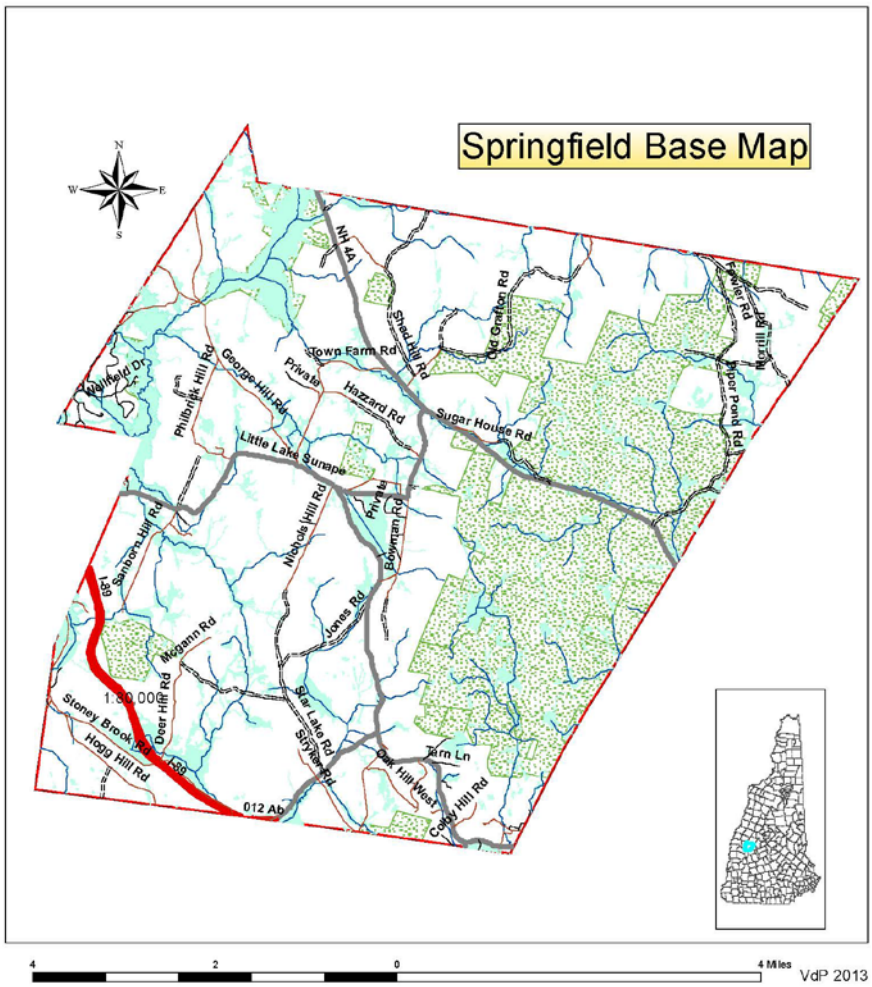
SPRINGFIELD WETLAND PROJECT

FINAL REPORT

Submitted to the
Upper Valley Lake Sunapee Regional Planning Commission
Springfield Planning Board



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EXECUTIVE SUMMARY

Between May 2013 and March 2014 a comprehensive inventory of wetlands was completed for the Town of Springfield, New Hampshire. The purpose of the inventory was to identify and accurately locate all wetlands and surface water resources in the town in order to update existing information on the town-wide wetlands map. The project also intended to provide direct education about wetland resources to town residents and school children in the area. A third objective was to confirm high wetland functional value among some of the larger wetland complexes in town, and to establish a basis for more in-depth wetland evaluations in the future. A final objective was to provide review and commentary on the existing wetlands ordinance, as well as the changes proposed by the Wetlands Subcommittee of the Springfield Planning Board. The Springfield Wetlands Project was sponsored by the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) and approved by the Springfield Planning Board and Conservation Commission.

The process of accurately mapping all wetlands and surface water in Springfield required several steps. First, digital geographic information system (GIS) files were uploaded from UNH Complex Systems Research Center using ArcGIS 10 software. This included uploading all baseline GIS data layers such as current roads, trails, conservation lands, political divisions, watershed information, water resources data, and the current, 2010 color infrared aerial photography. Secondly, any and all pertinent map and literature data associated with wetlands in the region was reviewed. This included a review of the Zoning Ordinance for Springfield, the 2010 update to the Wildlife Action Plan or WAP, and rare and endangered species records from the NH Natural Heritage Bureau.

The third task associated with mapping each wetland unit accurately was the completion of roadside surveys. This took place between May and December, and resulted in the recording of 630 water resource-related GPS points, 386 digital images of Springfield wetlands, and the coverage of roughly 81.4 miles of public roads (including Gile State Forest). The only roads that were not surveyed were those Class VI roads in the northeast part of town that were either gated and/or impassable by vehicles. Some of the latter were covered on foot, however. Ground-truthing allowed for the confirmation of wetland cover types as well as a quick assessment of wetland condition.

The bulk of the wetland mapping work took place in the office and entailed the careful identification of wetlands and surface waters using the 2010 color infrared aerial photographs. Aerial photo interpretation (API) used the infrared color band imagery, the National Hydrography Dataset (NHD), and the NRCS-based soils map to identify all wetlands in Springfield and within ½ mile of the town's border by their cover type (NWI cover class) and soil type. Cover types and soil types were often confirmed by the roadside survey data, especially in areas that had been affected by beavers since 2010. The resultant map (as herein attached) represents a 10-fold increase in accuracy and precision over the existing NWI and soil maps (i.e. mean unit size of .72 acres versus 8.1 acres and a wetland boundary precision level of 6 meters versus 90 meters).

The wetland mapping effort resulted in the identification of 4517 wetland units within the town boundary and an additional 853 wetland units within the ½ mile extended study area. Springfield wetland acreage totaled 3252 acres, plus an additional 1211 acres within ½ mile of the town's boundary. A total of 616 NWI cover class types were identified along with a total of 68 soil types (inclusive of upland islands). This represents a 53% increase in wetland acreage over the NWI map, and a 10-fold increase in the number of wetland units over NWI. In both cases this number includes the five 'Great Ponds' in Springfield, namely, Kolelemook Lake (98.3 ac.), Baptist Pond (86.4 ac.), Star Lake (67.6 ac.), Morgan Pond (54.0 ac.), and Dutchman's Pond (31.1 ac.).

In order to "confirm wetland condition" according to the terms of the contract, all 4517 wetland units were analyzed for their potential to be deemed "high quality." This first required the segregation of wetland units into evaluation areas according to the guidance provided by the *Method for Inventorying and Evaluating Non-tidal Wetlands in New Hampshire*, or the 'NH Method' (UNH Cooperative Extension, 2011, see Appendix D). Once the wetland units were placed into discrete wetland complexes, each complex was assessed for several ecological attributes. These included the following seven qualities:

1. Size > 2 acres[1]
2. Associated with and contiguous to perennial streams or great (> 10 ac.) ponds
3. Within or adjacent to Wildlife Action Plan highest ranked habitats[2]
4. Contained ≥ 3 National Wetland Inventory cover classes or a high interspersion of 2 cover classes[3]
5. Contained rare species or potential exemplary natural communities
6. Associated with a known or documented critical habitat area (e.g. vernal pool)
7. Occurred within 200 feet of a previously high value wetland, specifically McDaniel's Marsh or Bog Brook

The above attributes were proposed to comprise the basic elements of "high quality wetlands" for Springfield. Moreover, a minimum threshold of having *three or more* of these attributes was established for *designating* wetlands as having high value. This was in keeping with rapid wetland evaluations conducted in five other towns in the state (see Van de Poll 1999a, 2001, 2007, 2009a, 2013).

This rapid wetland evaluation process was conducted on 160 wetland complexes that varied from one cover type to 249 cover types (McDaniel's Marsh). These wetland complexes averaged 16.0 acres in size, and varied from 1.15 acres to 452.7 acres (McDaniel's Marsh). The total acreage of these complexes equaled 2437 acres, or 88% of the total acreage of wetlands in Springfield.[4] Of the 160 wetland complexes, a total of 87 had three or more of the above attributes. These proposed *designated wetlands* represented 86% of the total acreage of those wetlands that were evaluated. These are outlined in pink on the attached map (Appendix A-4).

[1] This minimum size threshold is in keeping with the state prime wetlands definition.
[2] Either highest ranked in the state or the biological region
[3] "High interspersion" is defined as a mosaic of several NWI cover types intermixed within the wetland
[4] It should be noted that none of the 'Great Ponds' were included in the assessment since these are covered by the Shoreland Conservation Overlay District.

Wetland assessment work also included the identification of vernal pools. These were either recorded as "possible, probable, or confirmed" depending on time of year, hydrologic condition, and the presence/absence of obligate vernal pool species. A total of 172 vernal pools were identified during the wetlands mapping process, of which three were confirmed as vernal pools, 141 as "probable," and 28 as "possible." These were in addition to the seven vernal pools identified by Watershed to Wildlife during their town-wide NRI in 2008, and the 26 vernal pools identified by the Springfield Conservation Commission identified prior to this study.

The vernal pool identification effort was part of the educational outreach task of the Springfield Wetlands Project. A Vernal Pool Study Guide was prepared for town citizens in order to advertise vernal pool attributes and promote their importance. This summary was distributed to town officials and posted on the town's web site. It also became part of the in-school programs that the author provided for high school students at Kearsage Regional High School. The latter took place in late fall on the school grounds, wherein three classes were held on the values of wetlands, notably vernal pools. Class outlines and curriculum guides were prepared for each of these classes in advance of each session.

The final task of the Springfield Wetlands Project was the review and revision of the Springfield Wetlands Ordinance. This began with participation in the town-wide forum in May, and was followed by several public conversations with Planning Board and Conservation Commission members. A careful review of the recommendations made by the Wetlands Subcommittee of the Planning Board resulted in targeted suggestions for clarifying and refining the protection of wetlands in Springfield. This included the clarification of language in the existing ordinance, the recommendation to recognize designated wetlands as high value wetlands deserving of 100-foot setbacks, the elimination of the minimum size for wetlands subject to the ordinance, and the allowance of small non-residential buildings within the wetland buffer area.

The following report reviews the above findings in more detail and provides greater context for the wetland map refinement work, which formed the largesse of the effort under the Springfield Wetlands Project.

McDaniel's Marsh

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- Bruce Allen, Chair
- Jane Seekamp
- Daphne Klein, Secretary
- Ken Jacques, Treasurer
- Cynthia Bruss
- Leigh Callaway, Selectmen's Representative
- Patricia Allen-Shaw, Alternate

New London-Springfield Water System Precinct
- Robert Thorp, Superintendent

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I. Overview and Purpose

In May of 2013 Ecosystem Management Consultants (EMC) of Sandwich, NH was selected by the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) to complete an inventory and rapid assessment of wetlands in Springfield, NH. The *Request for Proposals* contained the following goals for the Springfield Wetlands Project:

- Inform and educate citizens on the importance of conserving natural resources.
- Utilize the expertise of a Certified Wetland Scientist to develop an accurate town-wide wetland map.
- Integrate the revised town-wide wetland map into the permitting process.
- Develop appropriate regulations to integrate the mapped wetlands into the existing land use regulations.
- Utilize enhanced wetland mapping to more accurately identify properties that may require more detailed wetland boundary assessments early in the permitting process to save property owners' and Town representatives' time and money.
- Identify and locate vernal pools, where possible, and develop standards for identifying and protecting vernal pools.
- Simplify administration of the wetland regulations; develop regulatory standards that are easy to understand by property owners and simple to enforce by Town representatives.

Soon after the selection and contract negotiations process was completed, the UVLSRPC asked EMC to attend a public forum on Springfield's wetlands. The forum provided first-hand experience with the concerns of the citizens relative to the scope, clarity, and enforcement of the existing wetlands ordinance. Many excellent suggestions were made, notably by members of the Wetlands Subcommittee of the Planning Board, whose charge was to come up with recommendations for updating, simplifying, and clarifying the ordinance while making it reasonable for residents of Springfield. It was clear from this first meeting that the existing wetlands map was inaccurate and ineffective. It was also clear that many town residents believed that "one size does *not* fit all" and that a minimum of 10,000 square feet for wetland protection was arbitrary and burdensome. The challenge presented by the Town residents as well as the Regional Planning Commission staff was to at once increase the accuracy and precision of the town wetlands map and devise protective mechanisms that were targeted, reasonable, and scientifically sound.

The resulting project achieved all of the above objectives, although the integration of an improved wetlands map with simplified regulatory standards awaits further Planning Board review. Four presentations were given at public meetings and forums, three classes were taught at Kearsarge Regional High School, a vernal pool information sheet was created and distributed, the town-wide wetlands map was rendered more accurate and complete, a simplified wetland evaluation method was employed for 160 wetland complexes, the highest value wetlands in town were identified and mapped, and suggested revisions were made to the existing ordinance in order to clarify, simplify and legitimize the existing regulatory language. The following report reviews each of these accomplishments and outlines the suggested strategies for completing the integration of the new wetlands map with the wetlands ordinance.

II. Methods

A. Project Coordination

The administration and coordination of the Springfield Wetlands Project was deftly handled by UVLSRPC Senior Planner, Michael McCrory, with assistance from Senior Planner Rachel Ruppel. Both Mike and Rachel coordinated all meetings with town officials and provided map prints and documents for hearings and forums. Regular communications were maintained by email and phone with the Springfield Board of Selectmen, Planning Board, and Conservation Commission. Assistance was also provided by selected citizens for accessing certain parts of the town, for example, the New London-Springfield Water Precinct lands and Ausbon Sargent conservation lands. Three progress reports to the UVLSRPC were supplied on May 31, July 31, and October 31, 2013. Each report summarized progress on the tasks to date, and provided an updated timeline for completion for tasks in progress.

B. Information Review

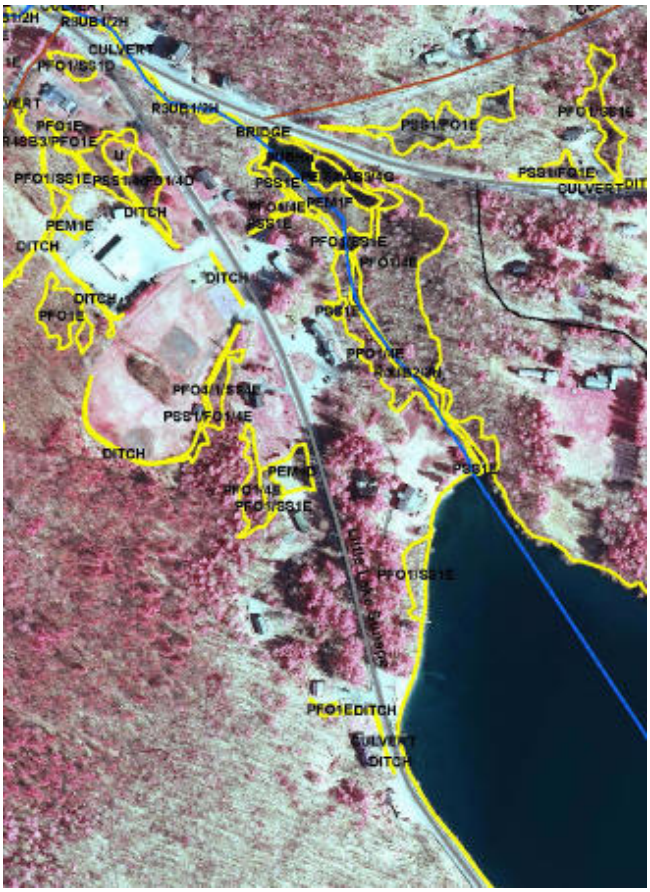
All pertinent information relative to Springfield water resources were reviewed over the course of the spring and summer. This included the Springfield Master Plan, Springfield Zoning Ordinance, the 2008 Natural Resources Inventory, excerpts of newsletters of the Springfield Historical Society, the southern upland watersheds profile in the NH Fish & Game's Wildlife Action Plan, the Quabbin to Cardigan (Q2C) Partnership prospectus, The Nature Conservancy's Forest Matrix Block Analysis for the state of New Hampshire, and notes of the Little Lake Sunapee Protective Association. Watershed to Wildlife's Natural Resources Inventory provided the most detailed information on Springfield's surface waters, yet the wetlands information was the same as is readily available from the state's geographic information system (GIS) data described below. The remaining references were more generalized but provided excellent context for the map improvements that followed.

C. Wetlands Mapping

New Hampshire's statewide GIS data known as NH GRANIT is housed at UNH Complex Systems Research Center (CSRC) in Durham. It offers a wide variety of remote (GIS) data that was consulted during Task 4 of the project. The NH GRANIT web site, http://www.granit.unh.edu, lists the following resource layers were used to derive the wetlands base map:

Resource Layer	Date	Description
Digital Elevation Models	1987	From USGS topographic sources
Digital Orthophoto Quads (DOQ's)	1998	NHAP, black-and-white
Digital Raster Graphics (DRG)	1987	USGS topographic maps
Landsat land use coverage	2001	Latest satellite imagery
NAIP aerial photography	2003,9	Statewide coverage
National Wetlands Inventory (NWI)	2001	USFWS Wetlands Inventory Data
NH Hydrography Dataset (NHD)	2010	Streams & rivers, other surface waters

NH Wildlife Action Plan (WAP)	2010	Wildlife habitat & condition ranking
Political boundaries	1996	UNH CSRC
Public Roads	2010	NH DOT
Soil units, especially hydric	2005	NRCS (available through Web Soil Survey)
Tagged Vector Contours (TVC)	1998	20-foot contour intervals (USGS)
USGS Color infra-red photography	2010	1-foot pixel, released June 2011
Watershed boundaries	2002	USGS (HUC 10, 12)



The most important resource in the above list of GIS data was the 2010, one-foot pixel, color infrared aerial photographs flown by the NH Department of Transportation. These ortho-rectified photographs provided an exceptional view of all areas of Springfield both in standard three-color format and in fourth band near infrared. The latter was reviewed using the recommended CSRC settings, wherein 'warm' reflectance objects displayed a pink to red color and 'cool' objects displayed various shades of light gray to black. Neutral reflectance appeared white. A sample clip from the aerial photo interpretation (API) map is shown at right.

Using the color indications on the map along with visible water features, the edge of each wetland was approximated using a standard mouse cursor on an ArcGIS 10.1 map platform. Each discrete wetland cover type was outlined in yellow, as shown above, and coded according to the apparent National Wetlands Inventory (NWI) 'Cowardin' cover type.[1] In keeping with NWI standards, all surface waters were mapped in this way, including lakes, ponds, and visible streams. Where individual cover types could not easily be discerned, a combination of types was assigned. Wetland areas were also compared with the latest release of digital Soil Survey data and appropriate soil types were assigned for each cover type unit. For naturally occurring wetlands, drainage class was estimated based on dominant vegetation. For example, any open marsh or scrub-shrub swamp

[1] Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service. FWS/OBS – 79/31. Washington, D.C.: Government Printing Office.

was assumed to be very poorly drained, whereas forested wetland fringes were usually assumed to be poorly drained.

As shown above, each wetland cover class and/or soil type was mapped as a separate polygon, and each polygon was snapped (seamed) together into a wetland complex. For most of the wetland polygons that were mapped in this way, one or more associated wetland types were found immediately adjacent to the first type mapped. Less than 10% of the wetland units were comprised of a single cover type; the remainder contained between two and 249 cover types, the latter being the greatest number found for a single wetland in McDaniel's Marsh. Except for upper watershed or isolated wetlands, each wetland unit was typically associated with a stream. The NHD was often very useful in helping determine the presence of a flowing surface water, and in the case of hardwood forests these streams could be easily seen. Stream alignments were not always correct, however, nor was the designation of perennial versus intermittent. Because of this, as well as the fact that many wetlands and streams were found in areas of coniferous cover, a significant effort was expended to field test the aerial photo interpretation (API) work. This latter effort is more fully described in the next section.

All visible and field-confirmed wet areas in Springfield were mapped using office-based GIS data and field-based observations. The first draft of the wetland base map was produced in early January 2014 and submitted to the UVLSRPC. In order to be consistent with the practice of evaluating wetlands beyond the town boundaries, all wetlands that continued beyond the edge of the town were also mapped. In most cases, contiguous wetlands outside of Springfield were mapped as far as one half-mile beyond the town boundary. Occasionally, large wetland complexes or surface waters were mapped beyond this extent if it appeared to be critical for subsequent wetland evaluation purposes (e.g. Little Lake Sunapee).

D. Wetland Value Confirmation

A critical part of the wetlands mapping task of Springfield were the roadside surveys that were conducted along most of the public thoroughfares of the town. These surveys served the purpose of

1) Gathering direct visual information on the wetland resources of Springfield
2) Identifying "pinch points" where wetland complexes appeared to be segregated from their upstream and/or downstream counterparts
3) Collecting data on culverts, arch spans, and bridges to determine hydrologic connectivity among and between wetland complexes
4) Making observations on water quality
5) Determining the approximate amount of pre-existing impacts to wetlands
6) Determining a wetland's value as wildlife habitat

All of these surveys took place during daylight hours and were performed without leaving the edge of the road's Right-of-Way (except on public land such as Gile State Forest). Most roadside surveys were completed by vehicle, but in the case of several Class VI roads these surveys were

completed on foot. A Garmin 12XL hand-held GPS unit with an average precision of 3.2 to 7.9 meters and a Canon SX20IS digital camera was used to record all data. GPS points were taken at each culvert, arch span or bridge, as well as the beginning and ending points of any wetland that immediately abutted the roadway. Pertinent photographs were taken of each wetland complex in order to capture salient cover and soil types as visible from the road. The latter were extremely useful for checking the cover and soil types that were derived from the 2010 aerial photographs described above.

Wetland map adjustments that followed these field surveys yielded a more precise correlation between map imagery and field recorded information. Extremely accurate mapping took place in open areas along roadways, around open water bodies, and along clearly defined streams under hardwood cover. The least precise mapping took place in areas away from roads under conifers, especially along stream channels dominated by white pine. In these cases, a maximum distance from the indicated stream thread conformed to contour lines and soil types. For example, in steep ravines the wetland edge was assumed to be the top of bank (i.e. width of the stream), which varied according stream size (order). In wider floodplains the edge of wet was assumed to be at the toe of an adjacent slope, especially if the soil type mapped for the floodplain area was indicated as poorly drained.

Figure 2. McDaniel's Marsh was the largest wetland mapped in Springfield. At over 452 acres, a total of 249 separate wetland cover types were identified within Springfield. The upstream wetland evaluation area extended an additional .6 miles into Grafton as far as Route 4A. The downstream evaluation area ended at the dam at George Hill Road

Wetland Evaluation

As requested by the UVLSRPC, the wetland mapping task included an evaluation step. Since a full-blown wetland assessment was not budgeted for the project, a rapid assessment was devised to address the sentiment noted above that "not all wetlands are created equal" (and therefore should not be regulated in the same way).[2] This rapid assessment technique was modeled after a similar effort in five other New Hampshire towns that wished to establish variable setbacks based on wetland value. The *Designated Wetlands* approach was first proposed in August of 2013, and explained in a separate document submitted to the Planning Board in November 2013.[3]

Designated wetlands were proposed to be those wetland whose functional values, and therefore contributions to society, were above average. A total of seven attributes were listed as proposed criteria by which certain wetlands would be designated. These are as follows:

1. Size > 2 acres[4]
2. Associated with and contiguous to perennial streams or great (> 10 ac.) ponds
3. Within or adjacent to Wildlife Action Plan highest ranked habitats[5]
4. Contained ≥ 3 National Wetland Inventory cover classes or a high interspersion of 2 cover classes[6]
5. Contained rare species or potential exemplary natural communities
6. Associated with a known or documented critical habitat area (e.g. vernal pool)
7. Occurred within 200 feet of a previously high value wetland, specifically McDaniel's Marsh or Bog Brook

It was further proposed that a *designated wetland* would contain three or more of these attributes. Among other things, this would eliminate a bias relative to size and would allow certain wetlands with very high wildlife value to be selected, especially those near the previously recognized Bog Brook/McDaniel's Marsh wetland complex.

The first step in identifying certain wetlands as potential *designated wetlands* was the segregation of the wetland cover class units into wetland complexes, otherwise referred to as wetland evaluation units. For this step, the revised wetland base map was broken up into discrete evaluation units using guidance published in the *Method for Inventorying and Evaluating Non-tidal Wetlands in New Hampshire*, or the 'NH Method' (UNH Cooperative Extension, 2011). Although more thoroughly reviewed Appendix D, the basis for separating wetland units into discrete complexes was as follows:

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[2] A clear example of this supported by several Planning Board and Wetland Subcommittee members was McDaniel's Marsh. With a 660-foot buffer, this wetland has been visibly recognized as having very high value.

[3] Please see Appendix C to review this document.

[4] This minimum size threshold is in keeping with the state prime wetlands definition.

[5] Either highest ranked in the state or the biological region

[6] "High interspersion" is defined as a mosaic of several NWI cover types intermixed within the wetland

a) Separate wetland units if
    a. The wetland narrows abruptly along a stream or river
    b. The wetland is bisected by road, railroad, or area of fill *without* any hydrologic connection between the units
    c. The wetland is bisected by a four-lane highway
    d. The wetland borders a large river (i.e. ≥ 5th order) or lake and is fed by a single source or surface water
b) Keep as one unit if
    a. The entire wetland is narrow along a stream
    b. The wetland is bisected by a road, railroad, or fill *with* a provision for free-flowing water that connects each side hydrologically
    c. The wetland is bisected by a four-lane highway but is spanned by a large bridge
    d. The wetland borders a small stream or river and is fed by several water sources

Once identified as a potential designated wetland, a series of database fields was created in ArcGIS that conformed to the seven attributes above and completed based on additional API. An eighth column was added that summed the point values for all seven attributes, and a series of point-ranked wetland complexes identified. For the purposes of this project, all wetland complexes that received three or more points were exported as a separate file and highlighted on the *Designated Wetlands – Proposed* map (see Appendix A-4).

E. Ordinance Review & Revision

The designation of selected wetlands was integrated with the project task of reviewing and revising the existing Springfield Wetland Conservation District Overlay Ordinance. Using the public comments and summary provided by the Wetlands Subcommittee of the Springfield Planning Board, a series of suggested changes were made to the current ordinance. The initial review included a check of citations, definitions, and standards as promulgated by the state of New Hampshire Department of Environmental Services and the U.S. Army Corps of Engineers. It also included a review of the Springfield Master Plan to ensure that the tenets of the ordinance was upheld by clear statements in the Master Plan. This was followed by a review of wetland ordinances from other towns, especially those that EMC have written in whole or in part.

Following this review, selected revisions were made to the existing wetlands ordinance in three areas:

1) Language clarity
2) Adherence to state and federal laws, rules, and definitions[7]
3) Wetland functional value as the basis for wetland protection

[7] Some deviation from state definitions were proposed for terms that are incorrectly defined, or whose definitions are in the process of being updated by the NHDES Wetlands Bureau.

Issues of language clarity required revisions to statements of purpose and intent, statements of definition, and statements of guidance. State and federal regulations were cited as required for definitions, setbacks, and permitting. Wetland functions and values were expanded to include all of those include in the town's master plan as well as those commonly recognized by wetland scientists and regulatory agencies. Revisions were also carried over to the Shoreland and Floodplain Conservation Overlay District language.

F. School Programs

A final task of the Springfield Wetlands Project addressed the outreach and education goals of the town and the Upper Valley Lake Sunapee Regional Planning Commission. The initial RFP included a stated desire to provide direct education to Springfield citizens on the importance of conserving natural resources. Through discussions with UVLSRPC staff it was apparent that this effort would best be served by reaching out to school children at Kearsarge Regional Middle and High Schools. This was completed by email and phone contacts with Springfield teachers who worked at these institutions. As described below, the results included several teaching sessions for students at the high school, as well as the promulgation of a wetland study guide, wetland training curricula, and a vernal pool fact sheet. Although this represented a modicum of effort, a more in-depth program, which was proposed as a follow-up project to the Springfield Wetlands Project, has yet to be approved and funded.

Figure 3. Teaching about wetlands behind Kearsarge Regional High School

III. Results / Discussion of Findings

A. General Findings / GIS Data Summary

The initial GIS data review calculated a total of 1606.5 acres of wetlands in Springfield according to the National Wetlands Inventory (NWI) data, or 5.6% of the town. This did not include all "great ponds," or those open water bodies larger than 10 acres, which comprised about 521.3 acres (1.8% of town) according to the NWI maps. These included in descending order of size, McDaniel's Marsh (159.2 ac.), Lake Kolelemook (97.3 ac.), Baptist Pond (85.2 ac.), Star Lake (66.7 ac.), Morgan Pond (55.1 ac.), Dutchman Pond (31.7 ac.), Palazzi Pond (16.0 ac.), and Little Lake Sunapee (10.1 ac. Springfield only).

Hydric soil data from the Natural Resource Conservation Service (NRCS) indicated a total of 3501.7 acres of poorly and very poorly drained soils, plus 520.2 acres of water for a total of 4021.9 acres, or 14.1% of the town. The Wildlife Action Plan (WAP) identified 889.4 acres of marsh & shrubland, plus 179.2 acres of peatland, for a total of 1068.6 acres of open wetland, or 3.8 % of the town. The latter figure does not include the forested floodplains and hemlock-hardwood-pine forests that are recognized as containing some wetland forests.

The National Hydrography Dataset (NHD) indicated a total of 92.8 miles of perennial stream in Springfield. The following table summarizes each of the named and unnamed streams:

Stream name	Number of Reach Units	Stream Order[8]	Total Reach Length (mi)	% of Total Stream Resources
Bog Brook	13	3	4.80	5.17
Carter Brook	11	2	2.52	2.72
Colcord Brook	17	2	3.39	3.65
Eastman Brook	2	3	.11	.12
Great Brook	7	2	1.23	1.33
Grove Brook	15	2	3.32	3.58
Hoyt Brook	1	1	.26	.28
Kidder Brook	17	3	3.96	4.27
Kimpton Brook	12	2	2.03	2.19
Sanders Brook	3	2	.79	.85
Unnamed Brooks	16	3	3.71	4.00
Unnamed Brooks	77	2	16.77	18.07
Unnamed Brooks	222	1	49.91	53.78
TOTAL	**413**	**3**	**92.80**	**100.01**

Table 1. Summary of Springfield flowing water resources by name and order

[8] Stream order is given for the highest level achieved in Springfield. In terms of designation, the upper-most perennial stream in a watershed is called a first order stream; if two first order streams join they become a second order stream; if two second order streams come together they become a third, etc.

B. Wetland Mapping

Considering the difference between the NWI wetlands data calculation of 1606.5 acres versus that of hydric soils (3501.7 acres), it was apparent that more work was needed in order to provide a better approximation of wetland location in town. The aerial photo interpretation work was also intended to eliminate an order of magnitude of precision that was lacking in the nation-wide mapping efforts. The 190-hour effort of identifying all wetlands and surface waters in Springfield and its half-mile extended study area yielded the following results:

Water Resource Type	Number of Wetland Units (total)	Total Acres	Springfield Only	% of Town	% of Total Water Resources
Lakes[9]	21	1097.23	495.48	1.74	15.25
Ponds	156	157.20	117.29	.41	3.59
Deep Marshes	48	28.89	26.44	.09	.79
Shallow Marshes	471	458.78	359.84	1.26	11.04
Scrub-Shrub Marsh	763	572.87	497.80	1.75	15.34
Moss-Lichen Bed	5	4.01	4.01	.014	.12
Forest Swamp	2731	1862.51	1518.08	5.33	46.71
Riverine	406	190.93	161.53	.57	5.00
Upland Islands	300	83.81	66.37	.23	2.02
Man-made[10]	469	7.11	5.71	.02	.18
TOTAL	**5371**	**4463.34**	**3252.55**	**11.41**	**100.04**

Table 1. Summary of Springfield water resources by water resource type (based on API)

A total of 4463.34 acres of wetlands and open water bodies were mapped within Springfield and the half-mile extended study area (see Appendix A). Wetlands represented 3207.88 acres among 5193 separate units, exclusive of culverts, ditches, drain tiles, and tunnels, whereas open water was split between lakes (1097.23 acres) and ponds (157.20 acres). Within Springfield, a total of 4517 wetland units were mapped representing 3252.54 acres. Of this, open water totaled 612.77 acres or 2.15 % of town. Wetlands totaled 2639.77 acres, or 9.27 % of town among 4387 separate wetland units.[11]

The remapping of Springfield's wetlands and open water bodies resulted in considerably different sizes and locations for the town's surface water resources. The total wetland acreage was 53% greater than that mapped by NWI, and 19.2% less than what was mapped as hydric soils. Although it may appear that the hydric soils were more accurate, there was actually a higher degree of overlap between the API-mapped wetlands and NWI wetlands versus those indicated by hydric soils. Over 81% of the NWI wetlands were covered by the API wetlands,

[9] Lake units also included shallow water, lakeshore units around a lake or pond (NWI Littoral subsystem).
[10] Man-made wetlands included areas covered by bridges, culverts, ditches, drain tiles, and tunnels.
[11] This total for wetlands does not include the 142-acre open water portion of McDaniel's Marsh.

whereas just 47% of the hydric soil areas were covered by API wetlands. The illustration below depicts this inconsistency well:

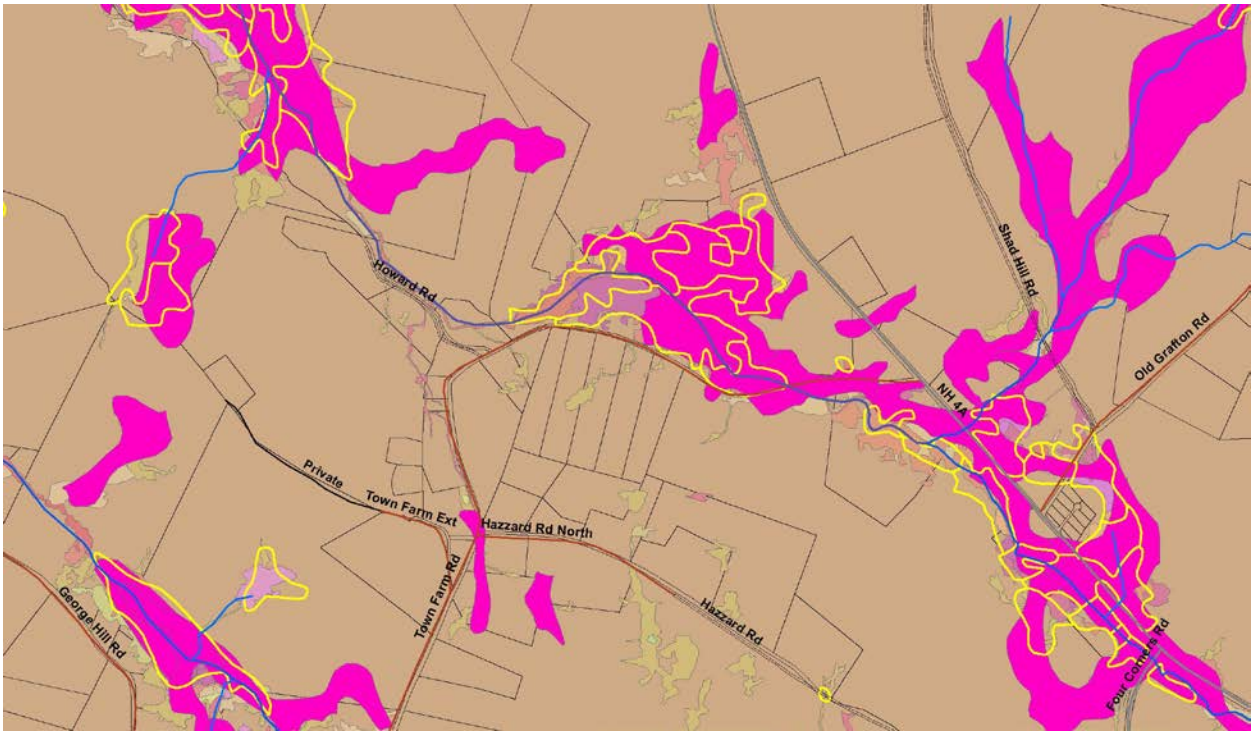


Figure 4. Comparison of NRCS-mapped hydric soils (shown in pink) versus NWI wetlands (yellow outlines) versus API-mapped wetlands (shown in various color shades). It is apparent that NRCS-derived hydric soils exceeded the actual amount of wetlands on the landscape, whereas NWI-based mapping underestimated the actual amount of wetlands. API mapping resulted in 1.53 times the amount of wetlands as mapped by NWI, and about 81% of the amount of wetlands indicated by hydric soils. The overlap between the three sources was far less, however - just 36.7% among all three sources.

In terms of specific data about each wetland unit, a much higher degree of precision also resulted. The NWI map contained 436 individual wetland map units among 59 types, whereas the API wetland map contains 4517 individual units among 616 types. The biggest difference lay in the inclusion of riparian wetland corridors, which were typically not mapped by NWI mapping. Another significant difference was found in the variable use of water regime modifiers that indicated whether or not the wetland was seasonally flooded/saturated (“E”) versus semi-permanently flooded (“F”) versus intermittently exposed (“G”) versus permanently flooded (“H”). As illustrated on the aerial photo base map these codes typically indicated the difference between, for example, a forested wetland (e.g. PFO1E) versus an open water pond (e.g. PUB3/4H). Most of the additional NWI cover class types of the API mapping process involved specific combinations of water regime modifiers and special modifiers.

The same level of precision was afforded the assignment of soil types in the API wetlands map. Each wetland unit was configured with a soil series name, phase (i.e. slope), and drainage code

(i.e. "A" for very poorly drained, "B" for poorly drained, "N" for upland inclusion soils, and "WATER" for permanently inundated sites). The soil series name conformed to standard hydric soil types that were common in Springfield, such as the Pillsbury fine sandy loam or the Ossipee mucky peat.[12] The assignment of soil type was principally determined by the vegetation cover as observed in the aerial photographs, or in the field. In general, wetlands with scrub-shrub and emergent herbaceous vegetation were assumed to be very poorly drained, and those with a forest cover were assumed to be poorly drained. A large number of exceptions were found, however, especially along major waterways where floodplain soils were often composed of non-organic sands covered by wetland vegetation (e.g. Bog Brook). Other exceptions were commonly found in small, isolated basins covered by spruce and fir, where stony, pit-and-mound topography has allowed trees to grow on top of deep organic soils (e.g. Ossipee mucky peat). In each case, changes between poorly and very poorly drained soils was deemed to be less critical than changes between upland and wetland soils.[13]

Figure 5. Left: a poorly drained, loamy sand hydric soil from a mixed forested swamp behind KRHS. Note the organic-rich surface horizon (left) and the grayish colors of the saturated mineral soil (right). The gray colors arise from the reduction of iron ions from prolonged anaerobia in the spring. Because of the hardpan layer beneath this 9-inch deep auger, the soil series was a Pillsbury fine loamy sand.

A total of 25 soils series were identified among the wetland units in Springfield. Eight of these were poorly drained and 11 were very poorly drained types. An additional six types were upland soils found within the 300 upland islands. Within Springfield, a total of 323 disturbed soil units (59.4 acres) were identified that contained hydric characteristics as indicated by a prevalence of

[12] Pillsbury fine sandy loam (647) is a poorly drained soil that is common in "perched" (i.e. hardpan) soils along drainageways and along the base of hills. Unless artificially altered (e.g. through timber harvesting), Pillsbury soils are commonly forested. Ossipee mucky peat (495) is a deep organic soil with ≥ 16 inches of well decomposed organic material at the surface underlain by very fine sandy to fine sandy loam. These soils form in very poorly drained basins and can be covered by trees, or in the case of large wetland depressions, covered by shrubs and herbs. Sphagnum moss is also very common in these soils.

[13] As noted in the Methods section above, there were several instances where a clear delineation between wetland upland was not possible. Areas with a dense canopy cover of coniferous trees, such as a hemlock terrace or balsam fir basin along a major stream, required estimations relative to the outer limit of wet soils. As with all of the wetlands mapped solely through API, these units will need to be checked further in the field by a Certified Wetland Scientist in order to determine where the exact wetland edge lies.

hydrophytic vegetation. This did not include the 258 culverts, drain tiles, or bridges (.76 acres) that were identified as "WATER." In all, the town of Springfield was found to have 1051.55 acres of poorly drained soils, 1428.97 acres of very poorly drained soils, and 705.66 acres of surface water (i.e. lakes, ponds, culverts, bridges, and certain deepwater portions of marshes). The following table summarizes the findings relative to hydric soils.

Soil Type	Number of Wetland Units (total)	Total Acres	Springfield Only	% of Town	% of Total Water Resources
WATER	570	1383.48	705.66	2.45	21.47
Very Poorly Drained	2112	1746.23	1428.97	5.02	44.00
Poorly Drained	2255	1249.21	1051.55	3.69	32.34
Upland Islands	300	83.81	66.37	.23	2.02
Man-made[14]	469	7.11	5.71	.02	.18
TOTAL	**5371**	**4463.34**	**3252.55**	**11.41**	**100.04**

Table 3. List of soil types assigned to wetlands (and upland inclusions) in study area

C. Wetland Value Confirmation

Between May 30 and December 7, 2013, a total of eight roadside surveys were completed along 81.4 miles of the roughly 84.6 miles of roads in Springfield.[15] A total of 630 GPS points were taken, mostly at culverts and the 'edge-of-wet' along the road. A total of 386 digital images were taken of wetlands and waterways, and notes were kept on the hydrologic connectivity between wetland units on either side of road crossings. Failed or partly failed culverts were recorded at roughly 8% of the 256 road crossings. Such observations were critical in the determination of the beginning and ending points of a wetland evaluation unit.

As noted above, the purpose of the roadside work was to confirm wetland cover class types and soil types in order to inform the API mapping process, and to determine where wetland complexes could logically be separated into individual evaluation units. The identification of wetland evaluation units was critical to the process of prescribing value to selected wetland complexes. In general, any road crossing that involved a failed or partly failing culvert represented a break point between two wetland complexes. This was the case regardless of the size of the road. For two-lane paved roads, a similar break was determined if the culvert was deemed to be undersized. For a four-lane road (i.e. Interstate 89), all wetlands on either side of

[14] Man-made wetlands included areas covered by bridges, culverts, ditches, drain tiles, and tunnels. Bridges, culverts, and the one tunnel was indicated as "WATER," whereas ditches and drain tiles were assigned a drainage class and soil series appropriate for one or more standard disturbed soil map units. The number of man-made soils therefore overlaps those that are poorly or very poorly drained.

[15] Road miles were derived from the 2010 NHDOT road data, which includes publicly accessible, privately maintained roads such as those in Eastman but does not include some of the access roads in Gile State Forest, such as Perley Road and Morgan Pond Road.

the highway was considered a separate evaluation unit. The only exception to this was Bog Pond Median, which lay between the north and southbound lanes of the highway.

Other conditions that forced a break between otherwise connected wetlands included a significant change in wetland type – e.g. Fisher Corner Road North and the Lumber Yard Complex, and certain dam structures, such as at Mill Pond and McDaniel's Marsh. Wetland evaluation units were also separated where basin wetlands narrowed into a long stretch of perennial stream, such as at Colcord Brook Headwaters and Nichols Hill Road West. Occasionally, linear wetlands that lay alongside a stream were kept as one evaluation unit, such as the Jones Road Crossing. And in two instances, wetland units that were adjacent but isolated were considered a single evaluation unit. This occurred at the Kimpton Brook Headwater Pools and at the Star Lake Fields Complex. At Kimpton Brook the basin pools were in close proximity to one another and likely served as a vernal pool "complex;"[16] at the Star Lake Fields the generally open landscape with a dense mosaic of very shallowly saturated wet meadows seemed logical to treat as one evaluation unit.

Results of the Wetland Designation Process

In sum, a total of 160 wetland evaluation units or complexes were identified. They contained between one and 249 cover class/soil polygons, and ranged between 1.15 acres and 452.7 acres in size, with the largest and most diverse wetland complex being McDaniel's Marsh. In total, the wetland evaluation areas comprised 2453 acres, or about 88% of the total wetland acreage mapped for Springfield. Each wetland evaluation unit was given an arbitrary name to aid in locating them geographically. A complete list of these units and the attributes they contain can be found in the attached large format map of proposed Designated Wetlands and in Appendix B below.

All 160 wetland evaluation units were given points for each of the seven attributes described above on page 6. These were summed as shown in Appendix B. A total of 87 wetland evaluation units achieved three points or more, which has been proposed as the minimum number of points for designation. These 87 wetlands represent 2105.01 acres, or 76% of the wetland acreage in Springfield. The average size of these proposed designated wetlands is 24.2 acres. The following table summarizes the results for this designation process.

SPRINGFIELD DESIGNATION WETLANDS - SUMMARY TABLE

Id	NAME	> 2 acres in Size	Adj. to Stream or Pond/Lake	WAP Priority	NWI Class Interspersion	Rare or End. Exemplary	Critical Habitat	McDaniel's or Bog Bk?	Point Sum	ACRES
1	Collins Memorial	1	1	0	1	0	0	0	3	4.73
3	Town Farm Rd East	1	1	0	1	0	0	0	3	25.90
4	Upper Grove Brook	1	1	1	1	0	0	0	4	13.67

[16] For conservation of vernal pool complexes, see Colburn (2004).

SPRINGFIELD DESIGNATION WETLANDS - SUMMARY TABLE

Id	NAME	> 2 acres in Size	Adj. to Stream or Pond/Lake	WAP Priority	NWI Class Interspersion	Rare or End. Exemplary	Critical Habitat	McDaniel's or Bog Bk?	Point Sum	ACRES
5	Grove Brook Headwaters	1	1	1	1	0	1	0	5	26.34
13	Kolelemook Lake South	1	1	0	1	0	0	0	3	15.94
14	Jones Road North	1	1	0	1	0	1	0	4	36.47
18	Colcord Brook Headwaters	1	1	1	1	0	1	0	5	26.19
20	Central Colcord Brook	1	1	1	0	0	1	0	4	9.64
21	Sanborn Hill Rd East	1	1	0	1	0	1	1	5	50.05
22	Sanborn Hill Rd NW	1	1	1	1	0	0	0	4	25.46
23	Colcord Ford	1	1	1	1	0	0	1	5	23.17
24	Bog Brook - Springfield	1	1	1	1	1	1	1	7	339.97
31	Philbrick Hill Rd Junction North	1	1	0	1	0	1	0	4	29.04
33	Grove Brook Central	1	1	0	1	0	1	0	4	63.58
37	Mill Pond Complex	1	1	0	1	0	0	0	3	42.08
38	Upper Mill Pond Complex	1	1	0	1	0	0	0	3	29.90
39	Old Grafton Rd Southeast	1	1	0	1	0	0	0	3	11.45
42	McDaniel's Marsh	1	1	1	1	1	1	1	7	452.73
44	Eastman Access Gravel Pits	1	0	1	1	0	0	0	3	14.86
46	George Hill East	1	1	0	1	0	0	0	3	14.69
48	Carter Brook Lower	1	1	1	1	0	0	0	4	25.61
50	Smith Brook Headwaters	1	1	1	0	0	1	0	4	16.55
51	Pillsbury Ridge NW	1	0	1	0	0	1	0	3	3.70
52	Pillsbury Ridge West	1	1	1	0	0	1	0	4	2.41
53	Smith Brook Upper	1	1	1	0	0	1	0	4	5.88
54	Sugar House Rd Headwaters	1	1	1	0	0	1	0	4	10.84
55	Sugar House Marsh	1	1	1	1	0	1	0	5	42.92
56	Sugar House Headwaters East	1	1	1	0	0	0	0	3	2.99
57	Upper Kimpton Brook Fen	1	1	1	0	0	1	0	4	4.19
58	Kimpton Brook Headwaters West	1	1	1	1	0	1	0	5	8.01
59	Upper Kimpton Brook Marsh	1	1	1	1	0	1	0	5	14.68
60	Kimpton Brook Headwater Pools	1	1	1	0	0	1	0	4	14.06
61	Lower Kimpton Brook	1	1	1	1	0	1	0	5	14.66
62	Piper Pond Rd North	1	1	1	1	0	1	0	5	15.43
63	Piper Pond Inflow Swamp	1	1	0	1	0	0	0	3	14.76
64	Walker Brook Junction	1	1	1	1	0	1	0	5	30.08
65	Upper Walker Brook Fen	1	1	1	0	0	1	0	4	3.64
67	Upper Walker Brook Beaver Ponds	1	1	1	1	0	1	0	5	45.67

SPRINGFIELD DESIGNATION WETLANDS - SUMMARY TABLE

Id	NAME	> 2 acres in Size	Adj. to Stream or Pond/Lake	WAP Priority	NWI Class Interspersion	Rare or End. Exemplary	Critical Habitat	McDaniel's or Bog Bk?	Point Sum	ACRES
68	Fowler Town Rd South	1	1	1	1	0	1	0	5	17.62
69	Fowler Town Rd End	1	1	1	1	0	1	0	5	10.29
71	Upper Walker Brook Ravine	1	1	1	0	0	0	0	3	3.76
72	Upper Walker Brook Bench Swamps	1	1	1	0	0	0	0	3	4.43
73	Three Meadow Swamp	1	1	1	1	0	1	0	5	23.28
74	Morrill Rd Swamp	1	1	0	1	0	0	0	3	15.76
76	Robinson Corner Beaver Swamp	1	1	1	0	0	0	0	3	2.11
77	Noyes Rd Junction	1	1	1	0	0	0	0	3	3.41
78	Kings HIghway South	1	1	1	1	0	0	0	4	10.49
82	Gile Forest Headwaters SE	1	1	1	1	0	0	0	4	9.63
83	Morgan Pond Headwaters	1	1	1	0	0	1	0	4	11.07
84	Morgan Pond NE	1	1	1	0	0	1	0	4	3.43
86	Morgan Pond Outflow Marsh	1	1	1	1	0	1	0	5	3.31
87	Kidder Brook Bench Swamp NW	1	0	1	0	0	1	0	3	5.76
88	Kidder Brook Beaver Complex	1	1	1	1	0	1	0	5	32.87
89	Upper Perley Rd Fen	1	1	1	1	0	1	0	5	9.21
90	Lower Perley Road Fen	1	1	0	1	0	0	0	3	8.70
91	Perley Rd Fen East	1	1	1	1	0	1	0	5	17.33
92	Reservoir Complex	1	1	1	0	0	0	0	3	6.39
93	Kidder Brook Complex West	1	1	1	0	0	0	0	3	8.51
94	Royal Arch Hill NE	1	1	1	0	0	1	0	4	9.27
95	Royal Arch Hill SE	1	1	1	0	0	1	0	4	2.59
96	Dutchman Pond NE	1	1	1	0	0	0	0	3	2.06
97	Lower Kidder Brook	1	1	1	1	0	1	0	5	8.40
98	Upper Twin Lakes	1	1	0	0	0	1	0	3	4.42
109	Georges Mills Rd Complex	1	1	0	1	0	1	0	4	36.75
110	McAlvin Pond	1	1	1	1	0	1	0	5	19.65
111	Bog Pond East	1	1	0	1	0	1	0	4	37.08
112	Baptist Pond Northeast	1	1	0	1	0	1	0	4	20.17
115	Bog Pond West	1	1	0	1	0	1	0	4	42.21
119	Star Lake Fields Complex	1	1	1	0	0	0	0	3	16.64
120	Star Lake Fields West	1	1	1	0	0	1	0	4	6.02
123	Little Stocker Pond Headwaters	1	1	1	1	0	1	0	5	33.80
124	Little Stocker Pond	1	1	1	0	0	1	0	4	19.36
125	Sanborn Hill Rd West	1	1	1	1	0	0	0	4	14.68
126	Sanborn Hill Tributary	1	1	1	0	0	0	0	3	2.77

SPRINGFIELD DESIGNATION WETLANDS - SUMMARY TABLE

Id	NAME	> 2 acres in Size	Adj. to Stream or Pond/Lake	WAP Priority	NWI Class Interspersion	Rare or End. Exemplary	Critical Habitat	McDaniel's or Bog Bk?	Point Sum	ACRES
131	Coniston Lake Headwaters East	1	1	1	0	0	0	0	3	2.14
134	Grantham Corner Fen	1	0	0	1	1	1	0	4	17.64
135	Stocker Pond Marsh Southeast	1	1	0	1	0	1	0	4	21.27
138	Eastman Pond Outflow Swamp	1	1	1	1	0	0	0	4	3.56
141	Four Corners Junction NE	1	1	0	0	0	1	0	3	8.43
142	Hole Pond Inflow Swamp	1	1	1	1	0	0	0	4	5.09
143	Old Grafton Rd West	1	1	1	0	0	0	0	3	3.05
154	Sugar House Marsh NW	1	1	1	0	0	0	0	3	2.89
156	Old Poor Rd Fen	0	1	1	1	0	0	0	3	1.71
157	Royal Arch Hill North	1	1	1	0	0	0	0	3	3.33
158	Morgan Pond NW	1	1	1	0	0	0	0	3	10.94
159	Howard Roadside Swamp	1	1	1	0	0	0	1	4	3.66
160	Howard Rd SW	1	1	0	0	0	0	1	3	6.11
									SUM	**2105.01**

Table 4. List of proposed Designated Wetlands

A total of 1800.69 acres equaled or exceeded 4 points (N = 55), 1265.64 acres (N = 23) equaled or exceeded 5 points, and 792.7 acres (N = 2) equaled or exceeded 6 points. The latter two wetlands were the largest complexes in town, McDaniel's Marsh and Bog Brook (Springfield).

One outcome of the wetland evaluation process was the recognition that not all Springfield wetlands were "created equal." Larger wetlands tended to contain more cover class types, deep water or marsh areas, and smaller wetlands tended to have uniform soil types and habitats. Wetlands away from roads and development tended to have more wildlife sign. Those adjacent to streams and ponds typically showed evidence of more complex habitat structure both in terms of vegetation and soils. Each of these variables factored into the Wildlife Action Plan's designation of highest ranked habitats in the state or biological region, and therefore most of the wetlands that met three or more of the designated wetland criteria showed up as being within a highest ranked habitat.[17]

[17] Smaller wetlands did include most of the 205 vernal pools identified in Springfield, 172 of which were located by the API mapping process and/or roadside surveys. As noted under Methods, vernal pools were considered "critical habitat" in the wetland designation process and therefore any wetlands that contained one or more vernal pools received a point for this attribute. In many cases this was enough to equal the three point minimum for designation. In one instance at Kimpton Headwater Pools, the entire wetland complex was identified on the basis of it containing a complex of vernal pools. Although just five are noted on the API wetlands map, it is likely that several others exist in this diverse ridgetop area.

Figure 6. One of the highest ranking wetlands can be easily seen along Route 4A. Labeled as Upper Kimpton Brook Marsh, this wetland complex of 14.67 acres received a point value of five points.

D. Ordinance Review & Revision

One purpose of the wetland designation process was to address the concern by many Springfield citizens that a one-size-fits-all threshold for wetlands and their setbacks does not work. Designating higher value wetlands was also intended to provide a justification for variable setbacks from wetlands in general, wherein higher value wetlands would receive the largest setback of 100 feet (as proposed by the Wetlands Subcommittee) and lower value wetlands would receive a smaller setback of 50 feet (also suggested by the Wetlands Subcommittee for forested wetlands and vernal pools). By identifying higher value wetlands in the wetland base map, the Planning Board and Selectmen would have an easier time offering a 'first cut' estimate of whether or not a certain wetland setback would need to be applied.

As noted in the Methods section above, the review and revision of the existing wetland ordinance was based on three principal objectives:

1) Language clarity
2) Adherence to state and federal laws, rules, and definitions[18]
3) Wetland functional value as the basis for wetland protection

[18] Some deviation from state definitions were proposed for terms that are incorrectly defined, or whose definitions are in the process of being updated by the NHDES Wetlands Bureau.

Of particular importance was the clarification of the purposes and intents section, since by law these need to a) parallel the town's master plan, b) clearly state why the ordinance is needed, and c) prescribe the parameters for protection contained within the Permitted Uses versus Prohibited Uses section. For this reason, an emphasis was placed on the value of wetlands in minimizing damage from stormwater and flooding, maintaining ecological integrity, ensuring water *quantity* as well as quality, and providing recreational use and scenic enjoyment. The latter two aspects were found to be valued in the master plan but were absent from the wetlands ordinance.

A second issue of language clarity arose with the consideration of which wetlands required protection. Since some wetlands in Springfield were created or have been highly modified from their original configuration, the use of the term "naturally occurring" was suggested as a way of eliminating ditches, drainage swales, and recently dug ponds from mandatory setbacks and protection. It was suggested that this be applied to "*pseudo*" vernal pools as well, since many isolated depressions that have been created by skidder ruts, graders, or other heavy equipment may spawn vernal pool-obligate species but otherwise lack the true character of these ephemeral water bodies.

Relative to Wetlands Buffers (Section 4.12), it was suggested that the same emphasis on wetland functions be included in the rationale statement for that section. Recommended revisions underscored the value of wetlands in trapping sediments, minimizing nutrient flows, and dissipating stormwater, especially since so much of this activity takes place immediately adjacent to the wetland boundary. It was also suggested that water quantity and groundwater recharge be included in the rationale, especially since there are so few sand and gravel aquifers in Springfield.

Perhaps the most significant (and potentially controversial) change to the Wetlands Ordinance that was suggested was to vary the setback distances from wetlands based on functional value. Functional value has been the premise for the designation of state-approved *prime wetlands* according to RSA 482-A:15. Functional value also forms the basis for mitigation and restoration according to Chapter 800 of the NHDES Wetlands rules. Although assessing functional value using a state-sanctioned methodology such as the 'NH Method' is time-consuming, costly, and not a part of this study, it is clear from the feedback provided by several town citizens and municipal officials, it is well-understood. For many years town residents have recognized the functional value of McDaniel's Marsh, and as a result, they have assigned a 660-foot setback from this very high value wetland.

The first suggested change relative to establishing setbacks was to eliminate the minimum size concept for local wetland regulation. The current NWI map only contains seven isolated wetland units less than 10,000 square feet that altogether total just over three acres; all the rest are attached to larger wetland complexes. The recently completed API wetlands map shows just 51 isolated wetland units less than 10,000 s.f. totaling just over 4.7 acres, with the remainder a part of larger wetlands. Thirty-three of these small wetlands are probable vernal pools that would be

subject to more stringent setbacks. When size is reduced to 7,000 s.f., the API wetlands map returns 36 units that totals just over 2.4 acres, 17 of which are probable vernal pools. In short, wetlands *not* covered by the either size threshold exceeds 99% when using the NWI map or the API map. And, as was clearly stated by members of the Wetlands Subcommittee, size does not necessarily indicate *value* especially when assessing wetland function.

As noted above, the rapid assessment of potential *designated wetlands* was intended to base wetland setbacks on functional value. This process has provided the town with an opportunity to protect higher value wetlands by establishing a setback distance that is commensurate with the services these wetlands provide. The previously recommended setback of 100 feet is upheld for these higher value wetlands, and a considerably small setback of 50 feet is suggested for all other wetlands that are naturally occurring.[19] Since vernal pools have been recognized as essential wildlife habitat, a concomitant setback of 100 feet is also suggested for these special wetland types. This is in keeping with the current state and federal setback standards as published in the "Secondary Checklist" of criteria that forms a part of the mandatory wetland permit application process (see http://des.nh.gov/organization/divisions/water/wetlands/documents/pgp-appendix-b.pdf).

In sum, the following setbacks from wetlands are suggested:

Wetland Type	Acreage of Wetlands Springfield Only	Setback from Wetland edge (suggested)	Acreage of Setback - Springfield Only	% of Town
McDaniel's Marsh	452.74	660 ft.	656.22	2.30
Great Ponds (> 10 ac.)	351.75	100 ft.	116.39[20]	.41
Designated Wetland	2105.10	100 ft.	1678.00[21]	5.89
Vernal Pools	N/A	100 ft.	145.68[22]	.51
All Other Wetlands	342.95	50 ft.	1622.15	5.70
TOTAL	**3252.54**		**4218.44**	**12.95**

Table 5. List of recommended buffers and their setback acreage.
Note: The total wetland buffer acreage calculated under the current ordinance is 5394.36 acres.

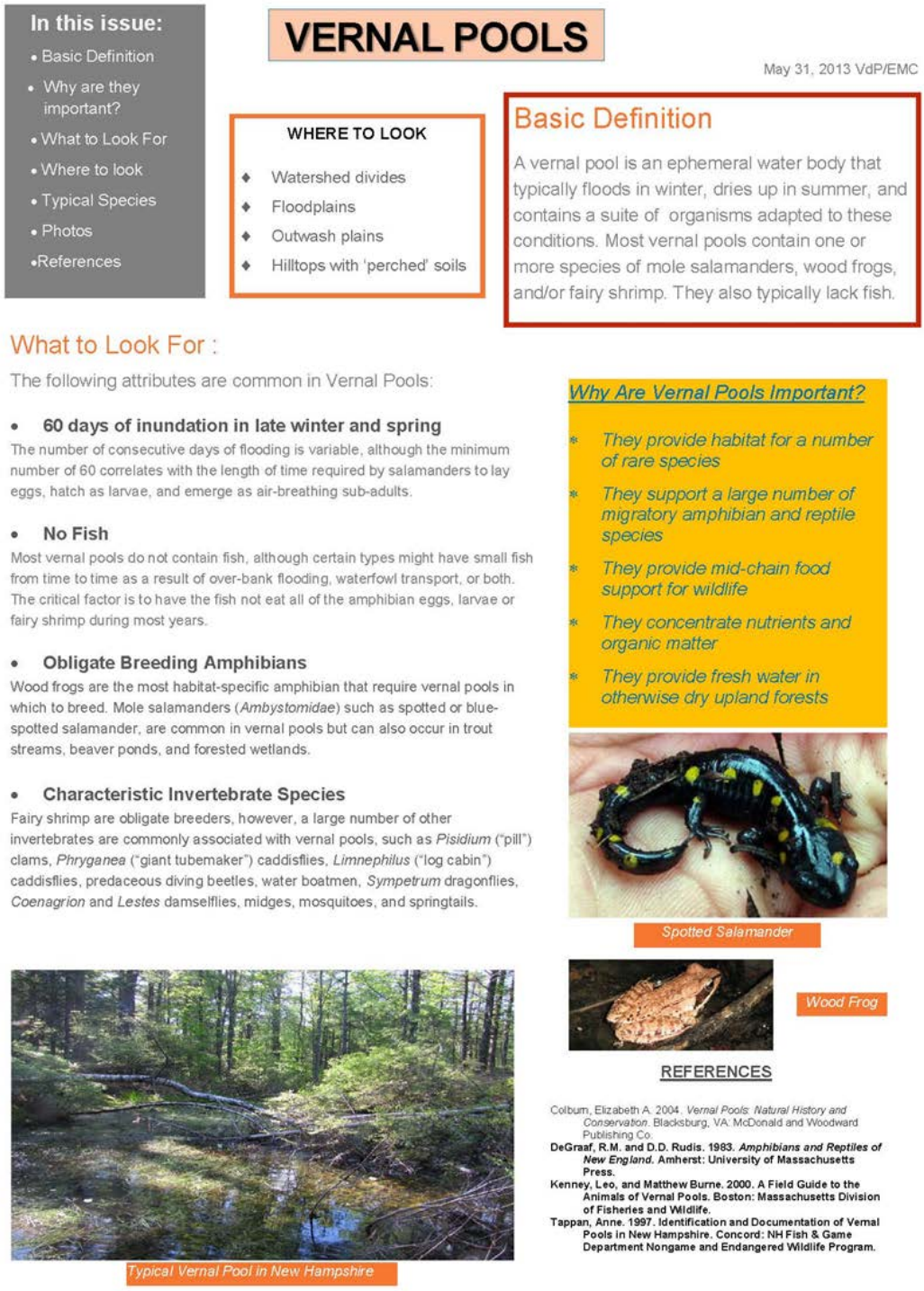
[19] Note that it has also been suggested that the town maintain a setback of 100 from **all** surface waters, and that this distance should supersede the wetland setback in all cases.
[20] This acreage does not include McDaniel's Marsh, nor does it include the setbacks to proposed designated wetlands adjacent to great ponds (e.g. Baptist Pond NE).
[21] This figure does not include McDaniel's Marsh.
[22] Vernal Pool buffers assume a 100-foot radius around single point at this time since they have not yet been mapped. They also overlap slightly with certain designated wetland buffers.

There were several other minor suggestions relative to revising the Wetlands Ordinance. Upon the suggestion by UVLSRPC, the inclusion of an allowable non-residential structure was included under the Permitted Uses section. More than one structure was also suggested as allowable but only by Special Exception. State-sanctioned best management practices (BMP's) for agriculture, silviculture, and stormwater management were also recommended as guidelines for other permitted uses. In terms of Prohibited Uses, an emphasis on the maintenance of water quality both of surface waters and groundwater was recommended. Finally, a number of revisions and additions were made to the Definitions section, most of which reflected state, federal, or scientific standards. As noted above, some of these are derived strictly from the scientific literature where state definitions were either inadequate or in the process of revision under the new Wetland Rules that are to be published in 2015. The full text of the suggested ordinance revisions can be found in Appendix F.

Figure 7. Erik Anderson's Zoology class listen to an explanation of wetland function for wildlife

E. School Programs

A final component of the Springfield Wetlands project focused on outreach and education. The first task associated with this effort was the drafting and distribution of a vernal pool guidance document for town officials and concerned citizens. This was crafted with the intent of having greater input about the location and recognition of these sensitive wetland types. A copy of this sheet is reproduced below.



In this issue:

- Basic Definition
- Why are they important?
- What to Look For
- Where to look
- Typical Species
- Photos
- References

VERNAL POOLS

May 31, 2013 VdP/EMC

WHERE TO LOOK

- Watershed divides
- Floodplains
- Outwash plains
- Hilltops with 'perched' soils

Basic Definition

A vernal pool is an ephemeral water body that typically floods in winter, dries up in summer, and contains a suite of organisms adapted to these conditions. Most vernal pools contain one or more species of mole salamanders, wood frogs, and/or fairy shrimp. They also typically lack fish.

What to Look For :

The following attributes are common in Vernal Pools:

- **60 days of inundation in late winter and spring**

The number of consecutive days of flooding is variable, although the minimum number of 60 correlates with the length of time required by salamanders to lay eggs, hatch as larvae, and emerge as air-breathing sub-adults.

- **No Fish**

Most vernal pools do not contain fish, although certain types might have small fish from time to time as a result of over-bank flooding, waterfowl transport, or both. The critical factor is to have the fish not eat all of the amphibian eggs, larvae or fairy shrimp during most years.

- **Obligate Breeding Amphibians**

Wood frogs are the most habitat-specific amphibian that require vernal pools in which to breed. Mole salamanders (*Ambystomidae*) such as spotted or blue-spotted salamander, are common in vernal pools but can also occur in trout streams, beaver ponds, and forested wetlands.

- **Characteristic Invertebrate Species**

Fairy shrimp are obligate breeders, however, a large number of other invertebrates are commonly associated with vernal pools, such as *Pisidium* ("pill") clams, *Phryganea* ("giant tubemaker") caddisflies, *Limnephilus* ("log cabin") caddisflies, predaceous diving beetles, water boatmen, *Sympetrum* dragonflies, *Coenagrion* and *Lestes* damselflies, midges, mosquitoes, and springtails.

Why Are Vernal Pools Important?

- *They provide habitat for a number of rare species*
- *They support a large number of migratory amphibian and reptile species*
- *They provide mid-chain food support for wildlife*
- *They concentrate nutrients and organic matter*
- *They provide fresh water in otherwise dry upland forests*

Spotted Salamander

Wood Frog

Typical Vernal Pool in New Hampshire

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Figure 8. Vernal Pool Guidance sheet prepared for town citizens in May 2013

A follow-up task was an attempt to provide a "Wetland Explore Day" for students and interested parents from the Kearsarge Regional School District. Since the end of the school year was imminent, it was not possible to schedule anything prior to the fall. After contacting several

teachers at KRMS and KRHS, a slightly different program was finally set up with Mr. Anderson's Zoology class at KRHS. One preparatory site visit and meeting was made to KRHS and three classes were held from October to November. Prior to each class a course outline along with course materials were prepared for the teacher. These were used in the field as well, since the emphasis was on having the students directly experience the wetlands surrounding the high school. The first class was an introductory one that focused of what wetlands were, and what the technical criteria for wetlands looked like. Plants were studied and soil cores were examined. The second class focused on wetlands as wildlife habitat, wherein the relatively pristine forested swamp and associated pools behind the school were visited (see above). This area had very evident sign of several common mammal species, including deer, coyote, fox, bear, fisher, and squirrel. The final class wrapped up talking about the wildlife habitat function by looking at beaver. The resident lodge and dam was inspected and several inquiries suggested for further research. Overall it appeared that while the students enjoyed getting outside and found a lot of its interesting, a more concerted effort over the course of the year would be required in order to provide substantive information about wetlands.

Figure 9. Vernal pool along Nichols Hill Road

IV. CONCLUSIONS & RECOMMENDATIONS

The Springfield Wetlands Project was designed to improve existing knowledge about wetlands and their importance in the town. Through careful mapping and analysis, the project produced a significantly enhanced wetlands map by which municipal officials and citizens alike can get a better sense of where the town's wetlands are located and whether or not they have high value. A rapid wetland evaluation system was put into place that allows town officials to determine which wetland attributes are the most important to protect. This report proposes the establishment of a *designated wetlands* category that identifies high value wetlands on the basis of meeting three of seven possible criteria. Both the minimum point value and types of criteria that the town deems important can be altered or adjusted to suit the town's needs in the future.

The current proposal recognizes that wildlife habitat, water quality, and proximity to McDaniel's Marsh are the three most important wetland values to the residents of Springfield. The seven criteria used for designating wetlands were derived directly from these values. Eighty-seven wetlands met three or more of these criteria, and are proposed as designated wetlands that deserve 100-foot setbacks. Both the wetlands and setbacks have been geographically located through a method that improves the current level of map precision by one order of magnitude.

The wetlands in Springfield are fairly pristine. As an upper watershed town, the amount of past dredging and filling of wetlands has amounted to less than roughly four percent of the wetland resource, and the number of high value wetlands represents almost 90% of the total wetland acreage. The fact that four major (HUC 10) watersheds are found in Springfield speaks to its importance in protecting downstream water quality. The town has already recognized this, as evidenced by language in the master plan, the zoning ordinance, and the current protection of its largest wetland, McDaniel's Marsh, by a 660-foot setback.[23] In spite of this, more can be done. The following offers some suggestions for further work:

1) Formally adopt the "Springfield Wetlands Map"

The first step towards integrating the new wetlands map into the existing wetlands ordinance is to have the Springfield Planning Board officially adopt the map as the basis for the ordinance. Existing language that cites the 2005, NWI-based wetlands map could be changed as follows:

"The boundary of a wetland on a specific site must be delineated by a Certified Wetland Scientist. Wetlands to be protected by this Ordinance are generally shown on the Springfield Wetlands Map dated March 2014. This map is available for viewing in the Office of the Board of Selectmen and the Town of Springfield web site (http://www.springfieldnh.net/ordinances.htm). The wetlands delineated on the Springfield Wetlands Map are based on roadside surveys and an aerial photo interpretation of

[23] McDaniel's Marsh overlies the largest groundwater supply aquifer in Springfield (Watershed to Wildlife 2008).

the 2010, 1-foot pixel, color infrared orthophotographs of the region (NHDOT 2011). This map shows the general location of wetlands as defined by this Ordinance."

At present the location of this paragraph follows the list of areas included in the wetland conservation district in 4.11. Its placement in this section is recommended.

2) Identify and Recognize Vernal Pools

The Wetlands Subcommittee has recognized the value of vernal pools on the landscape and have proposed a 50-foot setback from vernal pools. During the wetland mapping and field observation phase a total of 172 probable vernal pools were identified in town,[24] yet few of them have been confirmed as viable breeding habitats for vernal pool organisms. Confirmation of each pool by direct observation and recording of pool attributes will qualify them for being registered with the state. This can be done by municipal officials, students, and other volunteers in order to provide a more precise position for these small, isolated wetlands. Less than 20% of these pools lie within a proposed designated wetland, and many are so small that they fall below the current minimum wetland size of 10,000 square feet. As such they are currently unregulated by the town, even though they require a 100-foot setback for state wetland permitting purposes.

Figure 10. Beaver pond along Protectworth Trail (Jones Road). Aside from the well-established wetland values of wildlife habitat and water quality enhancement, open wetlands such as this beaver pond add scenic value especially when positioned along a public thoroughfare such as the Protectworth Trail above.

[24] This does not include the 26 vernal pools identified by the Springfield Conservation Commission and the seven vernal pools found by Watershed to Wildlife during the NRI work in 2008.

3) Establish specific criteria for "Critical Habitat"

One of the seven attributes used in the rapid assessment method recognizes the importance of "critical habitat." In keeping with the tradition of valuing wildlife habitat such as McDaniel's Marsh, this attribute invites the town to refine what it considers *critical* in terms of habitat elsewhere. The designated wetlands criteria list on Page 7 mentions vernal pools as a type of critical habitat, but there are many others. Waterfowl stop-over points, wildlife corridors, rare species breeding locations, exemplary wetland habitats, and groundwater discharge/recharge sites have also been recognized as important components of habitat. The town should consider refining this attribute and determining which wetlands besides McDaniel's Marsh deserve special protection on account of high quality (critical) habitat.

Figure 11. Like impaired wetlands (left), impaired streams also lack the functionality of pristine water bodies. Both the wetland and stream above lie adjacent to Interstate 89 and have been severely compromised by structural alteration, salt intrusion, and surface water run-off.

4) Consider designating streams as well

At present, all perennial streams fall under the definition of "water body" and therefore lie within the Shoreline Conservation Overlay District. A 100-foot setback is administered for streams as it is for wetlands, but special exceptions are only allowed for water impoundments at present. The Wetlands Subcommittee has proposed several other allowable exceptions such as septic tank replacements and various access ways that may be "essential to the productive use of the land." Not unlike the proposed designated wetlands, perennial streams have variable functionality, some of which depends on current and past land use practices. Designating certain streams as 'high quality' could provide relief from the 100-foot setback for lower quality streams where conflicting land uses are warranted. Additionally, a field-based assessment project could result in the determination of where the perennial stream begins since the NHD is not always

accurate.[25] This determination is critical for establishing whether or not a wetland is adjacent to or part of a "water body."

5) Conduct a comprehensive wetland evaluation of all major wetlands

The wetland evaluation conducted for this project was an outgrowth of the mapping process and was primarily conducted to quickly identify higher quality wetlands deserving of a larger setback. As indicated above, this evaluation was a *rapid* assessment technique, and should not replace a more thorough evaluation in the future. Since most of the "hard work" has been completed – that is, the API mapping of all wetland polygons and segregation of most wetland complexes into wetland evaluation units, the final step in this comprehensive assessment process will not be cost-prohibitive. A standardized wetland evaluation methodology such as the 'NH Method'[26] could be employed either as an additional consulting task or one completed by town volunteers. A volunteer-based assessment is not only cost-effective, it tends to provide greater visibility to the evaluation process, and can result in more widespread support when it comes time to vote on the protection of high value wetlands.

Figure 12. Baptist Pond. Like all six of the 'great ponds' in Springfield, Baptist Pond relies upon wetlands upstream to filter sediments and nutrients that would otherwise impair the quality of its water. Besides drinking water supply, wetlands provide a large number of invaluable benefits to society.

[25] Although most (i.e. > 80%) of the streams mapped by NHD were located within riverine wetlands during the API process, there are many that fall outside of any recognized wetland. Equally as important, wetlands that may be subject to a minimum setback because it is associated with a perennial stream should be field-tested to see if in fact the stream in question is perennial.

[26] *Method for Inventorying and Evaluating Non-tidal Wetlands in New Hampshire* (UNH Cooperative Extension, 2011).

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Appendices

Appendix A – Maps

1) 8.5 x 11" included with report

2) 36 x 48" maps included separately

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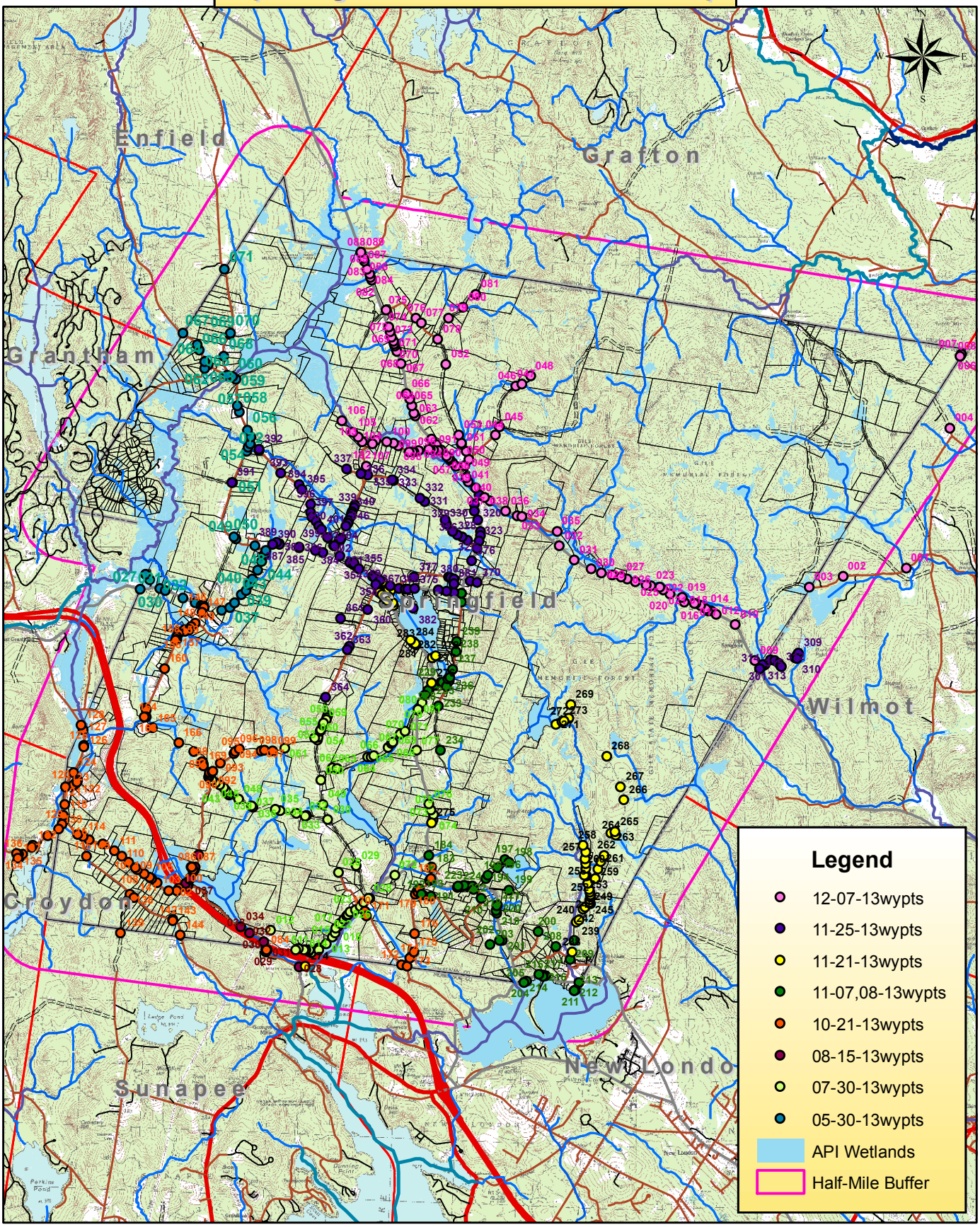
Springfield GPS Base Map



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EMC / VdP Feb 2014

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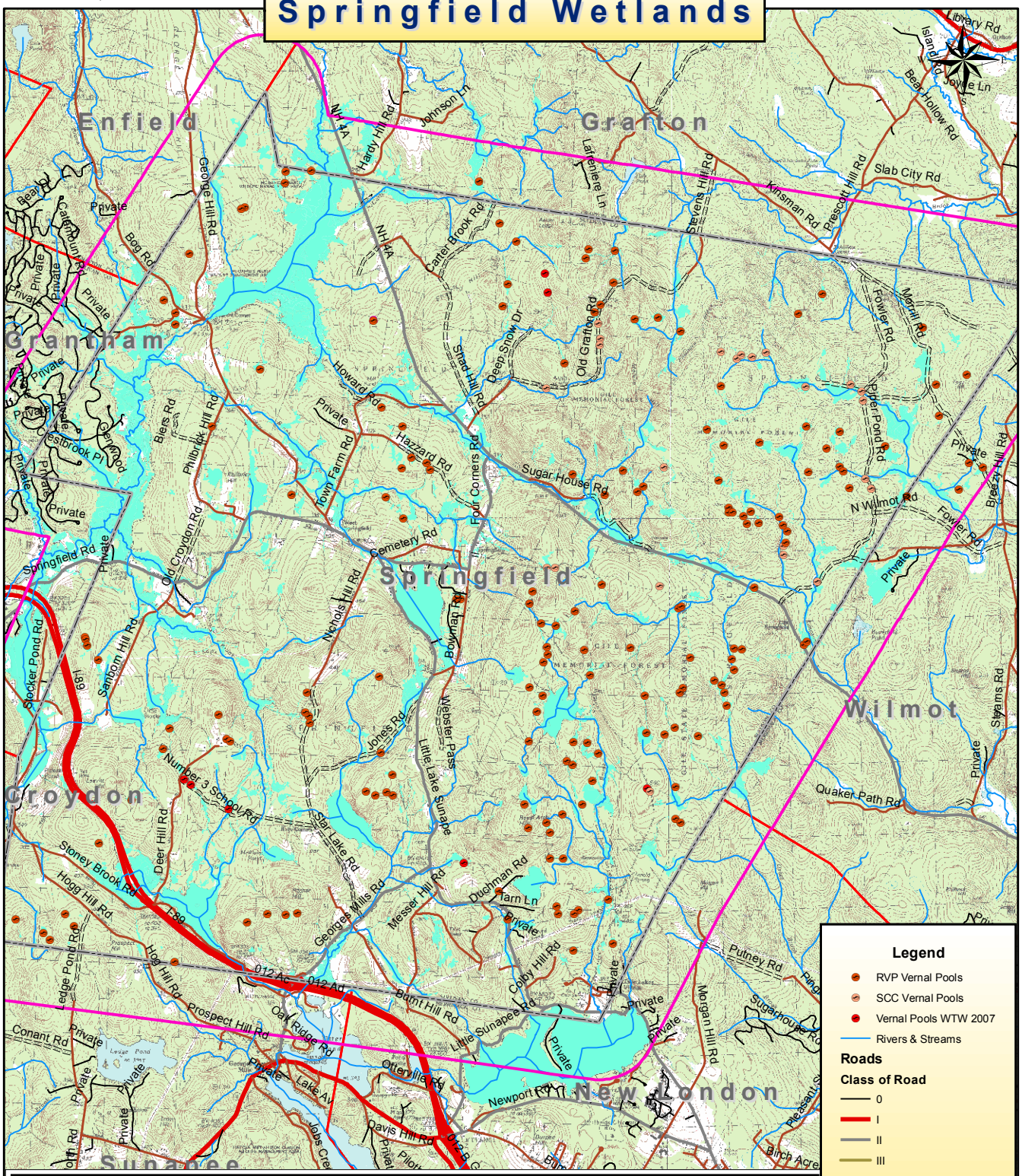
Springfield Wetlands



ABOUT THIS MAP

Wetlands have been identified through a combination of aerial photo interpretation (API) and roadside surveys using a Garmin 12XL GPS unit. The 2010 Color Infrared Orthorphotography flown by NH DOT and released through NH GRANIT was used as the principal data layer for API work. A total of 577 gps points were established along 84.5 miles of public roads in Springfield. The points marked wetland edges, culvert, bridges, and other salient points of interest. All points were checked against the 1-foot pixel aerial photography. Wetlands were mapped using soil, topographic, and aerial photo data as well as pictures taken during the roadside surveys. Each wetland cover type was assigned a unique value based on the Cowardin et al (1979) NWI cover class system. Soil types were also assigned to each unit based on NRCS data and the author's experience with wetland soils in the state of New Hampshire. Precision for most wetland types exceeds hand-held GPS levels of accuracy. Estimations were required for conifer-based wetland systems, especially in large, flat basins with little topography and mature trees. All errors and omissions are the responsibility of Ecosystem Management Consultants. This map provides the best approximation of wetland type and location in Springfield, however, it is not survey accurate and should not be used for any legal purpose regarding wetland delineations, that is, fieldwork will still be required. March 2014.

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Ecosystem Management Consultants

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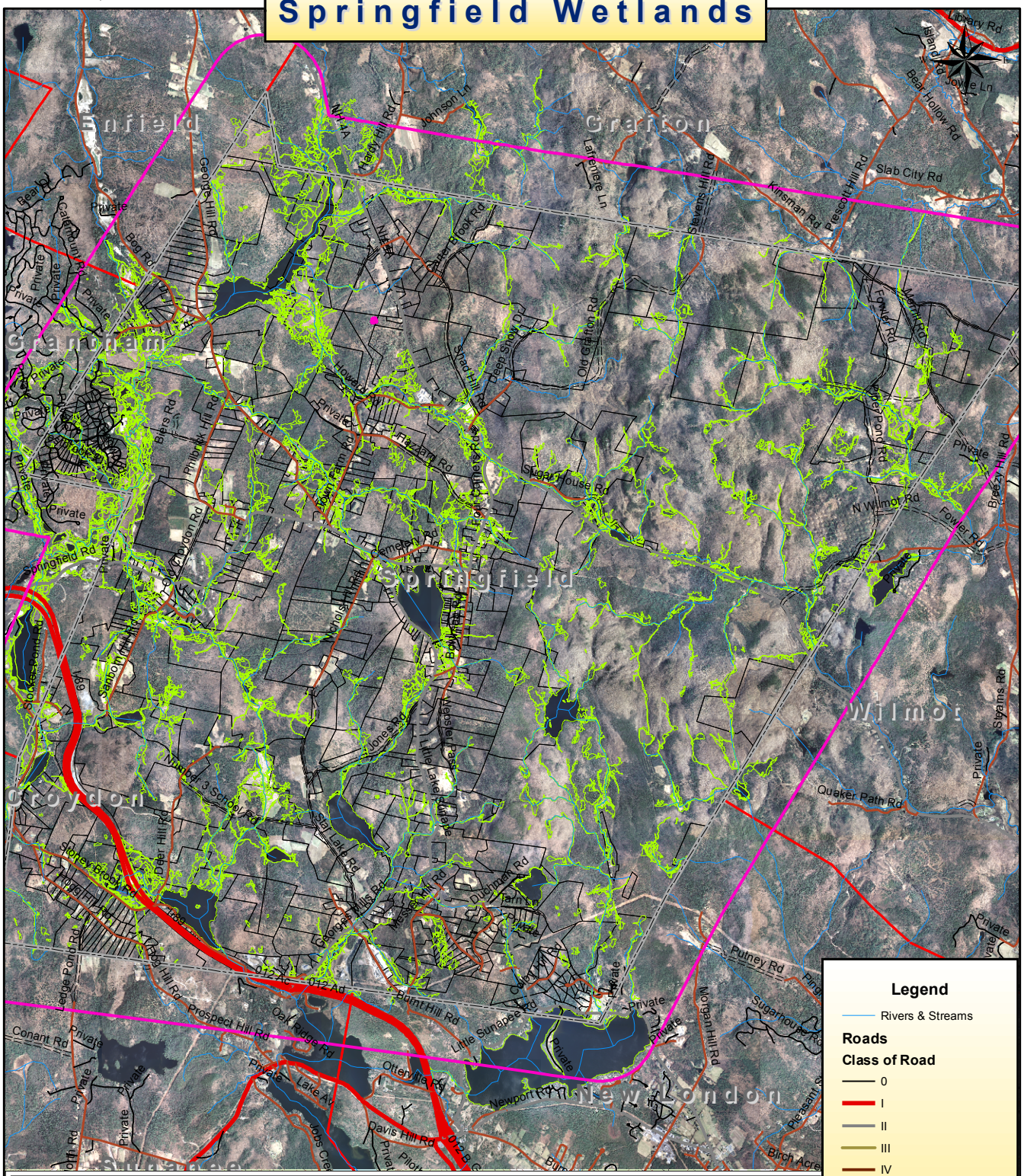
Springfield Wetlands



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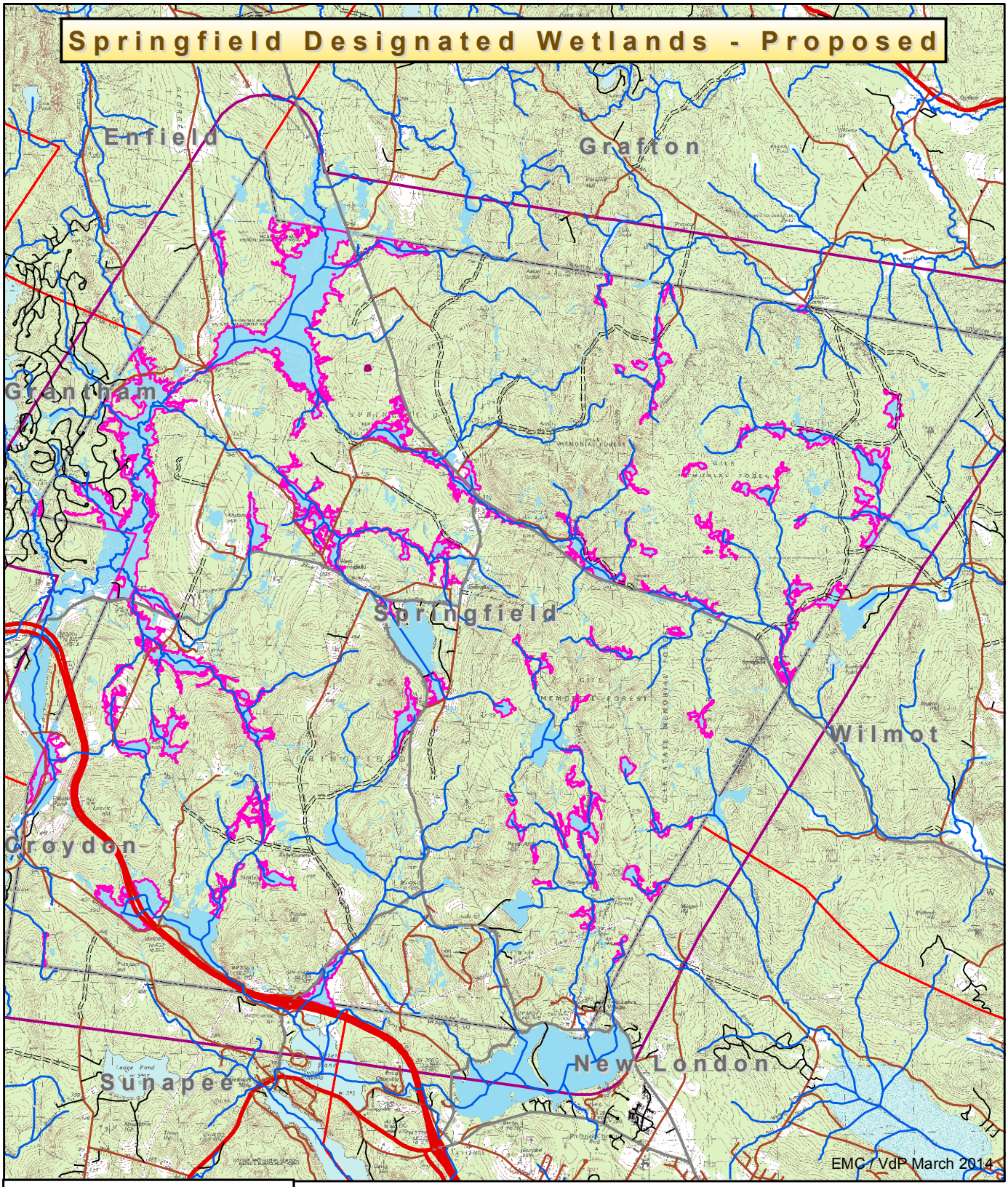

Legend

- Designated Wetlands - Proposed
- API Wetlands
- Half-Mile Buffer

Note: Please refer to the attached Final Report for details on the derivation of each Designated Wetland

2 1 0 2 Kilometers

2.5 1.25 0 2.5 Miles

N W E S

Ecosystem Management Consultants

Appendix B – Spreadsheets and Charts

Wetland Evaluation Units Summary TableB-1 to B-2

SPRINGFIELD WETLAND EVALUATION UNITS - SUMMARY TABLE												
	(Highlighted Wetlands ≥ 3 points)											
		> 2 acres in	Adj. to Stream	WAP	NWI Class	Rare or End.	Critical	McDaniel's	Point	ACRES	AREA (sq. ft.)	PERIMETER (ft.)
Id	NAME	Size	or Pond/Lake	Priority	Interspersion	Exemplary	Habitat	or Bog Bk?	Sum			
1	Collins Memorial	1	1	0	1	0	0	0	3	4.73	206006.04	3480.59
2	Lower Main Street	1	1	0	0	0	0	0	2	3.2	139464.69	4257.78
3	Town Farm Rd East	1	1	0	1	0	0	0	3	25.9	1128167.81	16607.89
4	Upper Grove Brook	1	1	1	1	0	0	0	4	13.67	595638.84	9216.55
5	Grove Brook Headwaters	1	1	1	1	0	1	0	5	26.34	1147242.18	19115.81
6	Hazzard Rd SE	1	0	0	0	0	0	0	2	6.68	291016.64	5045.84
7	Hazzard Rd NE	1	0	0	0	0	0	0	1	3.76	163764.66	4492.82
8	Four Corners & Hazzard Rd East	1	1	0	0	0	0	0	2	3.42	148931	8213.09
9	Kings Highway North	1	1	0	0	0	0	0	2	5.09	221727.86	10481.5
10	Lorent Drive West	1	1	0	0	0	0	0	2	3.04	132391.29	6015.79
11	Kolelemook Lake NE	1	0	0	0	0	1	0	2	2.92	126977.67	3094.45
12	Kolelemook Lake SE	1	0	0	0	0	0	0	1	2.59	112663.69	7632.25
13	Kolelemook Lake South	1	1	0	1	0	0	0	3	15.94	694209	9571.9
14	Jones Road North	1	1	0	1	0	1	0	4	36.47	1588834.95	14986.19
15	Star Lake Headwaters	1	1	0	0	0	0	0	2	5.03	219171.01	6705.94
16	Jones Rd Crossing	1	1	0	0	0	0	0	2	6.57	286383.49	12749.43
17	Star Lake Inflow	1	1	0	0	0	0	0	2	4.7	204839.4	7103.18
18	Colcord Brook Headwaters	1	1	1	1	0	1	0	5	26.19	1140823.57	20654.8
19	Nichols Hill Rd West	1	1	0	0	0	0	0	2	4.28	186507.66	9790.8
20	Central Colcord Brook	1	1	1	0	0	1	0	4	9.64	419950.15	12996.9
21	Sanborn Hill Rd East	1	1	0	1	0	1	1	5	50.05	2180106.74	24546.63
22	Sanborn Hill Rd NW	1	1	1	1	0	0	0	4	25.46	1108825.86	17922.58
23	Colcord Ford	1	1	1	1	0	0	1	5	23.17	1009152.71	8485.82
24	Bog Brook - Springfield	1	1	1	1	1	1	1	7	339.97	14809094.97	113828.53
25	Grantahm Rd Seepage	1	1	0	0	0	0	0	2	5.15	224147.52	7986.28
26	Grantham Rd Seepage North	1	1	0	0	0	0	0	2	2.6	113318.47	4284.04
27	Idlewold Southwest	1	0	0	0	0	0	0	1	9.06	394614.8	15660.7
28	Philbrick Hill Rd Junction East	1	1	0	0	0	0	0	2	4.02	175263.81	3326.65
29	Philbrick Hill Rd Junction SW	1	0	0	0	0	0	0	1	3.09	134520.79	4400.68
30	Philbrick Hill Rd South	1	0	0	0	0	0	0	1	5.84	254520.84	4001.53
31	Philbrick Hill Rd Junction North	1	1	0	1	0	1	0	4	29.04	1265099.42	10987.38
32	Philbrick Hill Summit	1	0	0	0	0	0	0	1	11.17	486420.02	5095.68
33	Grove Brook Central	1	1	0	1	0	1	0	4	63.58	2769754.25	40909.01
34	George Hill Rd Seepage	1	0	0	0	0	0	0	1	5.61	244438.1	4259.83
35	Grove Brook Lower	1	1	0	0	0	0	0	2	11.04	480713.83	20500.71
36	Hazzard Rd South	1	0	0	0	0	0	0	1	5.17	225187.45	5824.35
37	Mill Pond Complex	1	1	0	1	0	0	0	3	42.08	1832943.75	26503.51
38	Upper Mill Pond Complex	1	1	0	1	0	0	0	3	29.9	1302533.72	19988.19
39	Old Grafton Rd Southeast	1	1	0	1	0	0	0	3	11.45	498886.04	4498.27
40	Shad Hill Meadows	1	1	0	0	0	0	0	2	6.36	277084.2	5785.89
41	Shad Hill Rd Seeps	1	1	0	0	0	0	0	2	3.07	133851.09	3961.94
42	McDaniel's Marsh	1	1	1	1	1	1	1	7	452.73	19720950.32	95735.49
43	Eastman Access Junction	1	0	0	0	0	0	0	1	5.3	230839.27	4345.94
44	Eastman Access Gravel Pits	1	0	1	1	0	0	0	3	14.86	647244.63	9778.04
45	Bog Rd Seepage Swamp	1	0	0	0	0	1	0	2	6.59	287060.69	3444.38
46	George Hill East	1	1	0	1	0	0	0	3	14.69	639952.8	8954.01
47	McDaniel's Marsh NW	1	0	0	0	0	0	1	2	6.51	283643.71	4552.6
48	Carter Brook Lower	1	1	1	1	0	0	0	4	25.61	1115699.42	12147.48
49	Deep Snow Drive West	1	1	0	0	0	0	0	2	5.03	219052.94	7952.15
50	Smith Brook Headwaters	1	1	1	0	0	1	0	4	16.55	720930.61	18322.76
51	Pillsbury Ridge NW	1	0	1	0	0	1	0	3	3.7	161168.61	2902.98
52	Pillsbury Ridge West	1	1	1	0	0	1	0	4	2.41	105080.72	1993.99
53	Smith Brook Upper	1	1	1	0	0	1	0	4	5.88	256109.14	3968.22
54	Sugar House Rd Headwaters	1	1	1	0	0	1	0	4	10.84	472371.42	8997.62
55	Sugar House Marsh	1	1	1	1	0	1	0	5	42.92	1869637.89	21905.3
56	Sugar House Headwaters East	1	1	1	0	0	0	0	3	2.99	130375.43	4802.59
57	Upper Kimpton Brook Fen	1	1	1	0	0	1	0	4	4.19	182504.34	2937.22
58	Kimpton Brook Headwaters West	1	1	1	1	0	1	0	5	8.01	348998.34	6707.2
59	Upper Kimpton Brook Marsh	1	1	1	1	0	1	0	5	14.68	639367.64	9121.6
60	Kimpton Brook Headwater Pools	1	1	1	0	0	1	0	4	14.06	612397.52	17753.38
61	Lower Kimpton Brook	1	1	1	1	0	1	0	5	14.66	638445.8	21362.66
62	Piper Pond Rd North	1	1	1	1	0	1	0	5	15.43	671955.14	12037.12
63	Piper Pond Inflow Swamp	1	1	0	1	0	0	0	3	14.76	643136.14	9274.8
64	Walker Brook Junction	1	1	1	1	0	1	0	5	30.08	1310420.28	16661.08
65	Upper Walker Brook Fen	1	1	1	0	0	1	0	4	3.64	158694.12	2672.73
66	Walker Brook Headwaters Peatland	1	0	0	0	0	1	0	2	11.03	480324.98	10478.82
67	Upper Walker Brook Beaver Ponds	1	1	1	1	0	1	0	5	45.67	1989278.3	12930.08
68	Fowler Town Rd South	1	1	1	1	0	1	0	5	17.62	767663.14	7461.75
69	Fowler Town Rd End	1	1	1	1	0	1	0	5	10.29	448443.23	5554.63
70	Fowler Town Rd Seepage	1	0	0	0	0	0	0	1	4.53	197121.46	4331.32
71	Upper Walker Brook Ravine	1	1	1	0	0	0	0	3	3.76	163959.4	4994.37
72	Upper Walker Brook Bench Swamps	1	1	1	0	0	0	0	3	4.43	192924.8	4623.33
73	Three Meadow Swamp	1	1	1	1	0	1	0	5	23.28	1013860.76	13405.89
74	Morrill Rd Swamp	1	1	0	1	0	0	0	3	15.76	686452.37	7936.95
75	Fogg Hill NW	1	0	0	0	0	1	0	2	3.17	138259.75	4666.68
76	Robinson Corner Beaver Swamp	1	1	1	0	0	0	0	3	2.11	91921.68	1709.12
77	Noyes Rd Junction	1	1	1	0	0	0	0	3	3.41	148709.17	4342.82
78	Kings HIghway South	1	1	1	1	0	0	0	4	10.49	457050.24	8851.27
79	Route 4A Swamp South	1	0	1	0	0	0	0	2	3.48	151398.02	5127.47
80	Route 4A Ravine South	1	1	0	0	0	0	0	2	3.87	168745.66	2769.44
81	Kings Highway North	1	0	0	0	0	0	0	1	4	174201.45	4168.5
82	Gile Forest Headwaters SE	1	1	1	1	0	0	0	4	9.63	419300.98	8941.02
83	Morgan Pond Headwaters	1	1	1	0	0	1	0	4	11.07	482223.59	13010.61
84	Morgan Pond NE	1	1	1	0	0	1	0	4	3.43	149331.6	4026.72
85	Morgan Pond Bench SE	1	0	1	0	0	0	0	2	2.81	122506.01	3204.35
86	Morgan Pond Outflow Marsh	1	1	1	1	0	1	0	5	3.31	144188.02	3199.72

SPRINGFIELD WETLAND EVALUATION UNITS - SUMMARY TABLE												
	(Highlighted Wetlands ≥ 3 points)											
		> 2 acres in	Adj. to Stream	WAP	NWI Class	Rare or End.	Critical	McDaniel's	Point	ACRES	AREA (sq. ft.)	PERIMETER (ft.)
Id	NAME	Size	or Pond/Lake	Priority	Interspersion	Exemplary	Habitat	or Bog Bk?	Sum			
87	Kidder Brook Bench Swamp NW	1	0	1	0	0	1	0	3	5.76	251057.94	5513.39
88	Kidder Brook Beaver Complex	1	1	1	1	0	1	0	5	32.87	1431881.24	22151.82
89	Upper Perley Rd Fen	1	1	1	1	0	1	0	5	9.21	401032.86	2964.36
90	Lower Perley Road Fen	1	1	0	1	0	0	0	3	8.7	379137.71	6738.06
91	Perley Rd Fen East	1	1	1	1	0	1	0	5	17.33	754929.28	12834.33
92	Reservoir Complex	1	1	1	0	0	0	0	3	6.39	278275.22	7237.96
93	Kidder Brook Complex West	1	1	1	0	0	0	0	3	8.51	370843.37	9130.17
94	Royal Arch Hill NE	1	1	1	0	0	1	0	4	9.27	403658.85	4797.99
95	Royal Arch Hill SE	1	1	1	0	0	1	0	4	2.59	112926.71	2860.91
96	Dutchman Pond NE	1	1	1	0	0	0	0	3	2.06	89584.47	2700.37
97	Lower Kidder Brook	1	1	1	1	0	1	0	5	8.4	365712.12	8957.26
98	Upper Twin Lakes	1	1	0	0	0	1	0	3	4.42	192456.22	4716.75
99	Colcord Rd North	1	1	0	0	0	0	0	2	4.01	174587.26	4678.87
100	Tarn Rd South	1	1	0	0	0	0	0	2	7.67	333972.35	3664.3
101	Old Oak Hill Rd	1	1	0	0	0	0	0	2	2.58	112389.79	2541.25
102	Oak Hill Bog	0	0	0	0	1	1	0	2	1.15	49969.62	971.64
103	Oak Hill West	1	0	0	1	0	0	0	2	9.95	433272.81	8487.7
104	Oak Hill Southwest	1	0	0	0	0	0	0	1	5.76	251110	5157.44
105	East of Georges Mills Rd	1	1	0	0	0	0	0	2	6.32	275381.4	4337.11
106	Upper Georges Mills Rd Bench	1	1	0	0	0	0	0	2	3.09	134457.91	3608.16
107	Lumber Yard Complex	1	1	0	0	0	0	0	2	10.04	437302.05	4904.2
108	Messer Hill Rd East	1	1	0	0	0	0	0	2	5.15	224126.79	8032.03
109	Georges Mills Rd Complex	1	1	0	1	0	1	0	4	36.75	1600744.32	12990.73
110	McAlvin Pond	1	1	1	1	0	1	0	5	19.65	855839.84	11023.84
111	Bog Pond East	1	1	0	1	0	1	0	4	37.08	1615292.32	6644.2
112	Baptist Pond Northeast	1	1	0	1	0	1	0	4	20.17	878434.29	15808.19
113	Baptist Pond North	1	0	0	0	0	0	0	1	7.52	327679.58	6673.42
114	Bog Pond Median	1	1	0	0	0	0	0	2	3.65	159179.14	3729.24
115	Bog Pond West	1	1	0	1	0	1	0	4	42.21	1838573.32	15388.4
116	Baptist Pond Headwaters	1	1	0	0	0	0	0	2	10.87	473471.59	16109.39
117	No. 3 Schoolhouse Rd North	1	1	0	0	0	0	0	2	7.55	328769.62	5701.77
118	Star Lake Fields East	1	0	1	0	0	0	0	2	10.32	449616.43	8415.42
119	Star Lake Fields Complex	1	1	1	0	0	0	0	3	16.64	724840.6	31123.66
120	Star Lake Fields West	1	1	1	0	0	1	0	4	6.02	262355.85	5837.9
121	Deer Hill Rd East	1	1	0	0	0	0	0	2	4.71	205210.93	3405.88
122	Colcord Brook Headwaters East	1	1	0	0	0	0	0	2	4.15	180789.15	12119.44
123	Little Stocker Pond Headwaters	1	1	1	1	0	1	0	5	33.8	1472238.83	17886.86
124	Little Stocker Pond	1	1	1	0	0	1	0	4	19.36	843289.72	6007.65
125	Sanborn Hill Rd West	1	1	1	1	0	0	0	4	14.68	639599.28	14674.08
126	Sanborn Hill Tributary	1	1	1	0	0	0	0	3	2.77	120768.77	5669.01
127	Grantham Road South	1	0	0	0	0	0	0	1	2.87	125169.76	3284.08
128	Littler Stocker Pond Headwaters South	1	1	0	0	0	0	0	2	3.62	157539.44	4990.2
129	Deer Hill Rd Junction	0	0	0	1	0	1	0	2	1.35	58776.81	1635.31
130	Bog Pond Inflow Northwest	1	0	0	0	0	0	0	1	4.31	187641.57	6337.74
131	Coniston Lake Headwaters East	1	1	1	0	0	0	0	3	2.14	93227	4161.41
132	Stoney Brook Rd Bench	1	0	0	1	0	0	0	2	4.53	197174.42	4823.86
133	Palazzi Pond	1	1	0	0	0	0	0	2	18.92	824322.01	5117.86
134	Grantham Corner Fen	1	0	0	1	1	1	0	4	17.64	768279.94	6302.02
135	Stocker Pond Marsh Southeast	1	1	0	1	0	1	0	4	21.27	926718.4	11146.52
136	East Stocker Pond Fen	1	0	0	0	0	1	0	2	2.01	87717.8	1827.66
137	Sunnyside Rd Swamp	1	1	0	0	0	0	0	2	3.74	163003.25	6655.04
138	Eastman Pond Outflow Swamp	1	1	1	1	0	0	0	4	3.56	155037.94	4033.94
139	McDaniels Swamp Upper NW	1	0	0	0	0	0	1	2	7.03	306149.95	2800.49
140	Shad Hill Gap Swamp	1	0	0	0	0	0	0	1	2.95	128667.2	2436.67
141	Four Corners Junction NE	1	1	0	0	0	1	0	3	8.43	367388.52	7930.18
142	Hole Pond Inflow Swamp	1	1	1	1	0	0	0	4	5.09	221595.11	7475.37
143	Old Grafton Rd West	1	1	1	0	0	0	0	3	3.05	132960.09	4397.03
144	Sanders Brook Headwaters	1	1	0	0	0	0	0	2	2.24	97435.41	2023.45
145	Fowler Town Rd North	1	0	1	0	0	0	0	2	2.1	91562.91	3234.3
146	Upper Walker Brook Swamp	0	1	1	0	0	0	0	2	1.83	79637.59	2421.92
147	Butterfield Pond Swamp West	1	0	0	0	0	0	0	1	2.43	105720.42	1448.18
148	Great Brook Bench Swamp	1	0	0	0	0	1	0	2	3.33	144947.37	4180.92
149	Fisher Corner Rd North	1	1	0	0	0	0	0	2	2.3	100237.68	3179.67
150	George Hill Rd Seep	1	0	0	0	0	1	0	2	3.84	167412.18	3818.33
151	George Hilltop Swamp	1	0	0	0	0	1	0	2	2.77	120871.9	2541.17
152	Lower Camp Sunapee Seep	1	0	0	0	0	0	0	1	4.06	176965.06	5315.32
153	Town Line North	1	0	1	0	0	0	0	2	3.88	168909.96	3265.37
154	Sugar House Marsh NW	1	1	1	0	0	0	0	3	2.89	125766.9	3984.17
155	Sugar House Inflow Bench	1	0	1	0	0	0	0	2	3.25	141621.12	4974.23
156	Old Poor Rd Fen	0	1	1	1	0	0	0	3	1.71	74419.64	2076.59
157	Royal Arch Hill North	1	1	1	0	0	0	0	3	3.33	145089.22	1907.73
158	Morgan Pond NW	1	1	1	0	0	0	0	3	10.94	476738.54	4116.27
159	Howard Roadside Swamp	1	1	1	0	0	0	1	4	3.66	159573.7	2173.4
160	Howard Rd SW	1	1	0	0	0	0	1	3	6.11	266039.08	4093.03
								SUM		2472.62		

Appendix C

Designated Wetlands

in

Springfield, NH

R. Van de Poll, Ecosystem Management Consultants

November 2013

OVERVIEW

According to the 2005 Springfield Master Plan, "wetlands provide a number of valuable functions. These include:

· storage of floodwaters;
· storage and adsorption of soluble nutrients that otherwise would contaminate downstream water bodies;
· discharge of water to water bodies during periods of low flow;
· groundwater recharge;
· filtration;
· habitat for many species that depend on wetlands for part or all of their life cycle; and
· recreational opportunities." [Springfield Master Plan page 53]

In addition, the Master Plan notes that,

> "Wetlands are inappropriate areas for construction of buildings or septic systems or activities that involve alteration of the natural drainage patterns." [Springfield Master Plan page 53]

In 2012, the Springfield Planning Board established a Wetlands Committee that was charged with the task of making recommended changes to the existing Wetlands Conservation Overlay District Ordinance. The existing ordinance was put into place in 1987 and amended eight times, with the most recent amendment recognizing wetlands greater than 10,000 square feet in size plus a natural vegetation buffer of 100 feet from these wetlands (except for McDaniel's Marsh, which had a 660-foot buffer). Further, in 2006, the wetlands ordinance established that the "Springfield Wetlands Protection Map" would be based on the National Wetlands Inventory (NWI) map of wetlands on file at the Town Office. Site –specific delineations of wetlands had to be performed by a Certified Wetland Scientist.

The Wetlands Committee made several recommended changes to the existing wetlands ordinance, including but not limited to:

1) A reduction in the minimum size of a wetland to 7,000 square feet (with no minimum size for wetlands and marshes adjacent to open water)
2) The addition of vernal pools as a wetland type requiring a 50-foot buffer

3) A reduction of the wetland buffer to 50 feet for forested wetlands greater than 100 feet wide
4) The addition of a 150-foot buffer to "Special Wetlands"
5) A procedure for reviewing land use applications that involve probable impacts to the above-regulated wetlands and vernal pools
6) A requirement for restoration if a wetland or buffer is damaged during construction
7) Greater specifications on permitted uses and prohibited uses within the Wetlands Conservation Overlay District

Although the Wetlands Committee was very thorough and took in a great deal of feedback during its deliberations, it was evident at the May 21, 2013 community forum that there were additional concerns relative to their proposal. Among these concerns the following issues were identified:

- A new wetland map was needed
- This map should be easily accessible by members of the public
- Wetland regulations should be reasonable, simple, and flexible
- Buffers are important, but an opportunity for relief should be provided for properties affected by wetlands and buffers
- Informing and educating the public is important

This community forum was part of the **Springfield Wetlands Project** that arose from the award of a Community Development Block Grant through the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC). As a part of this project, several goals were identified that mimicked the concerns of the residents who attended the community forum:

- Simplify the wetlands regulations and make them easy to understand
- Ensure a balance between protecting wetlands and allowing for reasonable use of land
- Maintain broad public participation in the planning process
- Integrate the new, more accurate wetland map into the permitting process
- Develop standards for identifying and protecting vernal pools

Whereas most of these goals as well as the residents' concerns have been addressed by the Wetland Committee, there remain a few unresolved issues relative to the existing wetlands ordinance and the proposed revisions, namely,

a) The proposed changes potentially complicate the review and execution of the wetlands ordinance, for example:
    i. There is no guidance on where a wetland begins and ends relative to the minimum size of 7,000 s.f.
    ii. "Naturally occurring vernal pools" have not been defined
    iii. Wetland buffers have not been defined to be either 'along-the-ground' feet or horizontal feet from the edge of the wetland
    iv. "Restoration" has not been defined
    v. "Special Wetlands" have not been defined

b) The proposed changes are not necessarily based on science, are not consistent, or do not adhere to existing state and federal regulations, for example:
   i. The minimum size of 7,000 s.f. has no basis in the relative *value* of a wetland
   ii. The elimination of a minimum size for "wetlands and marshes … adjacent to open water" suggests that *any* wetland may be subject to the 100-foot setback since it can be shown that open water exists in almost all wetlands at certain times of year
   iii. The setback for vernal pools is only 50 feet, yet careful studies of the value of vernal pools suggest that a much larger buffer is required; further, the state and federal government currently require a **100 feet setback for vernal pools** as established by permitting rule
   iv. The provision of reducing the buffer to 50 feet for forested wetlands is based on a measurement from the "high water mark" – something that does not exist in > 95% of forested wetlands
   v. A buffer of 150 feet from "Special Wetlands" is somewhat arbitrary and unclear since the purpose of protecting these as yet undefined wetlands is not provided
   vi. No provision is made for artificially created wetlands (e.g. ditches, fire ponds, etc.) that could require a 100-foot buffer as well

PROPOSAL FOR THE DESIGNATION OF CERTAIN WETLANDS

In order to simplify and clarify the language of the proposed changes to the existing wetlands ordinance several revisions are herein recommended (please see the attached draft with 'track changes' employed). In sum, these changes

1) Eliminate the 7,000 square feet minimum size of a wetland
2) Creates instead a category called "**designated wetland"** that is based on several scientific criteria that relate to the value of the wetland being protected
3) Establish a single, 100-foot buffer from designated wetlands as mapped and identified during the current Springfield Wetlands Project mapping effort
4) Identify and define all vernal pools as requiring a 100-foot buffer in order to highlight their value and be consistent with state and federal regulations
5) Eliminate "Special Wetlands" until such time as they have been properly identified, evaluated, and approved at town meeting as being worthy of a setback greater than 100 feet
6) Clarify the wetland buffer to be 'along-the-ground' unless the slope exceeds 25% at which point it is calculated as the horizontal distance from the "edge of wet"

EVALUATION CRITERIA FOR THE NEW "DESIGNATED WETLANDS"

By virtue of the experience of mapping and/or evaluating wetlands for over a dozen towns since 1990, and as the principal wetland scientist author of the newly revised *Method for the Inventory and Evaluation of Freshwater Wetlands in New Hampshire* (NH Method, UNH

Cooperative Extension, 2013), it is apparent that certain wetlands are valuable enough to warrant additional protections under local law. Based on the values of wetland identified in the Springfield Master Plan and the existing Wetlands Conservation District Overlay Ordinance, it is proposed that these designated wetlands meet certain criteria that support water quality, provide flood storage, protect wildlife habitat, preserve rare species and exemplary natural communities, and supply the town with clean drinking water. The following criteria have been applied in other municipalities for treating high quality wetlands as *designated* and are herein proposed for Springfield:

1. Size > 2 acres
2. Associated with and contiguous to perennial streams or great (> 10 ac.) ponds
3. Within or adjacent to Wildlife Action Plan highest ranked habitats[1]
4. Contains ≥ 3 National Wetland Inventory cover classes or a high interspersion of 2 cover classes[2]
5. Contains rare species or potential exemplary natural communities
6. Associated with a known or documented critical habitat area (e.g. vernal pool)
7. Occurs within 200 feet of a previously recognize high value wetland, specifically McDaniel's Marsh or Bog Brook

In keeping with the practice of other towns, it is also proposed that each *designated wetland* meet at least **three** of the above criteria. In order to make reasonable selection of such wetlands, the as-yet-to-be-completed Springfield Wetlands Map shall include all of the wetland complexes that meet or exceed three of the above seven criteria. This map shall be the first step identifying and designating high value wetlands in the town and shall form the basis for further protections under the proposed revisions to the Wetlands Conservation District Overlay Ordinance.

[1] Either highest ranked in the state or the biological region

[2] "high interspersion" is defined as a mosaic of several NWI cover types intermixed within the wetland

Appendix D

Guidelines for Determining Wetland Units for Evaluation

3. Guidelines for determining wetland units for evaluation

When evaluating wetlands, there are situations when some wetlands will need to be broken into two or more units for evaluation, either where there is a natural break, or an artificial break that interferes with wetland hydrology. Artificial flow restrictions (such as roads, culverts, bridges, etc.) can fragment and alter the character of a wetland to a degree that warrants evaluating the wetland areas on each side of the restriction as separate units. Natural breaks can occur at a stream channel, or when there is a natural constriction such as a beaver dam. The guidelines presented below will assist you in deciding under which circumstances to break a wetland complex into separate units for purposes of evaluation. By following the guidance below **consistently** for all the wetlands in the study area, decisions will be more objective and defensible.

It is recommended that you keep wetlands whole unless there is a good reason to break the complex into two or more evaluation units. It is not possible to anticipate every situation, and many times, whether or not to break a wetland into separate evaluation units is up to the evaluator's judgment.

Once you have made the initial wetland unit determination, follow the guidelines below to see if any breaks are necessary. Note that the guidelines provided below will not cover all situations, since there is so much variability in nature. These guidelines cover some of the more common situations encountered.

Step 1: Review wetland maps and field check

Prior to field work, review the wetlands map prepared for the wetland/s being evaluated:

a. First look at the wetland areas identified in the **National Wetlands Inventory (NWI)**, and use this as your initial determination of the wetland unit for evaluation.
b. Next review the **hydric soils** together with NWI data and identify areas of hydric soils beyond the NWI boundaries that may need to be field checked for presence/absence of wetland conditions (hydrology, soils and vegetation).
c. Review **aerial photos** (provided on the GRANIT Data Mapper or other sources) that can provide additional information prior to field evaluation. It is best to use spring leaf-off photos.
d. **Field checking** is an important next step to establishing wetland boundaries and evaluation units. Note that further wetland evaluation unit changes may need to be made after the wetland has been field checked. Pay particular attention to wetland units whose continuity is not clear from mapped information
e. If a wetland crosses the boundary of the study area (town, watershed, etc.) the entire wetland should be mapped and evaluated.

Unless one of the following conditions applies, use the entire mapped wetland area as your evaluation unit.

Step 2: Guidelines for determining if a wetland area might need to be broken into wetland evaluation units.

Situation and Illustrations	Description	Decision
Wetland **narrows to a stream channel**. Use Mark's illustration for Auburn	a. After the narrowing point, there is no dominance of wetland vegetation, hydrology or soils or along the stream.	a. The point at which the wetland narrows to the stream channel is the downstream limit of that wetland evaluation unit. The evaluator will need to determine if a break is needed based on field assessment.
Wetland is bisected by a **railroad or a one or two-lane road** *Put something about culvert sizing in appendix (may be something in forestry BMPs). Is the culvert properly sized? Look at Maryann's stream crossing data* *Is diameter of culvert smaller than the stream width? Improperly sized culvert. Frank will look at TNC Ashuelot River study.*	a. Properly sized culverts (or a bridge) allows the free flow of surface water b. There is no culvert, the existing culvert is blocked, or the culvert is perched above the water surface. .	a. Evaluate the wetlands on each side of the road as a single wetland evaluation unit. b. Evaluate the wetland areas as two separate wetland evaluation units.
Wetland cut by a **four-lane (or greater) highway**	a. The highway is elevated and spans the entire wetland complex, and there is no obvious interruption to wetland hydrology b. The highway crosses through the wetland at ground level	a. Consider the wetland on both sides of the highway as a single wetland evaluation unit. b. Considered to be two separate evaluation units.
Wetland is **associated with a river**	a. Wetland is associated with a 1st, 2nd 3rd or 4th order stream b. Wetland is associated with a 5th order or greater stream.	a. The stream and associated wetland are considered to be a single wetland unit for evaluation. Only include the stream reach between the beginning and end points for the wetland b. Consider the wetland areas on each side of the river as separate wetland evaluation units, and include any part of the river that is less than 6.6ft deep (i.e. include any water with aquatic vegetation) in the evaluation area.

Situation and Illustrations	Description	Decision
Wetland is **associated with a lake**	a. Wetland is connected to a lake, classified as Lacustrine on NWI maps (depth greater than 6.6ft).	a. Consider the wetland areas around the lake as separate wetland evaluation units, and include any part of the lake that is less than 6.6ft deep (i.e. include any water with aquatic vegetation) in the evaluation area. An exception to this guideline is wetlands that occur in a clearly defined bay or cove (the bay or cove should be as deep as it is wide).
	b. Lakeshore wetlands in a bay or cove served by a single drainage.	b. Consider the wetland segments as part of the same wetland evaluation unit
	c. Lakeshore wetlands in a bay or cove that is served by more than one drainage.	a. Consider wetland areas served by the same drainage as part of the same wetland evaluation unit.
Wetland **crosses a town or watershed boundary**	a. Wetland boundary extends across a political or watershed boundary	a. Evaluate the wetland complex as a single unit regardless of the boundaries.

Appendix E

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Appendix F

ARTICLE IV. CONSERVATION OVERLAY DISTRICTS

These special regulations of overlay districts are in addition to the regulations of the underlying zoning district.

In all cases where the Wetlands Conservation Overlay District is superimposed over another zoning district in the Town of Springfield, that district whose regulations are more restrictive shall apply. Furthermore, where any provision of this district differs from those of other ordinances or regulations of the Town or State, then that provision or ruling which imposes the greater restriction or higher standard shall govern.

4.10 WETLANDS CONSERVATION OVERLAY DISTRICT

~~Wetlands are extremely important to the Town as they provide area for floodwater storage, wildlife habitat and groundwater recharge. It is intended that this Overlay District shall:~~
Wetlands are extremely important to the Town as they provide for the protection of water quality, for floodwater storage, for wildlife habitat and for groundwater recharge. It is intended that this Overlay District shall:

1. Prevent the development of structures and land uses ~~on naturally occurring wetlands~~ which will cause or contribute to pollution of surface water~~and~~ or groundwater ~~by sewage or toxic substances~~i~~o~~n naturally occurring wetlands;
2. Prevent destruction of ~~or significant changes~~ or degradation~~s~~ to ~~natural~~ a wetland's natural ability to receive stormwater and minimize damage from flooding;~~which provide flood protection;~~
3. Protect unique, rare and valuable natural areas and the species they contain;
4. Protect wildlife habitat and maintain ecological ~~balance~~integrity of said habitat;
5. Protect the ~~water~~quantity and quality of potential water supplies and existing aquifers (water bearing stratum) and aquifer recharge areas;
6. Prevent the loss or degradation of a diversity of recreational benefits in wetlands such as hunting, fishing, canoeing, bird watching, and hiking ~~Encourage those low intensity uses that can be harmoniously, appropriately and safely located in wetlands.~~
~~6.~~7. Prevent the loss of the visual and aesthetic qualities of wetlands including their contribution to open space, character, and overall scenic beauty of the landscape

4.11 Wetlands Conservation Overlay District Boundaries

The Wetlands Conservation Overlay District is an overlay district which places additional land use controls on existing underlying zoning districts. The boundaries of the Wetlands Conservation Overlay District include all wetlands ~~greater than 10,000~~7,000 ~~square feet in size~~ and wetland buffer areas described as follows:

1. Designated Wetlands~~Wetlands~~, as defined herein, ~~greater than 10,000~~7,000 ~~square feet in size~~ which include, but are not limited to, swamps, marshes and bogs.
~~1.~~2. Naturally occurring vernal pools of any size.
~~2.~~3. W~~The w~~etland buffers as specified below in Section 4.12 ~~– Wetland Buffers.~~

~~The boundary of a wetland on a specific site must be delineated by a certified wetlands scientist. The wetlands to be protected by this Ordinance are delineated on the Springfield Wetlands Protection Map dated August 2005. This map is available for viewing in the Office of the Board of Selectmen. The wetlands delineated on the Springfield Wetlands Protection Map are based on the National Wetlands~~

~~Inventory Maps of Wetlands. This map shows the general location of wetlands as defined by this Ordinance except if the wetland is 10,000 square feet or less.~~

All applications for a land use change (building permit, subdivision, site plan, etc.) will be reviewed by a representative of the Board of Selectmen or Planning Board, as appropriate, and a representative of the Conservation Commission who will visually inspect the area in question and report to the applicable Board as to the presence or absence of wetlands and wetland buffers in the area to be impacted by the proposed land use change.

If the Applicant is dissatisfied with the report rendered by the Board representative and the Conservation Commission, the Applicant may retain an independent Certified Wetland Scientist, at the Applicant's expense, who will visually inspect the area in question and present a written report to the applicable Board as to the presence or absence of wetlands and wetland buffers in the area to be impacted by the proposed land use changes.

In the event that the report concludes that wetlands are likely present and the Applicant wishes to continue the application process, the Applicant may retain an independent Certified Wetland Scientist to map the area in question at the Applicant's expense. The delineation shall be consistent with the DES Wetlands Bureau Rules, as amended. The completion of a New England District Wetland Delineation Datasheet (US Army Corps of Engineers, latest version) by the Certified Wetland Scientist can provide the appropriate level of documentation to address questions about the delineation.. A report of the Scientist's findings shall be submitted to the Town Board applied to, and shall include, if warranted, a wetland map of the area in question, along with a written report of the results of the investigation, together with data forms completed.

4.12 Wetland Buffers

~~Wetland buffers are areas that are designed to remain vegetated in an undisturbed and natural condition to provide and protect habitat and travel corridors for wildlife and to protect adjacent wetland functions and values from upland impacts to water quality. Unless otherwise specified in Section 4.14, wetland buffers shall be retained in their natural condition. Where wetland buffer disturbance has occurred during construction, restoration is required. All wetland buffers are measured from the wetland boundary.~~

Wetland buffers are areas that are designed to remain vegetated and in an undisturbed and natural condition that will:

1. ~~Provide and protect habitat and travel corridors for wildlife~~Protect the water quality of adjacent wetlands and the surface waters associated with them;
2. ~~Prevent adverse impact to adjacent wetlands~~Trap sediments, minimize nutrient flows, and dissipate stormwater into adjacent wetlands and their associated surface waters;
3. ~~Protect the water quality to adjacent wetlands.~~Provide and protect habitat and travel corridors for wildlife;
4. Provide permeable surfaces for infiltration by groundwater.

Unless otherwise specified in section 4.14, wetland buffers shall be retained in their natural condition. Where wetland buffer disturbance has occurred during construction, restoration is required. Such restoration shall be sufficient to meet or exceed the original functions and values of the wetland in question according to the *Method for the Inventory and Evaluation of Freshwater Wetlands in New Hampshire* (aka the 'NH Method') or a suitable alternative approved by the NH Department of Environmental Services. All wetland buffers are measured across the ground from the wetland boundary, unless the average slope of the wetland buffer exceeds 25%, in which case the setback distance will be corrected for slope to meet the minimum setback distance on a horizontal basis.

The minimum width of the wetland buffers shall be:

1. ~~660 feet from the wetland boundary of McDaniel's Marsh; and~~
2. ~~100 feet from the wetland boundary of all other wetlands greater than 10,000 square feet in size.~~
1. ~~Buffers 100 feet wide around wetlands and marshes greater than 7,000 square feet, and wetlands and marshes of any size adjacent to open water. The buffer is reduced to 50 feet in width in areas where a wetland transitions to a forested wetland that is in excess of 100 feet in width, measured from the high water mark of the wetland.~~100 feet from the edge of Designated Wetlands
2. 100 feet from all surface waters, including vernal pools
   ~~Buffer 50 feet wide around naturally occurring vernal pools. This buffer is a "no disturbance" buffer, and not subject to Section 4.14 Uses Permitted by Special Exception~~
3. ~~Buffer 660 feet wide around McDaniel's Marsh~~**50 feet adjacent to all other wetlands as long as the distance from the wetland edge to the nearest water body is at least 50 feet.**
4. ~~Buffer 150 feet wide around Special Wetlands~~660 feet from the edge of McDaniel's Marsh

The boundary of the Wetlands Conservation Overlay District and entire length of the upland limit of the wetland buffer as delineated by a Ceertified Wetlands Scientist shall be marked with highly visible construction tape prior to, and maintained for the full duration of, any construction-related activities.

4.13 Permitted Uses

Development is not permitted in the Wetlands Conservation Overlay District including the wetland buffers specified above. ~~Permitted uses are those which will not require the erection or construction of any structures or buildings; will not alter the natural surface configuration by addition of fill or by dredging; and uses that are otherwise permitted by the Zoning Ordinance.~~ The following uses are permitted provided a use is not prohibited or restricted by Section 4.15 Prohibited Uses or otherwise prohibited by the Zoning Ordinance. Such uses include the following:

A. Forestry and tree farming using state-sanctioned best management practices in order to protect wetlands from damage and prevent sedimentation.
B. Cultivation and harvesting of crops according to ~~recognized~~ state sanctioned ~~soil conservation~~best management practices for agriculture including the protection of the wetlands from pollution caused by fertilizers, pesticides and herbicides used in such cultivation.
C. Wildlife refuges.
D. Parks and outdoor recreation uses consistent with the purpose and intent of this Ordinance;
E. Conservation areas and nature trails.
F. Open Spaces as permitted or required by the Subdivision Regulations or the Zoning Ordinance.
G. Dry hydrants or fire ponds which are constructed to permit unobstructed flow of water.
~~G.~~H. **One (1) single-story, non-residential structure (i.e. boat sheds, tool sheds and similar accessory structures) within the wetland buffer up to a maximum of 150 square feet in size.**
~~H.~~I. Docks, breakwaters, moorings, beach maintenance and wells as permitted by the Wetlands Bureau of the NH Department of Environmental Services.

4.14 Uses Permitted by Special Exceptions

All activities in the Wetland Conservation District not listed in Section 4.13 Permitted Uses are presumed to impair the wetland functions and values unless proven otherwise by the Applicant as provided in this Ordinance.

The following uses may be permitted by the Zoning Board of Adjustment provided an application

complies with all of the provisions outlined in Section 3.12 – Uses Permitted by Special Exceptions and Section 11.42 Special Exceptions:

A. Water impoundments which do not substantially alter non-stream wetlands and are subject to approval ~~of wetland permits by the Wetlands Bureau~~ of the New Hampshire Department of Environmental Services, if required; and

~~B. Road, driveway and utility right of way or easement crossings only if there is no feasible alternative location and subject to approval of wetland permits by the Wetlands Bureau of the New Hampshire Department of Environmental Services, if required.~~

B. Replacement of septic tanks and leach fields where evidence is submitted that no viable alternative exists elsewhere on the lot.

C. The construction, repair, or maintenance of streets, roads, and other access ways, including driveways, footpaths, bridges, and utility right of way easements including power lines and pipe lines, if essential to the productive use of the land adjacent to the Wetlands Conservation Overlay District. These uses shall be located and constructed in such a way as to minimize any detrimental impact upon the wetlands and consistent with state recommended design standards (see Fish & Game Department 2008, or as amended and subject to approval of the DES Wetlands Bureau, if required), and only if no viable alternative is available.

D. Two (2) or more single-story, non-residential structures (i.e. boat sheds, tool sheds and similar accessory structures) within the wetland buffer up to a maximum of 150 square feet in size.

E. Other uses that the Applicant proves will not interfere with the wetland functions and values, water quality or as value to wildlife habitat, pursuant to Section 4.10

~~C.~~F. As provided in Article VIII.

4.15 Prohibited Uses

Uses prohibited within the Wetlands Conservation Overlay District include, but are not limited to, the following:

A. The establishment or expansion of salt storage sheds, automobile junk yards, solid waste facilities or hazardous waste facilities.

B. The bulk storage of chemicals, petroleum products, toxic or hazardous materials.

C. The dumping or disposal of snow or ice collected from roadways and parking areas located outside the Overlay District.

D. Filling, dredging, or draining of the wetland or its associated surface waters.

E. Changing the flow of water into, through, or out of the wetland or its associated surface waters.

F. Pollution of the wetland~~s~~, ~~surface water, or groundwater~~or its associated surface or groundwater.

G. Substantial clearing of vegetation or alteration of the surface topography, except for purposes of agriculture or forest management in accordance with current best management practices.

H. Use of fertilizer on lawns, except lime or wood ash.

I. Sand and gravel excavations or processing of excavated materials unless associated with a use approved as a Special Exception.

J. Mineral extraction.

~~Processing of excavated materials.~~

K. Impervious surfaces, unless associated with a use approved as a Special Exception.

L. Activities which result in soil compaction such as parking vehicles or heavy equipment, unless associated with a use approved by Special Exception.

M. Underground tank.

~~C.~~N. Storage of petroleum products, hazardous chemicals or materials, chemical fertilizers, pesticides, insecticides, or herbicides.

4.16 Restoration

Any Wetland or wetland buffer altered in violation of this Ordinance shall be restored at the expense of the offender and to the satisfaction of the Town. Such restoration shall be subject to all state and local permits as required.

4.20 SHORELAND CONSERVATION OVERLAY DISTRICT

Shoreland is extremely important to the Town ~~as it provides protection of~~since it helps protect water bodies ~~which~~ that provide significant scenic, recreational, and wildlife values ~~with the~~as well as potential ~~for~~ public water supplies. It is intended that this Overlay District shall:

A. Protect natural areas by preventing the development of structures and land uses within 100 feet of a water body which will potentially contribute to pollution of surface and groundwater by sewage or toxic substances;
B. Protect surface waters from sedimentation, turbidity, runoff of storm water, and effluent from sewage disposal systems;
C. Preserve tree cover and other vegetative cover;
D. Protect wildlife habitat and maintain ecological ~~balance~~integrity of said habitat;
E. Preserve scenic views;
F. Encourage those low intensity uses that can be harmoniously, appropriately and safely located within the shoreland district.

4.21 Shoreland Conservation Overlay District Boundaries

The Shoreland Conservation Overlay District is an overlay district which places additional land use controls on existing underlying zoning districts. The boundaries of the Shoreland Conservation Overlay District include areas within 100 feet of any water body as defined in this ordinance. The boundary shall be measured horizontally from the mean high water mark of any pond, reference line of any great pond or lake, and top of the bank of any ~~water body~~permanent stream.

The Shoreland Conservation Overlay District shall be considered to have been established in March 2006 for the purposes of this ordinance due to the adoption of similar restrictions at that time in an earlier ordinance.

4.22 Permitted Uses

Permitted uses in the Shoreland Conservation Overlay District are those which meet the requirements of the NH Shoreland Water Quality Protection Act and will not require the erection or construction of any structures or buildings; will not alter the natural surface configuration by addition of fill or by dredging; and uses that are otherwise permitted by the Zoning Ordinance as follows:

A. Forestry and tree farming using state-sanctioned best management practices in order to protect water bodies from damage and prevent sedimentation.
B. Cultivation and harvesting of crops according to ~~recognized~~ state-sanctioned ~~soil conservation~~best management practices including the protection of the water bodies from pollution caused by fertilizers, pesticides and herbicides used in such cultivation.
C. Wildlife refuges.
D. Parks and outdoor recreation uses consistent with the purpose and intent of the District;
E. Conservation areas and nature trails.
~~F. Wells, waterlines, and septic systems.~~
~~G.~~F. Open Spaces as permitted or required by the Springfield Regulations or the Zoning Ordinance.
G. Dry hydrants or fire ponds which are constructed to permit unobstructed flow of water.

H. **One single-story, non-residential structure (i.e. changing rooms, tool sheds and similar accessory structures) within the shoreland buffer up to a maximum of 150 square feet in size.**
I. Docks, breakwaters, moorings, beach maintenance and wells as permitted by the Wetlands Bureau of the NH Department of Environmental Services.

4.23 Uses Permitted by Special Exceptions

All activities in the Shoreland Conservation Overlay District not listed in 4.22 Permitted Uses are presumed to impair the shoreland functions and values unless proven otherwise by the Applicant as provided in this Ordinance.

The following uses may be permitted by the Zoning Board of Adjustment provided an application complies with all of the provisions outlined in Section 3.12 – Uses Permitted by Special Exceptions -and Section 11.42 Special Exceptions and~~s~~ is permitted by the New Hampshire Department of Environmental Services, if required:

A. Water impoundments which do not unreasonably interfere with the functioning of natural systems or that the environmental benefits of the impoundment outweigh the adverse impacts;
B. Boathouses
~~B.~~C. **Two or more single-story, non-residential structures (i.e. changing rooms, tool sheds and similar accessory structures) within the shoreland buffer up to a maximum of 150 square feet in size.**
~~C. Road, driveway and utility right of way or easement crossings only if there is no feasible alternative location.~~
D. As provided in Article VIII.
E. Installation of wells and water lines.
F. Replacement of septic tanks and leach fields where evidence is submitted that no viable alternative exists elsewhere on the lot.
G. The construction, repair, or maintenance of streets, roads, and other access ways, including driveways, footpaths, bridges, and utility right of way easements including power lines and pipe lines, if essential to the productive use of the land adjacent to the Wetlands Conservation Overlay District. These uses shall be located and constructed in such a way as to minimize any detrimental impact upon the wetlands and consistent with state recommended design standards (see Fish & Game Department 2008, or as amended and subject to approval of the DES Wetlands Bureau, if required), and only if no viable alternative is available.

~~D.~~H. Other uses that the Applicant proves will not interfere with the wetland functions and values, water quality or as value to wildlife habitat, pursuant to Section 4.10

4.24 Prohibited Uses

Uses prohibited within the Shoreland Conservation Overlay District include, but are not limited to, the following:

A. The establishment or expansion of salt storage sheds, automobile junk yards, underground storage tanks, solid waste facilities or hazardous waste facilities.
B. The bulk storage of chemicals, petroleum products, toxic or hazardous materials.
C. The dumping or disposal of snow or ice collected from roadways and parking areas located outside the Overlay District.

~~Filling, dredging, or draining of the wetland.~~
D. Changing the flow of surface or groundwater into the water body associated with the shoreland
E. Pollution of the ~~wetlands,~~ surface water~~,~~ or groundwater associated with the shoreland.
F. Substantial clearing of vegetation or alteration of the surface topography, except for purposes of agriculture or forest management in accord with current best management practices.
G. Use of fertilizer on lawns, except lime or wood ash.
H. Sand and gravel excavations or processing of excavated materials unless associated with a use approved as a Special Exception.
I. Mineral extraction.
~~Processing of excavated materials.~~
J. Impervious surfaces, unless associated with a use approved as a Special Exception, and allowable up to the maximum allowed by the NH Shoreland Water Quality Protection Act, as amended.
K. Activities which result in soil compaction such as parking veheicles or heavy equipment, unless associated with a use approved by Special Exception.
L. Underground tank.
~~D.~~M. Storage of petroleum products, hazardous chemicals or materials, chemical fertilizers, pesticides, insecticides, or herbicides.

4.25 Additional Restrictions

A. Water Frontage – Any new lots on a pond, lake or other impoundment shall have not fewer than 200 linear feet of shore frontage as measured using standards provided the NH Shoreland Water Quality Protection Act, with an additional 8 linear feet of shore frontage for each additional dwelling unit over 12 units; or for a group development, the provision of two additional linear feet per person for whom the facility is proposed.
B. Commercial, Multi-Unit Buildings, or Clusters of Buildings – The minimum setback from the top of the bank of the water body shall be 150'.
C. Parking – An area of 400 square feet for parking shall be reserved for each dwelling unit; or for each four persons in the case of a group development or beach use that is planned. For other uses, the provisions of Section 6.20—Off-Road Loading and Parking shall apply. Paved parking areas larger than 400 square feet shall be located at least 500 feet from the top of the bank.

4.30 FLOODPLAIN CONSERVATION OVERLAY DISTRICT

Areas determined to be within a 100 year flood area by the Federal Emergency Management Agency (FEMA) are subject to the Floodplain Management Ordinance. This ordinance is considered part of this zoning ordinance though it is represented as a separate document available through the Town Offices. Maps of the 100 year flood areas are provided in the Town Offices. There shall be no new development within thise designated floodplain.

ARTICLE XIII. DEFINITIONS

For the purpose of this Ordinance, the following terms have the following meanings:

Abandoned
The discontinued use of a structure or use for a continuous period of at least one year which occurs when the owner (a) intends to abandon or relinquish the use, and (b) takes some overt act, or fails to act, in some way that implies that the owner neither claims nor retains any interest in that use.

Abutter
Any person whose property adjoins or is directly across the road or stream from the land under consideration. For purposes of receiving testimony only, and not for purposes of notification, the term abutter shall include any person who is able to demonstrate that his land will be directly affected by the proposal under consideration. For the purpose of receipt of notification in the case of an abutting property being under a condominium or other collective form of ownership, the term abutter means those officers of the collective or association as defined in RSA 356 –B:3)XXIII. For purposes of receipt of notification by a municipality of a local land use board hearing, in the case of an abutting property being under a manufactured housing park form of ownership as defined in RSA 205-A: 1:II, then term "abutter" includes the manufactured housing park owner and the tenants who own manufactured housing which adjoins or is directly across the road or stream from the land under consideration by the local land use board. (RSA 672:3)

Accessory Building
A subordinate building incidental to and on the same lot occupied by the main building or use. The term "accessory building", when used in connection with a farm, shall include all buildings customarily used for farm purposes.

Accessory Use
A use incidental to, and on the same lot as, a principal use. For clarification, in residential districts, private recreational facilities, such as a tennis court or swimming pool, are accessory uses.

Accessory Use of Structure
A use of structure on the same lot with, and of a nature customarily incidental and subordinate to, the principal use or structure.

Adjacent
Bordering, contiguous, or neighboring. The term includes wetlands that ~~directly~~hydrologically connected at the surface to other surface waters, or that are in reasonable proximity to these waters, but physically separated from them by man-made dikes, culverts or barriers, natural river berms, and similar obstructions.

Best Management Practices
As promulgated by the state of New Hampshire, measures or practices used to minimize impacts on wetlands and water resources, such as those used to control erosion, reduce sedimentation, or prevent other forms of water quality degradation.

Bog
Bog means a wetland distinguished by stunted evergreen trees and shrubs, peat deposits, an absence of inflows or outflows, and/or highly acidic soil and/or water conditions.

Brook or Stream
A brook or stream is a scoured natural or artificial channel indicating periods of concentrated water flow.

Buffer
The protected area adjacent to wetlands and other surface waters in the Wetlands Conservation Overlay District designed to remain vegetated in an undisturbed and natural condition to protect adjacent ~~Wetland~~ functions and values from upland impacts and provide habitat for wildlife. All wetland buffers are measured along the ground from the wetland boundary unless the average slope exceeds 25%, in which case the horizontal distance of the buffer must be corrected for slope.

Building
Any structure whether portable, movable or fixed, built to form a shelter for persons, animals or property of any kind.

Certified Wetland Scientist
Certified wetland scientist means a person who, by reason of his or her special knowledge of hydric soils, hydrophytic vegetation, and wetland hydrology acquired by course work and experience as specified by RSA 310-A:84,II-a and II-b, is qualified to ~~delineate wetland boundaries and prepare wetland maps~~ practice wetland science in accordance with standards ~~for identification of wetlands adopted~~established by the New Hampshire Department of Environmental Services or the United States Army Corps of Engineers or its successor, and who has been duly certified by the New Hampshire Board of Certification for Natural Scientists.

Cluster Development
A form of residential subdivision that permits building units to be grouped on lots with reduced dimensions and frontages provided that the density of the original lot as a whole shall not be greater than the density allowed under existing regulation and that remaining land area is devoted too privately or commonly owned or dedicated open space.

Company Vehicle
Any motor vehicle used primarily for business purposes, except any heavy vehicle or equipment as defined herein.

Designated Wetland
A wetland that is identified on the Springfield Wetlands Map that meets at least three of the following seven criteria:

1. Size > 2 acres
2. Associated with and contiguous to perennial streams or Great Ponds (i.e. > 10 ac.)
3. Within or adjacent to Wildlife Action Plan highest ranked habitats[1]
4. Contains ≥ 3 National Wetland Inventory cover classes or a high interspersion of 2 cover classes[2]
5. Contains rare species or potential exemplary natural communities
6. Occurs within known or documented Critical Habitat Area
7. Occurs within 200 feet of a High Value wetland, specifically McDaniel's Marsh or Bog Brook

[1] Either highest ranked in the state or the biological region
[2] "high interspersion" is defined as a mosaic of several NWI cover types intermixed within the wetland

Development
Any human-made change to improved or unimproved real estate, including but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operation.

Driveway
An area built for access to a garage or off-road parking space, serving not more than two lots. The driveway entrance is that area running from the property line abutting the road to a distance of 25' into the property and the width of the driveway.

Dwelling, Single-Unit
A detached residential building designed for and occupied by one household only.

Dwelling, Two-Unit
A residential building designed for or occupied by two households living independently of each other in individual dwelling units.

Dwelling, Multi Unit
A residential building designed for or occupied by three or more households, with the number of households in residence not exceeding the number of dwelling units provided or permitted.

Dwelling Unit
One room, or rooms connected together, constituting a separate independent housekeeping establishment for owner occupancy, rental or lease, and physically separated from any other rooms or dwelling units which may be in the same structure. For the purpose of this definition, an independent housekeeping establishment includes the following minimum attributes: space devoted to kitchen facilities for the storage, preparation and consumption of food (including counters, cabinets, appliances, and a sink for washing dishes), space for one or more bedrooms for sleeping, and a bathroom with a tub and/or shower. (A bar equipped with a bar-sink and an under-the-counter refrigerator shall not constitute kitchen facilities.)

Ecological Integrity
The state or condition of being intact, whole, complex, yet stable; in ecology, the term refers to a naturally occurring condition largely unaffected by human disturbance where biodiversity and the physical, chemical, and biological factors that influence it are capable of co-evolving in repeatable patterns over long periods of time.

Essential Services
The erection, construction, alteration or maintenance by public utilities or municipal or governmental agencies of underground or overhead gas, electrical, steam or water transmission, or distribution systems, including poles, wires, mains, drains, sewers, pipes conduit, cables, fire alarm boxes, police call boxes, traffic signals, hydrants, road signs, and similar equipment and accessories in connection there-with, *but not including buildings*, reasonably necessary for the furnishing of adequate service by such public utilities or municipal or other governmental agencies or for the public health or safety or general welfare.

Equipment, Heavy
Includes backhoes, bucket loaders, excavators, skid-steers, bulldozers, graders, self-propelled compaction devices, cranes, booms, scrapers and pans used in site preparation and road construction, as well as skidders, shears, whole-Tree chippers, firewood processors and portable sawmills used in logging operations. Farm or agricultural implements are excluded from this definition.

Fen
Any peat-accumulating wetland that has either a defined inflow or outflow of surface water. Also see **Bog**.

Frontage, Road
The width of a lot measured along its common boundary with the road line. Lots will be provided access from a common boundary with the road line where this common boundary meets the minimum length required by the Zoning Ordinance. Lots fronting more than one road shall count only the length of the road where the lot access is located as their frontage.

Glare
Intense and blinding light causing visual discomfort or disability.

Group Development
The residence of a group of six or more persons, not related by blood, marriage, adoption, or guardianship and living together as a single unit.

Guest Facilities
Bed and Breakfasts, inns, campgrounds, boarding houses, and camps.

Heavy Vehicle
Any vehicle having more than two axles.

Hydric Soils
Soils that are saturated, flooded or ponded long enough during a sufficient portion of the growing season to develop anaerobic (oxygen lacking) conditions in the upper soil layers. Hydric soils are generally poorly drained or very poorly drained.

Interest Holder
Shall mean the applicant; abutters of any portion of the subject property; and holders of conservation, preservation, or agricultural restrictions on the subject property(ies).

Junk Yard
Any business or any place of storage or deposit, whether in connection with another business or not, which has stored or deposited two or more unregistered motor vehicles which are no longer intended or in condition for legal use on the public highways, or used parts or motor vehicle or old iron, metal, glass, paper, cordage, or other waste or discarded or secondhand material which has been a part, or intended to be a part, of any motor vehicle, the sum of which parts or material shall be equal in bulk to two or more motor vehicles. Junk yard shall also include any place of business or storage or deposit of motor vehicles purchased for the purpose of dismantling the vehicles for parts or for use of the metal for scrap and where it is intended to burn material which are parts of a motor vehicle or cut up the parts thereof (RSA 236:112).

Lot
A parcel of land occupied or to be occupied by only one principle building and the accessory buildings or uses customarily incidental to it. A lot shall be of sufficient size to meet minimum zoning requirements for use, coverage and area, and to provide such yards and other open spaces as are herein required.

Lot Size Averaging
A method of subdivision allowed in the Forest Conservation District to allow a greater density of development while increasing preserved open space and providing greater flexibility to land owners.

Low Impact Development
A stormwater management approach focusing on controlling stormwater by using small,

decentralized methods to treat stormwater close to the source. The primary goals of LID are accomplished through LID site planning and LID treatment practices including 1.) lessening the impact of development, and impact of stormwater resulting from that development on the natural environment; 2.) using the land more efficiently; and 3.) lowereing capital and operating costs associated with development. This is unlike conventional stormwater management which focuses on piping stormwater away from a site to large centralized stormwater treatment areas.

Luminaire (light fixture)
A complete lighting unit consisting of one or more electric lamps, the lamp holder, any reflector or lens, ballast (if any), and any other components or accessories.

Manufactured Home
Any structure, transportable in one or more sections, which, in the traveling mode, is eight body feet or more in width and 40 body feet or more in length, or when erected on site, is 320 square feet or more, and which is built on a permanent chassis and is designed to be used as a dwelling with or without a permanent foundation when connected to required utilities, which include plumbing, heating and electrical heating systems contained therein (RSA 674:31). A manufactured home as defined in this section shall *not* include pre-site housing or recreational vehicles

Manufactured Housing Park
Any lot land on which two or more manufactured houses are parked and occupied for living purposes. A manufactured house occupied as the principal residence of the land owner shall not be counted in this definition as long as density requirements are met.

Marsh
~~Marsh means a~~A wetland that is distinguished by the absence of trees and shrubs; is typically dominated by soft-stemmed herbaceous plants such as grasses, reeds, and sedges; and where the water table is at or above the surface throughout the year.~~, but can fluctuate seasonally.~~

Naturally Occurring
Any surface water that was present prior to pre-colonial European settlement, and that retains physical, chemical, and biological characteristics that are largely unaffected by human disturbance. Note that some surface waters which have been partly excavated, ditched, diked, or dammed may have retained or recovered such characteristics as would normally be found in a pristine water body unaffected by human influences.

Non-conforming Structure, Use, or Lot
A structure, use, or lot that existed legally prior to the adoption of the provision in the zoning ordinance which now prohibits or restricts it.

Outdoor, Active Recreation Uses
Leisure-time activities, usually of a formal nature and often performed with others, requiring equipment and taking place at prescribed outdoor places, sites, or fields. Outdoor, Active Recreation Uses include, by way of example, baseball, softball, soccer and other field sports; outdoor track; tennis and other outdoor court games; golf; outdoor basketball courts; trails for hiking, biking, cross-country skiing and equestrian uses; and outdoor equestrian facilities.

Outdoor, Passive Recreation Uses
Outdoor activities that involve relatively inactive or less energetic activities, such as walking, bird

watching and picnicking.

Overlay District
An area which is subject to special, additional regulations to protect a natural resource. An Overlay District is superimposed over the underlying use district(s.) The special regulations of an Overlay District are in addition to the regulations of the underlying zoning district(s.) Uses permitted in the underlying use district may be prohibited or require a Special Exception subject to conditions of the Overlay District. In case of conflict between the Overlay District and the underlying use district, the more restrictive shall apply.

Parking Space
An off road space available and sufficient for parking of one motor vehicle.

Pre-site Built Housing
Any structure designed primarily for residential occupancy which is wholly or in substantial part made, fabricated, formed, or assembled in off-site manufacturing facilities in conformance with the United States Department of Housing and Urban Development minimum property standards and local building codes, for installation, or assembly and installation, on the building site. Pre-site built housing shall not include manufactured housing as defined in RSA 674:31.

Recreation Facilities
An area and appurtenances designed for the purpose of leisure time activities such as:

a. Publicly-owned recreational facilities: town, county or state areas; ponds and lakes; also forest areas where timber is privately owned, but which are open to the public through permanent easement.
b. Privately-owned tax exempt recreational facilities that are available to the public; example: civic organizations that have a tax exempt status. Privately-owned, noncommercial recreation facilities that are not generally available to the public (example: veterans' organizations).

Recreational Vehicle
A vehicle which is

a. built on a single chassis;
b. 400 square feet or less when measured at the largest horizontal projection;
c. designed to be self propelled or permanently towable by a light duty truck; and
d. designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use.

Right-of-way
Includes all town, state and federal highways, and the land on either side of same, as covered by the Statutes, to determine the widths of the right-of-way. It shall also include any private access documented by deed or approved plan.

Road or Public Way
The public rights-of-way which the Town or State has the duty to maintain regularly or a right-of-way shown on a subdivision plat which provides the principal means of access to abutting property approved by the Planning Board and recorded with the County Register of Deeds. The word **road** shall include the entire right-of-way. A discontinued road shall not constitute an existing approved road for the measurement of frontage along the road lot line.

RSA
Revised Statutes Annotated, State of New Hampshire.

Septage
This means septage as defined by RSA 485-A:2, IX-a, namely" material removed from septic tanks, cesspools, holding tanks or other sewage treatment storage units, excluding sewage sludge from public treatment works and industrial waste". Septage includes domestic septage as well as septage from industrial and commercial sources.

Septic System
An underground system used for the decomposition of domestic wastes including a septic tank, connection lines, a distribution box, distribution lines and a disposal or leach field.

Sign
Any combination of letters, numerals, lines, symbols, shapes or designs, in any medium, on any surface, intended to convey the identity of, or information about, any person, place, thing, product, or service.

Sludge
This means sludge as defined by RSA 485-A:2,XI-a, namely "the solid or semisolid material produced by water and wastewater treatment processes".

Special Exception
A use of a building or lot which may be permitted under this Ordinance only upon application to the Zoning Board of Adjustment and subject to the approval of the Board when such use would be in harmony with the Town Plan and would not be detrimental to the public health, safety, order, comfort, convenience, appearance, prosperity or general welfare and only in cases where the words "Special Exception" in this Ordinance pertain.

Stream, Intermittent
A stream that only flows during periods of high water tables, i.e. generally during winter months and after significant rainfall events. Intermittent streams are visible during the dry times of year as channelized rivulets with mineral soil as the substrate.

Stream, Permanent
A stream that generally flows year-round because its bed lies below the water table, or because more water is supplied from upstream than can infiltrate the ground.

Structure
Anything constructed, placed, or erected on the ground, or attached to something already existing on the ground, with or without durable foundation, whether temporary or permanent. Among other things, structures including buildings, manufactured homes, pre-site built housing, walls, decks or platforms, temporary carports and storage structures, sheds, greenhouses and other accessory structures (including Dish Antennas or satellite earth stations that are over 3 feet in diameter). The following are excluded from the definition of "structure:" fences, stone walls, animal shelters under 15 square feet, children's swing sets, dumpsters, flagpoles, sand boxes, playhouses and other playground equipment, signs and sign installation devices, tents for camping and temporary tent structures used for functions and gatherings.

Surface Waters
Surface waters ~~to~~ include **naturally occurring** lakes, ponds, permanent streams, wetlands, and vernal pools.

Swamp
~~Swamp means a~~A wetland that is dominated by trees and shrubs.

Town
The entire Town of Springfield extending to the boundaries with the surrounding towns.

Town Plan
The Master Plan as defined in RSA 674:2-4, to be implemented by the appropriate administration of the Springfield Subdivision Regulations and Zoning Ordinance.

Tract
A relatively large land area to which density standards can be applied in considering potential subdivision into lots or possible use for multiple building units without subdivision.

Variance
A relaxation of the terms of this Ordinance, where such relaxation will not be contrary to the public interest and where, owing to conditions peculiar to the property, a literal enforcement of this Ordinance would result in unnecessary and undue hardship. Variances can only be granted by the Zoning Board of Adjustment.

Vernal Pool
Any **naturally occurring**, temporary body of water that a) lacks fish; and b) contains one or more obligate breeding amphibians, specifically mole salamanders (Ambystomidae) or wood frogs; and c) contains macro-invertebrates typically found in ephemeral, fishless ponds. Vernal pools are typically inundated at a depth greater than 10 inches during 60 or more days in late winter – spring, and dry up during the summer months.

Water Body
Any pond or lake of one acre or more and any permanent stream. (See also "Permanent Stream.")

Wetland
Wetland means "wetlands", as defined by RSA 482-A:2,X, namely "an area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions". Wetlands include swamps, marshes, bogs and similar areas. See the specific definitions for bog, marsh, and swamp.

Appendix G

What is the Springfield Wetlands Project?

Overview

In early 2013 the Springfield Planning Board applied for a grant to make changes to the town wetland regulations. Voters supported this grant at the 2013 Town Meeting. The Springfield Wetlands Project will continue the work of the Planning Board and its Wetland Committee and make changes to the Town regulations.

Project Goals

- Simplify the current wetland and shoreland regulations. Make the regulations easy to understand and enforce.
- Develop a more accurate town-wide wetland map and integrate it into the permitting process.
- Maintain property owner rights to reasonably use their land while protecting important natural resources.
- Have broad public participation in the planning process.

Planning Board Public Meeting

December 19, 2013, 7:00 PM

Location: Springfield Public Works & Public Safety Building, 2791 Main Street

The Planning Board will be reviewing the new wetlands map and draft zoning amendment language. Open to the public.

Town of Springfield
2750 Main Street
Springfield, NH 03284
www.springfieldnh.net

SPRINGFIELD WETLANDS PROJECT

Project Update for Springfield Residents and Property Owners

Public Meeting December 19, 2013
Hosted by the Springfield Planning Board
Time: 7:00 PM
Location: Springfield Public Works & Public Safety Building
2791 Main Street, Springfield, NH

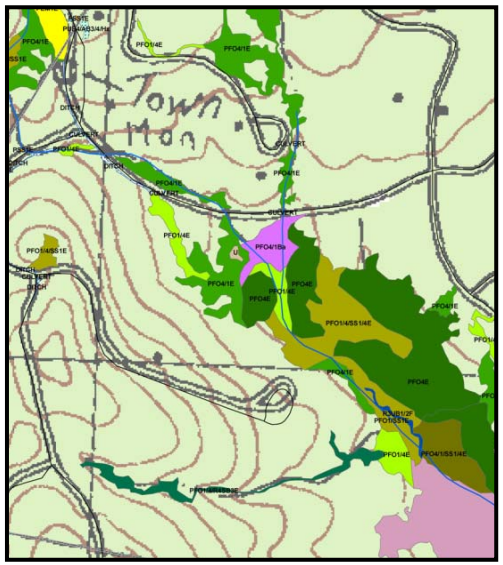
Springfield Wetlands Project Update

Town-Wide Wetland Mapping

The town presently uses a wetland map based on the National Wetland Inventory. As part of this project Rick Van de Poll, PhD., a Certified Wetland Scientist, has been working on a detailed town-wide wetland map based on Aerial Photo Interpretation and extensive field observations.

On December 19 Dr. Van de Poll will present the completed wetland map. This new wetland map will be a significant improvement over the existing wetland map Town representatives use as a reference.

A side-by-side comparison of a portion of the current and new wetland maps is on display at the Springfield Town Office for public viewing.



Aerial Photo Interpretation Map

Draft Zoning Changes

In addition to a new map, Dr. Van de Poll has been developing amended zoning language to meet the project goals of making Springfield's regulations easy to understand and enforce. These amendments have arisen from the following sources:

- 2012 Proposed Wetlands Ordinance Changes Report by the Springfield Wetlands Committee.
- Public input during the May 2013 public forum.
- Planning Board and Conservation Commission review of draft language.
- Professional experience with writing and amending ordinances in 12 towns and cities in N.H.

ABOUT THE WETLAND SCIENTIST

Dr. Rick Van de Poll is the principal of Ecosystem Management Consultants (EMC) of Sandwich, New Hampshire and is a Certified Wetland Scientist (#110) in the state of New Hampshire. Since 1988, Dr. Van de Poll has conducted wetland delineations and wetland assessments on over 250,000 acres in 72 towns. He has served as Chairman of the NH Joint Board of Natural Scientists and has taught various wetland courses at the graduate, undergraduate, and high school level, including Wetlands Science and Policy, Wetlands Flora, and Wetlands Identification. He is the senior wetland scientist author of the 'NH Method' (2013) and offers training workshops around the state with the other co-authors. He has ongoing involvement in statewide and national initiatives on wetland education and

Education and Outreach

Public outreach have been a focus for this project. In addition to direct mail the Planning Board hosted a public session at the Town Hall in May 2013, the Conservation Commission hosted project displays during the Old Home Day festivities in July 2013, and Dr. Van de Poll helped instruct Kearsarge Regional High School students about wetland ecology and wildlife in the fall 2013 .

You are invited to the December 19 Planning Board meeting to learn more about the project and why the Planning Board believes it is in the Town's interest to do this work.

Questions? Call Michael McCrory, Senior Planner at UVLSRPC (448-1680).

Dr. Van de Poll teaching students about wetlands

The Springfield Wetlands Project has been made possible through a Community Planning Grant from New Hampshire Housing and the US Department of Housing and Urban Development.

New Hampshire Housing
Bringing You Home

US Department of Housing and Urban Development