

HYDROLOGIC AND VEGETATION GRADIENTS
IN THE TRANSITION ZONE
OF RHODE ISLAND RED MAPLE SWAMPS

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Hydrologic, vegetative, and soils criteria have been proposed for the identification and delineation of wetlands. These criteria have been proposed with little empirical data, and these terms have not been precisely defined. An imprecise wetland definition has made it difficult to establish one accepted method for wetland boundary determination and has hindered the implementation of wetland regulations. This project was undertaken with three objectives: (1) to describe hydrologic relationships among soil drainage classes along a gradient from wetland to upland at three forested sites in Rhode Island; (2) to determine which vegetation layers are the most helpful for wetland boundary location along the gradient; and (3) to develop a methodology for wetland boundary determination using vegetation data. Analysis of data collected over two years showed that the hydrologic relationships among soils of different drainage classes changed from year to year. Poorly drained soils were more closely related to very poorly drained wetland soils than to moderately well drained upland soils. Separate PCA ordinations of herb- and shrub-layer data at each site showed three vegetation zones - wetland, transition, and upland - occurring in the herb layer only. Discriminant analysis was used to classify vegetation sample plots (herb- and shrub-layers separately) as either wetland or upland and wetland boundaries were

located using these data. Classification often resulted in a "boundary zone" of alternating wetland and upland quadrats. A rule was developed to place a boundary line within this zone. Herb-layer boundary zones were narrower than shrub-layer boundary zones in most cases. The herb-layer boundary lines usually fell in poorly drained soil; the shrub-layer boundary lines often fell in drier soil. The results of discriminant analyses grouping herbs by U.S. Fish and Wildlife Service wetland indicator status were similar to the herb-layer results. Discriminant analysis may be useful for assessing the value of other boundary-determination methodologies, but requires too much data for general use in boundary delineation. The vegetation results suggest that herbs may be a better guide than shrubs for locating the wetland boundary in southern New England red maple swamps.