

IDENTIFICATION OF VERNAL POOLS and THEIR BUFFERS



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What is a Vernal Pool?

- Definition (General):
- Vernal Pools are temporary surface waters that are inundated in winter, typically dry up in summer, and support the breeding of specific vertebrate and invertebrate animals that require these conditions.

What is a Vernal Pool?

- Definition (State):

“Vernal pool” means a surface water or wetland, including an area intentionally created for purposes of compensatory mitigation, which provides breeding habitat for amphibians and invertebrates that have adapted to the unique environments provided by such pools and which:

(a) Is not the result of on-going anthropogenic activities that are not intended to provide compensatory mitigation, including but not limited to:

- (1) Gravel pit operations in a pit that has been mined at least every other year; and
- (2) Logging and agricultural operations conducted in accordance with all applicable New Hampshire statutes and rules; and

(b) Typically has the following characteristics:

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

Primary Indicators

- “Primary vernal pool indicators” means the presence or physical evidence of breeding by marbled salamander, wood frog, spotted salamander, jefferson-blue spotted salamander complex, or fairy shrimp.

Secondary Indicators

“Secondary vernal pool indicators” means physical evidence used by wildlife biologists or certified wetlands scientists who are familiar with vernal pool habitats as evidence of the presence of a vernal pool, if primary vernal pool indicators are absent and other vernal pool characteristics suggest vernal pool habitat. Secondary vernal pool indicators include, but are not limited to, caddisfly larvae and cases (Limnephilidae, Phryganeidae, or Polycentropodidae), clam shrimp and their shells (Laevicaudata, Spinicaudata), fingernail clams and their shells (Sphaeriidae), aquatic beetle larvae (Dytiscidae, Gyrinidae, Haliplidae, and Hydrophilidae), dragonfly larvae and exuviae (Aeshnidae, Libellulidae), spire-shaped snails and their shells (Physidae, Lymnaeidae), flat-spire snails and their shells (Planorbidae), damselfly larvae and exuviae (Coenagrionidae, Lestidae), and true fly larvae and pupae (Culicidae, Chaoboridae, and Chironomidae).

Physical Indicators

- ❖ Generally shallow (i.e. < 1 meter deep)
- ❖ Inundated by water ≥ 60 days in the spring or fall
- ❖ Typically isolated from other surface waters, at least during late spring or summer
- ❖ Small watersheds
- ❖ Often “perched” – i.e. sitting above hardpan soil or ledge

Biological Indicators

- ❖ Mole Salamanders (Ambystomidae)
 - ❖ Jefferson's salamander
 - ❖ Blue-spotted salamander
 - ❖ Spotted salamander
 - ❖ Marbled salamander
- ❖ Wood Frog (Ranidae)
- ❖ Fairy Shrimp (*Eubranchipus spp.*)
- ❖ Other facultative invertebrates
- ❖ No fish!

Primary Indicator Species

- Ambystomid Salamanders



Primary Indicator Species

- Ambystomid Salamanders



Spotted Salamander

Primary Indicator Species

- Ambystomid Salamanders



Jefferson's-Blue Spotted Complex



Primary Indicator Species

- Wood Frog



Primary Indicator Species

- Fairy Shrimp



Secondary Indicator Species

- Other Invertebrates



Darner Dragonfly (Aeshnidae)



Predaceous Diving Beetle (Dytiscidae)



Anabolia caddisfly (Limnephilidae)



Predaceous Diving Beetle (Dytiscidae)



Phryganeid caddisfly (Limnephilidae)

Secondary Indicator Species

- Other Invertebrates



Ptilostomis (Phryganeidae)



Argia moesta (Coenagrionidae)



Giant Tubemaker Caddisfly (Phryganeidae)



Pseudosuccinea columella (Lymnaeidae)



Water scavenger beetle (Hydrophilidae)

Some Vernal Pool Types



Classic Woodland Pool, Grantham

Some Vernal Pool Types



Forested Wetland Pool, Dublin

Some Vernal Pool Types



Rookery Pond, Dublin

Some Vernal Pool Types



Hale Swamp Pond,
Center Harbor

Some Vernal Pool Types



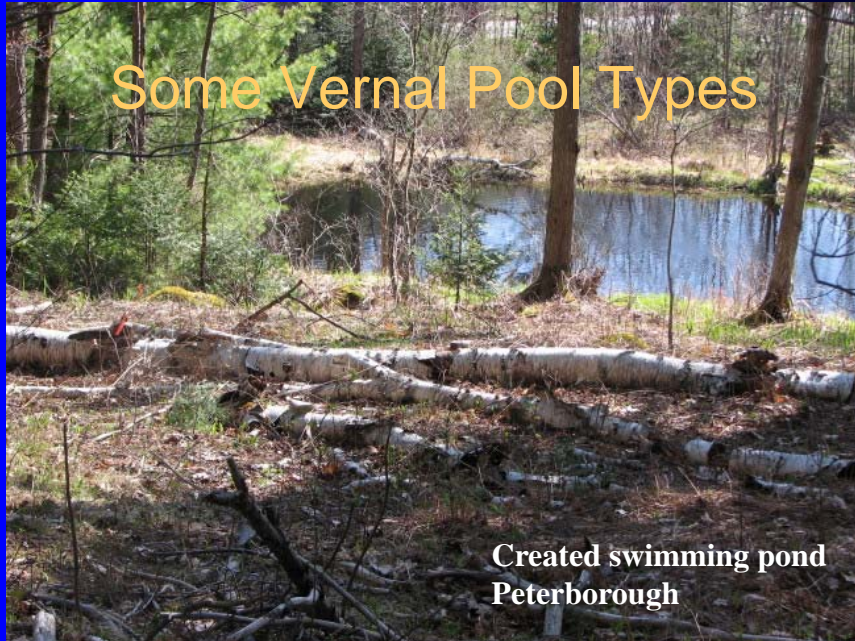
Bogle Brook Floodplain, Peterborough

Some Vernal Pool Types



**Mink Brook Highlands
Hanover**

Some Vernal Pool Types



Created swimming pond
Peterborough

Created Vernal Pools

- Excavated Ponds
 - Open water, no vegetation
 - Planted & stabilized banks
 - Cat-tails come in along margin
 - Duckweed covers surface
 - Algae proliferates, the dies, and created hypoxic conditions, fish die, aquatic life stressed
 - Invasive plants come in along margins, pond eutrophication
 - Margins develop forested condition, cooling water and limiting excessive algal growth; biotics come back



Created Vernal Pools

- **Fragmented & Filled Pools**

- Hydrology created and maintained by run-off
- Canopy shading reduced
- Overland migration routes potentially fatal
- Temp.s increase dramatically in late spring
- DO drops & kills embryos
- Fragmentation promotes predation by skunks & raccoons
- Metapopulation weakened from genetic isolation



Created Vernal Pools

- **Skidder Ruts**

- Open water, no vegetation
- Unplanted & destabilized banks
- Sedges & rushes grow in during summer
- Salamander lays eggs in deep spots
- Temperatures increase quickly in spring
- Oxygen taken up by bacteria
- Water table drops too quickly to support full development of larvae
- Larvae die, but pool remains open for years as “trap” for future migrants



Vernal Pool Conservation



What is an adequate Buffer?

Buffer: “A naturally vegetated upland area adjacent to a wetland or surface water”

Chase, Deming & Latawiec (NHOSP) 1995

EPA: 100 feet

State of NH: 100 feet

Best: Entirety of immediate sub-watershed around the pool

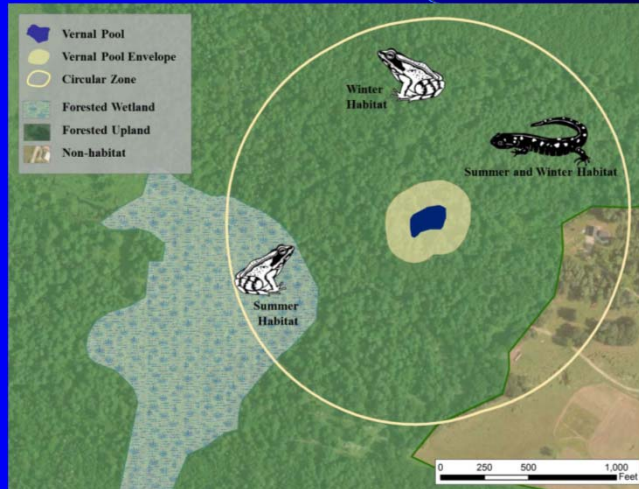
Directional Buffers

- **100-foot buffer area calculated**
- **Buffer area shifted to allow for narrower setbacks in certain directions**
- **Buffer direction favored towards existing amphibians migration routes**
- **Preference given to upland connectivity to unfragmented and/or protected lands**

Buffer Zone Guidance (ACOE)

1. Avoid disturbance within the VP depression and envelope (extends 0-100 feet from the VP depression's edge)
Vernal Pool BMPs 2 January 2015
2. Limit development to less than 25% of the CTH (extends 100-750 feet from the VP depression's edge).
3. Exclude roads and driveways from the VP envelope.
4. Establish directional corridors consisting of unfragmented forest with at least a partly-closed canopy of overstory (>50% cover) trees to provide shade, deep litter and woody debris. Maintain duff layer, native understory vegetation and downed woody debris in the VP depression, envelope, CTH, and corridors connecting wetlands and VPs.
5. Minimize impedance to amphibian terrestrial passage. Cape Cod style-curbings³ or no curbing options should be used for new road construction.

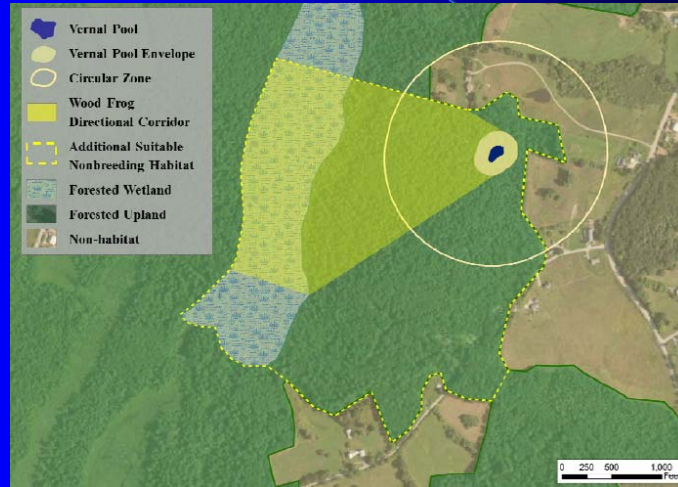
Directional Buffers



Directional Buffers



Directional Buffers



Directional Buffers

