US Army Corps of Engineers – New England District
Vernal Pool Assessment

Vernal Pool Definition:

Vernal pools are depressional wetland basins that typically go dry in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending upon landscape position and parent material(s). In most years (5 out of 10), pools support one or more obligate species, including: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson's salamander, and fairy shrimp; however, they preclude sustainable populations of predatory fish.

Vernal Pool Assessment:

This vernal pool assessment method is designed to characterize vernal pools and to provide a valuation for specific features of the pool. Since characteristics of vernal pools vary considerably and in turn can lead to varying functions and levels of functions among different pools, this methodology is designed to offer a simplistic approach to assessing and comparing vernal pools. In addition, it can provide a basis for developing appropriate compensatory mitigation for impacts to vernal pools.

The data collected for assessing vernal pools should be acquired during site visits conducted at the appropriate season(s) (e.g., early spring for egg mass counts, early summer for presence of metamorphs, etc.). A minimum of one year's data is required, but three to five years' data is encouraged to account for variation in hydrology and climate, plant communities, and wildlife use. In particular, for large projects that undergo many years of planning, there should be the opportunity to collect several seasons' worth of site data on any vernal pools present.

Physical characteristics of some pools may be relatively stable, while these same characteristics (e.g., depth, size, substrate, etc.) may vary in different pools. Variations in pool characteristics can be accounted for through careful observation and record keeping during site visits.

Timing of site visits is crucial, both to catch the right season and the right time within that season for what is being sampled. The start of the amphibian breeding season may vary by several weeks from year to year, based on temperature, pool ice cover, and other climatic conditions. Likewise, the breeding season varies geographically from southern New England to northern New England, in addition to the climatic conditions of a particular year.

It is important to visit the pool and record data at several different times of the year, and to use appropriate sampling methods for the data being collected. For instance, some species may require more intensive sampling methods than other species to determine presence or absence. Early spring visits are needed to conduct egg mass surveys, while later visits can identify metamorphs and determine reproductive success via the number of metamorphs leaving prior to drying. Studies within the vernal pool envelope and critical area can identify migratory pathways of the vernal pool organisms. This can also identify the portions of the surrounding landscape (especially in the vernal pool envelope and the vernal pool critical terrestrial habitat) that are being utilized by particular species present.

Predatory fish, bullfrog tadpoles, and green frog tadpoles have been shown to consume the egg masses and larvae of vernal pool-breeding amphibian species, and have the potential to cause complete reproductive failure when present in high densities. PLEASE NOTE: The specific combination of indicator and predator species present may have variable impact on the reproductive success of a given indicator species (e.g., the presence of a population of green frog tadpoles may have little or no impact on

the reproductive success of spotted salamanders). Therefore, it is important to note the presence/absence and relative abundance of these predatory species in the pool. Enough information should be gathered to differentiate sustainable, resident predator populations from smaller, unsustainable or transient groups that will not have as great an impact on vernal pool indicator species. In a pool with high predator densities, it is especially recommended that egg mass counts of vernal pool indicator species be supplemented with larval dip-net sampling or amphibian trapping during the summer and fall months to document larval development and to provide insight on reproductive success.

Data should be submitted on the Corps of Engineers – New England District "Vernal Pool Characterization Form." In addition, for functional assessment of the vernal pool, the Corps of Engineers – New England District "Vernal Pool Valuation Score Form" should be used.

Vernal Pool Characterization Form:

To document how a pool functions within its landscape, a Vernal Pool Characterization Form should be used for each vernal pool being assessed. Additional notes, drawings, and photographs (of the pool and surrounding habitat) are encouraged to supplement this form. Aerial photographs of the pool and surrounding landscape (e.g., from Google Earth©) should also be attached.

Vernal Pool Valuation Score Form:

The required information from the Vernal Pool Characterization Form can be transferred directly to the Vernal Pool Valuation Score Form. PLEASE NOTE: the alpha-numeric designations on the Vernal Pool Valuation Score Form are not the same as those on the Vernal Pool Characterization Form since the former has been rearranged for valuation purposes.

The Vernal Pool Valuation Score Form is divided into three separate sections: vernal pool characteristics, vernal pool envelope and critical habitat characteristics, and species present in vernal pool. THE VALUATION SCORES ARE TOTALLED SEPARATELY FOR EACH OF THE THREE SECTIONS. DO NOT COMBINE THESE THREE SCORES INTO A SINGLE SCORE.

The numbers to the right of the checkboxes on this form are the values used to score the features of the vernal pool being evaluated. For each section, these numbers are totaled for all boxes checked and included at the bottom of the section. Typically, one box per topic will be checked. Under B.2., multiple items may be checked if the surrounding land use is not homogeneous. In this case, each scored number is related to the percentage of that land use in the vernal pool envelope. For example, if all of the land in the vernal pool envelope is forested upland, it gets a value of 16. However, if only 50% is forested upland, this portion gets an 8 (50% of 16) and the remainder gets whatever portion it encompasses (e.g., if the remaining 50% is "developed >25%," it gets a score of 1 and this item gets a total score of 9).

In Section C, the presence of any indicator species gets a score of 16 for this item; scores are not per species, e.g., the presence of three indicator species yields a score of 16, not 48. The only negative score is for the presence of a *resident population* of a predator species. Again, the -16 is for the category, not each resident population of a predator species present.

Checklist for Submissions:

_____ Vernal Pool Characterization Form
_____ Pool and surrounding habitat photographs
_____ Sketch of pool and surrounding habitat
_____ Vernal Pool Valuation Score Form
_____ Aerial photographs
_____ Additional notes, including description of sampling methods