COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

41 Main Street
Bolton, MA 01740
508. 281.5160
www.ceiengineers.com

May 7, 2019

Mr. Michael Antonellis, Planning Director
Lancaster Community Development and Planning
701 Main Street, Suite 4
Lancaster, MA 01523

Re: Vernal Pool Assessment – Goodridge Brook Estates

Dear Mr. Antonellis:

As requested by the Lancaster Department of Community Development and Planning, Comprehensive Environmental Inc. (CEI) conducted a field investigation to further document the potential presence of a vernal pool on the proposed Goodridge Brook Estates property (the Site). The field investigation was conducted on May 1, 2019 to supplement the data collected by CEI on April 16, 2019 as documented in a letter report dated April 19, 2019. CEI staff (Bob Hartzel and Chris McGuiness) were accompanied during the May 1, 2019 field investigation by the project applicant's representatives, Mark Arnold and Dan Wells of Goddard Consulting (GC). Findings of the field investigation are summarized below.

Vernal Pool Biological Criteria

CEI observed 19 spotted salamander egg masses (SS1-SS19) within a portion of an intermittent stream channel. Each egg mass was photographed (Attachment 1) and field-located with a mapping grade Trimble Global Positioning System (GPS) unit. The egg mass locations are presented in Figure 1. In several instances when multiple egg masses were observed in very close proximity, a single GPS point was taken to represent the grouping of egg masses. To minimize disturbance of the stream within the area where egg masses were observed, the GPS location points were taken on the bank of the channel at the bank location closest to the egg mass(es). These locations were marked with a wire flagging stake.

In addition to the 19 egg masses observed by CEI, an additional egg mass was previously documented by GC on April 23, 2019 and flagged in the field at the location on Figure 1 listed as Goddard SS8. CEI did not observe an egg mass at this location but did collect a GPS point at the Goddard flagging point.

The Massachusetts Division of Fisheries and Wildlife - Natural Heritage and Endangered Species Program (NHESP) accepts a variety of biological evidence for vernal pool certification, including a total of 5 egg masses from obligate species (any combination, regardless of species). Based on the 20 spotted salamander egg masses documented within a well-defined portion of the Site, CEI believes that the biological criteria for vernal pool certification has been satisfied.

Vernal Pool Physical Criteria

In addition to meeting biological criteria, the NHESP requires that a vernal pool must have no fish populations, which is essential to the breeding success of vernal pool species. Physical evidence in support of a fishless habitat includes, but is not limited to, evidence of a "*pool with no permanently flowing outlet*". As presented in CEI's peer review letter dated April 19, 2019, CEI conducted a review of the intermittent stream watershed area using USGS StreamStats, and confirmed that the watershed area is

0.13 square miles. This area is well below the 0.5 square mile threshold as specified in the Massachusetts Wetlands Protection Act for a presumption of perennial flow. Although the intermittent stream was flowing during both of CEI's field investigations, CEI finds the presumption of intermittent flow appears to be supported by watershed size and field observations of channel morphology.

CEI discussed the site's physical characteristics with Jacob Kubel, the NHESP Conservation Scientist who leads the state's vernal pool certification program. With regard to documenting intermittent stream flow, Mr. Kubel confirmed that it was not a requirement to provide a photo or video the stream without flow when submitting documentation of vernal pool conditions for NHESP review, and that evidence supporting existence of a fishless habitat was of primary importance. Based on preliminary review of the site location and field photos from CEI's site visit on April 16, 2019, Mr. Kubel stated, *"I have little reason to presume the swamp exhibits perennial flow or supports a permanent population of fish, and the presence of that many Spotted Salamander egg masses suggests it has a sufficient hydroperiod to support successful reproduction by the species. Shallow, low-flow, braided-channel swamps often support Spotted Salamander reproduction".*[1]

Mr. Kubel further stated that, for a vernal pool with features as observed at the Site (i.e., egg masses within an intermittent stream channel), it is appropriate to define and document the physical boundaries of the vernal pool by:

1. Documenting and mapping the stream segment where biological evidence is observed, as bound by the most upstream and downstream observations;

2. Mapping the banks of the stream within the specified intermittent stream segment, as presented in Figure 1. If egg masses are observed only within the intermittent stream channel, the vernal pool area for review and potential NHESP certification would be the area defined by the length and width of the specified stream segment. The potential vernal pool area in Figure 1 covers an area of approximately 3,337 square feet over an approximately 524-foot segment of the intermittent stream.

3. Collecting field photos and other supporting data (e.g., water depth within the vernal pool) as specified in the NHESP vernal pool certification form. Field photos are included in Attachment 1. Water depths at the location of each egg mass observation are listed below in Table 1.

[1] Email from Jacob Kubel (NHESP) to Bob Hartzel (CEI), April 26, 2019.

Table 1: Water Depths at Spotted Salamander Egg Mass Locations, 5/1/2019

Egg Mass #	Water Depth
SS1, SS2	9”
SS19	8”
SS3, SS4	7”
SS5	7”
SS6	6”
SS7	6”
SS8, SS9	5”
SS10, SS11, SS12	6”
SS13	5”
SS14, SS16	6”
SS15	5.5”
SS17	6”
SS18	6”
Goddard SS8	6”

Conclusions

1. Based on CEI’s observed field evidence of vernal pool breeding habitat and NHESP guidance with regard to physical criteria for sites of this type, the area identified on Figure 1 appears to meet both the biological and physical criteria for certification as a vernal pool.
2. Certification as a vernal pool requires review by NHESP following submittal of a NHESP Vernal Pool Field Observation Form (blank form included as Attachment 2 for reference).

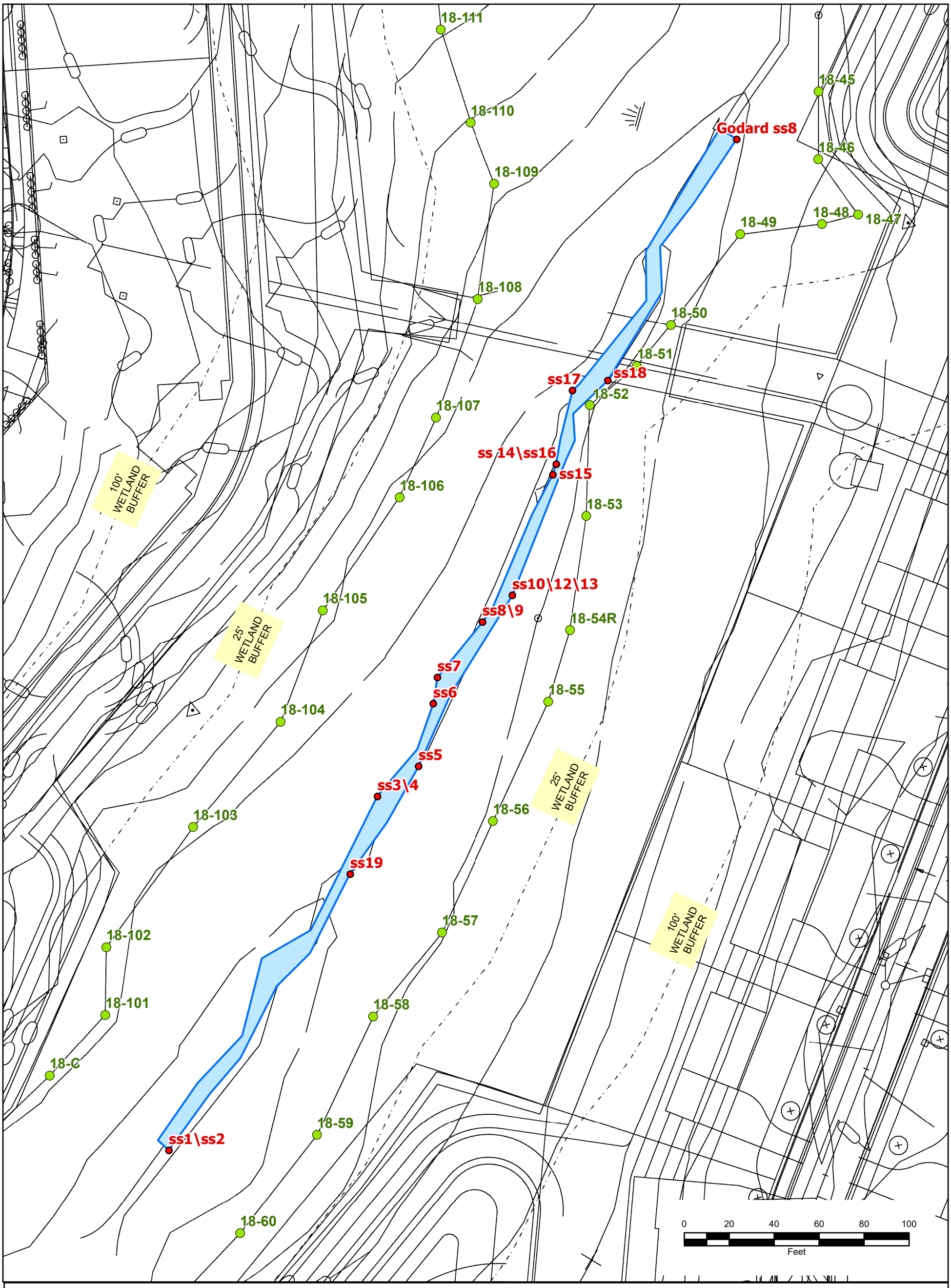
Please contact me at (508) 281-5201 or rhartzel@ceiengineers.com if you have any questions about this report.

Sincerely,

Robert Hartzel, CLM
Principal Scientist
Comprehensive Environmental, Inc

Figure 1:

Spotted Salamander Egg Mass Locations, 05/01/2019



Spotted Salamander Egg Mass

Potential Vernal Pool Boundary

Wetland Flags

Notes:
1. Figure includes spotted salamander egg mass locations and potential vernal pool boundary field-located by CEI with a Trimble GPS unit on 05/01/2019. Base map provided by Robert Truax of of GLM Engineering Consultants, Inc. on 05/02/2019.
2. Spotted salamander egg mass locations represent intermittent stream bank location closest to the egg mass(es).

N

Figure 1:
Goodridge Brook Estates Property - Spotted Salamander Egg Mass Locations and Potential Vernal Pool Boundary

Comprehensive Environmental Incorporated

05.07.19

Attachment 1:

Field Photographs, 05/01/2019

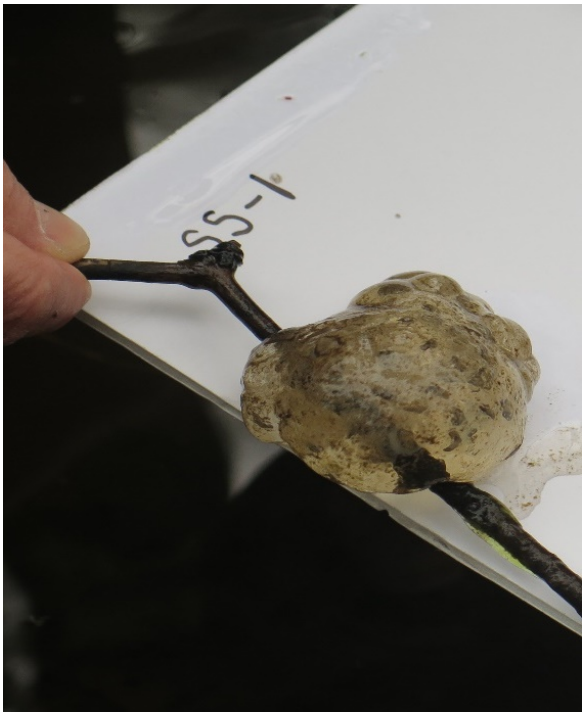


Photo 1: Spotted salamander egg mass SS1.

Photo 2: Spotted salamander egg mass SS2.

Photos 3 and 4: View upstream (left photo) and downstream (right photo) of SS1 and SS2 egg masses.

Photo 5: Spotted salamander egg mass SS3.

Photo 6: Spotted salamander egg mass SS4.

Photos 7 and 8: View upstream (left photo) and downstream (right photo) of SS3 and SS4 egg masses.

Photo 9: Spotted salamander egg mass SS5.

Photos 10 and 11: View upstream (left photo) and downstream (right photo) of SS5 egg mass.

Photo 12: Spotted salamander egg mass SS6.

Photos 13 and 14: View upstream (left photo) and downstream (right photo) of SS6 egg mass.

Photo 15: Spotted salamander egg mass SS7.

Photos 16 and 17: View upstream (left photo) and downstream (right photo) of SS7 egg mass.

Photo 18: Spotted salamander egg mass SS8.

Photo 19: Spotted salamander egg mass SS9.

Photos 20 and 21: View upstream (left photo) and downstream (right photo) of SS8 and SS9 egg masses.

Photo 22: Spotted salamander egg mass SS10.

Photo 23: Spotted salamander egg mass SS11.

Photo 24: Spotted salamander egg mass SS12.

Photos 25 and 26: View upstream (left photo) and downstream (right photo) of SS10, SS1, and SS12 egg masses.

Photo 27: Spotted salamander egg mass SS13.

Photos 28 and 29: View upstream (left photo) and downstream (right photo) of SS13 egg masses.

Photo 30: Spotted salamander egg mass SS14.

Photo 31: Spotted salamander egg mass SS16.

Photos 32 and 33: View upstream (left photo) and downstream (right photo) of SS14 and SS16 egg masses.

Photo 34: Spotted salamander egg mass SS15.

Photos 35 and 36: View upstream (left photo) and downstream (right photo) of SS15 egg mass.

Photo 37: Spotted salamander egg mass SS17.

Photos 38 and 39: View upstream (left photo) and downstream (right photo) of SS17 egg mass.

Photo 40: Spotted salamander egg mass SS18.

Photos 41 and 42: View upstream (left photo) and downstream (right photo) of SS18 egg mass.

Photo 43: Spotted salamander egg mass SS19.

Photos 44 and 45: View upstream (left photo) and downstream (right photo) of SS19 egg mass.

Photos 46: View upstream of Goddard SS8 egg mass (*egg mass location flagged by GC on 4/23/2018, but no photo was taken of the egg mass*).

Attachment 2:

NHESP Vernal Pool Field Observation Form (blank)

Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife

II. Vernal Pool Field Observation Form

or use with the *Guidelines for the Certification of Vernal Pool Habitat, March 2009.*

For Office Use Only

THE NHESP STRONGLY RECOMMENDS THAT LANDOWNER PERMISSION BE OBTAINED PRIOR TO COLLECTING CERTIFICATION DOCUMENTATION. IT IS THE SOLE RESPONSIBILITY OF AN INDIVIDUAL PROVIDING VERNAL POOL CERTIFICATION INFORMATION TO ENSURE THAT ALL ACTIVITIES ASSOCIATED WITH GATHERING SAID INFORMATION COMPLY WITH THE LAW.

INSTRUCTIONS:
Please provide all information requested. Attach additional pages if needed. All required biological & physical evidence must be documented by photos, video, or audio of suitable quality (resolution, focus, indicators of scale) so species ID can be confirmed & pool features assessed. Documentation must be labeled. Sign/date the form; incomplete forms will be returned.

Additional Instructions for *Specific* Numbered Boxes:
1. Include an identifying name or tracking # for your pool & use it to label photos, maps, & any other documentation. If you used the Potential Vernal Pool (PVP) datalayer (available at MassGIS), include the PVP #. Written directions must be included with landmarks to help navigate to the pool.
3. 3A & 3B are for certification by the Obligate Species Method. Provide photos, video, or audio (chorusing) of the required breeding evidence or fairy shrimp **AND** photo(s) or video of the pool holding water.

1. Pool Location (Please complete a separate form for each pool).

Town_____ Potential Vernal Pool # (if known)_____

Pool Name or Tracking # (e.g., Elm St. VP, VP#1)_____

Written Directions to Pool (required):_____

2. Pool/Species Observation Dates (month/day/year):

First date pool observed_____ Last date pool observed _____

First date species observed _____ Last date species observed_____

3B. Biological Evidence: *Fairy Shrimp*

Date Observed (m/d/y)_____

3A. Biological Evidence: *Obligate Amphibians*

Indicate breeding evidence and date observed for each species. Evidence must include ≥1 of the following for certification: congressing salamanders **OR** ≥5 pairs wood frogs in amplexus **OR** salamander spermatophores **OR** a full wood frog chorus (calls constant, continuous, & overlapping) **OR** a total of ≥5 egg masses, regardless of species **OR** ≥1 MESA-listed salamander egg mass(es). Each individual egg mass or mated pair required for certification (e.g., all 5 wood frog egg masses) must be photographed or videotaped. If more than the minimum required number is observed, photo the required number, and count or estimate the total number and indicate in the table below.

SPECIES *State-listed species	Dates	COURTING ADULTS	Dates	SPERMATOPHORES	Dates	# EGG MASSES	Dates	SALAMANDER LARVAE	Dates	TRANSFORMING JUVENILES
Spotted salamander										
Blue-spotted salamander *										
Jefferson salamander *										
Marbled salamander *										
Unidentified Mole salamander										
SPECIES	**Dates**	**# MATED PAIRS** (≥ 5 pairs)	**Dates**	**Full Chorus** (calls continuous & overlapping)	**Dates**	**# EGG MASSES**	**Dates**	**TADPOLES**	**Dates**	**TRANSFORMING JUVENILES**
Wood frog										
TOTAL(S)										

Instructions (continued)

4. Certification by the Facultative Amphibian Method - provide photo, video, or audio (chorusing) of the required breeding evidence and photo(s) or video of the pool holding water **AND** dry.

6. Provide information to help distinguish the pool & assess its features.

7. All required biological & physical evidence must be documented by good quality photos, video, or audio.

8. Indicate the 3 required maps submitted.

4. Biological Evidence: *Facultative Amphibians*

Breeding evidence[1] of ≥ 2 species must be documented by photos, video, or audio.

BREEDING AMPHIBIANS	DATE OBSERVED month/day/year	BREEDING EVIDENCE[1] OBSERVED
Spring peeper		
Gray treefrog		
American toad		
Fowler's toad		

Breeding evidence[1] includes: full breeding choruses (call constant & overlapping), ≥ 5 adults in amplexus, any # of egg masses, tadpoles, and/or transforming juveniles in pool.

5. Rare Wetland Species

Were MESA-listed species observed using this pool?

☐ Yes ☐ No

If yes, please submit a Rare Animal Observation Form with photo & map to the NHESP (available at www.nhesp.org).

6. Description of Pool and Surroundings ~ Please describe to the best of your ability and knowledge.

Dimensions (please include measurements or estimates):

Approx. Length:_____ Approx. Width:_____ Approx. Maximum Depth:_____

Describe distinctive features (roads, structures, boulders, foot trails, vegetation types, etc.) which are visible from or near the pool that would help someone recognize it.

Origin of the pool (check): ☐ Natural depression ☐ Human-made pool/ditch ☐ Created wetland/pool ☐ Other or Unknown (describe)_____

The pool's hydroperiod is most likely: ☐ Seasonal (drying out in most years) ☐ Semi-permanent (drying partially in most years) ☐ Permanent

Describe any inlet or outlets to/from the pool and their permanence (e.g., streams, culverts, etc).

Land use in vicinity of pool (approx. 100 ft from pool edge – check all that apply): ☐ upland forest ☐ forested wetlands ☐ emergent marsh/scrub-shrub wetland ☐ agricultural/grassland/meadow ☐ residential/commercial ☐ other_____

7. Documentation Submitted – Label with pool name or tracking #, town, date taken, observer's name.

☐ Photo(s) ☐ Video ☐ Audio

☐ Obligate Species ☐ Facultative Species ☐ Pool Holding Water ☐ Dry Pool

8. Maps Submitted

Pool locus must be delineated & identified with your pool name or tracking #.

3 REQUIRED MAPS:

☐ USGS Topographic Map - 1:24,000 or 1:25,000 or better

☐ Color orthophoto - 1:12,000 or better

and ≥1 of the following:

☐ Assessor's map (Map and Plot #)

☐ Professional survey

☐ Sketch map - with directions and distances from permanent landmarks

☐ GPS longitude/latitude coordinates:

Latitude = _____

Longitude = _____

9. Property Owner Information - Landowner information is optional & is available from local tax assessor's offices.

Name_____

Address_____

Town_____ State_____ Zip_____ Assessors Map/Pcl#_____(if known)

10. Observer Information & Signature – Must be filled out & signed.

Name_____

Address_____

Town_____ State_____ Zip_____

Telephone_____ E-mail_____

I hereby certify under the pains and penalties of perjury that the information contained in this report is true and complete to the best of my knowledge.

Signature_____ Date_____

Signature of Adult, if Observer is under 18 years of age_____

All submissions and supporting documents will be retained by the NHESP and, with the exception of information for MESA-listed species and the identity of minors, are available to interested parties under the Public Records Law.

SEND COMPLETED, SIGNED FORM & SUPPORTING DOCUMENTATION TO:

NHESP - Vernal Pool Certification
MA Division of
Fisheries & Wildlife
1 Rabbit Hill Rd.
Westborough, MA 01581

For questions call 508-389-6360