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Portsmouth Vernal Pool Inventory

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Portsmouth Vernal Pool Inventory

Prepared for:

City of Portsmouth, NH
Conservation Commission

Prepared by:



122 Mast Road, Suite 6, Lee, NH 03861

in cooperation with

The City of Portsmouth Planning Department

and

New Hampshire Estuaries Project

October 2008

This project was funded by a grant from the New Hampshire Estuaries Project, as authorized by the U.S. Environmental Protection Agency's National Estuary Program.



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I. EXECUTIVE SUMMARY

West Environmental, Inc. (WEI) conducted a city-wide Vernal Pool Inventory to locate, document and map vernal pools in Portsmouth. This effort was coordinated with the Portsmouth Planning Department and Conservation Commission to help the City of Portsmouth in vernal pool identification and mapping. The goal of this project was to locate isolated wetlands that provide vernal pool habitat. Currently the City of Portsmouth's wetland regulations exempt wetlands less than 5,000 square feet from the local 100' buffer zone. This study identified smaller wetlands which have the potential to provide vernal pool habitat that may deserve the 100 foot buffer protection. It should be noted that vernal pool habitat can exist in a variety of freshwater wetlands including larger red maple swamps. These areas were also mapped when encountered. A field workshop was held for the Conservation Commission members to give them hands-on training in vernal pool ecology. The results of this Vernal Pool Inventory were presented to the Portsmouth Conservation Commission in July of 2008. Based on the results of this study and the recent revisions to the NHDES Wetlands Bureau regulations which added rules for vernal pool protection, the Portsmouth Conservation Commission has recommended a change to the Article 8 - Environmental Protection Standards of the City of Portsmouth to include vernal pool identification and protection with a 100' buffer.

II. VERNAL POOLS DEFINED

The NHDES wetlands Bureau defines a vernal pool in their Administrative Rules Env-Wt 101.99 as “a surface water or wetland ... which provides breeding habitat for amphibians and invertebrates that have adapted to the unique environment of such pool and which... typically has the following characteristics:

- Cycles annually from flooded to dry conditions, although the hydroperiod, size, and shape of the pool might vary from year to year;
- Forms a shallow depression or basin;
- Has no permanently flowing outlet;
- Holds water for at least 2 contiguous months following spring ice-out;
- Lacks a viable fish population; and
- Supports one or more primary vernal pool indicators, or 3 or more secondary vernal pool indicators”

Primary vernal pool indicators include wood frogs, mole salamanders and fairy shrimp. Secondary indicators include species of aquatic insects including the larvae of caddisfly, dragonfly, and damselfly; fingernail clams and certain aquatic beetles; and other specific species that inhabit vernal pools.

III. METHODOLOGY

This inventory utilized the following methodology to identify and map the vernal pools of Portsmouth:

- Establishment of 10 vernal pool focus areas
- Review and implementation of Spring 2006 color aerial ortho photos
- Evaluation of City-wide topographic overlay onto 2006 color aerial photography
- Spring 2008 field reconnaissance
- Collection of vocalization data
- Collection of physical characteristics of each pool (where possible)
- Identification of specific vernal pool species
- A review of existing site evaluations
- Mapping the limits of identified pools

Aerial photos of each focus area were evaluated to locate the presence of standing water and potential pools were identified. Field reconnaissance was conducted during early breeding season and egg laying (4/16 – 5/12/08) when wood frog vocalization was at its peak. Mapping was performed utilizing 2006 city-wide topography over Spring 2006 color aerial ortho photos. Follow up inspections were conducted to verify pool hydrology in mid- to late-June.

Limitations

This study was partially constrained by access to private property and as a result focused on collection of amphibian vocalization in suitable vernal pool habitat. A complete vernal pool survey was not possible; therefore each pool identified in this study is noted as a potential vernal pool. A Vernal Pool Documentation Sheet was completed for each potential vernal pool. However, typical data collected through dip netting including aquatic invertebrate sampling was not performed. A sample of this form is in Section V.

IV. VERNAL POOL DOCUMENTATION SHEET

Observer's name: _____ Focus Area: _____

Address: _____ Pool ID: _____

Location of Pool: _____

Photos attached: _____ pool _____ animals

Date: _____ Weather: _____ Pool Size: _____ Water Depth: _____
(estimated)

SPECIES

- adult
- vocalization
- amplexus
- courtship
- spermatophores
- eggs
- tadpoles/larvae
- juveniles
- macroinvertebrates

Comments: _____

SITE/TYPE _____ upland-isolated (pool not associated with wetland) Setting:
 _____ bottomland-isolated (pool in its floodplain – not a wetland)
 _____ wetland complex (pool within or associated with a larger wetland habitat)

HABITAT (estimate % of type)

_____ woodland (specify type)	deciduous	coniferous	mixed
_____ agriculture or open fields			
_____ gravel pit			
_____ residential			
_____ roadside			
_____ other			

OVERSTORY _____ heavy overstory, >50% shrubs and/or trees
 _____ moderate overstory, <50% shrubs and/or trees
 _____ open site with grasses, forbs, scattered shrubs

COVER (estimate % of type)	BOTTOM (estimate % of types composing bottom surface)
_____ shrubs	_____ sand
_____ emergent vegetation	_____ mud/soft sediment
_____ branches, twigs	_____ leaf litter
_____ submergent vegetation	_____ submergent vegetation
_____ sphagnum moss	_____ emergent vegetation
_____ other	

Dominant Plants in Pool:

Dominant Plants around Pool:

COMMENTS:

V. FINDINGS AND FOCUS AREA SUMMARIES

A key component to function of vernal pools is the presence of suitable dispersal habitat for amphibians in the form of undeveloped forest. A vernal pool is only viable if the surrounding upland provides a woodland community for the adult amphibians to utilize for the majority of the IV life cycle. Significant portions of the City of Portsmouth have been urbanized and do not have suitable forest to support vernal pool species. These constraints were utilized in the identification of focus areas and major portions of the city were not included in this study due to dense urbanization.

A total of 33 potential vernal pools were identified in this study. There are several clusters of vernal pools located within the less developed portions of Portsmouth. These include a cluster in Focus Area 1 in the vicinity of Walker Bungalow Road and Maritime Cottage Road. This cluster appears to be the most important and includes six vernal pools, three of which are large and could support significant numbers of amphibians. A second cluster is located off Jones Avenue which had been previously identified as part of a site evaluation on a city-owned property. This cluster also includes six vernal pools with only one larger pool and several small satellite pools (smaller pools that may not be utilized every breeding season). Both of these clusters have viable supporting upland habitat and may support additional amphibian species including mole salamanders.

Focus Area 3 had five pools, one of which is a large pool located south of Elwyn Road across from the Urban Forestry Center. This pool is limited by its proximity to both the road and adjacent residential subdivision which decreases the ability of amphibians to utilize the supporting upland habitat. There is also a large area of vernal pool habitat within a forested wetland south of Elwyn Road and east of Harding Road.

The remaining potential pools are scattered throughout six other focus areas and they range from very small isolated wetlands to vernal pool habitat in larger forested wetlands. Some of these pools are in suitable forest habitat and others are in locations that are compromised by adjacent development.

A summary of the field work for each focus area follows. Photos of a few vernal pools are also included in this section. Vernal Pool Data Sheets are included in Appendix A.

Portsmouth Focus Area 1

- #1A**
- Large **vernal pool** with open canopy and bordered by lawn on western boundary
 - 36” standing water
 - Calling wood frogs noted
 - Shrub species include highbush blueberry and dense winterberry
 - Herb species include some grasses and sedges
 - Numerous egg attachment sites present
- #1B**
- Large **vernal pool** with small open canopy area
 - 36” standing water
 - Calling wood frogs noted
 - Connected to #1a upstream
 - Canopy species include red maple and white pine
 - Shrub species include highbush blueberry and winterberry
 - Numerous egg attachment sites present
- #1C**
- Largest **vernal pool**
 - 36” standing water
 - Calling wood frogs noted
 - Egg masses were observed
 - Canopy species include red maple and white pine
 - Shrub species include highbush blueberry and winterberry
 - Open canopy area with dense shrubs
 - Numerous egg attachment sites present
- #1D**
- **Vernal pool** with small open canopy
 - 24” standing water
 - Calling wood frogs noted
 - Canopy species include red maple and white pine
 - Shrub species include highbush blueberry and winterberry
- #1E**
- Not a vernal pool – small wetland pocket
- #1F**
- **Vernal pool** with small open canopy
 - 12” standing water
 - Adult wood frogs and egg masses observed
 - Canopy species include red maple
 - Shrub species include highbush blueberry
 - Herb species include cinnamon fern and sedges
- #1G**
- Stream and associated wetland

Portsmouth Focus Area 2

- #2A**
- **Vernal pool** with 24” of standing water
 - Calling wood frogs noted
 - Canopy species include red maple and red oak
 - Shrub species include highbush blueberry and maleberry
 - Herb species include some grasses and sedges
 - NHSC info - Fairy shrimp, American toad, whirligig beetle, egg strands, caddisfly larvae were noted
- #2B**
- Possible **vernal pool** with 24” of standing water
 - Canopy species include red maple
 - Shrub species include highbush blueberry and winterberry
 - NHSC info - green frog larvae, water boatman, water strider
- #2C**
- **Vernal pool** with 12” standing water
 - Calling wood frogs noted
 - Canopy species include red maple
 - Shrub species include highbush blueberry and winterberry
 - NHSC info –Wood frog egg masses and larvae and water striders
- #2D**
- **Vernal pool** with 20+” standing water
 - Calling wood frogs noted
 - 36 wood frog egg masses, wood frog larvae and water striders noted
 - Canopy species include red maple
 - NHSC info -Shrub species include highbush blueberry and winterberry
- #2E**
- **Vernal pool** adjacent Jones Avenue with 12” standing water
 - Calling wood frogs noted
 - Canopy species include red maple and white ash
 - Shrub species include highbush blueberry and winterberry
 - NHSC info - Caddisfly larvae and egg masses observed
- #2F**
- NHSC info - **Vernal pool** with 12” standing water
 - Calling wood frogs noted
 - Canopy species include red maple
 - Shrub species include highbush blueberry and winterberry
 - NHSC info-11 wood frog egg masses and wood frog larvae observed
- NHSC –** This information comes from a report prepared by NHSC, Inc. entitled Vernal Pool Assessment Jones Avenue Tax Map 228, Lot 1 dated June 2007

Portsmouth Focus Area 3

- #3A** ▪ Man made pond
- #3B** ▪ Shadows, part of larger wetland
- #3C** ▪ Not a wetland
- #3D** ▪ Stream with shadows
- #3E** ▪ Large **vernal pool**
 - Scrub-shrub wetland with open canopy in the middle
 - Canopy species include red maple
 - Shrub species include highbush blueberry, winterberry and buttonbush
 - Peepers and caddisfly larvae noted
 - Calling wood frogs noted
 - Excellent structure numerous egg attachment sites present
- #3F** ▪ Small **vernal pool**
 - Calling wood frogs noted
 - Canopy species include red maple
 - Shrub species include highbush blueberry
 - Ledge bound
- #3G** ▪ pond
- #3H** ▪ Looks like pond (no access)
- #3I** ▪ Looks like pond (no access)
- #3J** ▪ Very small **vernal pool** next to driveway and Elwyn Road
 - Calling wood frogs noted
 - May have water quality issues
- #3K** ▪ Potential **vernal pool**
 - Calling peepers noted
 - Very small
- #3L** ▪ **Vernal pool** habitat within large red maple swamp
 - Many calling wood frogs noted
 - Canopy species include red maple
 - Shrub species include highbush blueberry and winterberry
 - Herb species include cinnamon fern

Portsmouth Focus Area 4

- #4A**
- Not present (aerial photo image possibly caused by a large white pine “signature”)
- #4B**
- Off road to Spring Brook Condominiums – this wetland is situated just east of the tennis court/swimming pool recreational area
 - Depth of water is 3-4’
 - Wetland is more pond-like in character and associated with scrub-shrub wetland along east and south perimeter with much shallower water
 - Depth of water may accommodate fish species
 - Western end is more emergent in character
 - Photo documentation taken
- #4C**
- This wetland was located off Lang Road and adjacent a field
 - PFO1E in character
 - This vernal pool is surrounded by perimeter of hardwoods (red oak, red maple, black birch)
 - Depth of water is 36”
 - 2 wood frog egg masses, 1 giant water beetle, and water striders were observed
 - Habitat features including leaf litter, forested canopy, perimeter of wetland shrubs for egg attachment and adjacent forested tract were observed
 - Indicator species were found
 - Photo documentation taken
- #4D**
- This wetland was located off Lang Road and across from Beechstone Luxury Apartments
 - PFO1/4E in character
 - Mostly surrounded by white pine and red maple – a few internal wetland shrubs of highbush blueberry and winterberry were observed
 - Depth of water is 36”
 - Water striders and mosquito larvae were observed, but no indicator species were present
 - Habitat features including critical water depth, leaf litter, forested canopy, internal shrub vegetation for egg attachment and adjacent forested tract were observed
 - Restraints observed included potential salt contamination from Lang Road, nearby brush pile/debris piles, and scattered trash
 - Photo documentation taken

Portsmouth Focus Area 5

#5A

- Access via a nearby power line (off Ocean Road)
- PEM1E in character
- Vegetation is chiefly comprised of broad-leaved cattails, sensitive fern, and interspersed meadowsweet shrubs
- There is an overflow structure located at the center of the wetland – it is unclear if wetland is also serving in stormwater collection
- Pool depth was approximated at 4”
- Usage by vernal pool species was questioned due to the wetland’s position with commercial development and Ocean Road
- Wetland may actually be located in Greenland
- Photo documentation taken

#5B

- Access via Ocean Village Development (off Ocean Road)
- Pond-like in character
- Incoming/outgoing flowage
- Average depth was estimated at 4-5’
- Perimeter of eastern hemlock and red maple
- Appears that water depth may support a fish population
- Hydrologically connected with red maple/skunk cabbage swamp on the north and by an emergent pool (#5c) on the south
- Photo documentation taken

#5C

- PEM1E in character
- This pool has an Atlantic white cedar and red maple perimeter
- The core vegetation is comprised of wetland grasses with an interspersed meadowsweet shrubs
- Water depth was estimated at 12-14”
- Incoming/outgoing flowage
- Mosquito larvae and water striders were noted
- The wetland appears to have the potential to support vernal pool species
- The wetland is hydrologically connected with #5d on the south
- Photo documentation taken

#5D

- PFO4/1E in character
- This is an Atlantic white cedar/white pine/red maple forested wetland
- There is an interspersed highbush blueberry shrub component
- Flowage was evidenced outgoing
- Water depth was estimated at 12-14”
- The topography was pit & mound
- Mosquito larvae and water striders were observed
- This pool also appears to be capable of supporting vernal pool activity
- Photo documentation taken

Portsmouth Focus Area 6

- #6A**
- Not present (aerial photo image possibly caused by white pine “signature” along with an elevation change in the topography)
- #6BB**
- Observed a forested-scrub/shrub wetland with approximately 6” of pooled water with pit & mound topography
 - No visual evidence of any indicator species
 - Observed the following macroinvertebrates: water striders, mosquito larvae, whirligig beetles
 - #6BB may provide potential vernal pool habitat
 - Leaf litter, an adjacent tree canopy, and internal shrubs/detritus for egg attachment are present
 - Potential may be restrained by proximity to commercial development, Heritage Road, and active railroad tracks
 - Calling barred owls were heard in the adjacent white pine forest
- #6B**
- Appears this wetland may have been part of #6b prior to the railroad track installation
 - Observations made were similar to #6b
- #6C**
- This wetland was emergent in character (PEM1E) being chiefly comprised of broad-leaved cattails with perimeter of sapling trees
 - Average depth of pooled water was 8”
 - There was no evidence of vernal pool indicator species
 - A green frog was heard
- #6D**
- Not a vernal pool
 - Part of a larger red maple swamp
- #6DD**
- This wetland contains a pooled area just south and adjacent the access road providing access to the nearby ball field
 - The wetland is scrub-shrub in character surrounded by white pine
 - No indicator species were observed
 - The depth of pooled water was approximately 12”
- #6E**
- Old test pit in red maple swamp
 - Vernal pool in forested wetland
- #6F**
- Calling wood frogs noted
 - Canopy species include red maple and eastern hemlock
 - Shrub species include winterberry, highbush blueberry, and speckled alder
 - Herb species include cinnamon fern, Canada mayflower
 - Closed canopy
- #6G**
- Last two photos
 - Squeezed between railroad and Banfield Road
 - See notes in yellow folder

Portsmouth Focus Area 7

- #7A**
 - Possible vernal pool
 - Part of wetland drainageway
 - Water depth of 6”

- #7B**
 - Possible vernal pool
 - Water depths of 8+”

- #7C**
 - Vernal pool
 - Part of red maple swamp
 - Canopy species include red maple
 - Shrub species include highbush blueberry, winterberry and maleberry
 - Herb species include cinnamon fern and Canada mayflower
 - Calling wood frogs noted

Portsmouth Focus Area 8

- #8A**
 - Not a vernal pool
 - Man made pond in sand pit
 - Bullfrogs observed

- #8B**
 - Dense area of large white pine

Portsmouth Focus Area 9

- #9A**
 - Detention basin

- #9B**
 - Detention basin

- #9C**
 - Mitigation basin

- #9D**
 - Mitigation basin

- #9E**
 - Detention basin

Portsmouth Focus Area 10

- #10A**
 - Potential vernal pool
 - Water depth of 12+”
 - Canopy species include red maple and white pine
 - Shrub species are sparse
 - Closed canopy
 - Adult wood frogs noted

- #10B**
 - Potential vernal pool
 - Adult wood frogs noted
 - Canopy species include red maple and dense white pine
 - Shrub species are sparse
 - Water depth of 12+”



1. This is a view of Pool 7C which is vernal pool habitat within a forested wetland. These types of pools are typically larger in size but have a shallow water depth.



2. This is a view of Pool 6F off of Ocean Road. This is a small pool with thick shrub habitat surrounding it.



3. This is a view of Pool 4C north of Lang Road. Vernal pools often have a mixed canopy around them which provides shading in portions of the pool.



4. This is a view of Pool 6DD. Some pools have water depth exceeding 36 inches during spring high water.



5. This is a spotted salamander which is a primary indicator species.



6. Wood frogs are a primary indicator species and were the most common species identified in this inventory.



7. This is a view of a wood frog egg mass at the pool surface attached to a shrub branch which is typical for this species.



8. This is a spotted salamander egg mass which has a cloudy white tinge to it and is also attached to a twig in the pool.



9. This is a view of a large wood frog egg mass which can contain up to 1,000 eggs.



10. This is a view of a hatching egg mass of wood frogs. Individual egg masses within a pool can hatch at different times based on water depth and shade from the surrounding forest canopy.

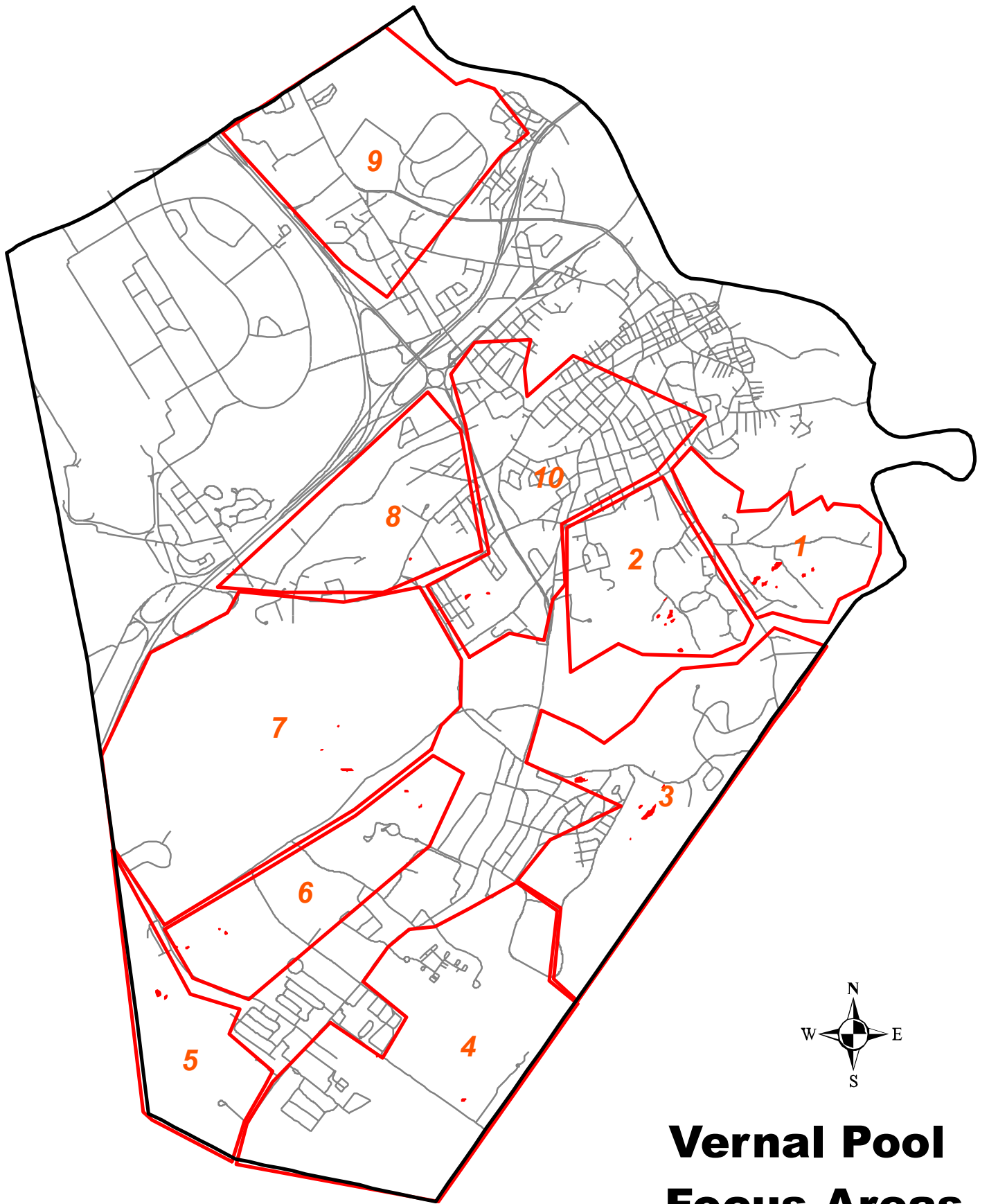


11. This is a view of a single fairy shrimp which is also a primary vernal pool indicator.

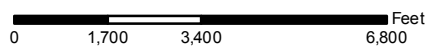


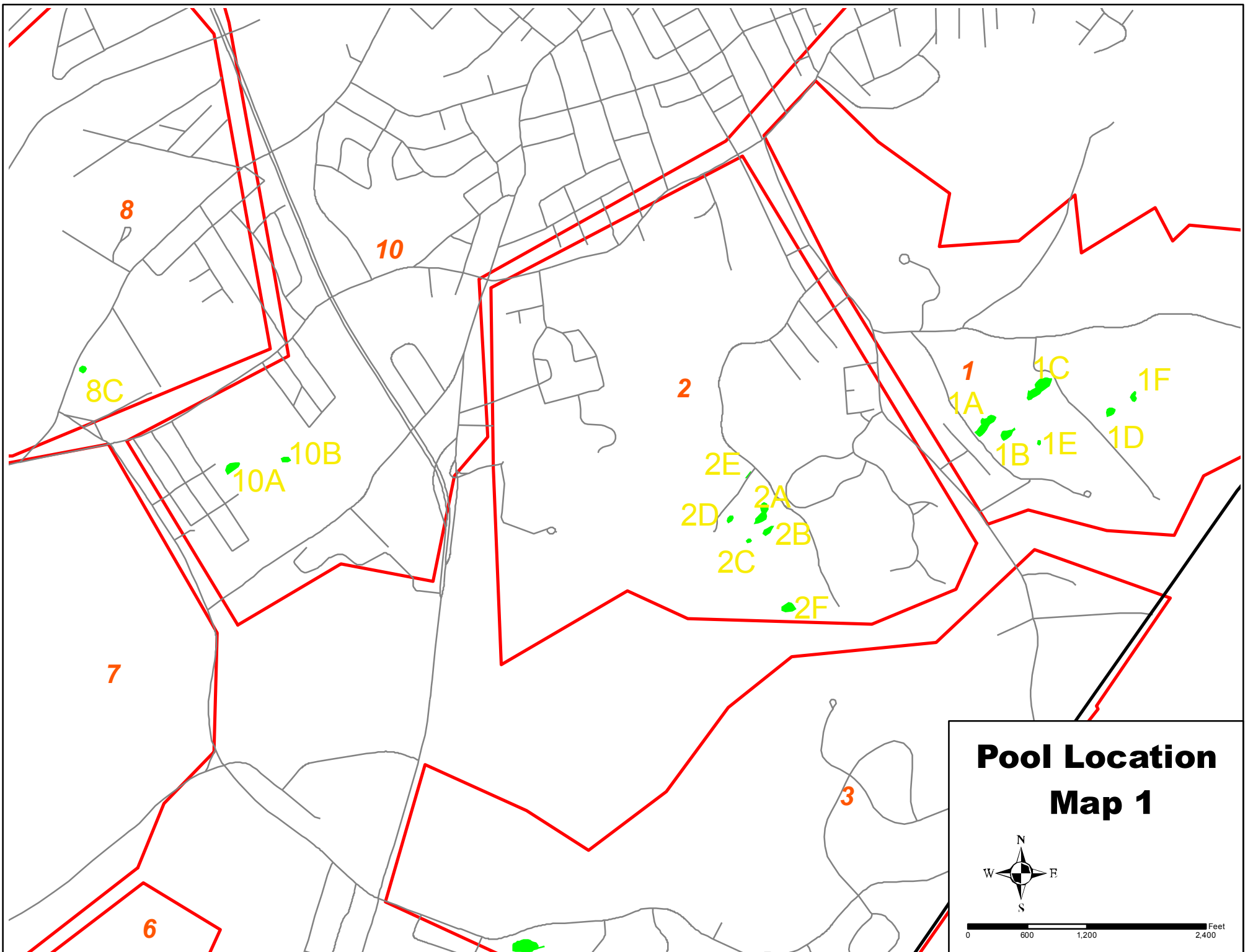
12. This is a view of caddisfly larvae which looks like a little pine cone and is typically constructed by very small twigs that provide a protective home for the larvae.

VI. FOCUS AREA AND POOL LOCATION MAPS



Vernal Pool Focus Areas

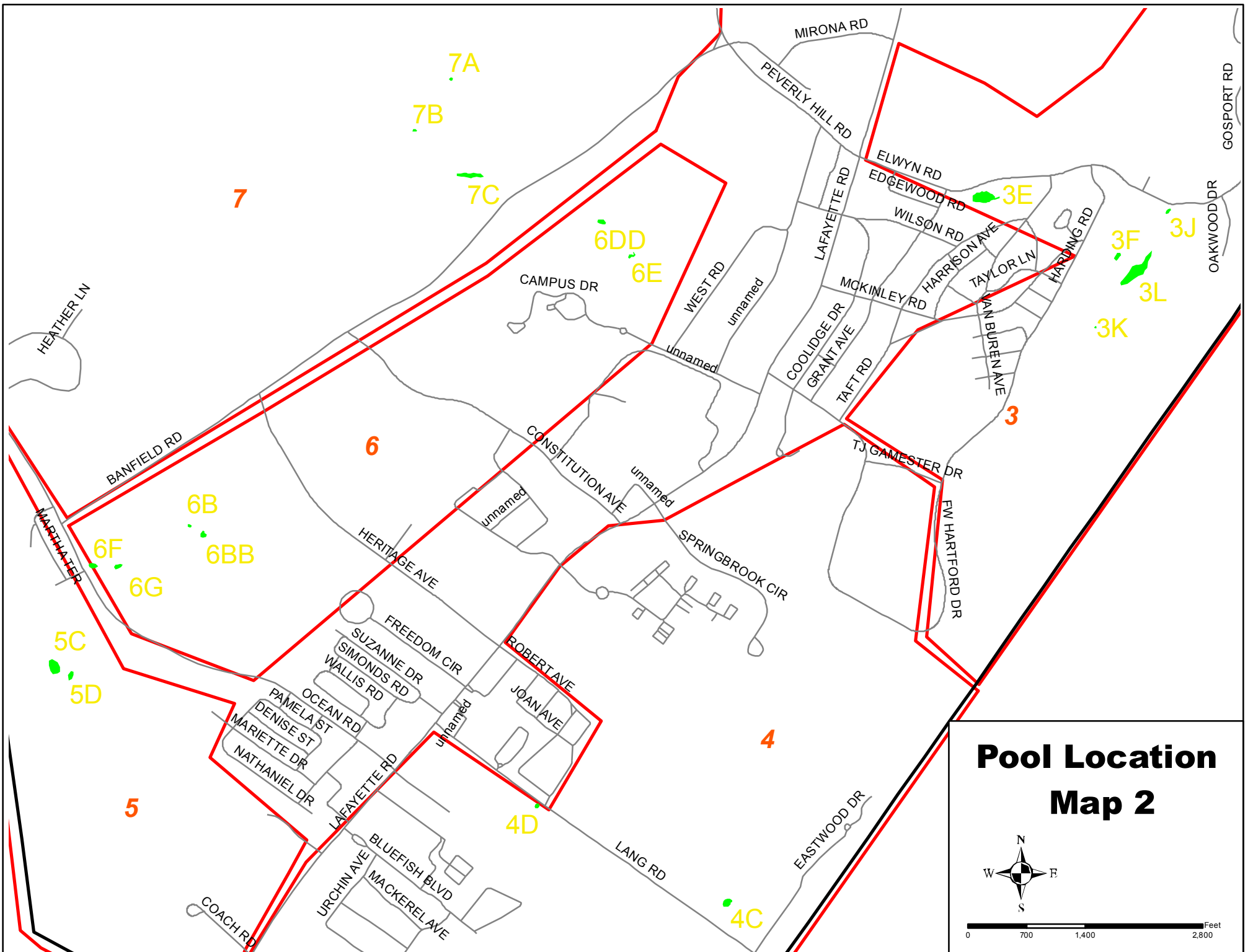




Pool Location Map 1



0 600 1,200 2,400 Feet



Pool Location Map 2

A north arrow is positioned above a scale bar. The scale bar is marked with 0, 700, 1,400, and 2,800 feet.

VII. REFERENCES

Burne, Matthew R. and Leo P. Kenney. A Field Guide to the Animals of Vernal Pools. Massachusetts Division of Fisheries & Wildlife. May 2000.

Identification and Documentation of Vernal Pools in New Hampshire. Anne Tappan, Ed. NH Fish & Game Department, Nongame and Endangered Wildlife Program. 1997.

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Science and Conservation of Vernal Pools in Northeastern North America. Aram J.K. Calhoun and Phillip G. deMaynadier, Ed. CRC Press. 2008.

Tynning, Thomas F. Stokes Nature Guides - A Guide to Amphibians and Reptiles. Little, Brown and Company. 1990.

Voshell, J. Reese, Jr. A Guide to Common Freshwater Invertebrates of North America. McDonald & Woodward Publishing Company. 2002.

APPENDIX A

Vernal Pool Documentation Sheets

[NHEP Note: The documentation sheets are not available electronically, as part of this file. Please contact the NHEP office for more information.]

APPENDIX B

**Proposed Revisions to
Wetland Protection Regulations**

Article 8 Environmental Protection Standards

- Section 10.810 Wetlands Protection**
Section 10.830 Earth Products Removal and Placement

Section 10.810 Wetlands Protection

10.811 Purpose

The purposes of this Section are:

1. To maintain, and where possible improve, the quality of surface waters and ground water by controlling the rate and volume of stormwater runoff and preserving the ability of wetlands to filter pollution, trap sediment, retain and absorb chemicals and nutrients, and produce oxygen.
2. To prevent the destruction of, or significant changes to, wetlands, related water bodies and adjoining land which provide flood protection, and to protect persons and property against the hazards of flood inundation by assuring the continuation of the natural or existing flow patterns of streams and other water courses within the City.
3. To protect, and where possible improve, potential water supplies and aquifers and aquifer recharge areas.
4. To protect, and where possible improve, wildlife habitats and maintain ecological balance.
5. To protect, and where possible improve, unique or unusual natural areas and rare and endangered plant and animal species.
6. To protect, and where possible improve, shellfish and fisheries.
7. To prevent the expenditure of municipal funds for the purpose of providing and/or maintaining essential services and utilities which might be required as a result of misuse or abuse of wetlands.
8. To promote the use of best management practices and low impact development in and adjacent to wetland areas.

10.812 Relationship to Other Regulations

- 10.812.10 The provisions and criteria set forth in this Section are in addition to the provisions of applicable state and federal laws and regulations, other sections of this Zoning Ordinance, and other local ordinances and regulations.

- 10.812.20 Where any provision of this Section conflicts with a state or federal law or regulation, another section of this Zoning Ordinance, or another local ordinance or regulation, the more restrictive provision shall apply.
- 10.812.30 Nothing in this Section shall permit a use or activity which is contrary to any other provision of the Zoning Ordinance.
- 10.812.40 Notwithstanding any other provisions of the Zoning Ordinance, the City of Portsmouth and its administrative and operating agencies and instrumentalities shall comply with the provisions of this Section.

10.813 Jurisdictional Areas

The provisions of this Section 10.810 apply to the following jurisdictional areas:

- 10.813.10 Any inland wetland, other than a vernal pool, that is 5,000 square feet or more in area;
- 10.813.20 Any vernal pool regardless of area.
- 10.813.30 Any non-tidal perennial river or stream.
- 10.813.40¹³ The inter-tidal areas and tidal wetlands of Sagamore Creek, Little Harbour, or North Mill Pond, defined as follows:
- (a) Sagamore Creek: Bounded by the easterly side of Peverly Hill Road and the southerly side of Greenleaf Avenue as these cross Sagamore Creek, and extending along the Creek to Little Harbour.
 - (b) Little Harbour: Extending along the Little Harbour shoreline from the municipal line with the Town of Rye to the southerly side of New Castle Avenue, and including Goose Island, Belle Island, Pest Island and that portion of Shapleigh Island lying south of New Castle Avenue.
 - (c) North Mill Pond: Extending along the westerly shoreline of North Mill Pond between Bartlett Street and Maplewood Avenue, and along the easterly shoreline of North Mill Pond between Bartlett Street and the North Cemetery lot.¹⁴

10.814 Identification and Delineation of Wetlands and Wetland Buffers

10.814.10 Wetlands

- 10.814.11 Wetlands shall be identified by use of the Federal Manual and/or Field Indicators, and shall be delineated by on-site inspection of soil types,

¹³ Adapted from Article III, §10-301(A)(7) in existing ordinance. Deleted prefatory reference to purposes because this section is now part of the “Wetlands” section.

¹⁴ Easterly shoreline reference adapted from Section 10-305(B)(4) in the existing ordinance.

vegetation, and hydrology by a New Hampshire certified wetland scientist at a time when conditions are favorable for such determination.

10.814.12 A created wetland shall be considered a wetland for the purposes of this section.

10.814.13 Any area which may have been a wetland but was filled prior to January 1, 1970 or pursuant to properly issued Federal, State and local permits granted prior to the adoption of this Ordinance shall be judged according to the conditions existing at the time an application for a building permit or subdivision is filed or submitted.

10.814.20 Wetland Buffers

10.814.21 The purpose of a wetland buffer is to reduce erosion and sedimentation into the adjacent wetland, vernal pool or water body, to aid in the control of nonpoint source pollution, to provide a vegetative cover for filtration of runoff, to protect wildlife habitat, and to help preserve ecological balance.

10.814.22 The required wetland buffer for a jurisdictional wetland or water body shall be defined as all land within 100 feet of the jurisdictional area.

10.814.23 The Planning Board may require larger buffer or setback distances on a site-specific basis to protect against water quality degradation and to preserve significant wildlife and botanical habitats.

10.814.24 Wetland buffers, including vegetated buffer strips and limited cut areas, shall be parallel to and measured from the reference line for the applicable jurisdictional area on a horizontal plane.

(1) Inland wetland buffers shall be measured from the edge of the applicable inland wetland or surface water body.

(2) Tidal wetland buffers shall be measured from the edge of the tidal wetland or highest observable tide line of the inter-tidal areas defined in Section 10.813.40.

10.815 Notification to Planning Director

Notice shall be provided to the Planning Director prior to any construction, demolition, tree cutting, vegetation removal, or other alteration in a wetland or wetland buffer.

10.816 Permitted Uses

10.816.10 The following uses are permitted in wetlands and wetland buffers:

1. Any use that does not involve the erection or construction of any structure or impervious surface, will not alter the natural surface configuration by the addition of fill or by dredging, will not result in

site alterations, and is otherwise permitted by the Zoning Ordinance. Examples of such uses include forestry and tree farming, wildlife refuges, parks and recreational uses, conservation and nature trails, and open spaces as permitted or required by the Zoning Ordinance or Subdivision Regulations.

2. Improvements to existing public rights-of-way and sidewalks.
3. The construction of piers or docks, provided that all required local, state and federal approvals have been granted.
4. The construction of an addition or extension to a one-family or two-family dwelling that lawfully existed prior to the effective date of this Ordinance or was constructed subject to a validly issued conditional use permit, provided that:
 - (a) The footprint area of the addition or extension shall not exceed 25 percent of the area of the footprint of the principal heated structure existing prior to the effective date of this Ordinance or constructed pursuant to a validly issued conditional use permit (this 25 percent limit shall not be based on pre-existing attached or detached garages, sheds, decks, porches, breezeways, or similar buildings or structures);
 - (b) The addition or extension shall be no closer to a wetland or water body than the existing principal structure; and
 - (c) The addition or extension shall conform with all other provisions of the Zoning Ordinance and with all other applicable ordinances and regulations of the City of Portsmouth.
5. Water impoundments to enhance a wetland, provided that all required state and federal permits have been granted. Copies of all applicable permits shall be provided to the Planning Board and Conservation Commission prior to the start of construction.
6. The use of motor vehicles, except for all-terrain vehicles, when necessary for any purpose permitted by this Ordinance.

10.816.20 Any use not specifically permitted by 10.816.10 above is prohibited unless authorized by the Planning Board through the grant of a conditional use permit.

10.817 Conditional Uses

10.817.10 General

The Planning Board is authorized to grant conditional use approval for any use not specifically permitted in section 10.816, subject to the procedures and findings set forth herein.

10.817.20 Application Requirements

- 10.817.21 The application for conditional use approval shall be submitted to the Planning Director.
- 10.817.22 The application shall be in a form prescribed by the Planning Board, and shall include the following information:
- (1) Location and area of lot and proposed activities and uses;
 - (2) Location and area of all jurisdictional areas (vernal pool, inland wetland, tidal wetland, river or stream) on the lot and within 250 feet of the lot;
 - (3) Location and area of wetland buffers on the lot;
 - (4) Description of proposed construction, demolition, fill, excavation, or any other alteration of the wetland or wetland buffer;
 - (5) Setbacks of proposed alterations from property lines, jurisdictional areas and wetland buffers;
 - (6) Location and area of wetland impact, new impervious surface, previously disturbed upland;
 - (7) Location and description of existing trees to be removed, other landscaping, grade changes, fill extensions, rip rap, culverts, utilities;
 - (8) Dimensions and uses of existing and proposed buildings and structures.
 - (9) Any other information necessary to describe the proposed construction or alteration.
- 10.817.23 The application shall describe the impact of the proposed project with specific reference to the criteria for approval set forth in Section 10.818.20 (or Section 10.818.30 in the case of utility installation in a right-of-way), and shall demonstrate that the proposed site alteration is the alternative with the least adverse impact to areas and environments under the jurisdiction of this ordinance.

10.817.30 Review and Approval Procedure

- 10.817.31 The Planning Director shall refer all applications to the Conservation Commission for review and comment.
- 10.817.32 The Planning Board may require the findings of an independent New Hampshire certified wetland scientist or other additional special investigative studies, and may assess the owner reasonable fees to cover the costs of such studies and for the review of documents required by application.

- 10.817.33 The Planning Board shall hold a public hearing on the application within 90 days of the initial submittal to the Planning Board, and shall issue a letter of decision within 10 days of the public hearing. The time requirements stated herein may be waived by the applicant.
- 10.817.34 Public notice for public hearings shall be made in accordance with State law.
- 10.817.35 The application process pursuant to this section may proceed prior to and/or run concurrent with the State and Federal permit processes, but the Conditional Use Permit shall not become effective until the State and Federal permits are received.
- 10.817.36 Conditional Use Permit shall expire one year after the date of approval by the Planning Board unless a Building/Change of Use Permit is issued prior to that date. The Planning Board may grant a one-year extension if the applicant submits a written request to the Planning Board prior to the expiration date. Any other extension may be granted only after a new public hearing on the reconsideration of the application.

10.818 Findings Required for Approval

10.818.10 General

- 10.818.11 The Planning Board shall grant conditional use approval provided that it finds that all other restrictions of this Ordinance are met and that proposed development meets all the criteria set forth in section 10.818.20 or 10.818.30, as applicable.
- 10.818.12 The Planning Board shall evaluate an application for a conditional use permit in accordance with *The Highway Methodology Workbook Supplement – Wetland Functions and Values: A Descriptive Approach*, NAEPP-360-1-30a, US Army Corps of Engineers, New England Division, September 1999, as amended.
- 10.818.13 The burden of proof that the criteria required for approval of the conditional use permit exist or are met shall be the responsibility of the applicant.
- 10.818.14 Economic considerations alone are not sufficient reason for granting a conditional use permit.

10.818.20 Criteria for Approval

Any proposed development, other than installation of utilities within a right-of-way, shall comply with all of the following criteria:

- (1) The land is reasonably suited to the use.
- (2) There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use.
- (3) There will be no adverse impact on the wetland functional values of the site or surrounding properties;
- (4) Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals; and
- (5) The proposal is the alternative with the least adverse impact to areas and environments under the jurisdiction of this Section.

10.818.30 Public and Private Utilities within Rights-of-Way in Wetlands and Wetland Buffers

The installation of utilities (including power lines and pipelines) within a right-of-way in an inland wetland or wetland buffer shall comply with all of the following criteria instead of the criteria set forth in section 10.818.20:

- (1) The proposed construction is in the public interest;
- (2) Design, construction, and maintenance methods will minimize any detrimental impact of such use upon the wetland and will include restoration of the site as nearly as possible to its original grade, condition, and vegetated state;
- (3) No alternative feasible route exists which does not cross or alter a wetland or have a less detrimental impact on a wetland; and
- (4) Alterations of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.

10.818 Performance Standards

10.818.10 Stormwater Management

All construction activities and uses of buildings, structures, and land within wetlands and wetland buffers shall be carried out so as to minimize the volume and rate of stormwater runoff, the amount of erosion, and the export of sediment from the site. All such activities shall be conducted in accordance with Best Management Practices for stormwater management including but not limited to:

1. *Best Management Practices to Control Non-point Source Pollution: A Guide for Citizens and City Officials*, NHDES, January 2004.
2. *Innovative Stormwater Treatment Technologies Best Management Practices Manual*, NHDES, 2002.

10.818.20 Vegetation Management

10.818.21 The required wetland buffer includes two smaller areas where additional standards and criteria apply: a vegetated buffer strip and a limited cut area. The width of these areas shall be based on the type of jurisdictional area, as follows:

Jurisdictional Area	Vegetated Buffer Strip	Limited Cut Area
Vernal pool	0' - 50'	50' - 75'
Inland wetland, other than vernal pool, greater than 5,000 square feet in area	0' - 25'	25' - 50'
Non-tidal perennial stream or river	0' - 25'	25' - 75'
Inter-tidal area or tidal wetland as specified in section 10.813.40	As required by the Comprehensive Shoreland Protection Act, as amended	

10.818.22 If the vegetated buffer strip specified in Section 10.818.21 contains an area that has a slope of 10% or more for at least 10 feet in a direction perpendicular to the edge of the jurisdictional area, the required width of the vegetated buffer strip shall be increased to 55 feet from the edge of a vernal pool and to 40 feet from the edge of any other wetland.

10.818.23 Removal or cutting of vegetation:

- (1) Chemical control of vegetation is prohibited in all areas of a wetland or wetland buffer.
- (2) The removal or cutting of vegetation is prohibited in a wetland or vegetated buffer strip, except that non-chemical control of plants designated by the State of New Hampshire as “New Hampshire Prohibited Invasive Species” is permitted.

- (3) The removal of more than 50% of trees greater than 6" diameter at breast height (dbh) is prohibited in the limited cut area.

10.818.24 Fertilizers:

- (1) The use of any fertilizer is prohibited in a wetland, vegetated buffer strip or limited cut area.
- (2) The use of fertilizers other than low phosphate and slow release nitrogen fertilizers is prohibited in any part of a wetland buffer.

10.818.25 Pesticides and herbicides:

The use of pesticides or herbicides is prohibited in a wetland or wetland buffer, except that application of pesticides by a public agency for public health purposes is permitted.

APPENDIX C

Aerial Photo Field Sheets

[NHEP Note: The field sheets are not available electronically, as part of this file. Please contact the NHEP office for more information.]