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AN EVALUATION OF WETLANDS IN THE FRAZIER BROOK WATERSHED WARNER, NEW HAMPSHIRE

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Final Masters Project
Antioch New England Graduate School
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AN EVALUATION OF WETLANDS IN THE FRAZIER BROOK WATERSHED WARNER, NEW HAMPSHIRE

A Masters Project
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ABSTRACT

The assessment of the functional values of wetlands is an increasingly important facet of wetlands science. Such assessments are used by communities, planners and scientists in the management, protection, and restoration of wetland resources. There are several different evaluation techniques which are used by resource managers. Some techniques require professional knowledge and training, others are designed for use by nonprofessionals such as local conservation commissions. In order to avoid improper decisionmaking, wetlands evaluation methods should be used only for the specific purposes for which they were designed.

This project focused on the assessment of fourteen functional values (e.g. wildlife habitat, flood control potential, nutrient attenuation, etc.) of wetlands in the Frazier Brook watershed, in Warner New Hampshire. Functional values were assessed and calculated using the Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire (Amman, et .al)., which is intended for use in broad scale planning. A total of sixteen wetlands were mapped and evaluated. Of these wetlands, three scored first or second in all of the functional values. This was attributed to their large size (over 20 acres) and their proximity to a waterbody or watercourse.

Specific recommendations for the use of the information generated by the evaluation project are contained in this report. Such recommendations include: designation of prime wetlands; educational activities; and enactment of local regulations.

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I. INTRODUCTION

Project Purpose

Wetlands evaluation is defined as " the process of determining the value of a wetland based on an assessment of the potential and/or functional values of that wetland" (Amman et. al, 1991). The purpose of this project is to assess the functional values of wetlands located in the Frazier Brook watershed, using the Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire, (Amman et.al, 1991).

Information generated by this project will be used to provide the Town of Warner Conservation Commission and Planning Board with a basis for pursuing one or more of the following options for wetlands protection:

1. Development/update of zoning regulations;
2. Use in review by the Planning Board of subdivision and site plans;
3. Commenting to the state Wetlands Board on dredge and fill applications;
4. Commenting to the U. S. Army Corps of Engineers on dredge and fill applications;
5. Designation of Prime Wetlands; and
6. Acquisition of wetlands.

In order to more effectively plan for growth and development many communities undertake inventories and assessments of their resources, both natural and cultural. These inventories help communities to identify those resources most in need of protection, and select the most appropriate protection and/or management techniques. The primary goal of this project is to facilitate local planning and resource management efforts by providing information on the wetlands located in the Frazier Brook watershed, of Warner, New Hampshire.

Evaluation Methods

The results of this project should be used with caution, as wetlands evaluation methods such as the NH Method, are designed to be used as general planning tools only. The NH Method is not a site-specific assessment technique, and is not appropriate for use in impact analysis. It's primary function is to provide information on the comparative values of a group of wetlands for certain functions (e.g. flood control, wildlife habitat, etc.), and point out those areas are potentially high value, or which may require more in-depth investigation.

Evaluation methods do exist which are designed for site-specific analysis, however, they can be complex, time-consuming, and expensive to use, and must be performed by trained professionals.

Project Description

This project focuses on the assessment of the functional values of sixteen wetlands in the Frazier Brook watershed, within the Town of Warner, New Hampshire. In order to assess the functional values of wetlands it is important to understand what wetlands are, and how they are defined and regulated, therefore a general discussion of wetlands is included in this report. Also included in this document are: a description of the watershed study area, including zoning and land use; a description and critique of the methodology used; individual profiles of the sixteen wetlands evaluated in the target watershed, including vegetation, soils and hydrologic regime; research results and conclusions; and recommendations on how to use the information generated by this study.

This is the first phase of a multi-phase wetlands project being undertaken by the Warner Conservation Commission on a watershed basis.

II. WETLANDS DESCRIBED AND DEFINED

What Are Wetlands?

Wetlands can be broadly described as areas which are intermediate between upland ecosystems and open bodies of water. Most wetlands develop in low places in the landscape and are categorized generally as swamps, bogs, and marshes. Each wetland type has its own characteristic vegetation: swamps are dominated by woody vegetation such as trees and shrubs; bogs are characterized by plants and

trees adapted to highly acidic conditions; and marshes are treeless wetlands characterized by soft-stemmed herbaceous plants.

New Hampshire regulations refer to wetlands in terms of marsh, swamp and bog, which are not really useful in identifying regulated wetlands. Cowardin et. al (1979) was recently sited as the classification source for wetlands in New Hampshire, and is more scientifically accurate. Unfortunately, the NH Wetlands Board regulations state a preference for protection of wetlands based on these generic terms, e.g. bogs are given higher status than marshes, and swamps are considered least valuable based on their abundance.

The U.S. Army Corps of Engineers defines wetlands as "those areas that are saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions". This definition is also used in the application of the NH Method, upon which this project is based.

Other agencies, local, state, and federal, may define wetlands in a slightly different manner, however all the definitions are essentially concerned with the three basic elements described below; vegetation, hydrology, and soils.

Vegetation

Plants which are used as wetland indicators are known as hydrophytic species and are adapted to growing in water or in saturated soil conditions. Hydrophytes are defined as "macrophytic plant life growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content (USCOE et.al, 1989).

Hydrology

According to Mitsch and Gosselink (1986), hydrology is considered to be the most significant factor in determining the establishment and maintenance of specific types of wetlands and wetland processes. An area is considered to have wetland hydrology when "saturated to the surface or inundated at some point in time during an average rainfall year" (USCOE et. al, 1989). Water movement and storage in wetlands affects how the soils develop and what vegetation is present. This in turn affects the functions which are performed by a wetland.

Soils

Soil is defined as solid earth material that has been altered by physical, chemical, and organic processes, such that it can support rooted plant life (Keller, 1976). The factors that are important in the formation of soils include climate, topography, time, parent material, and activities of plants and animals (SCS, 1989).

Hydric (wetland) soil is defined by the U.S. Department of Agriculture, Soil Conservation Service (USDA/SCS) as "soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part". Usually, soils which are saturated or ponded for seven days or more during the growing season exhibit hydric characteristics. There are two basic classifications of hydric soils: organic soils (Histosols) and mineral soils (Tiner, 1985). Generally, soils that have at least 18 inches of organic matter in the upper layer are considered to be organic, and soils with less organic matter are considered to be mineral (Tiner, 1985). A listing of hydric soils found in Merrimack County is contained in Appendix 3.

Wetland Functions and Values

Wetlands provide many different beneficial functions, including flood water storage, wildlife habitat, nutrient attenuation, recreational opportunity, and groundwater protection. However, it is important to note that not all wetlands perform all functions, nor do they perform them to the same degree. The functions which a wetland performs may also vary on a seasonal basis, especially functions such as flood water storage, groundwater recharge/discharge, nutrient attenuation, and sediment trapping.

Wetlands Regulation

Wetlands are regulated at both the state and federal levels. At the state level, the New Hampshire Wetlands Board is responsible for reviewing projects which involve filling, dredging or other alteration of wetlands and submerged lands, and granting or denying permits based on the potential impacts of a project. At the federal level, the U.S. Army Corps of Engineers (COE) has primary responsibility for the regulation of wetland impacts, with input from the Environmental Protection Agency and the Fish & Wildlife Service.

State and federal regulatory authorities often overlap, and it may be confusing for an applicant or local Conservation Commission to determine when a state Wetlands Board permit is required, and when both Wetlands Board and COE permits are required. In general, the Corps jurisdiction is similar to the Wetlands Boards, but the Corp does exempt certain activities in small, isolated wetlands which cause minimal environmental damage. Contacting the regional Corps of Engineers Office is the most prudent course of action if there is uncertainty on the part of the developer, landowner or local Conservation Commission on whether a federal permit is required.

In New Hampshire, local communities may also enact wetlands ordinances which may be more restrictive than state or federal laws. Inventory and assessment projects can provide valuable information to communities seeking to enhance protection of their wetland resources through local regulations.

III. DESCRIPTION OF WATERSHED STUDY AREA

The study area is the Frazier Brook watershed, located in the Town of Warner, New Hampshire (MAP 1). The watershed is approximately 4.3 square miles and is rural in nature (MAP 1A). The terrain is fairly steep and rugged, and is primarily forested.

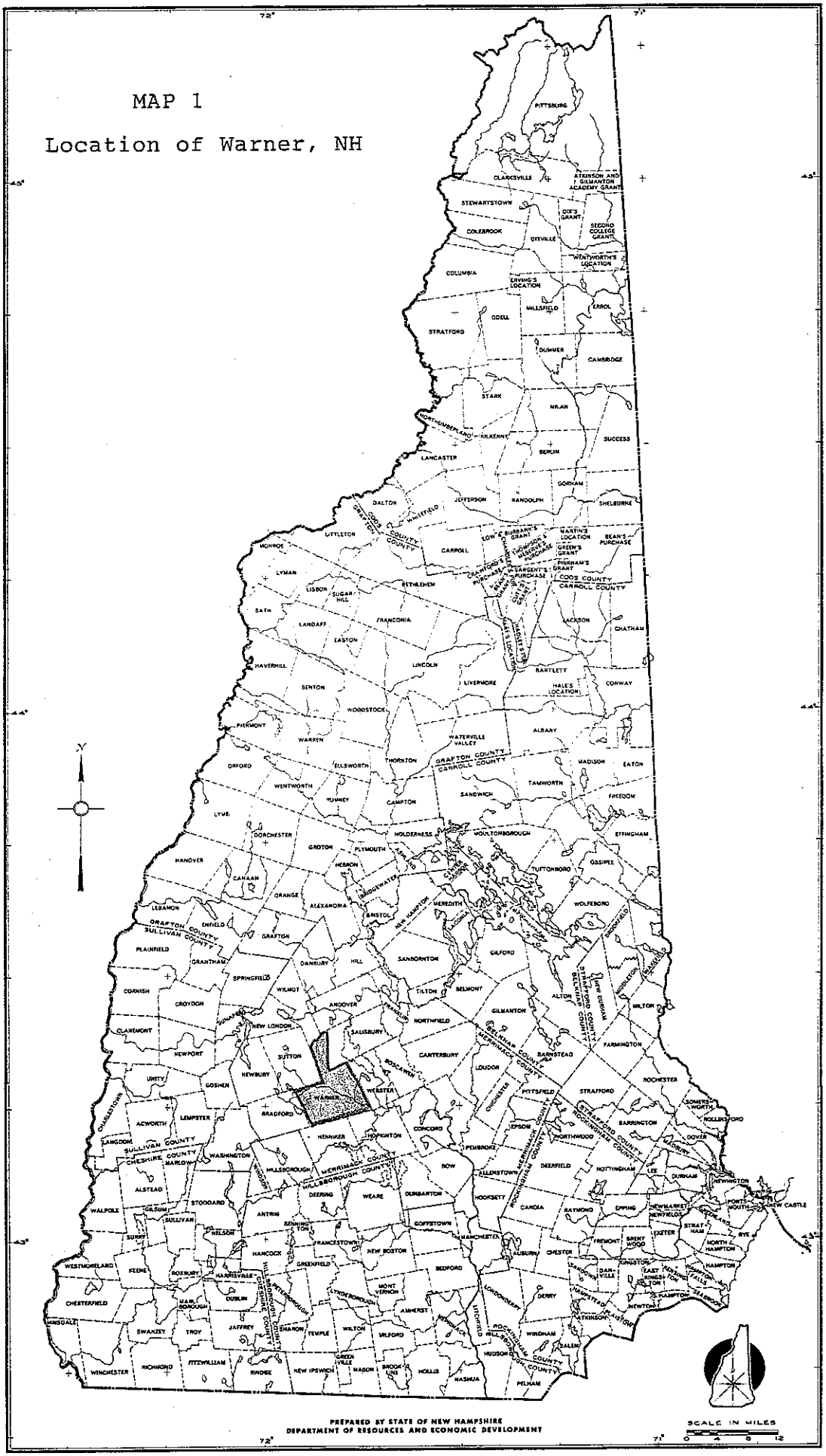
Land uses in the watershed consist of those which are compatible with a rural setting, including: forestry, some agricultural use, and limited single family residential housing.

The entire study area falls within either the R3 or OC1 zoning districts, which are described below.

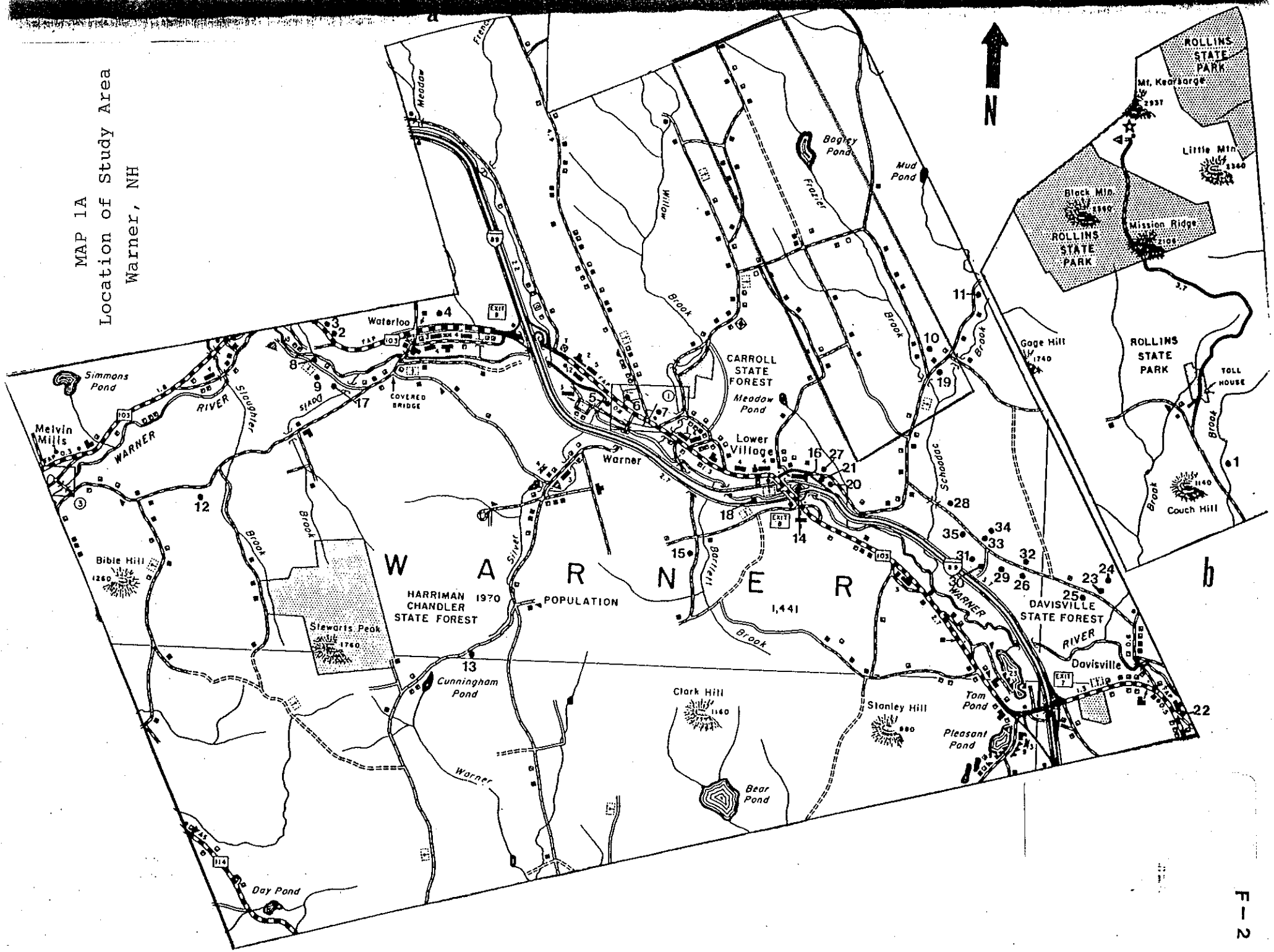
Low Density Residential District (R3): "Designated for residential and agricultural uses on land remote from municipal water and sewer services which because of its character requires large minimum lot sizes to handle the individual family's water and sewer disposal needs. Uses normally associated with residential neighborhoods such as schools, churches, and parks are permitted, and certain businesses are permitted by special exception". The R3 zone requires a 250' minimum frontage, and a 3 acre minimum lot size. Any building lot which borders a public lake or pond must have a minimum of 100' of shoreline. (Warner Zoning Ordinance, 1991).

MAP 1

Location of Warner, NH



MAP 1A
Location of Study Area
Warner, NH



Open Conservation District (OC1): "Designated for agricultural, forestry, and very limited residential uses on inaccessible land which because of steepness of slope, poor drainage, or periodic flooding shall not be intensively developed" (Warner Zoning Ordinance, 1991).

The OC1 district requires minimum frontage of 300', and a minimum lot size of 5 acres. Any lot bordering the shoreline of a public lake or pond must have a minimum of 200' of shoreline.

Other Zoning Provisions: The General Provisions section of the Warner Zoning Ordinance states that "All buildings, including storage tanks shall be set back a minimum of 75 feet from the Warner River, ponds greater than 10 acres and all other perennial waterways and streams as shown on standard 7 1/2 minute USGS quadrangle maps. In addition, a maximum of 50% of the existing natural vegetation shall remain as a buffer". (Warner ZO, Article IV, 1991).

IV. METHODOLOGY

The Methodology used for this project is The Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire. This method is based on a similar method developed for the state of Connecticut and was adapted for use by New Hampshire communities by the Audubon Society of New Hampshire, the New Hampshire Department of Environmental Services (NH DES), and the US Department of Agriculture, Soil Conservation Service (USDA/SCS) in 1991. The NH Method

involves the use of numerical rating system for assessing the 14 functional values listed and described below.

1. **Ecological Integrity** - Evaluates the overall health and function of the wetland ecosystem.

2. **Wildlife Habitat** - Evaluates the suitability of the wetland as a habitat for those animals typically associated with wetlands and wetland edges. No single species is emphasized.

3. **Finfish Habitat** - Evaluates the suitability of watercourses, ponds, or lakes associated with the wetland for either warm water or cold water fish. No single species or group of species is emphasized.

4. **Educational Potential** - Evaluates the suitability of the wetland as a site for an "outdoor classroom".

5. **Groundwater Use Potential** - Evaluates the potential use of the underlying aquifer as a drinking water supply.

6. **Nutrient Attenuation** - Evaluates the potential of the wetland to reduce the impacts of excess nutrients in runoff water on downstream lakes and ponds.

7. **Sediment Trapping** - Evaluates the potential of the wetland to trap sediment in runoff water from surrounding upland.

8. **Shoreline Anchoring And Dissipation of Erosive Forces** - Evaluates the effectiveness of the wetland in preventing shoreline erosion.

9. **Visual/Aesthetic Quality** - Evaluates the visual and aesthetic quality of the wetland.

10. **Water-based Recreation** - Evaluates the suitability of the wetland and associated watercourses for non-powered boating, fishing, and other similar recreational activities.

11. **Flood Control Potential** - Evaluates the effectiveness of the wetland in storing floodwaters and reducing downstream flood peaks.

12. **Urban Quality of Life** - Evaluates the potential for the wetland to enhance the quality of urban life by providing wildlife habitat and other natural values in an urban setting.

13. **Historical Site Potential** - Evaluates for indications of use by early settlers.

14. **Noteworthiness** - Evaluates the wetland for certain special values such as critical habitat for endangered species, etc.

Application of the NH Method involves answering a series of predetermined questions for each functional value. Each question is allocated a point value, and when all questions have been answered the point total is added up and divided by the number of questions to give an average number called the **Functional Value Index** (FVI). The FVI is then multiplied by the acreage of the wetland and the final result is the **Wetland Value Unit** (WVU). The WVUs for each functional value are used to make comparisons between wetlands within the study area. Only scores for like functional values are compared, for example, the scores for all wetlands will be compared for wildlife habitat to determine which wetland scored highest. Appendix 4 contains a sample data sheet.

The NH Method requires that wetlands in the study area be mapped prior to evaluation of functional values. Mapping for this project involved the production of a mylar base map and two mylar overlays. One overlay includes soils information, and the other overlay includes land use/zoning, and wetland boundaries. The base map was produced by enlarging the watershed area using an existing USGS mylar quad, from 1:24,000 scale to 1:12,000 scale. Soils maps (USDS/SCS, 1965) National Wetlands Inventory Maps (USF&W Service, 1990), were also modified so that all maps/overlays are at the same scale.

The wetlands in the study area were mapped and classified based on the U.S. Fish & Wildlife system found in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et. al, 1979), and maps developed by the Fish & Wildlife Service through the National Wetlands Inventory (NWI) Project. For the most part the NWI maps accurately portrayed the type of wetland (scrub-shrub, forested, etc.) found during field investigations. The only two discrepancies

noted were in: (1) Bagley Pond (MAP 3), which contained an area of scrub-shrub vegetation in the southeast corner designated on the NWI map as open water, and an area of emergent vegetation in the northwest corner, which is also designated as open water on the NWI map; and (2) FBT 1 (MAP 5), which contained an area of dense emergent vegetation designated as open water on the NWI map. These vegetated areas could have grown in after the aerial photographs (which the NWI maps are based on) were taken.

All wetlands greater than 1 acre in size within the Frazier Brook watershed were mapped and evaluated. In addition, all wetlands adjacent and/or connected to a waterbody or watercourse were mapped and evaluated, regardless of size. The total number of wetlands evaluated was sixteen. Each wetland was given a code based on its position in the watershed (Map 2).

Evaluations conducted for each wetland were based on field observations made between September 1 and October 30, 1991. Summary data sheets for each wetland are contained in Appendix 5.

It should be noted that the New Hampshire Method is a wetlands evaluation method and its main purpose is to assess the functional values of a group of wetlands in order to determine their relative importance. Wetlands evaluation should not be confused with wetlands delineation, which involves determining the extent of wetland boundaries in the field.

V. PROFILE OF WETLANDS IN THE FRAZIER BROOK WATERSHED

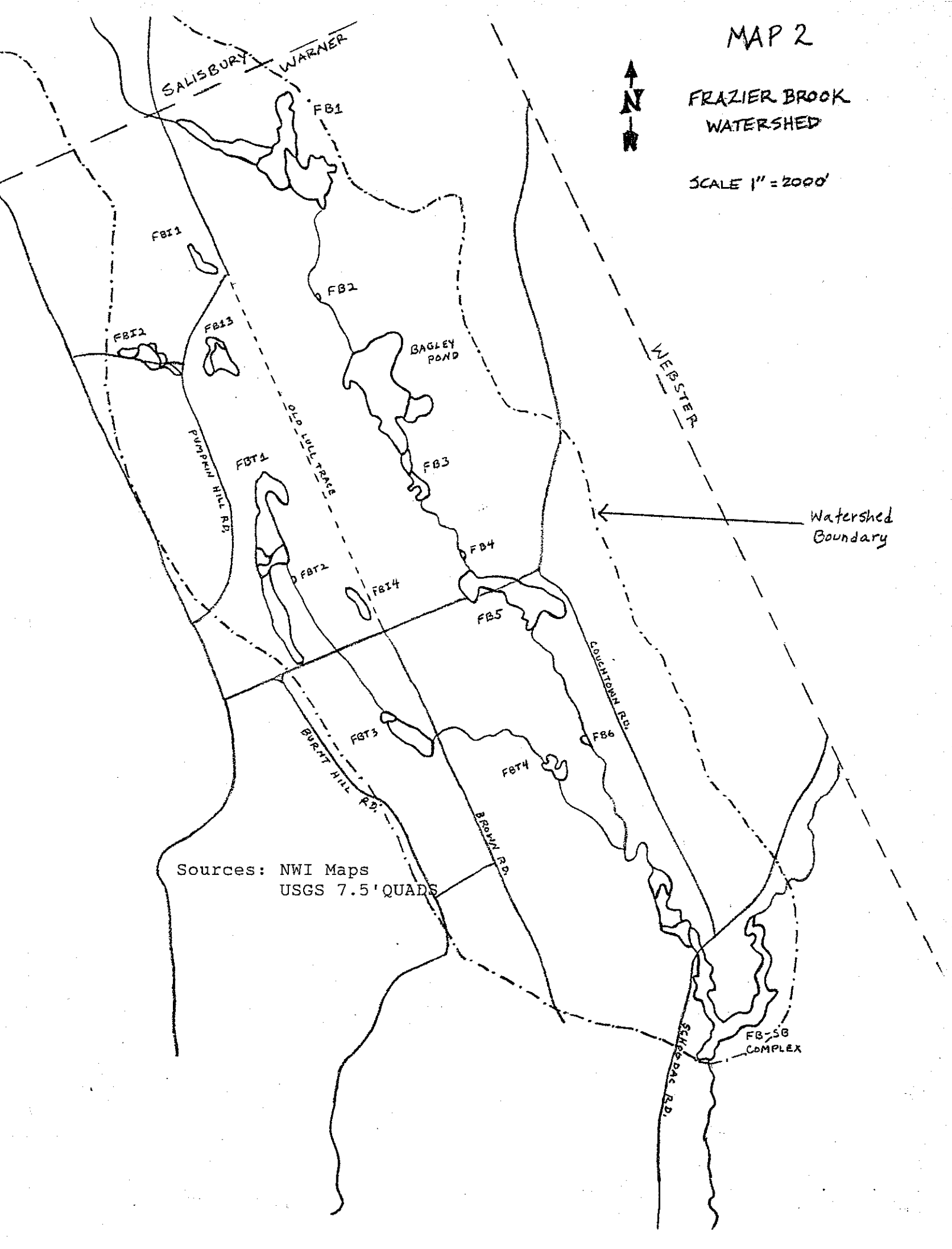
As previously mentioned, wetlands were coded based on their position in the watershed (MAP 2). Table 1 summarizes the physical and biological characteristics of the wetlands found in the study area. In addition, all wetlands are briefly described below.

TABLE 1. WETLANDS OF THE FRAZIER BROOK WATERSHED

Wetland Code	Wetland Classifications	Wetland Acreage	Watershed Acreage	Watershed Slope
FB1	PEM/SSIE, PFOIE, PUBH	31.0	790	12%
FB2	R3UBH	0.9	49	9%
BP	PUBH, PSS3B	24.5	310	11%
FB3	PFO4E, PEMIE	4.3	75	10%
FB4	R3UBH	0.9	26	10%
FB5	PSSIE	18.0	258	11%
FB6	R3UBH	1.4	59	10%
FB-SB	PSSIA, PEMIA, PEMIE, PSSIE	30.0	614	9%
FBT1	PEMIE, PUBH, PSSIF, PFO1/4	20.5	221	9%
FBT2	PSSIE	0.9	10	2.5%
FBT3	PUBHh, PFOIE	5.0	92	10%
FBT4	PSSIEb	2.8	103	11%
FBI1	PFOIE	2.15	34	10%
FBI2	PEMIE, PSSIE	6.45	62	8%
FBI3	PSSIE, PFOIE	5.8	24	6%
FBI4	PSSIE	2.15	28	6%

Note 1: Watershed acreage refers to the size of the land area that drains into that particular wetland. Watershed slope refers to the average slope of the watershed for the individual wetland.

Note 2: A detailed explanation of the Cowardin Wetland Classification System can be found in Appendix 1.


MAP 2
FRAZIER BROOK WATERSHED
SCALE 1" = 2000'
N
SALISBURY
WARNER
WEBSTER
FB1
FBI1
FBI2
FBI3
FB2
BAGLEY POND
FB3
FBT1
FBT2
FBI4
FB4
FB5
FBT3
FBT4
FB6
PUMPKIN HILL RD.
OLD HILL TRACE
COUCHTOWN RD.
BURNT HILL RD.
BROWN RD.
SCHOODAC RD.
FB-SB COMPLEX
Watershed Boundary
Sources: NWI Maps
USGS 7.5'QUADS

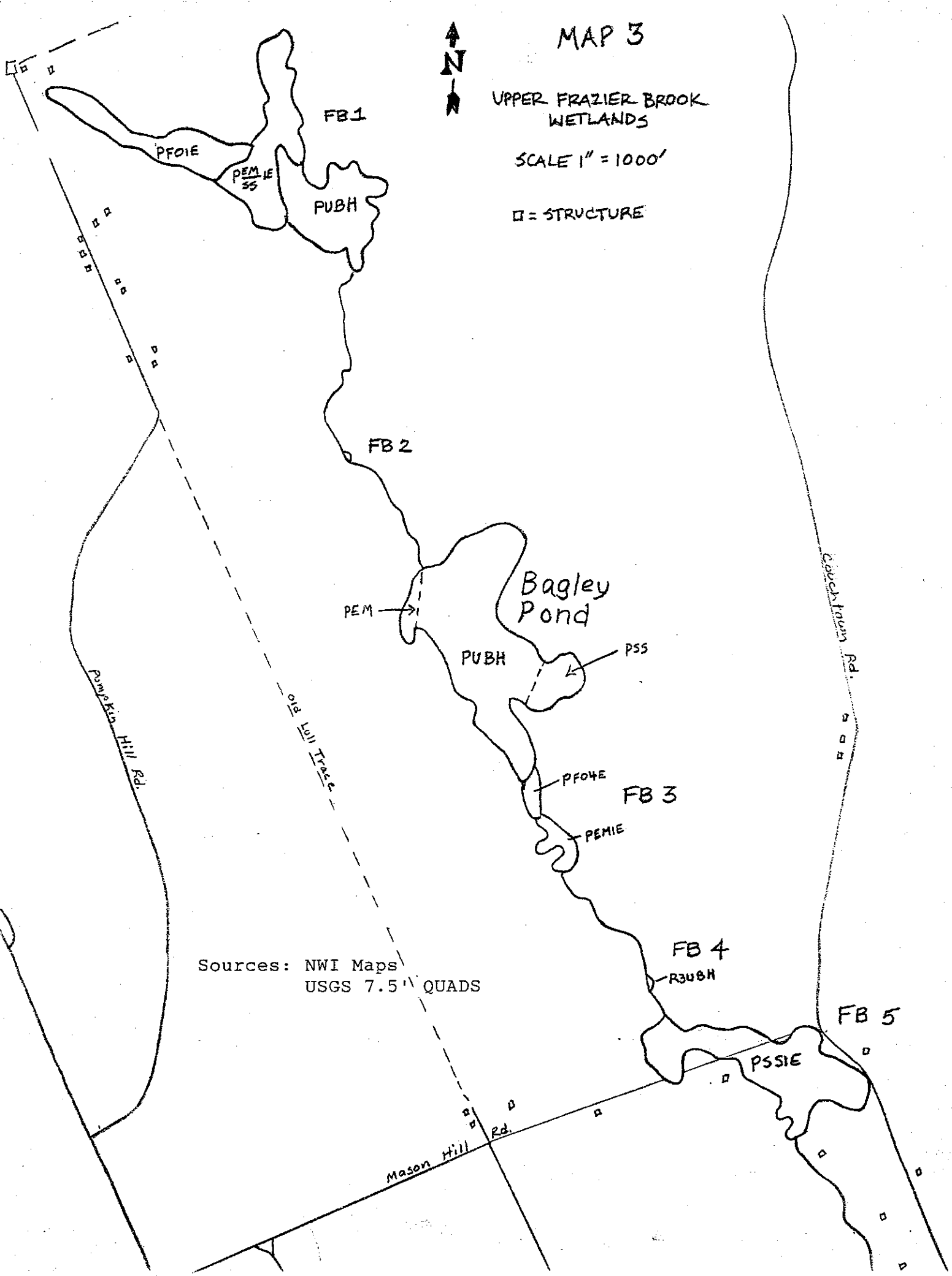
Frazier Brook (FB) Wetlands (MAPS 3,4)

Frazier Brook originates on Sawyer Hill in the Town of Salisbury, and flows south into Warner. It is approximately 6 miles in length and empties into Schoodac Brook, which is a tributary of the Warner River. All wetlands in this category are hydrologically connected to Frazier Brook.

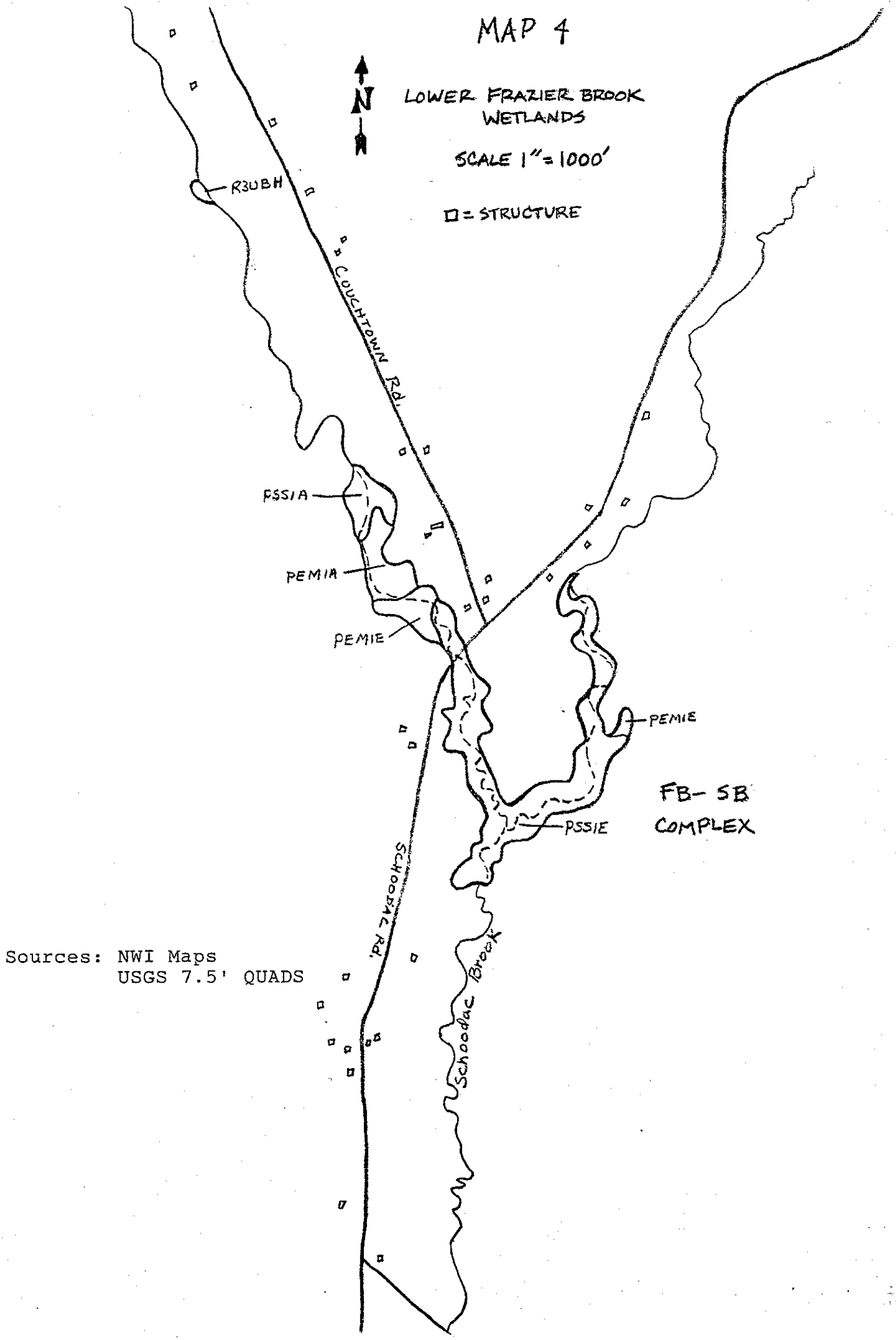
FB1 is a 31 acre wetland just over the Warner/Salisbury town line and is divided into three separate vegetated cover classes: Palustrine Emergent/Scrub-shrub; Palustrine Forested; and Palustrine Unconsolidated Bottom. Evidence of beaver activity is seen throughout this large wetland complex. Soils are either muck and peat, or open water.

Vegetation in this complex is diverse and ranges from forest species such as Red Maple (*Acer rubrum*), White Ash (*Fraxinus americana*), and Eastern Hemlock (*Tsuga canadensis*) to various emergent grasses, sedges, and rushes, to shrubs such as Buttonbush (*Cephalanthus occidentalis*) and Speckled Alder (*Alnus rugosa*), to floating aquatics such as *Potamogeton* spp., and Water Lilly (*Nymphaea odorata*).

FB2, FB4, and FB6 were very similar in appearance and size, and so are discussed together: These three wetlands are classified as Riverine Upper Perennial Unconsolidated Bottom, and are approximately 1 acre in size. They are located directly within the Frazier Brook stream channel, and are characterized by various mosses and lichens, and have very little floodplain development. Water velocity and stream channel gradient are both fairly high.


MAP 3
N
UPPER FRAZIER BROOK WETLANDS
SCALE 1" = 1000'
□ = STRUCTURE
FB1
PFO1E
PEM/SS1E
PUBH
FB2
Bagley Pond
PEM
PUBH
PSS
PFO4E
FB3
PEM1E
FB4
R3UBH
FB5
PSS1E
Pumpkin Hill Rd.
Old Lull Trace
Coventown Rd.
Mason Hill Rd.
Sources: NWI Maps
USGS 7.5' QUADS

MAP 4



Sources: NWI Maps
USGS 7.5' QUADS

BP (Bagley Pond) is a large Palustrine Unconsolidated Bottom wetland. Including adjacent vegetated wetlands, BP is approximately 24.5 acres in size. Most of this area is covered by open water, however, there are two distinct vegetated areas; one area is in the northwest corner and is dominated by Three-way Sedge (*Dulichium arundinaceum*); the other area is found in the southeast corner of the pond and is dominated by scrub-shrub vegetation such as Leatherleaf (*Chamaedaphne calyculata*), stunted Red Maple (*Acer rubrum*), and Sheep Laurel (*Kalmia angustifolia*) (see Map 3). These vegetated areas have characteristic Marsh soils.

FB3 is a 5 acre wetland divided into two distinct cover classes, Palustrine Forested and Palustrine Emergent. This wetland is located directly downstream of the outlet of Bagley Pond, and is partially dependent upon the existence of a beaver dam. Vegetation in forested areas is dominated by Eastern Hemlock (*Tsuga canadensis*) and Red Maple (*Acer rubrum*). Emergent plant species include various hydrophytic sedges, grasses and rushes.

FB5 is an 18 acre wetland complex dominated by scrub-shrub vegetation such as Speckled Alder (*Alnus rugosa*) and Winterberry Holly (*Ilex verticillata*). Soils are a combination of Muck and Peat, and Ridgebury and Whitman very stony loams (greater than 50% of the wetland). This wetland has survived some significant man-made impacts including filling for road construction and culvert placement.

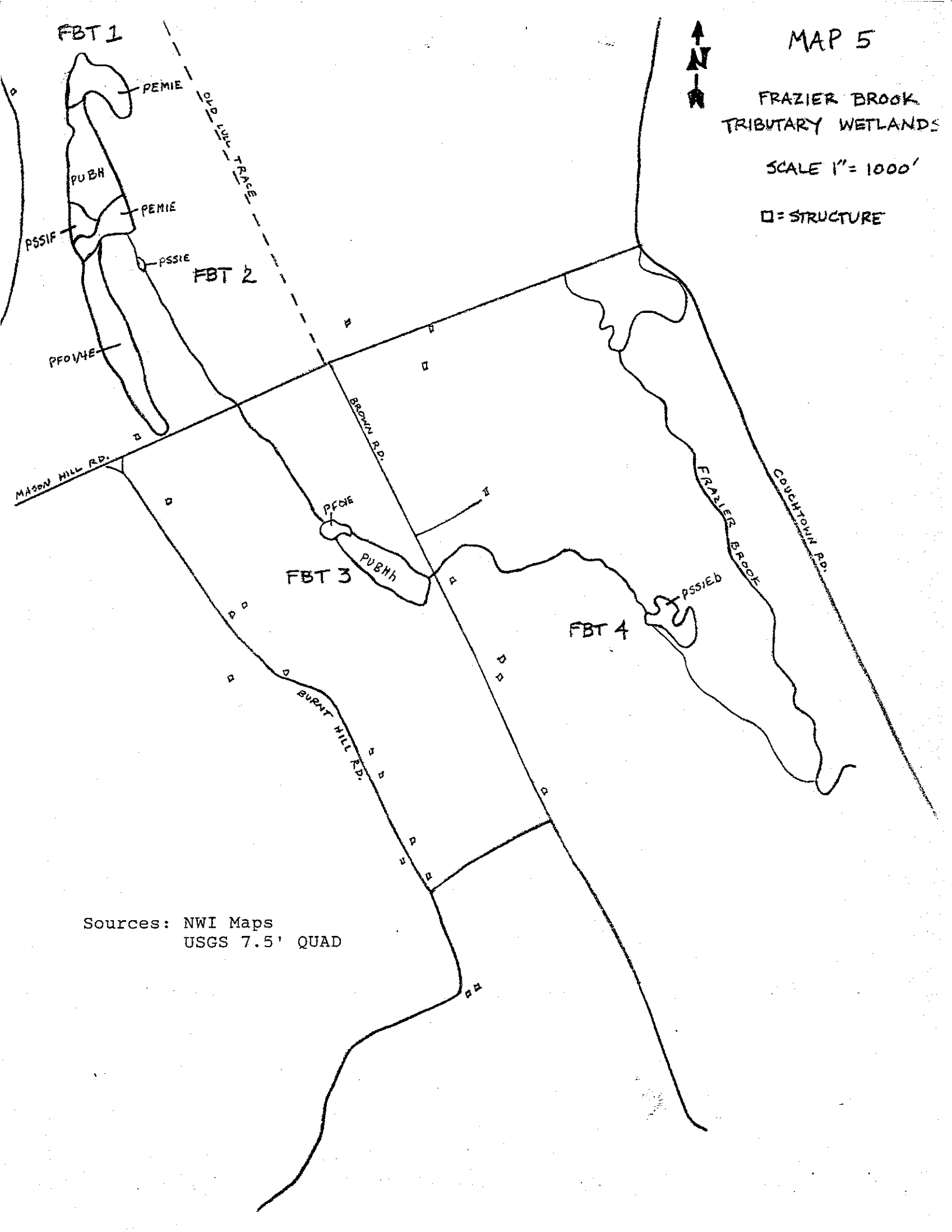
FB-SB Complex: This 30 acre wetland includes the lower stretch of Frazier Brook, its confluence with Schoodac Brook, and a portion of Schoodac Brook itself. Although part of this wetland falls within the Schoodac Brook watershed it is a continuous hydrologic unit and was evaluated as such.

This wetland complex is very diverse and is dominated by scrub-shrub vegetation in some areas, and emergent vegetation in others. Scrub-shrub species include dense thickets of Speckled Alder (*Alnus rugosa*), Winterberry Holly (*Ilex verticillata*) and Silky Dogwood (*Cornus ammomum*). Emergent areas were dominated by grasses such as Bluejoint (*Calamagrostis canadensis*), and Rattlesnake (*Glyceria canadensis*), as well as Bur-reed (*Sparganium* spp.) Soils of this wetland are classified as Scarboro (Sc) fine sandy loam.

Frazier Brook Tributary (FBT) Wetlands (MAP 5)

Frazier Brook tributary originates in a large wetland area between Pumpkin Hill Road and the Old Lull Trace and flows in a southeast direction for approximately 2 miles to where it joins Frazier Brook. All wetlands in this category are hydrologically connected to Frazier Brook tributary.

FBT1 is a 20.5 acre wetland which forms the headwaters of the Frazier Brook tributary. It is very diverse and is characterized by several different Palustrine vegetated cover classes: Forested, Emergent, Scrub-Shrub, and Open Water. Forested areas are dominated by Eastern Hemlock (*Tsuga canadensis*) and Red Maple (*Acer rubrum*); scrub-shrub areas are dominated by Winterberry Holly and (*Ilex verticillata*), Highbush Blueberry (*Vaccinium corymbosum*); emergent areas


FBT 1
PEMIE
OLD LUCE TRACE
PUBH
PEMIE
PSSIF
PSSIE
FBT 2
PFO1/4E
MASON HILL RD.
BROWN RD.
PFOIE
PUBHh
FBT 3
FBT 4
PSSIEb
FRAZIER BROOK
COUGHTOWN RD.
BURNT HILL RD.
N
MAP 5
FRAZIER BROOK TRIBUTARY WETLANDS
SCALE 1" = 1000'
□ = STRUCTURE
Sources: NWI Maps
USGS 7.5' QUAD

are dominated by Cat-tail (*Typha latifolia*), and various species of sedges, rushes and grasses. Soils are classified as Muck and Peat (greater than 50% of the wetland) and Ridgebury and Whitman very stony loam (RdA).

FBT2 is less than 1 acre in size and is located just downstream of FBT1. It is classified as Palustrine scrub-shrub and is dominated by Speckled Alder (*Alnus rugosa*). Soils are classified as Ridgebury and Whitman very stony loam (RdA).

FBT3 is a 5.74 acre wetland classified mainly as Palustrine Unconsolidated Bottom, with a small area of Forested wetland on the northern end. The forested area of FBT3 is dominated by Red Maple (*Acer rubrum*). The rest of the wetland is dominated by open water, with some fringing areas of emergent and scrub-shrub vegetation.

FBT3 has been filled at the southern edge, and a 36" diameter culvert is located at the outlet of the wetland, and provides a conduit for the Frazier Brook tributary. Soils are classified as Ridgebury and Whitman very stony loam.

FBT4 is a 2.8 acre wetland which is the result of beaver activity. It is classified as Palustrine scrub-shrub, and is dominated by Speckled Alder (*Alnus rugosa*), Highbush Blueberry (*Vaccinium corymbosum*) and Winterberry Holly (*Ilex verticillata*).
Soils are characterized as Gloucester extremely stony sandy loam (GsD).

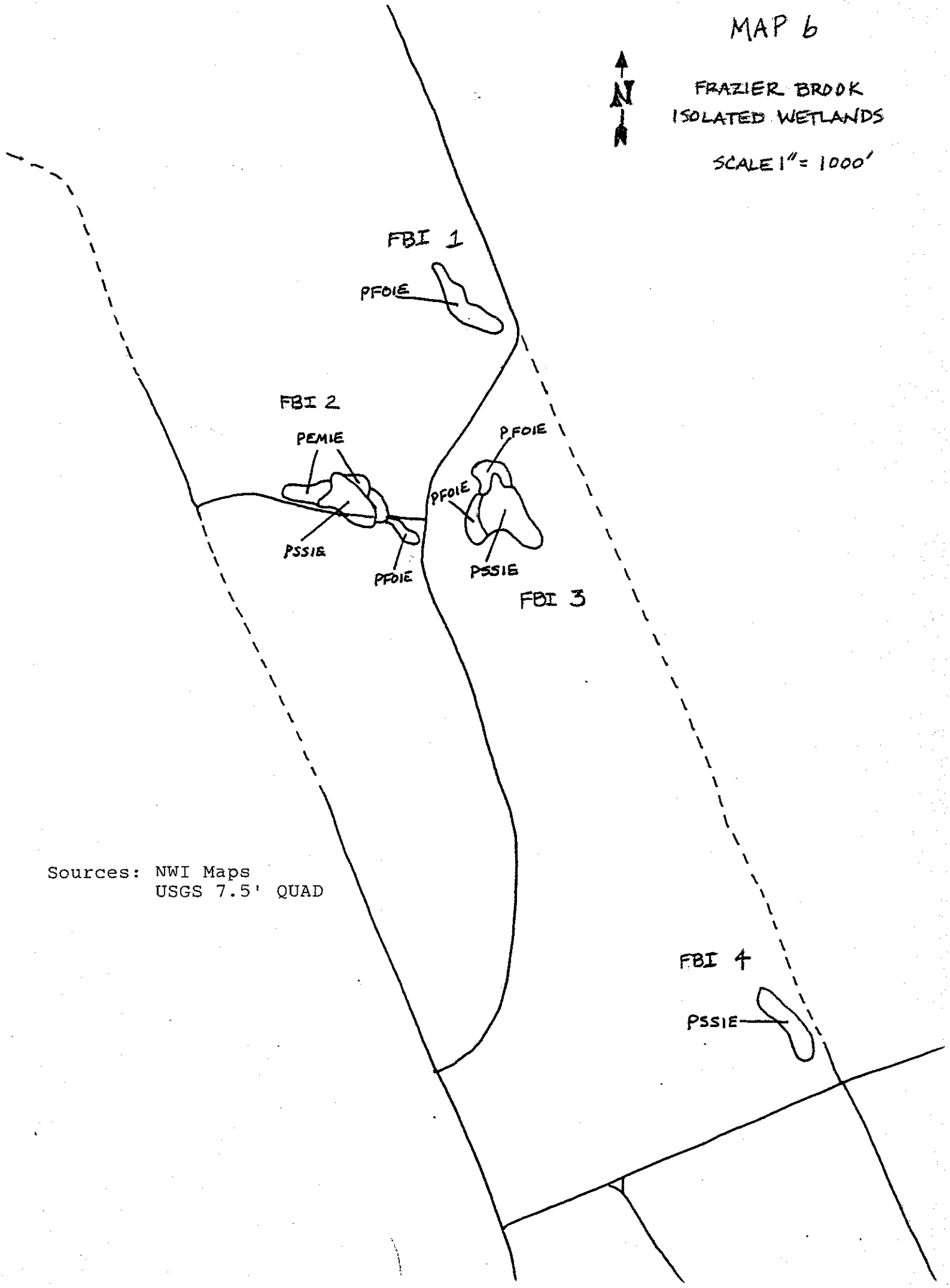
Frazier Brook Isolated (FBI) Wetlands (MAP 6).

The wetlands described in this category are found scattered throughout the watershed. These isolated wetlands are not connected to a waterbody or watercourse, but are found in low areas of the landscape, and receive runoff from the surrounding uplands.

FBI1 is a 2.15 acre wetland classified as Palustrine Forested, and is dominated by broad-leaved deciduous species such as White Ash (*Fraxinus americana*) and Red Maple (*Acer rubrum*). The understory of this wetland contains various species of shrubs such as Winterberry Holly (*Ilex verticillata*) and Highbush Blueberry (*Vaccinium corymbosum*). Other vegetation included various hydrophytic ferns, and Sphagnum moss (*Sphagnum spp.*). Soils are classified as Gloucester very stony sandy loam (GrB), but field observations indicated several inches of muck, and the area was saturated to the surface.

FBI2 is 6.45 acre wetland with three different areas of dominant vegetation: Forested, Emergent, and Scrub-shrub. The dominant forest species is Red Maple (*Acer rubrum*), the dominant shrub species is Speckled Alder (*Alnus rugosa*), and emergent species include sedges of the genus *Carex*. This wetland is bisected by Duck Pond Lane. Soils are classified as Gloucester very stony sandy loam (GsD), but the surface layer consists of several inches of muck.

FBI3 is a 5.8 acre Palustrine wetland with areas of Forested vegetation, and scrub-shrub vegetation. Forested areas are dominated by Red Maple (*Acer rubrum*) and Eastern Hemlock (*Tsuga canadensis*), and scrub-shrub areas are


MAP 6
N
FRAZIER BROOK
ISOLATED WETLANDS
SCALE 1" = 1000'
FBI 1
PFOIE
FBI 2
PEMIE
PSSIE
PFOIE
FBI 3
PFOIE
PFOIE
PSSIE
FBI 4
PSSIE
Sources: NWI Maps
USGS 7.5' QUAD

dominated by Highbush Blueberry (*Vaccinium corymbosum*) and Huckleberry (*Gaylussacia baccata*). There is also a layer of *Sphagnum* moss covering the floor of the wetland. Soils are classified as Muck and Peat (Mp).

FBI4 is a 2.15 acre wetland classified as Palustrine Scrub-shrub. Dominant shrub species include Winterberry Holly (*Ilex verticillata*), Silky Dogwood (*Cornus amomum*), and Highbush Blueberry (*Vaccinium corymbosum*). Also present were emergent species such as Cat-tail (*Typha latifolia*), Bur-reed (*Sparganium spp.*) and various grasses, sedges and rushes. Soils are classified as Ridgebury and Whitman very stony loam (RdA).

VI. RESULTS

The evaluation results are presented below in both written and graphic form.

Highest Ranking Wetlands

Three wetlands ranked #1 in one or more functional value: Bagley Pond, FB1, and FB-SB Complex. This is not surprising due to their size (over 20 acres) and proximity to a waterbody or watercourse. The New Hampshire Method uses the acreage of a wetland as a multiplier, therefore larger wetlands usually score higher. Several of the Functional Values are also based on a wetlands relationship to open water, and wetlands which are not associated with a waterbody will score lower.

FB1 ranked first in ecological integrity, wildlife habitat, flood control potential, nutrient attenuation (tied with FB-SB Complex), and noteworthiness.

FB-SB Complex ranked first in finfish habitat - stream, groundwater use potential, sediment trapping, nutrient attenuation (tied with FB1), shoreline anchoring, and historical site potential.

Bagley Pond ranked first in finfish habitat-pond, educational potential, visual/aesthetic quality, and water-based recreation.

The same three wetlands also ranked second in most of the functional values. The only other wetlands that ranked in the top two in any of the functional values were FBT4: 2nd in shoreline anchoring, and FBT1: 2nd in flood control potential, and nutrient attenuation.

Other High Ranking Wetlands

FB5 ranked high in several functional values: ecological integrity, wildlife habitat, flood control potential, sediment trapping, and nutrient attenuation.

FBT1 ranked high in ecological integrity, wildlife habitat, flood control potential, and sediment trapping.

Special Findings

Groundwater Potential - FB-SB complex is the only wetland which had a positive value in groundwater potential, which is due to its proximity to a potential aquifer. These results are based on groundwater mapping work done by the US Geological Survey in 1976, which is the most current information available. More detailed studies are currently being undertaken by the USGS, however the information has not yet been released.

Rare and Endangered Species - According to a review completed by the New Hampshire Natural Heritage Inventory, Department of Resources and Economic Development, there are no known or documented occurrences of rare and/or endangered species within the Frazier Brook watershed. It should be noted, however, that this information is not based on a recent field surveys, and is subject to change pending additional field work.

Urban Quality of Life - None of the wetlands in the study area met the minimum criteria to be assessed for this value, due to existing "open space" zoning, and rural land use. All wetlands scored 0 points for this functional value.

Finfish Habitat, Water-based Recreation - Those isolated wetlands within the watershed did not score in the Finfish Habitat or Water-based Recreation values because they are not connected to a waterbody or watercourse, and have little or no open surface water, which is a minimum requirement for these functional values.

Noteworthiness - Only three wetlands scored in this category: FB1, FB-SB Complex, and Bagley Pond. These wetlands ranked high in Noteworthiness due to their number 1 ranking in one or more of the other functional values. As was previously mentioned, these wetlands are also the largest in acreage, and are all associated with a waterbody or watercourse.

Graphic Presentation of Results

Tables 2-4: Wetland Value Units

Tables 2, 3, and 4 give an overview of all the wetlands and how they scored in the evaluation. Those scores which are underlined represent the highest score for a particular functional value. Scores which are double underlined represent the second highest score for a particular functional value. Wetlands which have the greatest number of underlines and/or double underlines are those which dominate the study area. These high ranking values indicate areas to be avoided in assessing development impacts, or areas which may require a site specific evaluation when proposed for development.

TABLE 2. WETLAND VALUE UNITS - FRAZIER BROOK WETLANDS

	W E T L A N D					
FUNCTIONAL VALUE	FB1	FB2	BP	FB3	FB4	FB5
Ecological Integrity	29.8	.90	24.5	4.4	.84	14.0
Wildlife Habitat	28.9	.61	18.1	3.2	.56	18.0
Finfish Habitat - stream	.3	.02	0.0	0.2	.02	0.2
Finfish Habitat - pond	10.8	0.0	15.8	0.0	0.0	0.0
Educational Potential	7.3	.46	9.2	2.8	.44	4.6
Visual/Aesthetic Quality	9.5	.59	12.8	2.9	.59	6.2
Water-based Recreation	8.2	.57	17.0	2.9	.45	.86
Flood Control	31.0	0.0	24.5	0.0	0.0	18.0
Groundwater Potential	0.0	0.0	0.0	0.0	0.0	0.0
Sediment Trapping	23.6	.16	15.4	1.4	.15	14.6
Nutrient Attenuation	24.0	.16	12.7	2.2	.13	11.9
Shoreline Anchoring	.05	.025	.05	.23	.03	.92
Urban Quality of Life	0.0	0.0	0.0	0.0	0.0	0.0
Historic Site Potential	2.2	.23	.75	.28	.25	1.7
Noteworthiness	31.0	0.0	24.5	0.0	0.0	0.0

00.0 = Highest Score

00.0 = 2nd Highest Score

TABLE 3. WETLAND VALUE UNITS - FRAZIER BROOK AND FRAZIER BROOK TRIBUTARY WETLANDS

	W E T L A N D					
FUNCTIONAL VALUE	FB6	FB-SB	FBT1	FBT2	FBT3	FBT4
Ecological Integrity	1.4	26.4	20.5	.90	5.5	2.5
Wildlife Habitat	.95	20.7	17.2	.52	4.6	2.1
Finfish Habitat-stream	.04	1.2	0.0	.02	0.0	.08
Finfish Habitat-pond	0.0	0.0	5.0	0.0	2.2	0.0
Educational Potential	.60	2.7	5.1	.48	3.2	.23
Visual/Aesthetic Quality	.90	1.2	6.9	.50	3.9	.31
Water-based Recreation	.73	7.1	4.5	.50	3.2	.50
Flood Control Potential	0.0	20.5	20.5	0.0	5.7	2.8
Groundwater Use Potential	0.0	0.0	0.0	0.0	0.0	0.0
Sediment Trapping	.24	24.0	16.6	.23	4.6	2.3
Nutrient Attenuation	.24	24.0	13.5	.32	3.8	1.6
Urban Quality of Life	0.0	0.0	0.0	0.0	0.0	0.0
Shoreline Anchoring	.04	2.7	0.5	.04	.70	2.3
Historical Site Potential	.40	2.8	2.0	.25	.42	.14
Noteworthiness	0.0	30.0	0.0	0.0	0.0	0.0

00.0 = Highest Score

00.0 = 2nd Highest Score

TABLE 4. WETLAND VALUE UNITS
FRAZIER BROOK ISOLATED WETLANDS

W E T L A N D

FUNCTIONAL VALUE	FBI1	FBI2	FBI3	FBI4
Ecological Integrity	1.6	4.8	5.0	1.7
Wildlife Habitat	1.2	3.9	3.0	1.2
Finfish Habitat-stream	0.0	0.0	0.0	0.0
Finfish Habitat-pond	0.0	0.0	0.0	0.0
Educational Potential	.23	1.0	.25	.50
Visual/Aesthetic Quality	.25	.53	.23	.59
Water-based Recreation	0.0	0.0	0.0	0.0
Flood Control Potential	2.2	6.5	5.8	1.9
Groundwater Use Potential	0.0	0.0	0.0	0.0
Sediment Trapping	.80	2.4	1.9	.65
Nutrient Attenuation	.97	2.9	2.3	.95
Urban Quality of Life	0.0	0.0	0.0	0.0
Shoreline Anchoring	0.0	0.0	0.0	0.0
Historical Site Potential	.03	.10	.03	.03
Noteworthiness	0.0	0.0	0.0	0.0

<u>00.0</u> = Highest Score

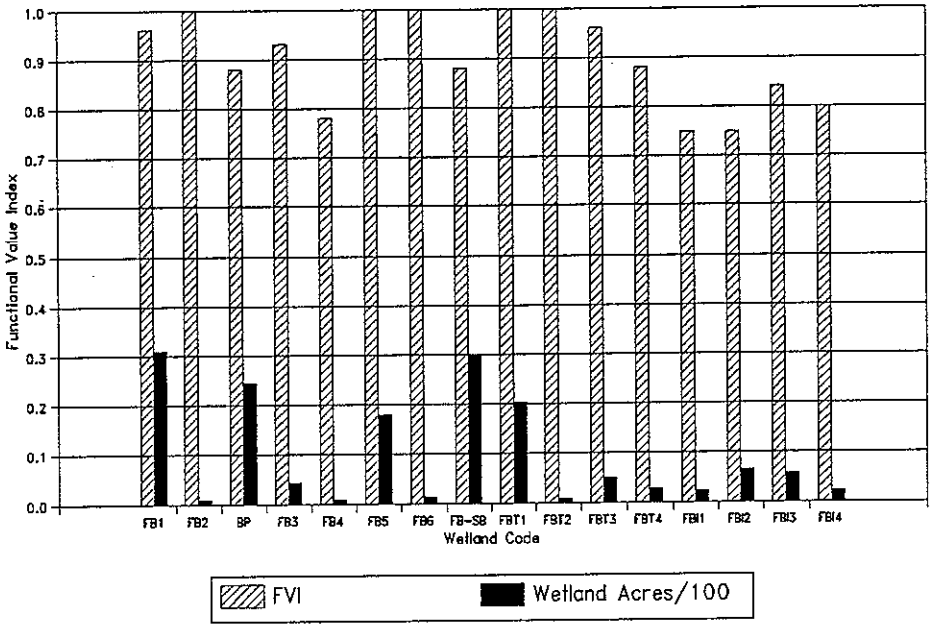
<u>00.0</u> = 2nd Highest Score

NOTE: None of the wetlands in Table 4 scored either first or second in any of the functional values.

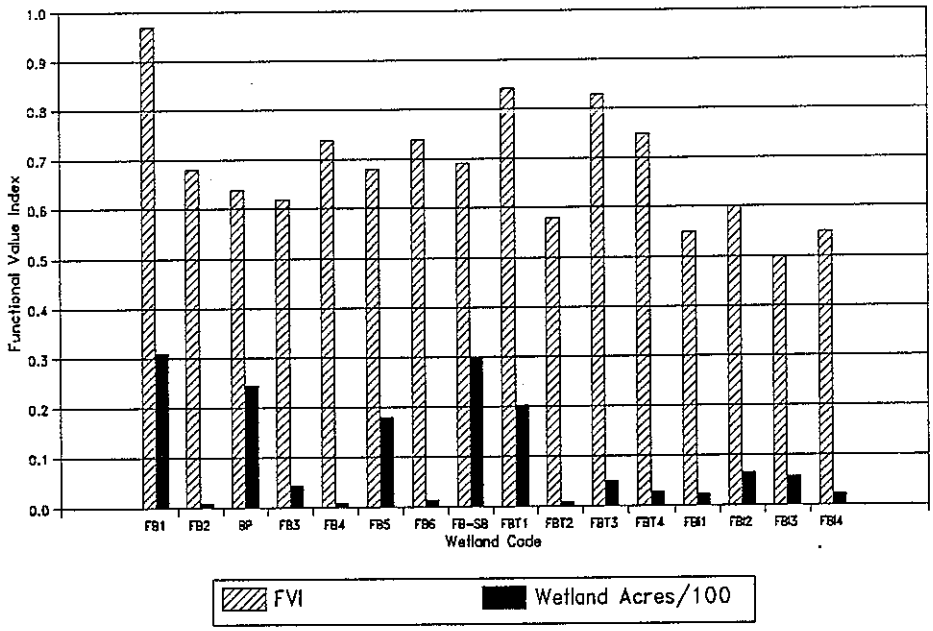
Bar Graphs for Functional Values

The bar graphs presented below are used to simplify the presentation of numerical results. The x-axis displays the wetland code name, and the y-axis represents the range of functional values. The bars represent only the **Functional Value Index** (FVI) (average score) from the summary sheet and not the **Wetland Value Unit** (average score x wetland acreage) for the wetland. Wetland size (divided by 100) is also included so that a comparison can be made between the area of a wetland and its FVI score.

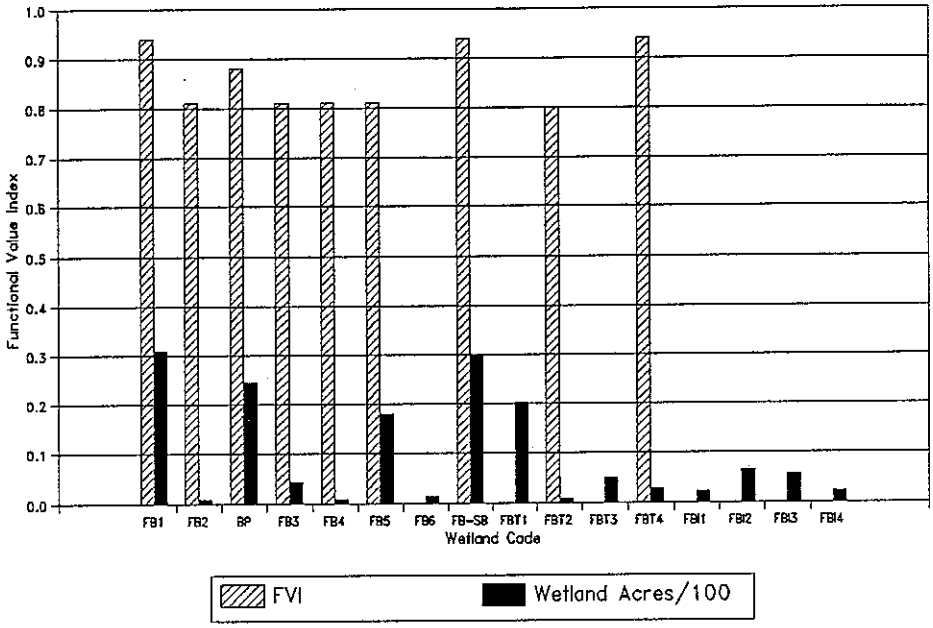
Ecological Integrity



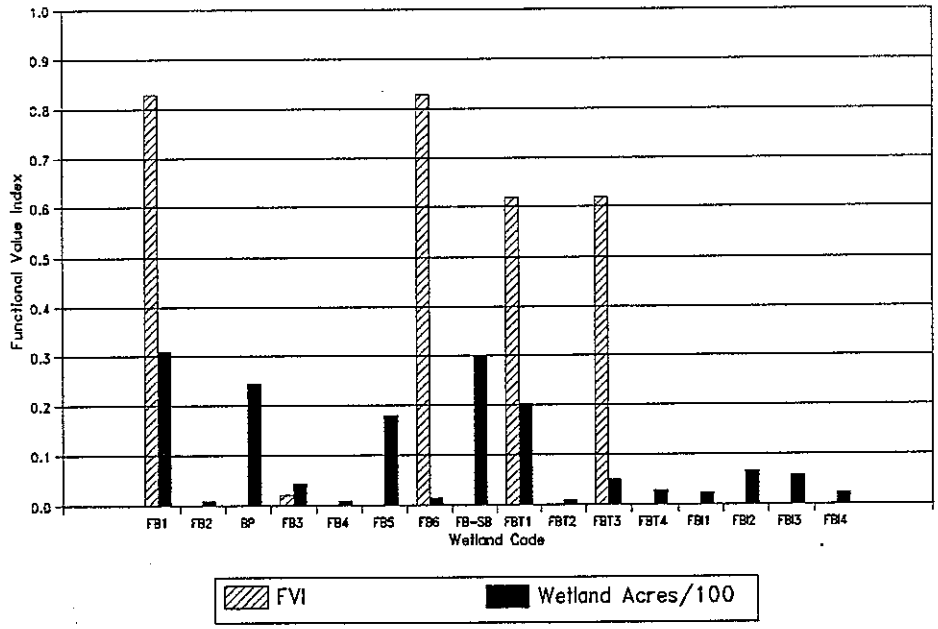
Wildlife Habitat



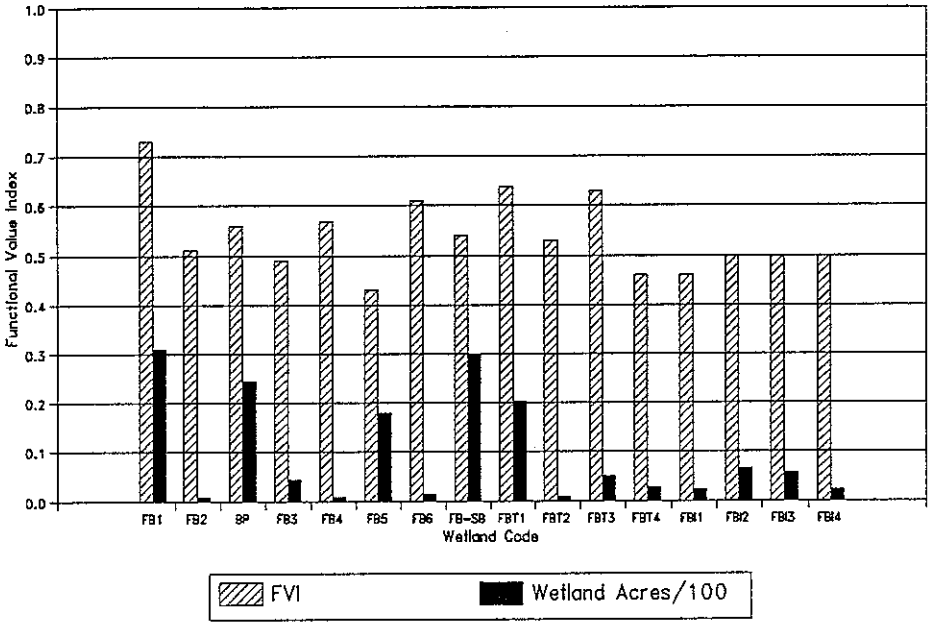
Finfish Habitat – Stream



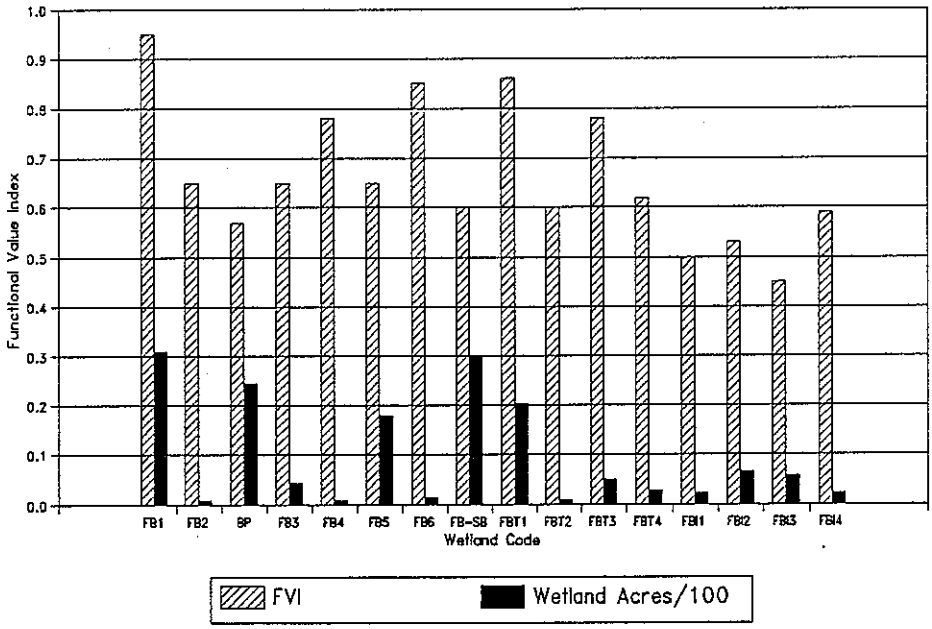
Finfish Habitat – Pond



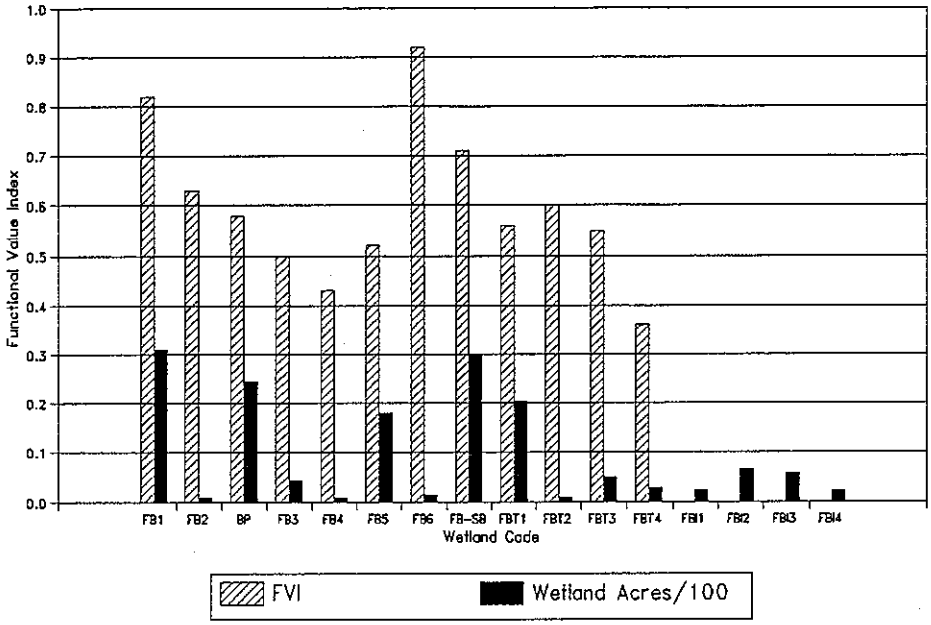
Educational Potential



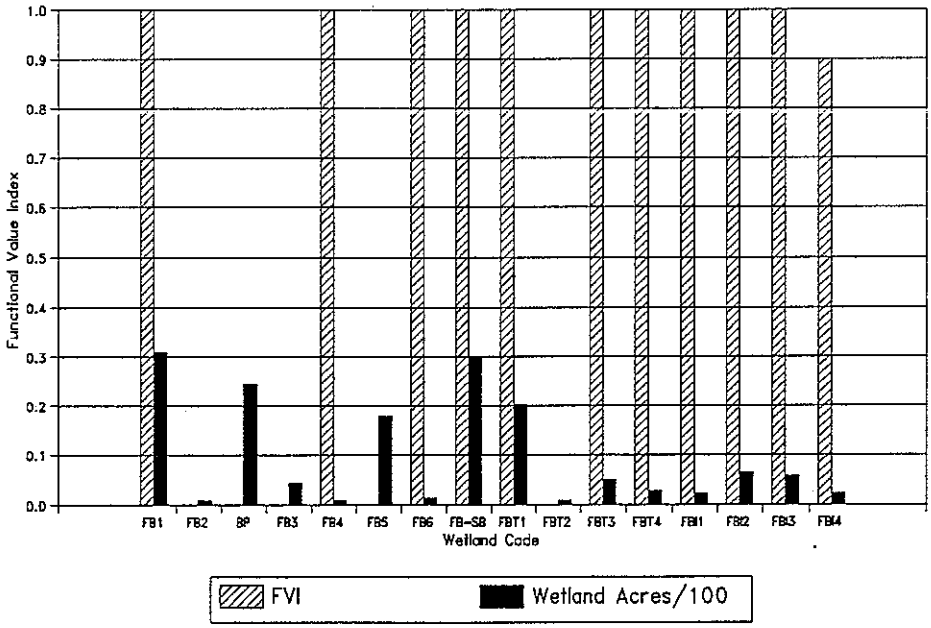
Visual/Aesthetic Quality



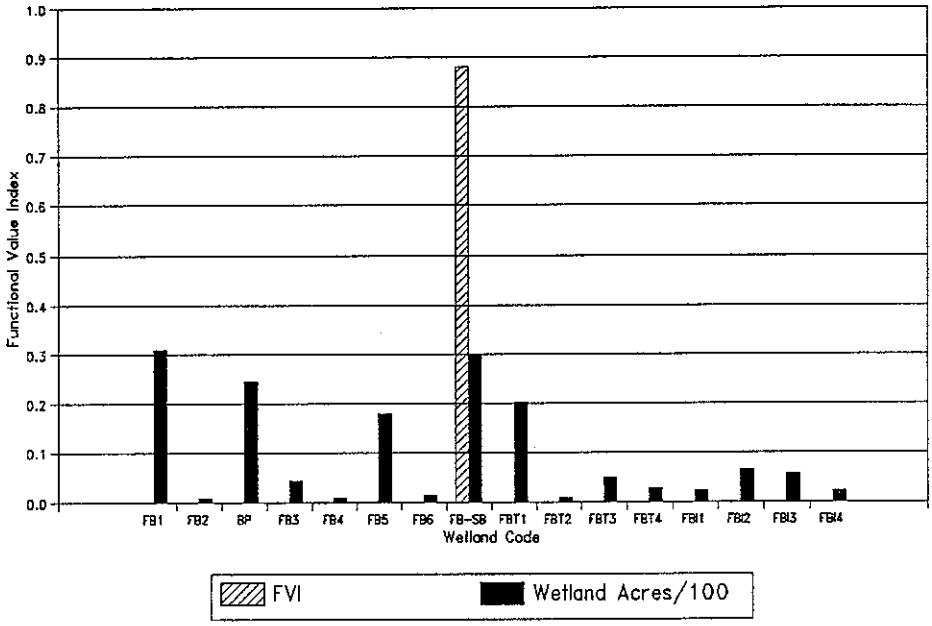
Water-Based Recreation



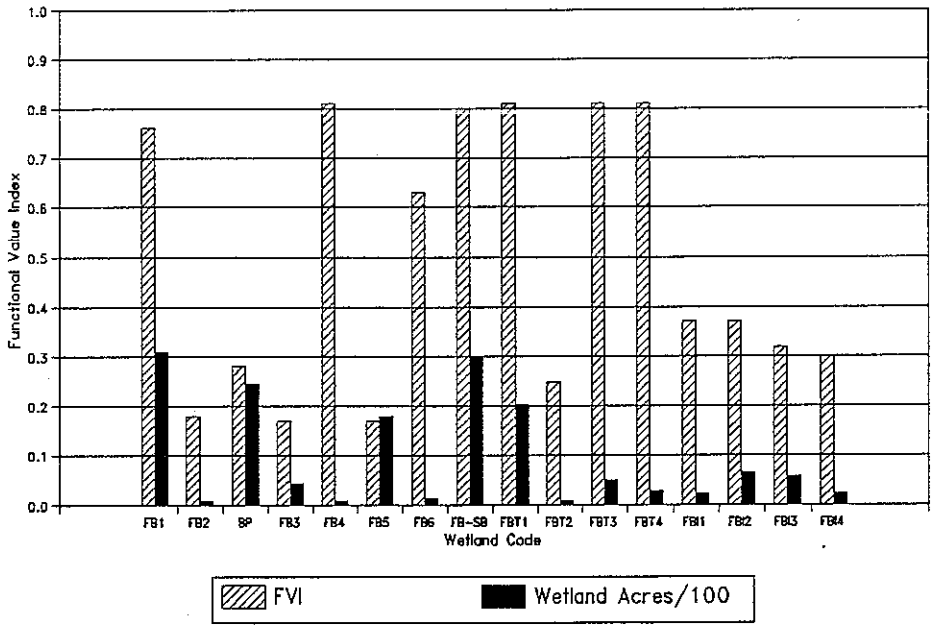
Flood Control Potential



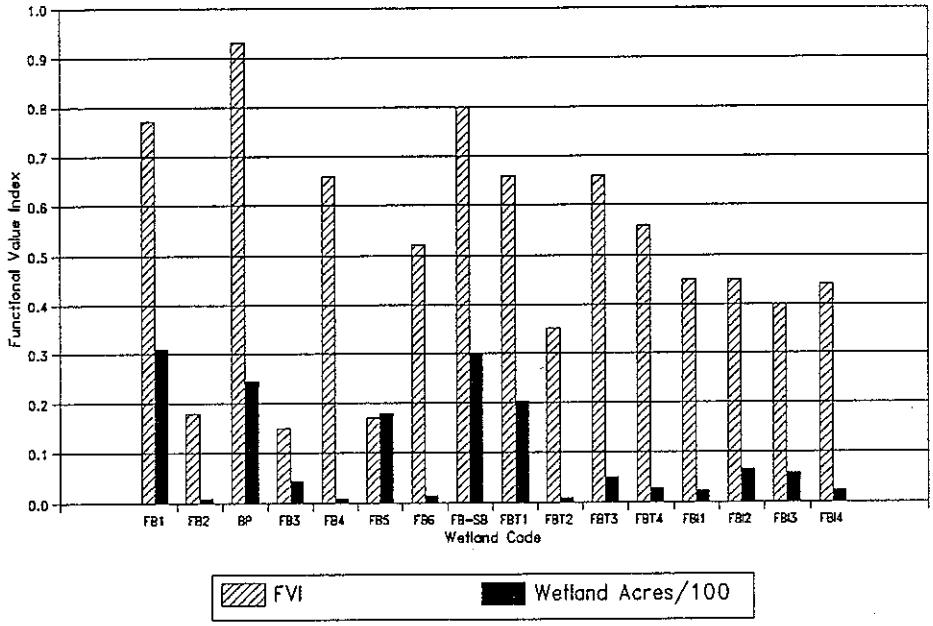
Groundwater Use Potential



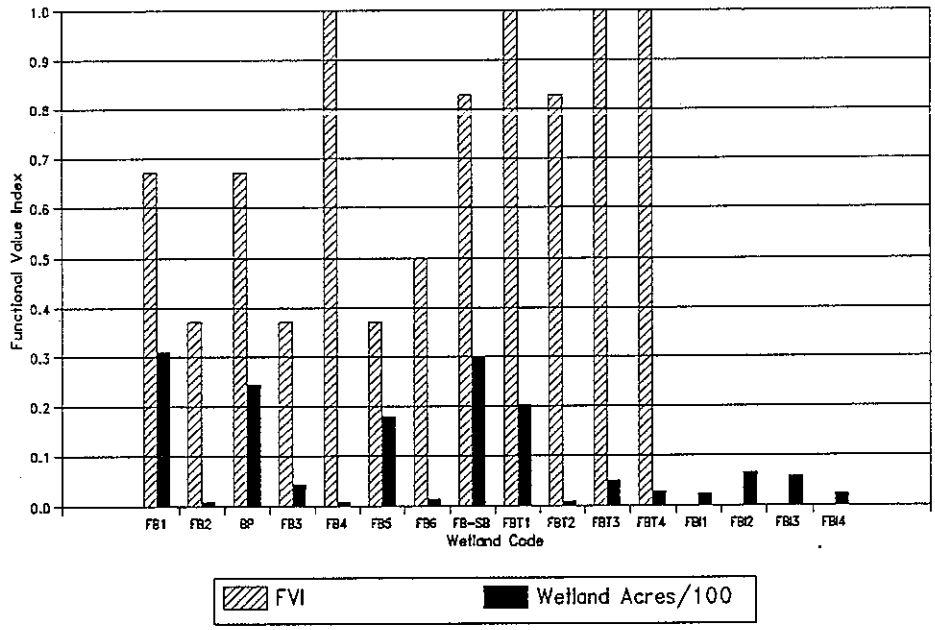
Sediment Trapping



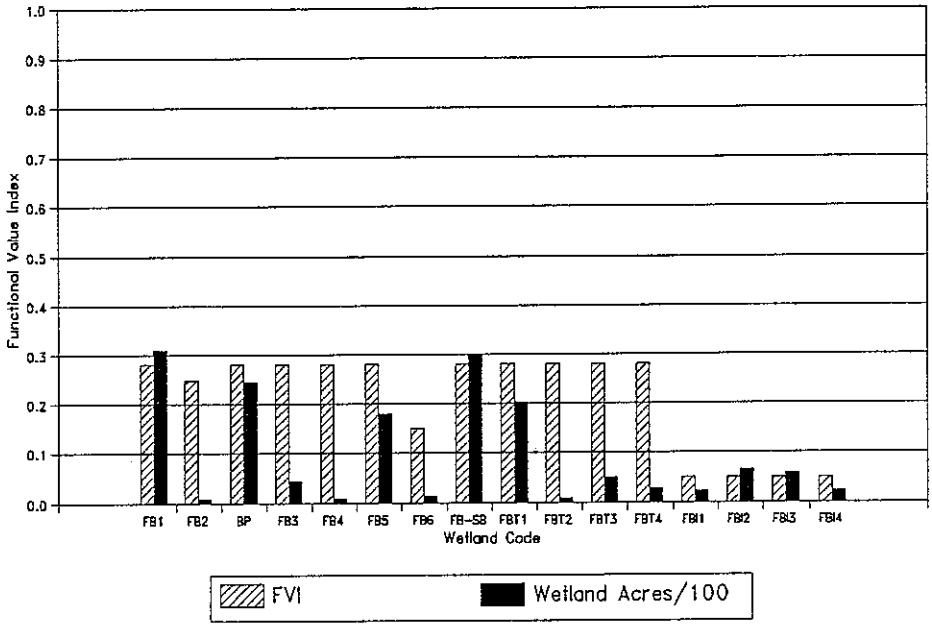
Nutrient Attenuation



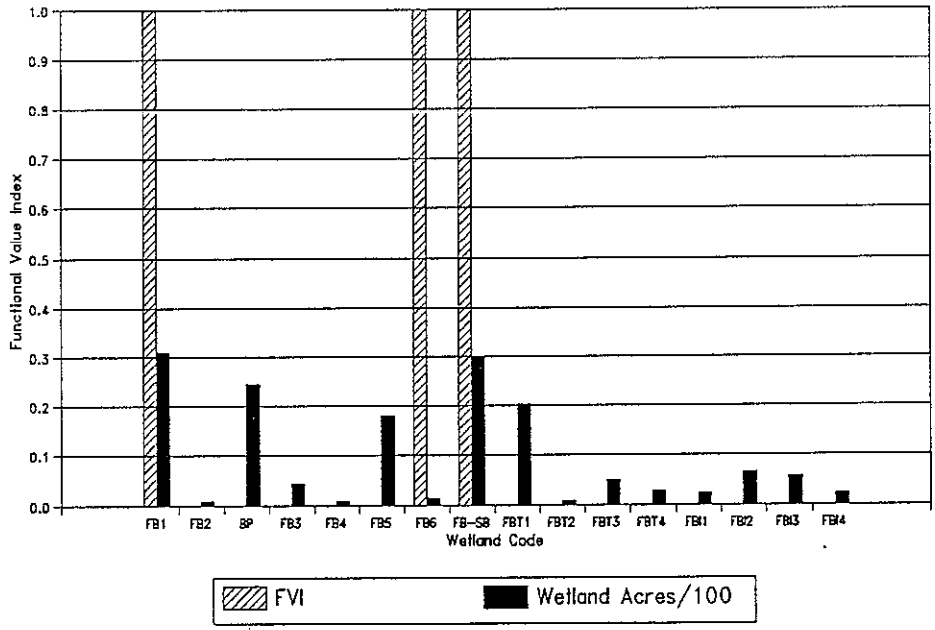
Shoreline Anchoring



Historical Site Potential



Noteworthiness



VII. CONCLUSION

Wetlands such as bogs, swamps and marshes, are valued habitats which provide many benefits to society and to the plants and animals which depend upon them. Functional values provided by wetlands include: flood water storage, nutrient absorption, groundwater protection, recreational potential, educational potential and aesthetic qualities. Each wetland provides different functions depending upon factors such as its location in the landscape, proximity to a waterbody or watercourse, and size.

Wetlands are defined and regulated by several agencies at all levels of government; local, state and federal. Although there may be some minor differences between agency definitions, most of them are based on three major environmental parameters: hydrology, vegetation, and soils.

Wetland inventories and assessments are essential tools for planners and resource managers to use in developing resource protection priorities. They are also valuable when used in educational efforts which raise awareness of the important benefits that wetlands provide to society. If used properly, techniques such as The Method for the Comparative Evaluation of NonTidal Wetlands in New Hampshire are valuable planning tools but they can have certain limitations. The NH Method is not a site specific evaluation method, and it measures only the potential values of wetland, not the actual values. It is not intended to be used in assessing the impacts of a specific activity on a particular wetland, and if so used could result in improper decisionmaking.

The NH Method uses the size of a wetland as a multiplier in computing scores for each functional value. This may result in low scores for small wetlands. Use of the Noteworthiness category somewhat compensates for this drawback in that it provides for wetlands which have special values that may be unrelated to size e.g. endangered/threatened species habitat or historical importance. Wetlands evaluation techniques such as the NH Method are still evolving, and should only be used in the proper context.

Another potential drawback of the New Hampshire Method is that certain valuable wetland types such as vernal pools and seep wetlands are not specifically addressed. These wetland types are often small in acreage and seasonal in nature, but they may be extremely important to the ecology of an area. For instance, vernal pools are important breeding areas for amphibians, and seeps often provide habitat for rare or unique flora. Perhaps as the scientific information base increases on these wetland types future efforts will be made to incorporate them into evaluation systems.

Of the sixteen wetlands that were evaluated, three consistently scored either first or second in one or more of the functional values: Bagley Pond (BP), FB-SB Complex, and FB1. FB5 also ranked high in several functional values, although it was not first or second. These wetlands probably scored high because they are large (20 acres +) and hydrologically connected to a waterbody or watercourse. Conversely, the small, isolated wetlands did not score high in any of the functional values. It is important to stress that although a small group of wetlands scored significantly higher in some or all of the functional values,

the fact that a wetland scored at all in the evaluation shows that the function does exist and is part of the natural resource assets of the community.

VIII. RECOMMENDATIONS

Recommendations for the use of information presented in this study are presented below.

1. *The Warner Conservation Commission should use the results of this study to pursue prime wetlands designation for wetlands in the Frazier Brook watershed which meet the criteria.*

   Under state law (RSA 482-A, Fill and Dredge in Wetlands) there are provisions which allow a community to designate wetlands which have outstanding values as "prime". Prime wetlands are those that "deserve special consideration, review, and protection due to their uniqueness, fragility, and/or unspoiled character" (Wetlands Board, 1990). Prime wetlands designation means that projects in or adjacent to a designated wetland receive a higher level of review by the NH Wetlands Board. Wetlands must meet certain criteria in order to be approved for prime designation by the state Wetlands Board.

   In order to be designated as prime a wetland is evaluated by the following characteristics: (1) must have very poorly drained soils (open water is included in this category); (2) high plant diversity or presence of rare/endangered flora; (3) frequented by a high number or great diversity of fauna or rare/endangered fauna; (4) high food chain productivity; (5)

hydrologic value(s) e.g. flood water storage; (6) historical site value; (7) unique or noteworthy characteristics; (8) high aesthetic value(s). In addition, size of the wetland is taken into account (See Appendix 6 for more detailed information on prime wetlands criteria).

Once a community decides which wetland(s) it wishes to nominate as prime, a report detailing how these wetlands meet the prime criteria must be submitted to the New Hampshire Wetlands Board, along with maps (at the same scale as town tax maps), which delineate the wetlands within the nearest 50 feet.

This study provides information on the functional values and physical and biological characteristics of the sixteen wetlands in the target watershed, thus it can be used to determine which wetlands will qualify as prime candidates. Suggested candidates for prime wetlands study should, at a minimum, include the following: FB1, FB5, FB-SB Complex, FBT1, and Bagley Pond.

2. ***The Warner Conservation Commission should conduct an inventory of landowners whose property includes or abuts prime wetland candidates.***

The commission could use such an inventory to contact landowners in order to (1) educate them about the value of wetlands found on their properties, and (2) determine their interest in donating or selling land/easements to the town. Information on landowners can be obtained through the Town tax records and maps.

3. *The Warner Conservation Commission should present the results of this study to the Zoning Board of Adjustment, Planning Board, and Board of Selectmen.*

The purpose of this presentation would be to provide town officials with information which could be used for more informed decisionmaking in their respective areas. The author of this report, or a member of the Conservation Commission would be a good choice to undertake such a presentation.

4. *The Warner Conservation Commission should present a public program on the results of this study to members of the community.*

Such a presentation will serve as an educational tool by providing information on the functions and values of wetlands in the Frazier Brook watershed. It will also provide a means by which to solicit support for prime wetland candidates, which must be approved for submission by a vote at Town Meeting. The presentation should stress the benefits provided by wetlands which are associated with cost avoidance for the town as a whole as well as individual property owners. The author of this report, or a member of the Conservation Commission would be a good choice to undertake such a presentation.

5. *The Warner Conservation Commission should conduct evaluation projects using the NH Method for the other watersheds within the community.*

Conducting such inventories/evaluations provides information which can be used by the Conservation Commission and the Planning Board in reviewing development proposals and their potential impacts on wetland resources. This is a proactive, rather than reactive approach to land use planning, and can result in better management of wetlands. Such inventories and evaluations can be accomplished through the use of volunteers with some knowledge of natural resources/wetlands. The NH Method requires a minimal amount of training which is available through NH Audubon for a modest fee. If funding is available, the Town could also hire an environmental consulting firm to complete the assessment

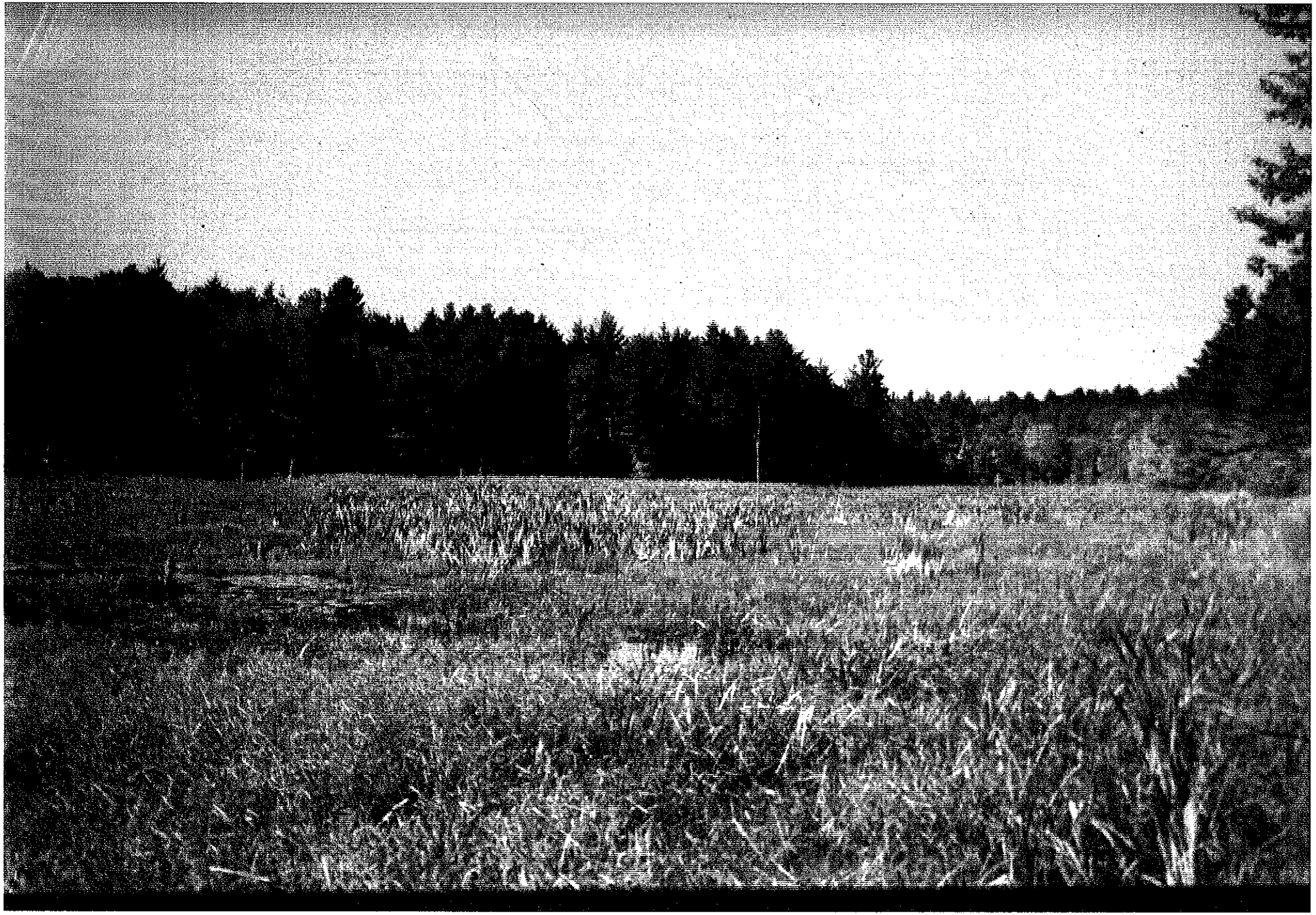
6. *The Warner Conservation Commission should use the information contained in this report as the basis for pursuing the enactment of a local wetlands protection ordinance.*

Local ordinances can provide an added measure of protection for wetland resources, especially those which have unusual characteristics or high functional values on a town-wide basis. Several of the towns surrounding Warner have already enacted such protective measures. Model ordinances and technical assistance regarding the writing and procedure for enactment of local wetland ordinances are available through the New Hampshire Central Regional Planning Commission.

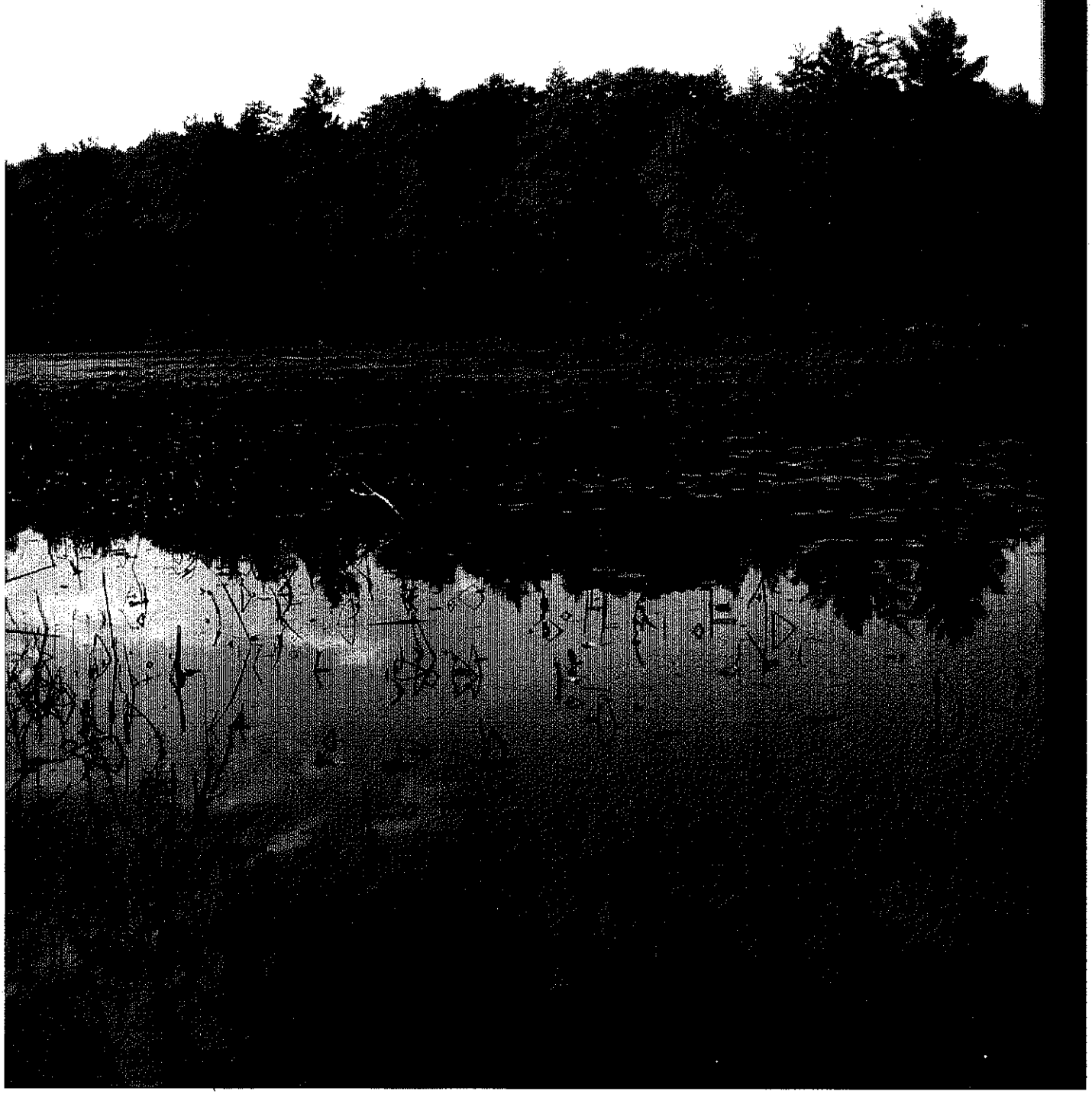
APPENDIX A

Photographs of Highest Ranking Wetlands
in the Frazier Brook Watershed

FRAZIER BROOK TRIBUTARY 1 (FBT1)



FRAZIER BROOK 1 (FB1)
PUBH Section



BAGLEY POND (BP)

FRAZIER BROOK 5 (FB5)

FRAZIER BROOK - SCHOODAC BROOK COMPLEX (FB-SB)

APPENDIX 1

Description of the Cowardin Wetlands Classification System

Introduction

In order to describe wetlands it is important to classify them by type. The New Hampshire Method for the Evaluation uses the classification system developed by the U.S. Fish & Wildlife Service (Cowardin, 1979). This system is hierarchical and divides wetlands into 5 major categories or systems: Marine, Estuarine, Riverine, Lacustrine, and Palustrine. The Cowardin system also includes deepwater habitats, which are those areas which are permanently flooded, and lie below the deepwater boundary of wetlands. Figure 1 illustrates the classification system.

Wetlands in the 5 major systems are further broken down into subsystems, classes, dominance types, and modifiers. Since the wetlands within the study area represent either the Palustrine System or the Riverine System, only those systems, classes, and modifiers found in the study are described below. A complete description of all wetland systems and deepwater habitats can be found in Cowardin (1979).

PALUSTRINE SYSTEM (P)

The Palustrine system includes all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 20 acres; (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2 meters at low water; and (4) salinity less than .5 parts per thousand. The Palustrine system is bounded by upland or any of the other 4 wetland and deepwater systems.

There are no subsystems within the Palustrine System

Class - highest taxonomic unit below the subsystem level. It describes the general appearance of the habitat in terms of either the dominant life form of the vegetation, or the physiography and composition of the substrate - features that can be recognized without the aid of detailed environmental measurements.

Class: Scrub - Shrub (SS)

This class includes areas dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. All water regimes except tidal are included. Scrub-shrub wetlands may represent a successional stage leading to Forested Wetland or they may be relatively stable. This is one of the most widespread wetlands classes in the U.S.

Subclasses:

Broadleaved deciduous
Broadleaved evergreen

Class: Unconsolidated Bottom (UB)

This class includes all wetland and deepwater habitats with at least 25% cover of particles smaller than stones, and a vegetative cover less than 30% . Water regimes are restricted to subtidal, permanently flooded, intermittently exposed, and semi-permanently flooded.

Subclasses:

Cobble - gravel

Class: Emergent (EM)

Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. Vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed.

Subclasses:

Persistent
Non-persistent

Class: Forested (FO)

Forested wetlands are characterized by woody vegetation that is 20 feet tall or taller. All water regimes except subtidal are included. This class is most common in the eastern U.S. and in sections of the west where moisture is relatively abundant. Forested wetlands normally possess an overstory of trees, an understory of young trees or shrubs, and a herbaceous layer.

Subclasses:

Broad-leaved Deciduous
Needle-leaved Evergreen

RIVERINE SYSTEM (R)

The Riverine System includes all wetlands and deepwater habitats contained within a channel with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and (2) habitats with water containing ocean - derived salts in excess of .5 parts per thousand. A channel is defined as "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water". Water is usually, but not always, flowing in the riverine system.

Subsystems: The Riverine System is divided into four subsystems: Tidal, Lower Perennial, Upper Perennial, and Intermittent. Each is defined in terms of water permanence, gradient, water velocity, substrate, and the extent of floodplain development. The only Riverine subsystem represented in the study area is Upper Perennial.

Upper Perennial

In Upper Perennial wetlands the gradient of the channel is high, and velocity of the water fast. There is no tidal influence and some water flows throughout the year. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentration is normally near saturation. The fauna is characteristic of running water, and there are few or no planktonic forms. There is very little floodplain development.

MODIFIERS

In order to fully describe wetlands and deepwater habitats certain modifiers are used at the class level and at lower levels in the classification hierarchy. The modifiers described below were adapted from existing classifications or were developed specifically for this system.

Water Regime Modifiers

Permanently Flooded (H): Water covers the land surface throughout the year in all years. Vegetation is composed of obligate hydrophytes (defined as species that are found in wetlands > 99% of the time).

Diked/Impounded (h): Water storage in an area is affected by the presence of a structure such as a dam or dike.

Seasonally Flooded/Saturated (E): Surface water is present for extended periods especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface.

Saturated (B): The substrate is saturated to the surface for extended periods during the growing season, but surface water is seldom present.

Temporarily Flooded (A): Surface water is present for brief periods during the growing season, but the water table usually lies well below the surface for most of the season. Plants that grow both in uplands and wetlands are characteristic of the temporarily flooded regime.

U.S. Fish & Wildlife Service Wetlands Definition

The U.S. Fish & Wildlife Service defines wetlands as "lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water". For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year. Examples of wetlands include swamps, bogs, marshes, wet meadows, and fens.

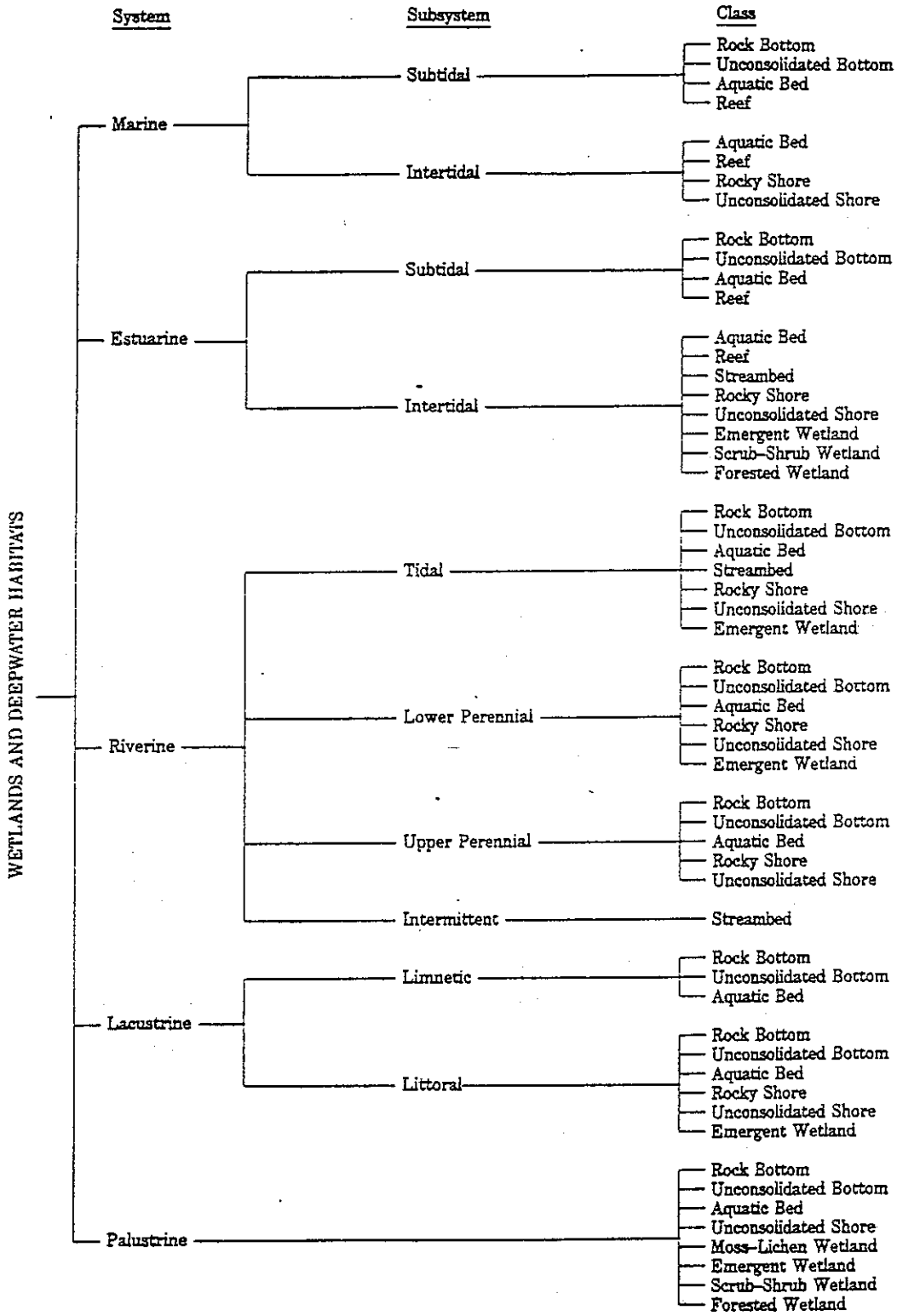


Figure C-1: Classification Hierarchy of Wetland and Deepwater Habitats, Showing Systems, Subsystems, and Classes. The Palustrine System does not include deepwater habitats. (Taken from Cowardin et al., 1979)

APPENDIX 2

SOIL SERIES DESCRIPTIONS

The following is a description of the soil series which represent the soils found in the wetlands of the Frazier Brook watershed.

Marsh (Mh) consists of areas covered by shallow water most of the time. Occurs mainly around the edge of lakes and ponds, but is also found in depressions that contain water during much of the year. Vegetation consists of grasses, reeds, sedges, cattails and rushes. Very important habitat for wildlife, especially waterfowl.

Muck and Peat (Mp) consists of deposits of organic matter that are more than 12" deep. The native vegetation on areas not forested consists of mosses, sedges, reeds, highbush blueberry, and highbush cranberry. Groundwater level is near enough to the surface to saturate plant remains most of the year and thus help preserve them.

Ridgebury and Whitman (RdB) very stony loams, 3% - 8% slopes. Gently sloping to sloping soils found in depressions and at the base of long slopes. Soils are poorly drained, but water is seldom ponded.

Ridgebury and Whitman (RdA) very stony loams, 0% - 3% slopes. Nearly level to gently sloping, strongly acid soils found in depressions and broad, level areas. Saturated by a high water table which is close to the surface in spring, late fall, and winter.

Scarboro (Sc) fine sandy loam. Nearly level, poorly drained, sandy soils found in depressions, plains, and terraces. Native vegetation may include elm, red maple, white pine, speckled alder, and highbush blueberry.

Gloucester (GsD) extremely stony sandy loam, 8% - 25% slopes. Moderately sloping to moderately steep, occurs on hillsides and mountainsides. Moderately well drained to well drained.

Water (W) areas of open water, permanently flooded

A more comprehensive description of soil series may be found in the Soil Survey of Merrimack County, New Hampshire, U.S. Department of Agriculture/Soil Conservation Service, 1965.

APPENDIX 3

Hydric Soils of
Merrimack County, NH

MERRIMACK COUNTY (1961)

Map Symbol	Soil Name	Hydric Soil Class
Lm	Limerick	B
Mh	Marsh	A
Mp	Muck and Peat	A
RbA	Ridgebury	B
RbB	Ridgebury	B
*RdA	Ridgebury	B
	Whitman	A
RdB	Ridgebury	B
RdB	Whitman	A
Ru	Rumney	B
Sa	Saco	A
Sc	Scarboro	A
W	Water < 40 acres	A
Water	Water > 40 acres	A

* This map unit contains more than one soil. Use hydric soil class B for this analysis.

MERRIMACK COUNTY UPDATE (Subject to change)

5	Rippowam	B
6	Saco	A
15	Searsport	A
97	Greenwood	A
97	Ossipee	A
115	Scarboro	A
125	Scarboro	A
295	Greenwood	A
333B	Roundabout	B
347A	Lyme	B
347A	Moosilauke	B
347B	Lyme	B
347B	Moosilauke	B
395	Chocorua	A
495	Ossipee	A
533	Raynham	B
538A	Squamscott	B
547A	Walpole	B
547B	Walpole	B
549	Peacham	A
647A	Pillsbury	B
647B	Pillsbury	B
657A	Ridgebury	B
657B	Ridgebury	B
W	Water	A

Wetland Name/Code: FB-1

NEEDED FOR THIS EVALUATION:

- USGS topographic map
- Recent aerial photographs
  Research of town historical map(s)/ town history
- National Register of Historical Places
- Local knowledge of historical sites

Functional Value 13
HISTORICAL SITE POTENTIAL

A Evaluation Questions	B Computations or Actual Value	C Evaluation Criteria	D Functional Value Index (FVI)
ALL QUESTIONS TO BE ANSWERED IN THE FIELD:			
1. Proximity of potential site to nearest perennial water-course.		a. 0 to 50 yards b. 51-100 yards c. > 100 yards	(1.0) 0.5 0.1
2. Visible stone or earthen foundations, berms, dams, standing structures, etc.		a. Yes b. No	1.0 (0.0)
3. Existence of mill pond at site.		a. Presence of pond or pond site **AND** remains of dam b. Presence of pond or pond site **OR**, remains of dam c. No apparent remains of pond or of dam	1.0 0.5 (0.1)
4. Presence of historical buildings.		a. Yes b. No	1.0 (0.0)

AVERAGE FVI FOR FUNCTIONAL VALUE 13 = Average of Column D = .28.

AVERAGE FVI FOR FUNCTIONAL VALUE 13 = 1.0 if the site has known or documented historical significance.

EVALUATION AREA FOR FUNCTIONAL VALUE 13 = Area of potential site for Historical Significance = 8 acres.

Wetland Name/Code: FB-1

NEEDED FOR THIS EVALUATION:

- List of federal and/or state endangered or threatened species
- Knowledge of any management activities by local nature centers, land protection groups, scouting programs, garden clubs, etc.
- Completed evaluations for all other wetlands in the study area

Functional Value 14
NOTEWORTHINESS

A Evaluation Questions	B Computations or Actual Value	C Evaluation Criteria	D Functional Value Index (FVI)
ALL QUESTIONS TO BE ANSWERED IN THE OFFICE:			
1. Wetland contains critical habitat for a state or federally listed threatened or endangered species.		a. Yes b. No	1.0 (0.0)
2. Wetland is known to be a study site for scientific research.		a. Yes b. No	1.0 (0.0)
3. Wetland is a national natural landmark or recognized by NHNHI as an exemplary natural community.		a. Yes b. No	1.0 (0.0)
4. Wetland has local significance because it ranks among the highest number of WVU's within the study area for one or more Functional Values.		a. Yes b. No	(1.0) 0.0
5. Wetland has local significance because it has biological, geological, or other features which are locally rare or unique.		a. Yes b. No	1.0 (0.0)
6. Wetland is known to contain an important archaeological site.		a. Yes b. No	1.0 (0.0)
7. Wetland is hydrologically connected to a state or federally designated river.		a. Yes b. No	1.0 (0.0)

AVERAGE FVI FOR FUNCTIONAL VALUE 14 = 1.0 if the FVI for any question is equal to 1.0, otherwise the average FVI for FUNCTIONAL VALUE 14 is 0.0 = 1.0.

EVALUATION AREA FOR FUNCTIONAL VALUE 14 = Total area of wetland = 21.0 acres.

APPENDIX 5

SUMMARY DATA SHEETS

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FB-1 Total area of wetland 31 acres

County Merrimack Town Warner Date 10/2/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	.96	31.0	29.8
2. Wetland Wildlife Habitat	.97	31.0	28.9
3. Finfish Habitat:			
Part A - Rivers and Streams	.94	.32	0.30
Part B - Ponds and Lakes	.83	13.0	10.8
4. Educational Potential	.73	10.0	7.3
5. Visual/Aesthetic Quality	.95	10.0	9.5
6. Water-based Recreation	.82	10.0	8.2
7. Flood Control Potential	1.0	31	31.0
8. Ground Water Use Potential	0	31	0
9. Sediment Trapping	.76	31	23.6
10. Nutrient Attenuation	.77	31	23.9
11. Shoreline Anchoring and Dissipation of Erosive Forces	.67	.07	.05
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.28	8.0	2.2
14. Noteworthiness	1.0	31.0	31.0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FB-2 Total area of wetland 0.9 acres

County Merrimack Town Warner Date 9/22/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	1.0	.90	.90
2. Wetland Wildlife Habitat	.68	.90	.61
3. Finfish Habitat:			
Part A - Rivers and Streams	.81	.028	.02
Part B - Ponds and Lakes	0	0	0
4. Educational Potential	.51	.90	.46
5. Visual/Aesthetic Quality	.65	.90	.59
6. Water-based Recreation	.63	.90	.57
7. Flood Control Potential	0	.90	0
8. Ground Water Use Potential	0	.90	0
9. Sediment Trapping	.18	.90	.16
10. Nutrient Attenuation	.18	.90	.16
11. Shoreline Anchoring and Dissipation of Erosive Forces	.37	.07	.025
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.25	.90	.23
14. Noteworthiness	0	0	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FB-3 Total area of wetland 5.0 acres

County Merrimack Town Warner Date 10/4/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	0.88	5.0	4.4
2. Wetland Wildlife Habitat	0.64	5.0	3.2
3. Finfish Habitat:			
Part A - Rivers and Streams	0.88	0.18	.16
Part B - Ponds and Lakes	0	—	0
4. Educational Potential	0.56	5.0	2.8
5. Visual/Aesthetic Quality	0.57	5.0	2.9
6. Water-based Recreation	0.58	5.0	2.9
7. Flood Control Potential	0	5.0	0
8. Ground Water Use Potential	0	5.0	0
9. Sediment Trapping	.28	5.0	1.4
10. Nutrient Attenuation	.43	5.0	2.2
11. Shoreline Anchoring and Dissipation of Erosive Forces	.67	.34	.23
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.28	1.0	.28
14. Noteworthiness	0	5.0	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FB-4 Total area of wetland 0.9 acres

County Merrimack Town Warner Date 10/4/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	0.93	0.90	0.84
2. Wetland Wildlife Habitat	0.67	0.90	0.60
3. Finfish Habitat:			
Part A - Rivers and Streams	0.81	0.028	0.02
Part B - Ponds and Lakes	0	0	0
4. Educational Potential	0.49	0.90	0.44
5. Visual/Aesthetic Quality	0.65	0.90	0.59
6. Water-based Recreation	0.50	0.90	0.45
7. Flood Control Potential	0	0.90	0
8. Ground Water Use Potential	0	0.90	0
9. Sediment Trapping	0.17	0.90	0.15
10. Nutrient Attenuation	0.15	0.90	0.13
11. Shoreline Anchoring and Dissipation of Erosive Forces	0.37	.07	0.03
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	–	0
C: Educational Opportunity	0	–	0
D: Visual/Aesthetic Quality	0	–	0
E: Water-based Recreation	0	–	0
13. Historical Site Potential	0.28	0.90	0.25
14. Noteworthiness	0	0.90	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FB-5 Total area of wetland 18.0 acres

County Merrimack Town Warner Date 9/6/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	0.78	18.0	14.0
2. Wetland Wildlife Habitat	0.74	18.0	13.3
3. Finfish Habitat:			
Part A - Rivers and Streams	0.81	0.23	0.18
Part B - Ponds and Lakes	0	0	0
4. Educational Potential	.57	8.0	4.6
5. Visual/Aesthetic Quality	.78	8.0	6.2
6. Water-based Recreation	.43	2.0	.86
7. Flood Control Potential	1.0	18.0	18.0
8. Ground Water Use Potential	0	18.0	0
9. Sediment Trapping	.81	18.0	14.6
10. Nutrient Attenuation	.66	18.0	11.9
11. Shoreline Anchoring and Dissipation of Erosive Forces	1.0	.92	.92
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	–	0
C: Educational Opportunity	0	–	0
D: Visual/Aesthetic Quality	0	–	0
E: Water-based Recreation	0	–	0
13. Historical Site Potential	.28	6.0	1.7
14. Noteworthiness	0	18.0	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FB-6 Total area of wetland 1.4

County Merrimack Town Warner Date 9/2/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	1.0	1.4	1.4
2. Wetland Wildlife Habitat	0.68	1.4	0.95
3. Finfish Habitat:			
Part A - Rivers and Streams	0.81	0.05	0.04
Part B - Ponds and Lakes	0	0	0
4. Educational Potential	.43	1.4	0.6
5. Visual/Aesthetic Quality	.65	1.4	.9
6. Water-based Recreation	.52	1.4	.73
7. Flood Control Potential	0	1.4	0
8. Ground Water Use Potential	0	1.4	0
9. Sediment Trapping	.17	1.4	.24
10. Nutrient Attenuation	.17	1.4	.24
11. Shoreline Anchoring and Dissipation of Erosive Forces	.37	.11	.04
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	–	0
C: Educational Opportunity	0	–	0
D: Visual/Aesthetic Quality	0	–	0
E: Water-based Recreation	0	–	0
13. Historical Site Potential	.28	1.4	.40
14. Noteworthiness	0	1.4	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code BP (Bagley Pond) Total area of wetland 24.5

County Merrimack Town Warner Date 10-4-91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	1.0	24.5	24.5
2. Wetland Wildlife Habitat	0.74	24.5	18.1
3. Finfish Habitat:			
Part A - Rivers and Streams	0	-	0
Part B - Ponds and Lakes	.83	19.0	15.8
4. Educational Potential	.61	15.0	9.2
5. Visual/Aesthetic Quality	.85	15.0	12.8
6. Water-based Recreation	.92	18.5	17.0
7. Flood Control Potential	1.0	24.5	24.5
8. Ground Water Use Potential	0	0	0
9. Sediment Trapping	.63	24.5	15.4
10. Nutrient Attenuation	.52	24.5	12.7
11. Shoreline Anchoring and Dissipation of Erosive Forces	0.5	.09	.05
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	-	0
C: Educational Opportunity	0	-	0
D: Visual/Aesthetic Quality	0	-	0
E: Water-based Recreation	0	-	0
13. Historical Site Potential	.15	5	.75
14. Noteworthiness	1.0	24.5	24.5

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FB-SB Complex Total area of wetland 30 acres

County Merrimack Town Warner Date 9/15-9/16/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	.88	30	26.4
2. Wetland Wildlife Habitat	.69	30	20.7
3. Finfish Habitat:			
Part A - Rivers and Streams	.94	1.3	1.2
Part B - Ponds and Lakes	0	—	0
4. Educational Potential	.54	5.0	2.7
5. Visual/Aesthetic Quality	.60	2.0	1.2
6. Water-based Recreation	.71	10.0	7.1
7. Flood Control Potential	.95	30.0	28.5
8. Ground Water Use Potential	.88	30.0	26.4
9. Sediment Trapping	.80	30	24
10. Nutrient Attenuation	.80	30	24
11. Shoreline Anchoring and Dissipation of Erosive Forces	.83	3.2	2.7
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.28	10	2.8
14. Noteworthiness	1.0	30	30.0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FBT-1 Total area of wetland 20.5 acres

County Merrimack Town Warner Date 9/30/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	1.0	20.5	20.5
2. Wetland Wildlife Habitat	.84	20.5	17.2
3. Finfish Habitat:			
Part A - Rivers and Streams	0	—	0
Part B - Ponds and Lakes	.62	8.0	4.96
4. Educational Potential	.64	8.0	5.1
5. Visual/Aesthetic Quality	.86	8.0	6.9
6. Water-based Recreation	.56	8.0	4.5
7. Flood Control Potential	1.0	20.5	20.5
8. Ground Water Use Potential	0	20.5	0
9. Sediment Trapping	.81	20.5	16.6
10. Nutrient Attenuation	.66	20.5	13.5
11. Shoreline Anchoring and Dissipation of Erosive Forces	1.0	0.5	0.5
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.28	7.0	2.0
14. Noteworthiness	0	20.5	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FBT-2 Total area of wetland .9 acre

County Merrimack Town Warner Date 9/30/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	1.0	.90	.90
2. Wetland Wildlife Habitat	.58	.90	.52
3. Finfish Habitat:			
Part A - Rivers and Streams	.80	.02	.02
Part B - Ponds and Lakes	0	—	0
4. Educational Potential	.53	.90	.48
5. Visual/Aesthetic Quality	.60	.90	.50
6. Water-based Recreation	.60	.90	.50
7. Flood Control Potential	0	.90	0
8. Ground Water Use Potential	0	.90	0
9. Sediment Trapping	.25	.90	.23
10. Nutrient Attenuation	.35	.90	.32
11. Shoreline Anchoring and Dissipation of Erosive Forces	.83	.05	.04
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.28	.90	.25
14. Noteworthiness	0	.90	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FBT-3 Total area of wetland 5.74

County Merrimack Town Warner Date 9/1/91

Investigator(s) S. D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	.96	5.74	5.5
2. Wetland Wildlife Habitat	.83	5.74	4.6
3. Finfish Habitat:			
Part A - Rivers and Streams	0	—	0
Part B - Ponds and Lakes	.62	4.3	2.7
4. Educational Potential	.63	5.0	3.2
5. Visual/Aesthetic Quality	.78	5.0	3.9
6. Water-based Recreation	.55	5.74	3.2
7. Flood Control Potential	1.0	5.74	5.74
8. Ground Water Use Potential	0	5.74	0
9. Sediment Trapping	.81	5.74	4.6
10. Nutrient Attenuation	.66	5.74	3.8
11. Shoreline Anchoring and Dissipation of Erosive Forces	1.0	.70	.70
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.28	1.5	.42
14. Noteworthiness	0	5.74	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FBT-4 Total area of wetland 2.8 acres

County Merrimack Town Warner Date 9/8/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	.88	2.8	2.46
2. Wetland Wildlife Habitat	.75	2.8	2.10
3. Finfish Habitat:			
Part A - Rivers and Streams	.94	0.09	0.08
Part B - Ponds and Lakes	0	—	0
4. Educational Potential	.46	0.5	.23
5. Visual/Aesthetic Quality	.62	0.5	.31
6. Water-based Recreation	.36	1.4	.50
7. Flood Control Potential	1.0	2.8	2.8
8. Ground Water Use Potential	0	2.8	0
9. Sediment Trapping	.81	2.8	2.3
10. Nutrient Attenuation	.56	2.8	1.57
11. Shoreline Anchoring and Dissipation of Erosive Forces	1.0	2.3	2.3
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.28	.5	.14
14. Noteworthiness	0	2.8	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FBI-1 Total area of wetland 2.15 acres

County Merrimack Town Warner Date 9/29/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	.75	2.15	1.6
2. Wetland Wildlife Habitat	.55	2.15	1.2
3. Finfish Habitat:			
Part A - Rivers and Streams	0	—	0
Part B - Ponds and Lakes	0	—	0
4. Educational Potential	0.46	0.5	.23
5. Visual/Aesthetic Quality	0.5	0.5	.25
6. Water-based Recreation	0	0	0
7. Flood Control Potential	1.0	2.15	2.15
8. Ground Water Use Potential	0	2.15	0
9. Sediment Trapping	.37	2.15	.80
10. Nutrient Attenuation	.45	2.15	.97
11. Shoreline Anchoring and Dissipation of Erosive Forces	0	2.15	0
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.05	.5	.03
14. Noteworthiness	0	2.15	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FBI-2 Total area of wetland 6.45 acres

County Merrimack Town Warner Date 9/6/91

Investigator(s) S. D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	.75	6.45	4.8
2. Wetland Wildlife Habitat	.6	6.45	3.9
3. Finfish Habitat:			
Part A - Rivers and Streams	0	—	0
Part B - Ponds and Lakes	0	—	0
4. Educational Potential	.5	2.0	1.0
5. Visual/Aesthetic Quality	.53	1.0	.53
6. Water-based Recreation	0	—	0
7. Flood Control Potential	1.0	6.45	6.45
8. Ground Water Use Potential	0	6.45	0
9. Sediment Trapping	.37	6.45	2.4
10. Nutrient Attenuation	.45	6.45	2.9
11. Shoreline Anchoring and Dissipation of Erosive Forces	0	—	0
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.05	2.0	.10
14. Noteworthiness	0	6.45	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FBI-3 Total area of wetland 5.8 acres

County Merrimack Town Warner Date 9/22/91

Investigator(s) Stephanie D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	.84	5.8	5.0
2. Wetland Wildlife Habitat	.5	5.8	3.0
3. Finfish Habitat:			
Part A - Rivers and Streams	0	—	0
Part B - Ponds and Lakes	0	—	0
4. Educational Potential	0.5	0.5	.25
5. Visual/Aesthetic Quality	0.45	0.5	.23
6. Water-based Recreation	0	—	0
7. Flood Control Potential	1.0	5.8	5.8
8. Ground Water Use Potential	0	5.8	0
9. Sediment Trapping	.32	5.8	1.9
10. Nutrient Attenuation	.40	5.8	2.3
11. Shoreline Anchoring and Dissipation of Erosive Forces	0	—	0
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.06	0.5	.03
14. Noteworthiness	0	5.8	0

SUMMARY SHEET FOR THE N.H. METHOD

Wetland name or code FBI-4 Total area of wetland 2.15 acres

County Merrimack Town Warner Date 10/1/91

Investigator(s) S. D'Agostino

A Functional Value	B FVI From Data Sheets	C Size of Evaluation Area (Acres)	D Wetland Value Units B x C
1. Ecological Integrity	.80	2.15	1.7
2. Wetland Wildlife Habitat	.55	2.15	1.2
3. Finfish Habitat:			
Part A - Rivers and Streams	0	2.15	0
Part B - Ponds and Lakes	0	2.15	0
4. Educational Potential	.50	1.0	.50
5. Visual/Aesthetic Quality	.59	1.0	.59
6. Water-based Recreation	0	2.15	0
7. Flood Control Potential	.9	2.15	1.9
8. Ground Water Use Potential	0	2.15	0
9. Sediment Trapping	.3	2.15	.65
10. Nutrient Attenuation	.44	2.15	.95
11. Shoreline Anchoring and Dissipation of Erosive Forces	0	2.15	0
12. Urban Quality of Life			
B: Wetland Wildlife Habitat	0	—	0
C: Educational Opportunity	0	—	0
D: Visual/Aesthetic Quality	0	—	0
E: Water-based Recreation	0	—	0
13. Historical Site Potential	.05	.50	.03
14. Noteworthiness	0	2.15	0

NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES

Wt 607.05 Slope Stabilization. The board shall require that reasonable measures are used to stabilize slopes affected by projects. These may include grading, vegetating, rip-rap, revetment, and other appropriate measures.

Source. #2923, eff 12-10-84

CHAPTER Wt 700 PRIME WETLANDS

PART Wt 701 CRITERIA

Wt 701.01 Purpose. The purpose of these regulations is to provide criteria to municipalities for use in designating wetlands of significant value that are worthy of extra protection because of their uniqueness, fragility and/or unspoiled character. (RSA 483-A:7)

Source. #2924, eff 12-11-84

Wt 701.02 Evaluation. The following criteria shall be utilized in a thoughtful evaluation process to determine in each municipality those wetlands that deserve special consideration, review, protection, and designation as "prime".

(a) Soils. All wetlands to be designated as prime shall have the wettest soils as identified under the National Cooperative Soil Survey performed by the U. S. Soil Conservation Service. These soils in New Hampshire which generally have a slope of 3% or less, are currently categorized as the very poorly drained mineral soils, the very poorly drained organic soils, and fresh or saltwater marsh, namely:

(1) Very poorly drained mineral soils: Example of soil series are: Biddeford, Saco, Scarboro, Whately and Whitman.

(2) Very poorly drained organic soils: Example soil series are: Ossipee, Chocorua, and other muck and peat soils.

(3) Marsh:

a. Borohemists (fresh water marsh)

b. Sulfihemists (salt water marsh)

(b) Flora. High value may be ascribed to a wetland that presents one or more of the following characteristics:

(1) High diversity of species ranging from water dwelling species to emergent species.

(2) Containing a native species at the extremity of its range.

(3) Containing rare and/or endangered native plants.

(c) Fauna. Prime wetlands may be wetlands that are used by a great variety or large numbers of animals and/or birds for feeding, shelter, and/or reproduction. Prime wetlands may also be frequented by rare native species, species at the limit of their ranges, or endangered species.

(d) Food chain production. Consideration of food chain values is complex and involves a larger number of intricate biological and physical processes. Some factors to be evaluated are:

(1) The relative productivity of different types of wetlands.

(2) The amount of primary production available to terrestrial and aquatic food chains.

(3) The amount of that food chain production which supports specific animal species or groups, such groups may contain species that are endangered or those that have commercial value such as oysters, lobsters and other shellfish.

(4) Other factors controlling wetland productivity.

(e) Hydrology. To be classified as prime under this criteria, a wetland must significantly benefit the watershed by at least one of the following capacities:

(1) Store water and regulate flow in flashy watershed. The wetland size shall be at least one percent of the watershed.

(2) Filter out sediments and regulate flow of nutrients to maintain water quality in adjacent lakes and streams. The wetland size shall be at least one percent of the watershed.

(3) May be indicative of a significant aquifer.

(f) Historical, archeological and/or scientific importance. Significant areas of wetlands which have historical or archeological importance may be considered for designation as prime wetlands. Wetlands which have an on-going research value may also be designated.

(g) Outstanding or uncommon geomorphological features. Unique or unusual physical forms of wetlands which reflect geologic processes are worthy of preservation such as unique or regional examples of geological history. Such forms may occur in either estuarine or fresh water environments.

(h) Aesthetics. Prime wetlands, in addition to supporting diverse flora and fauna, may also contain distinctive landscape features which can gratify the aesthetic senses through intrinsic appreciation of natural beauty.

(l) Evaluation, however, of aesthetic values is difficult to quantify and, at best, is entirely subjective. Although several scenarios can be developed to "positively" evaluate aesthetic values of wetland landscapes, a basic approach requiring much less knowledge in landscape principles is to analyze the "negative" aspect of the landscape. This approach is more appropriate since the positive features and their aesthetic implications are taken into account when the other functions and values of wetlands are evaluated. The approach, therefore, is to assign penalties to the negative elements or influences that already affect the overall appreciation of the wetlands such as adverse air quality, water quality, noise, non-conforming use, etc. However, a wetland can be extensively used by man and retain its aesthetic appeal. For example, there are many recreational activities, such as hunting, fishing, developing nature trails, etc., which would not conflict with the basic natural setting of an aesthetically prime wetland.

(i) Size. Although the size of a wetland is important in terms of its capacity to support significant and diverse types of flora and fauna, it is difficult to categorically define the importance of wetland relative to size alone. Wide diversity of wetland types requires that the importance of size be related to the individual characteristics and/or functions of the wetland in question. In general a wetland less than 5 acres, except when bordering open water, is expected to be short lived and of limited capacity to support significant flora and fauna, however, smaller areas may be considered prime with other values.

(j) Other considerations. Other selected and identified issues that are unique and important to the municipality may be evaluated.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

PART Wt 702 SUBMISSION

Wt 702.01 Report. A report shall be submitted with maps. This report shall identify each prime wetland by name or number correlated to map or maps. The rationale presented shall clearly set forth the applicable and significant criteria along with specific data that support the designation of each prime wetland.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

Wt 702.02 Map Format. The designation shall carefully describe each prime wetland with an exterior outline defined to nearest 50 feet in location and shall be related to property boundaries. Scale shall be the same as the municipal tax map. Map sheets submitted to the wetlands board shall not

exceed a size of 28 inches by 40 inches and shall have a one-inch border and title block with scale and legend. Such maps shall contain adequate identification of the prime wetlands. Colors shall not be used to identify prime wetlands perimeters.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

Wt 702.03 Acceptance. A review of the submission from each municipality shall be conducted by the board for compliance to the requirements of report and format. The board reserves the right to reject a submission for reasons of lack of completeness or non-conformance to format.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

PART Wt 703 PERMIT PROCESS

Wt 703.01 Determination. Applications filed for proposed projects will be reviewed by the municipal conservation commission, if any, or the municipal planning board, if any, or the municipal executive body to determine if the proposed project is located in or contiguous to prime wetlands. It shall be the responsibility of the municipal board(s) to notify the wetlands board in writing that the proposed project involves prime wetlands. If this notification is not received within 10 days from filing date with the town/city clerk the board will process the application under its regular procedures.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

Wt 703.02 Verification. Upon receipt of notification that a proposed project involves work in or adjacent to prime wetland, the application will be presented to the board for verification and a public hearing ordered.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

Wt 703.03 Incorrect Delineation. In the event that it is alleged that the prime wetlands incorrectly defines the limits of the prime wetland and evidence to that effect is presented to the wetlands board, the wetlands board may determine the designation of the disputed area.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

Wt 703.04 Public Hearings. Procedures are to be the same as under section entitled "Conduct of Hearings" with the addition that board members,

staff, and state agencies will submit oral testimony during the hearing and/or submit written reports as part of the record.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

PART Wt 704 NOTIFICATION OF DECISION

Wt 704.01 Notification of Approval.

(a) Announcement. A decision to approve any of the proposed projects involving prime wetlands shall have an effective date 28 calendar days after the date of decision. The municipal conservation commission, planning board, executive body, the applicant, and interested parties shall be notified forthwith of the decision.

(b) Issuing permits. The permit shall be issued to the applicant on the effective date unless a motion for rehearing has been filed by either the municipal conservation commission or municipal executive body. No rehearing shall be granted unless new and substantive information is filed with the motion.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

Wt 704.02 Notification of Denial. Interested parties will be informed in writing of a decision to deny the proposed project involving prime wetlands.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

staff, and state agencies will submit oral testimony during the hearing and/or submit written reports as part of the record.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

PART Wt 704 NOTIFICATION OF DECISION

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Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

Wt 704.02 Notification of Denial. Interested parties will be informed in writing of a decision to deny the proposed project involving prime wetlands.

Source. #1825, eff 10-5-81; ss by #2512, eff 10-19-83; ss by #2924, eff 12-11-84

CHAPTER Wt 800 ADMINISTRATIVE FINES

Statutory Authority: RSA 483-A:4-a, I and RSA 483-A:5-a.

PART Wt 801 PROCEDURES FOR IMPOSING ADMINISTRATIVE FINES

Wt 801.01 Who May be Fined. Fines under this chapter may be imposed for each offense upon the landowner, contractor, and any other person whether or not he/she is the owner of the land who violates the provisions of RSA 483-A or the administrative rules of the Wetlands Board.

Source. #4352, eff 1-4-88

Wt 801.02 Notice.

(a) The board shall notify, by first class mail, any person the board is considering imposing a fine upon of: (1) the proposed amount of the fine according to Part Wt 802; and (2) the person's right to a hearing before

REFERENCES

1. Amman, Alan P., and Amanda Lindley Stone, Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire, New Hampshire Department of Environmental Services, Concord, NH, 1991.

2. Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. Classification of Wetlands and Deepwater Habitats of the United States. Washington, D.D.: Fish & Wildlife Service, U.S. Department of Interior, 1979.

3. Fish & Wildlife Service, Department of Interior, National Wetlands Inventory Maps, Washington, D.C., 1990.

4. Keller, Edward A., Environmental Geology, University of California, Santa Barbara, 1976.

5. Mitsch, William J., and James G. Gosselink, Wetlands, Ohio State University, 1986.

6. New Hampshire Association of Conservation Commissions et. al, Guide to the Designation of Prime Wetlands in New Hampshire, Concord, NH, June, 1983.

7. New Hampshire Code of Administrative Rules, Chapter 700 - Prime Wetlands, Department of Environmental Services, 1988.

8. New Hampshire Department of Environmental Services, Water Supply and Pollution Control Division, New Hampshire Water Quality Report to Congress 305(b), Concord, New Hampshire, September, 1990.

9. New Hampshire Natural Heritage Inventory, Department of Resources and Economic Development - Endangered/threatened species listings, 1991.

10. Soil Conservation Service, United States Department of Agriculture, Soil Survey - Merrimack County, New Hampshire, 1965.

11. Tiner, Ralph, Field Guide to Non-tidal Wetlands Identification, Maryland Department of Natural Resources, U.S. Fish & Wildlife Service, 1988.

12. United States Army Corps of Engineers, U.S. Fish & Wildlife Service, U.S. Environmental Protection Agency, and U.S. Department of Agriculture, Federal Manual for Identifying and Delineating Jurisdictional Wetlands, Washington, D.C., 1989.

13. United States Geological Survey, Department of the Interior, topographic maps, 7.5 minute series, Warner Quadrangle, provisional edition, 1987.

14. United States Geological Survey, Department of the Interior, Availability of Ground Water in the Middle Merrimack River Basin, Central and Southern New Hampshire, Concord, NH, 1976.