUS

NH Fish and Game Department Wildlife Management Area - approximate boundary

Parcel for which NH Fish and Game or NH Dept of Resources and Economic Dev. is the primary protecting agency.

Conservation Land (access may be Restricted)

Stream or Shoreline

Wetland

Surface Water

Wildlife Mgt. Unit boundary

Primary route

Road or Street

Town Boundary

Most data presented on this map represent stock data sets obtained from NH GRANIT, at Complex Systems Research Center, UNH. CSRC, under contract to the NH Office of Energy and Planning (OEP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. OEP, CSRC, NHFGD and the cooperating agencies make no claim as to the validity or reliability or to any implied uses of these data.

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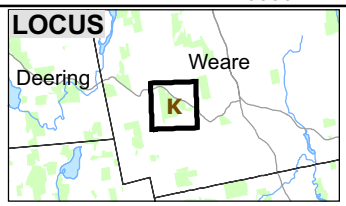

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- NHFGD Wildlife Management Area approx. boundary, acres (software calculated)
- Parcel for which NH Fish and Game Dept. or NH Dept of Resources & Economic Dev. is the primary protecting agency.
- Conservation land (may be restricted access)

2008 NAIP 1m orthophoto provided by GRANIT

- Stream or Shoreline
- Wetland
- Surface Water
- Road or Street
- Unmaintained
- Town Boundary

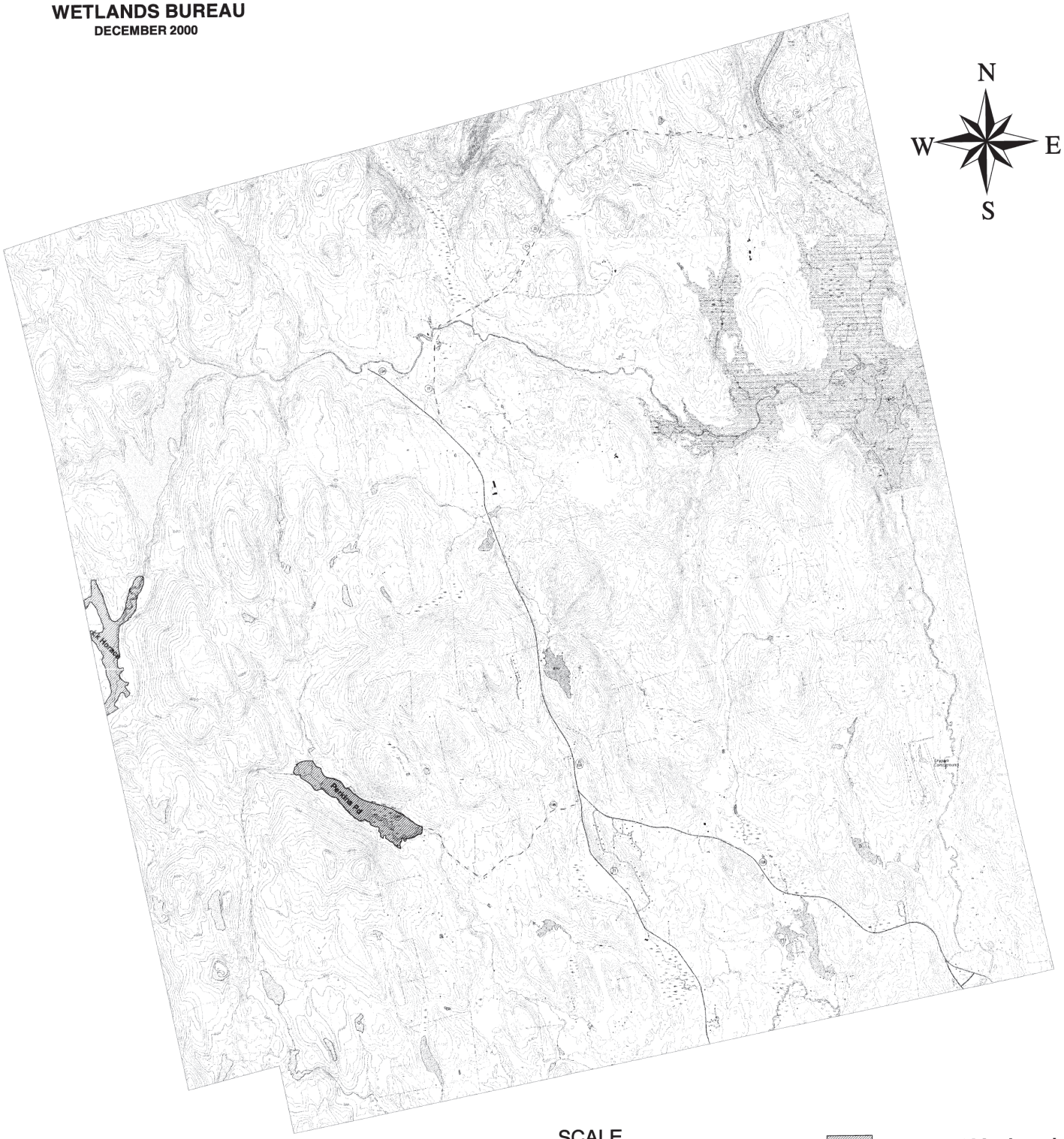
Appendix F: Weare Prime Wetlands Locus Map

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

WETLANDS BUREAU

DECEMBER 2000

WEARE PRIME WETLANDS



Note: The data on this map has been digitized using a Calcomp 9100 digitizer from base tax assessor's maps provided by the Town of Weare. Some error is inherent. The NH Wetlands Bureau assumes no responsibility for the accuracy of delineations. For legal delineations consult the base maps approved by the Town of Weare.

SCALE

1:24000

1 inch = 2000 feet

2000 0 2000 4000 6000 8000 10000 12000 14000 Feet

Prime Wetland

Town boundary

Road

Created by: David W. Gorhan December 2000