

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

Vernal Pool Definition:

Vernal pools are depressional aquatic resource 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). Pools usually support one or more indicator species, including: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson's salamander, and fairy shrimp; however, they should preclude sustainable populations of predatory fish.

Vernal Pool Assessment:

This vernal pool rapid assessment method is designed to characterize vernal pools and to provide a valuation for features of the pool and surrounding habitat for regulatory purposes – impact and compensatory mitigation assessment. 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 simplified approach to assessing and comparing key features of these highly variable aquatic systems. In addition, it can provide a basis for developing appropriate compensatory mitigation for impacts to vernal pools. As each vernal pool or vernal pool complex is unique, the Corps should be consulted prior to developing any specific sampling protocol to ensure that all the necessary data are collected without an over-expenditure of time and resources. Data should be submitted on the Corps of Engineers – New England District “Vernal Pool Characterization Form.”

The data collected for assessing vernal pools should be acquired during site visits conducted during the appropriate season(s) (e.g., early spring for egg mass counts, early summer for presence of metamorphs, etc.). When examining for egg masses, the entire pool should be comprehensively surveyed. A minimum of one year's data is recommended, but two to three years' data is encouraged to account for variations in reproductive effort, and hydrologic and climatologic conditions. In particular, for large projects that undergo many years of planning, it is highly recommended that vernal pool resources be identified in the initial planning phases to allow for collection of multiple seasons' worth of site data on any vernal pools present. When abilities to visit and survey the pools are limited to non-optimal times of the year, documentation of the Vernal Pool Characteristics and Vernal Pool Envelope and Critical Habitat Area Characteristics may be useful in determining the presence of vernal pools and their potential level of functioning.

Physical characteristics of some pools may be relatively stable, while these same characteristics (e.g., depth, vegetation, substrate, etc.) may vary in others. Such variations in pool characteristics can be accounted for through careful observations and record keeping during site visits. Timing of site visits is crucial to capture the appropriate seasons for sampling. 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. In addition to the climatic conditions, the breeding season varies geographically from southern New England to northern New England.

To appropriately document faunal usage of pools, repeated visits may be required during different seasons. For instance, some species may require more intensive sampling efforts in comparison to other species when determining presence/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. If deemed appropriate, studies within the vernal pool envelope and critical habitat areas can identify migratory pathways of the pool-breeding amphibians. This can also identify the

portions of the surrounding landscape (especially in the vernal pool envelope / critical terrestrial habitat) that are being utilized by particular pool-breeding amphibians.

Predators such as fish and bullfrog and green frog larvae have been shown to consume the egg masses and larvae of vernal pool-breeding amphibian species, and have the potential to lessen or 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 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 predators. 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.

Vernal Pool Characterization Form Instructions:

To document how a pool functions within its landscape, a Vernal Pool Characterization Form should be completed for each pool 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. We recommend doing a complete survey of the project area for vernal pools, as far in advance as possible.

The Vernal Pool Characterization Form is divided into three separate sections: vernal pool characteristics, vernal pool envelope and critical terrestrial habitat characteristics, and observed species present. THE VALUATION SCORES ARE TOTALLED SEPARATELY FOR EACH OF THE FIRST TWO SECTIONS. DO NOT COMBINE THESE TWO SCORES INTO A SINGLE SCORE. THE THIRD SECTION DOES NOT RECEIVE A SCORE, ONLY PRESENCE/ABSENCE.

The numbers to the right of the checkbox descriptions on this form are the values used to score the features of the vernal pool being evaluated. If there is "NA" or blank space instead of a number next to the checkbox, this feature is used for overall characterization purposes; however, it is not used to value the pool and the box should only be checked if present. For each section, the numbers are totaled for all boxes checked (NA and scoreless boxes are not included) and included at the bottom of the section. Typically, one box per topic will be checked. Under the "Vernal Pool Envelope and Critical Habitat Area Characteristics" (items B.1 and B.2., respectively) 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, it gets a value of 16. However, if only 50% is forested, this portion gets an 8 (50% of 16) and the remainder gets whatever portion it encompasses (e.g., if the remaining 50% is "open," it gets a score of 2 and this item gets a total score of 10). It should also be noted under B.1 and B.2 if one or more barriers to migration are present within these zones. These barriers may be natural (e.g., river, lake) or human-made (e.g., large highway), but effectively prevent the vernal pool fauna from crossing to utilize the habitat beyond. If one or more barriers are present, the percentage of the zone that is beyond the barrier(s) should be noted and the remaining percentage of landuse types should be completed for the portion of the zone which is accessible from the pool.

Section C documents the presence/absence of species. "Few/common/many" is used for quantifying the non-indicator species present in the pool. Best professional judgment should be used in applying these terms as the actual numbers for each will vary with the type of organisms documented.

Checklist for Submissions:

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| <input type="checkbox"/> | Vernal Pool Characterization Form | <input type="checkbox"/> | Sketch of pool and surrounding habitat |
| <input type="checkbox"/> | Pool and surrounding habitat photographs | <input type="checkbox"/> | Aerial photographs |
| <input type="checkbox"/> | Additional notes, including description of sampling methods | | |

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