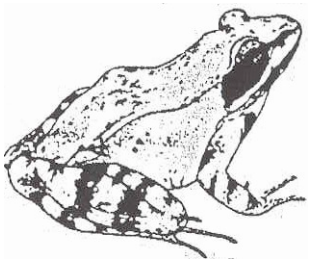
VERNAL POOL ECOSYSTEMS PROTECTION



PROPOSAL TO AMEND:

THE INLAND WETLANDS

AND WATERCOURSES REGULATIONS

OF THE TOWN OF EAST HADDAM CONNECTICUT

Presented By:

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Town of East Haddam, CT (revised J.L., 2/4/03) (JV Revised 5/20/03)

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1.0 Introduction

1.1 Overview

Vernal pools provide sanctuary and habitat that is crucial to the survival of several sensitive species. Both vertebrate and invertebrate species use vernal pools for reproduction, including mating and egg laying. Many populations of these species are currently declining and are listed by the State of Connecticut as Endangered or Of Special Concern. Current State, Federal and Town regulations do not specifically address vernal pools. The proposed amendment to the current Town of East Haddam Inland Wetlands and Watercourses (EHIWW) regulations will more effectively identify and protect vernal pools and their associated ecosystems.

2.0 Background

2.1 Vernal Pools and Associated Ecosystems:

The vernal pool ecosystem is a unique microhabitat. It can be composed of a single pool or an assemblage of several pools including any upland vegetated areas required to support the entire life cycle or a portion of any obligate vernal pool species. Obligate vernal pool species such as the wood frog *Rana sylvatica* (see Appendix A) are species that are so well adapted to this environment that they cannot successfully breed or reproduce anywhere else. Several other species also use vernal pool systems either directly as a supplemental source for successful breeding and reproduction or indirectly as a water or food source. If development degrades or fragments a pool or a pool system from its associated habitat, the number of species living in them can drastically decline or disappear altogether. The destruction of a pool can sever an essential part of a larger species migration corridor resulting in negative effects to several higher species. In order to protect the species that depend on vernal pools and their associated ecosystems, both the pool and any adjacent area must be preserved.

2.2 Vernal Pool Identification:

Vernal pools can be found throughout Connecticut in a variety of settings. They occur most commonly in natural or man-made depressions in glacial till soils where the percolation of surface water is impeded by bedrock or impervious soil layers. Vernal pools can also occur in areas where seasonal changes in groundwater levels intercept the surface. The result is ponding in depressions and other low-lying areas. A complete criterion for the identification of vernal pools is included with this proposal in Appendix B

A vernal pool is a watercourse with the following characteristics:

1. It occurs in a confined natural or manmade depression or basin.
2. It contains water for at least two consecutive months during the growing season.
3. It does not support a fish population.
4. It supports or has the capability of supporting obligate amphibian or invertebrate vernal pool species (see Appendix A).

2.3 Vernal Pool Species:

Vernal pools provide essential habitat for a myriad of terrestrial and aquatic species. Many vertebrate species such as salamanders are long lived (up to 20 years) and may breed in the same vernal pool numerous times throughout their lifetime (Semlitsch, 1998). Vernal pools species

can be divided into three basic categories: **obligate vernal pool species, facultative vernal pool species,** and **upland species.**

Obligate vernal pool species are those species that rely solely on vernal pools for successful breeding and early development. Obligate vernal pool vertebrate species in Connecticut include three species of salamander, one species of toad and one species of frog. In order for juveniles to develop and emerge from the pool before it dries up, tadpoles and salamander larvae must constantly search for food. This activity makes them extremely vulnerable and in the presence of fish they are often eaten. The salamander species include the spotted salamander *Ambystoma maculatum*, the marbled salamander *Ambystoma opacum (*a Connecticut listed species Of Special Concern), and the Jefferson salamander *Ambystoma jeffersonianum.* These species are collectively known as mole salamanders since they spend most of their adult lives underground (Jackson, 1998). The toad species is the Eastern spadefoot toad *Scaphiopus h. holbrookii* (a Connecticut listed Endangered species) and the frog species is the wood frog *Rana sylvatica*. Wood frogs live in forests rather than near lakes and streams and congregate at vernal pools to mate and lay their eggs. Research suggests that wood frogs are so sensitive to habitat disturbance and fragmentation that they may eventually disappear from forest patches smaller than 800-1000 acres (Silbert, 2001). The only obligate vernal pool invertebrate species in Connecticut is the Fairy shrimp *Anostraca sp*. Fairy shrimp are crustaceans that can grow up to one inch in length. As with the larval forms of the obligate vertebrate species, they are easily preyed upon and can be quickly consumed by fish species. The presence of adult fairy shrimp within a vernal pool usually indicates the absence of an established fish population.

Facultative vernal pool species use vernal pool systems to supplement breeding and/or reproduction. They may live in vernal pools for some part of their life cycle, but they are not restricted to them. Facultative vernal pool species include but are not limited to: the blue-spotted salamander *Ambystoma laterale (*a Connecticut listed species of special concern), the gray treefrog *Hyla versicolor*, the Northern spring peeper *Pseudacris c. crucifer*, the Eastern American toad *Bufo a. americanus*, the pickerel frog *Rana palustris*, several species of turtles such as the eastern painted turtle *Chrysemmys p. picta* and several species of invertebrates (Vernal pool wetlands, 1998).

Several other types of **upland species** also rely on vernal pools as an important source of food or water. These include a variety of migratory birds and small mammals.

2.4 Associated Ecosystems:

Upland areas adjacent to vernal pools are a critical element of vernal pool ecosystems, and many vertebrate vernal pools species, such as salamanders, rely on both vernal pools and upland habitat for survival. Research on the habitat requirements of obligate vernal pool species suggests that the size of the protected area required by these species may be significantly larger than the pool itself. It is based on these findings that obligate vernal pool species have been identified as among the most sensitive to the effects of habitat fragmentation and degradation (Klemens, 1998).

Adult salamanders have been shown to actively use vernal pools during reproduction (mating and egg laying) and salamander larvae rely on the vernal pool's aquatic habitat to feed on until metamorphosis. A study conducted by Phillip Demaynadier of the University of Maine (Conservation Biology, 1997) examined the impacts of edges on amphibians. This study demonstrated that management sensitive species are extremely sensitive to forest edge effects. The management sensitive species listed in the study included three of the six obligate vernal

pool species presented in Appendix A. The study estimated that these species were affected for a conservative distance of up to 35 meters (112 feet) from a vernal pool edge. The first 100+ feet surrounding a vernal pool have been called the "vernal pool envelope" (Calhoun and Klemens, year). The character of the vernal pool envelope determines the integrity of the vernal pool habitat, i.e., species success depends on adequate shade, water quality, and foraging/feeding habitat.

A study conducted by Raymond D. Semlitsch of the University of Missouri (Conservation Biology,1998) evaluated the terrestrial buffer zone requirements of the genus Ambystoma, to which the mole salamanders belong. This study concluded that a terrestrial buffer zone of 125.3 meters (about 400 feet) from the edge of an aquatic habitat would contain approximately 50% of the adult salamander population. The upland area in which vertebrate vernal pool species actively use during the non-breeding season for foraging, hibernating, and dispersal has been called the "critical terrestrial habitat" (Calhoun and Klemens, year). The extent of the critical terrestrial habitat has been shown to extend from the edge of the vernal pool envelope to a distance of 750 feet. This extent of habitat has been shown to contain approximately 95% of the adult salamander population (Semlitsch,1998).

Additionally, upland habitat provides a corridor for species migration and dispersal. Successful migration is dependent on ecosystem connectivity, and therefore, minimizing or eliminating disturbance to upland corridors between adjacent vernal pool systems is essential. Obligate vernal pool species populations may decline following a drought if pools are isolated or if immigration from other nearby pools is restricted. In addition, connectivity preserves genetic diversity of small populations and provides adjacent habitat necessary for adult populations.

3.0 Amendments

3.1 Reasons for the Proposed Amendments:

The purpose of this proposal is to initiate a process for the East Haddam Inland Wetlands and Watercourses Commission (EHIWWC) to more effectively identify and protect vernal pools and their associated ecosystems. Vernal pool ecosystems are important for the development and maintenance of natural diversity (Hoskins, 1998). These ecosystems warrant special consideration for protection, as many of the species they support are highly susceptible to fragmentation and environmental degradation.

3.2 Current Vernal Pool Regulatory Status:

The importance for vernal pool protective regulation is evident. The term "vernal" is mentioned in both the state statute and town regulations.

According to Connecticut General Statutes, Title 22a, Chapter 440, section 22a-38: "Watercourses means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, **vernal** or intermittent which are contained within, flow through, or border upon this state…"

Watercourses are similarly defined in the Town of East Haddam Inland Wetlands and Watercourses Regulations, section 2 item 2.1-q as: "…rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, **vernal** or intermittent which are contained within, flow through, or border upon the town… "

Language in both aforementioned also emphasizes the need for protecting the integrity of wetlands. For example, Connecticut General Statutes, Title 22a, Chapter 440, section 22a-36 states: "… wetlands and watercourses are an interrelated web of nature essential to… the existence of many forms of animal, aquatic and plant life. …Many inland wetlands and watercourses have been destroyed or are in danger of destruction because of unregulated use…Such unregulated activity has had and will continue to have a significant adverse impact on the environment and ecology… adversely affecting the ecological…values and benefits of the state for its citizens now and forever more."

3.3 Basis for Amended Regulation:

Wetland identification under current state and local regulations is based on soil type. Soils that are determined by a certified soil scientist to be poorly drained, very poorly drained, alluvial or floodplain are used to designate wetlands. Watercourses are defined by the presence of surface water. However, most intermittent streams and vernal pools are dry for a large portion of the year; therefore, the potential exists that based on soil type alone these pools and streams lack wetland characteristics. When vernal pools, in particular, are dry they may not be delineated as a wetlands or identified as watercourses, and subsequently escape State-mandated regulation (Pawlak, 1998). The proposed amendments to the EHIWW regulations include a direct (biologic) and indirect (hydrologic) based system of vernal pool identification. In addition, an extension of the regulated area surrounding vernal pools and the addition of an area of critical concern is proposed to enhance the EHIWWC's ability to protect fragile vernal pool ecosystems.

3.4 Proposed Amendment to the EHIWW Regulations

The goal of the proposed amendments is to develop a more effective system for the identification and subsequent protection of vernal pool ecosystems.

The first proposed amendment to the Town of East Haddam Inland/Wetlands and Watercourses Commission's regulations is a Vernal Pool Identification System (hereafter "identification system"). The identification system uses direct (biologic) and indirect (hydrologic) indicators to identify vernal pools, and is based on the draft, "Guidance to Connecticut's Municipal Inland Wetlands and Watercourses Agencies: Vernal Pool Definition / Indicators" provided in Appendix B

A qualified individual will be required to use the criteria detailed in the identification system to determine whether vernal pools exist on a subject property. Because vernal pools may not exhibit the soil characteristics generally associated with wetlands (see section 3.3), the aforementioned Qualified Individual does not need to be a certified soil scientist, but should be versed in the identification and function of aquatic ecosystems. Examples of Qualified Individuals include, but are not limited to, Biologists, Ecologists and Wetlands Scientists.

Once vernal pools are identified, additional information may be required as part of an EHIWW permit application. This information will include, but is not limited to, the modification of any map submitted with the permit application in order to include the location and boundaries of all vernal pools.

The second proposed amendment to the Town of East Haddam Inland/Wetlands and Watercourses Regulations is the extension of the regulated area from the current 75 feet to 125 fee for all inland wetlands and watercourses and the addition of an area of critical concern extending a minimum of 400 feet from the high water mark of the vernal pool in question. The

extension of the regulated area to 125 feet will allow the EHIWWC to regulate activities proposed within the "vernal pool envelope," while the addition of an area of critical concern will allow the EHIWWC to review all activities proposed within the "vernal pool critical terrestrial habitat" (see section 2.4). While the review of activities outside of the regulated area is allowable under current statutes, it is the desire of the EHIWWC to acknowledge that there is an area of critical upland habitat that surrounds vernal pools that is significant in the protection of vernal pools.

The third proposed amendment to the EHIWW Regulations requires that a vernal pool inventory worksheet is completed and submitted by a Qualified Individual as part of a wetlands permit application for each vernal pool identified on the subject property (Appendix D). The information provided on the worksheet will help establish potential impacts to the vernal pool ecosystem. Such factors to be evaluated include the proximity and size of any proposed disturbance, the extent and type of proposed road construction, potential changes in surface and/or groundwater hydrology, and the proposed erosion and sedimentation control measures to be implemented.

It should be emphasized that the proposed amendments do not intend to establish a blanket prohibition of all activities in the regulated area of a vernal pool any more than they currently do for all other inlands wetlands and watercourses. The amendments simply will allow the EHIWWC to have the opportunity to protect vernal pool ecosystems in a manner that is consistent with current scientific research.

3.5 Proposed Amendments:

Based on the information presented, the following amendments to the Town of East Haddam Inland Wetlands and Watercourses Commission's Regulations are proposed to more effectively identify and protect vernal pool ecosystems:

Additions to the existing regulations are indicated by CAPITALIZATION.

Deletions are indicated by bolded **strike through**

Comments are indicated by [*italics in square brackets*].

Section 2:2.1 Definitions.

[Add the Following definitions:]

"VERNAL POOL" MEANS A SEASONAL OR PERMANENT BODY OF STANDING WATER WITH THE FOLLOWING CHARACTERISTICS: 1) OCCURS WITHIN A CONFINED, NATURAL OR MANMADE DEPRESSION OR BASIN; 2) IT CONTAINS WATER FOR AT LEAST TWO CONSECUTIVE MONTHS DURING THE GROWING SEASON; 3) TYPICALLY LACKS A FISH POPULATION AND; 4) SUPPORTS OR HAS THE CAPABILITY OF SUPPORTING POPULATIONS OF VERNAL POOL OBLIGATE SPECIES. THE EXISTENCE OF A VERNAL POOL SHALL BE DETERMINED IN ACCORDANCE WITH THE CRITERIA FOR IDENTIFICATION SET FORTH IN THE DRAFT CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF WATER MANAGEMENT DOCUMENT ENTITLED, <u>GUIDANCE TO CONNECTICUT'S MUNICIPAL INLAND WETLANDS AND WATERCOURSES AGENCIES VERNAL POOL DEFINITION/INDICATORS.</u> See Appendix B

"VERNAL POOL OBLIGATE SPECIES" MEANS SPECIES THAT CAN ONLY REPRODUCE SUCCESSFULLY IN VERNAL POOL HABITATS. THEY INCLUDE THOSE SPECIES SET FORTH IN APPENDIX A

[Modify the following definitions:]

Section 3: Inventory of Regulated Areas

[Modify the following sections:]

Section 3.3.2

To prove the applicant IS exempt **form** FROM these regulations, the Commission may require the applicant to present documentation by a soil scientist that the land in question, or a portion of it, does not have a soil type classified by the National Cooperative Soils Survey as poorly drained, very poorly drained, alluvial, or floodplain AND DOCUMENTATION BY A QUALIFIED INDIVIDUAL THAT THE PROPERTY OR A PORTION OF IT DOES NOT HAVE ANY IDENTIFIED WATERCOURSES, INCLUDING VERNAL POOLS.

Section 3.3.4

The Commission shall continually inventory inland wetlands, **and** watercourses, INCLUDING VERNAL POOLS and update the official map delineating said wetlands, **and** watercourses, INCLUDING VERNAL POOLS to be regulated.

Section 3.3.*5*

When wetlands OR WATERCOURSE boundaries are in dispute as the Official Inland Wetlands and Watercourses Map is being considered and amended, the Commission may temporarily prohibit any person from conducting any activity or maintaining any facility without first obtaining a permit.

Section 5: General Requirements.

[Modify the Following sections:]

Section 5.5.2

The map of regulated areas entitled, "Official Inland Wetlands and Watercourses Map, East Haddam, Connecticut", shall serve as a guide to the wetlands, **and** watercourses boundaries and shall be considered a part of these regulations, and copies of said map shall be available for inspection in the Office of the Town Clerk. SAID MAP IS GENERATED FOR GUIDANCE AND CAN NOT REPLICATE ON SITE FIELD DESIGNATION BY A CERTIFIED SOIL SCIENTIST, OR IN THE CASE OF VERNAL POOL IDENTIFICATION, A QUALIFIED INDIVIDUAL.

Section 5.5.5

No person shall conduct any activity within [seventy five (75) feet] ONE HUNDRED AND TWENTY – FIVE (125) FEET (lateral distance) of any watercourse or mapped wetland

boundary OR WITHIN FOUR HUNDRED (400) FEET FROM A VERNAL POOL, which activity would constitute a regulated activity if it were conducted within or involved the use of a wetland, **or** watercourse, INCLUDING A VERNAL POOL, without first obtaining a determination from the Inland Wetlands and Watercourses Enforcement Officer or the Chairman of the Commission that such activity does not constitute a regulated activity.

Section 6: Application procedure

[Modify the following sections:]

Section 6.6.1

d. The information required by the Commission shall be furnished in sufficient copies to permit the Commission to carry out its duties under these regulations. In no case will fewer than ten (10) copies of a subdivision map and/or site plan map be accepted for a final review of an application proposal. (Less may be submitted if approved by the Inland Wetland and Watercourses Enforcement Commission Officer). Also, the Commission may request that all proposed roadway centerlines, wetlands bordered, WATERCOURSES INCLUDING VERNAL POOL BORDERS, location of all drainage facilities, septic area test pits, and proposed house sites be staked in the field by the developer's engineer or surveyor to permit the Commission to view the proposed locations. The centerline shall be staked every one hundred (100) feet and the stakes shall show the roadway stations.

Section 6.6.3

At any time during the review period, the Commission may require the applicant to provide more information about the wetlands, **and/or** watercourses, INCLUDING VERNAL POOLS in question and /or the proposed activity.

Section 6.6.4-a

1. Substantial turbidity, siltation or sedimentation in a stream lake or reservoir, the destruction, or impairment of an identified aquifer or recharge area, a substantial reduction of an inland wetland or watercourse channel INCLUDING A VERNAL POOL which might result in increasing the volume or velocity of water leading to upstream or downstream flooding: or

4. A reduction of the natural capacity of an inland wetland, **or** watercourse, INCLUDING A VERNAL POOL to support desirable biological life and/or function effectively as a part of the total ASSOCIATED wetland ecosystem including loss of productivity of an economic resource; or

Section 6.6.6

F. A VERNAL POOL INVENTORY WORKSHEET. (SEE APPENDIX C.)

f. G. Required additional information.

Section 6.6.9 <u>Plenary Ruling</u>

If the Commission finds that the activity applied for does or may involve a significant impact or major effect on the inland wetland, **or** watercourse, INCLUDING A VERNAL POOL, as defined in SectionS 2.1 (n) AND (q) of theses regulations, the Commission shall request information, **which** THAT may include, but is not limited to the following:

Section 7: Decision Procedure.

[Modify the following section:]

Section 7.1.2

d. All relevant facts and circumstances as they affect inland wetlands, **and** watercourses, INCLUDING VERNAL POOLS.

Section 8: Other Permits and Licenses.

[Modify the following section:]

Section 8.2

No person shall conduct any regulated activity within an inland, **or** watercourse INCLUDING VERNAL POOL, nor within the [75 (75) feet] ONE HUNDRED AND TWENTY–FIVE (125') feet (LATERAL DISTANCE) OF THE MAPPED BOUNDARY OF A WETLAND OR WATERCOURSE OR WITHIN FOUR HUNDRED (400) FEET (LATERAL DISTANCE) OF A VERNAL POOL, in accordance with section 5.5 herein above, if such regulated activity requires zoning or subdivision approval, without first having obtained a valid certificate of zoning or subdivision approval, special exception, site plan approval, **special exception, site plan approval,** certificate of zoning compliance, variance, or other documentation required by the East Haddam Zoning or Subdivision Regulations establishing that the proposal complies with the said Zoning or Subdivision Regulations.

Section 16: Amendments.

[Modify the following section:]

Section 16.1

These regulations and the Official Inland Wetlands and Watercourses Map may from time to time be amended by the Commission in accordance with changes in the General Statutes or regulations of the State Department of Environmental Protection, and as new information regarding soils, hydrology or OBLIGATE **botanical** species peculiar to inland wetlands, **and** watercourses, AND VERNAL POOLS in the town of East Haddam becomes available in the manner prescribed in the General Statutes for the establishment of regulations and boundaries. Any application for amendment to these Regulations, but not for amendments to the Official Inland Wetlands and Watercourses Map shall be provided to the Commissioner of the Department of Environmental Protection, or his designee, at least thirty-five (35) days prior to the date of the public hearing to be held therein. The foregoing shall apply to applications of any person, including the Commission itself.

Appendix A
Obligate Vernal Pool Species

Vernal Pool
Obligate Species

1. Vertebrates

a) Spotted salamander (*Ambystoma maculatum*)

b) Jefferson salamander (*Ambystoma jeffersonianum*)

c) Marbled salamander (*Ambystoma opacum*)

d) Wood frog (*Rana sylvatica*)

e) Eastern Spadefoot Toad (*Scaphiopus h. holbrookii*)

2. Invertebrates

a) Fairy Shrimp (*Anostraca sp.)*

Appendix B
Criteria for Vernal Pool Identification

Appendix C
Vernal Pool Inventory Worksheet

Physical Characteristics

Size of Vernal Pool

Surface area measured from the perimeter of the high water line.

Greater than 2,500 ft² ..... (3)_____

1,000 – 2,500 ft² ..... (2)_____

Less than 1,000 ft² ..... (1)_____

Size of Upland Habitat

Amount of undisturbed forest (Intact canopy and natural ground cover) adjacent to the pool or system.

20 – 30 acres ..... (3)_____

15 – 20 acres ..... (2)_____

Less than 15 acres ..... (1)_____

Road Proximity

Distance to closest road.

Less than 500 feet ..... (0)_____

Greater than 500 feet ..... (1)_____

Greater than 1,000 feet ..... (2)_____

Closest Road Composition

Road is paved ..... (-1)_____

Road has curbs ..... (-1)_____

Connectivity to other Vernal Pools

Distance to next closest vernal pool

Less than 500 feet to one other pool ..... (1)_____

Less than 1,000 feet of two or more pools ..... (2)_____

Biological Characteristics

Obligate Vertebrate Vernal Pool Species	Comments
Spotted salamander (*Ambystoma maculatum)*	**(1)**_____
Jefferson salamander (*Ambystoma jeffersonianum)*	**(1)**_____
Marbled salamander (*Ambystoma opacum)*	**(1)**_____
Wood frog *(Rana sylvatica)*	**(1)**_____
Eastern Spadefoot Toad (*Scaphiopus h. holbrookii)*	**(1)**_____

Invertebrate Vernal Pool Species	
Fairy Shrimp (*Anostraca sp.)*	**(1)**_____

Vernal Pool Inventory Worksheet

Applicant name: _____
Property address:
_____

Approximate location of vernal pool:
_____

1. Does the proposed plan involve disturbance within 125 ft of a vernal pool? _____

   a) If so, what is/are the type(s) of disturbance(s) proposed within this area?

2. Does the proposed plan involve disturbance within 400 ft of a vernal pool? _____

   a) If so, what is/are the type(s) of disturbance(s) proposed within this area?

3. What percentage of the total on-site disturbance will be:

   a) Within 125 ft of the vernal pool? _____%

   b) Within 400 ft of the vernal pool? _____%

4. Does the proposed plan involve new road construction within 500 ft. of a vernal pool? _____

   a) If so, will the new road(s) be paved? _____

   b) Will the new road(s) be curbed? _____

   c) What is the estimated daily traffic volume from 6 p.m. to 12 a.m.? ___cars/hr

5. Does the proposed plan involve the installation of erosion and sedimentation control measures within 500 ft of a vernal pool? _____

6. Will the proposed project result in an **increase** or **decrease** in the surface or Subsurface water flow to the vernal pool?

_____

a) If so, by how much per 10 year storm event? _____Cu ft/sec

Appendix D
Vernal Pool Impact Worksheet

Literature Cited

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