

HUDSONIA HARLEM VALLEY BIODIVERSITY MANUAL SUPPLEMENT

Calcareous Swamp

This profile includes predominantly deciduous swamps on calcium-rich soil or rock substrates and circumneutral to alkaline waters. (Some types of conifer swamp and non-tidal hardwood swamp may have similar soil and water chemistry; see profiles for those habitat types.) Characteristic plant species and assemblages distinguish calcareous swamps from acidic swamps. Open-canopy calcareous swamps may contain shrub and herbaceous species characteristic of fens, such as shrubby cinquefoil and grass-of-Parnassus. Corresponding NHP communities (Edinger et al. 2002) are silver maple-ash swamp, restricted in the study area to floodplains and red maple-tamarack peat swamp. NHP “perched swamp white oak swamp” of calcareous ridges corresponds closely to some swamps found in lowlands of the study area.

Vegetation

Red maple, commonly found in acidic swamps, is also found frequently in calcareous swamps. Associated tree species include slippery elm (*Ulmus rubra*), American elm (*U. americana*), swamp white oak (*Quercus bicolor*), black ash (*Fraxinus nigra*) and green ash (*F. pensylvanica*). Tamarack (*Larix laricina*) may occur in swamps with an acidic water layer above the underlying groundwater (see surface waters), and eastern red cedar (*Juniperus virginiana*) in swamps with clay substrates. Characteristic shrub species include poison sumac (*Toxicodendron vernix*), maleberry (*Lyonia ligustrina*), northern gooseberry (*Ribes hirtellum*) and alder-leaved buckthorn (*Rhamnus alnifolia*). Herbs in shaded swamps include wild calla (*Calla palustris*) and Pennsylvania saxifrage (*Saxifraga pensylvanica*), with swamp thistle (*Cirsium muticum*) in spring seeps.

Oak-dominant swamps are usually calcareous, with pin oak (*Quercus palustris*), swamp white oak (*Q. bicolor*) or mossycup oak (*Q. macrocarpa*) occurring with other common trees. In early-stage examples on abandoned agricultural land, the shrubs northern arrowwood (*Viburnum dentatum* var. *lucidum*), silky dogwood (*Cornus amomum*) and gray dogwood (*C. foemina* var. *racemosa*) occur in open ground among stands of trees. In later stage examples, where the tree canopy has closed the openings, these shrubs may be replaced by shade-tolerant winterberry (*Ilex verticillata*), possum-haw (*Viburnum lentago*) and spicebush (*Lindera benzoin*). Common herbaceous associates include spreading goldenrod (*Solidago patula*), sensitive fern (*Onoclea sensibilis*), moneywort (*Lysimachia nummularia*) and squarrose sedge (*Carex squarrosa*) (Hudsonia survey data).

Fauna

Calcareous swamps with large standing dead trees may provide nesting habitat for great blue heron and hole-nesting birds such as red-bellied woodpecker and wood duck. Live trees such as large maples and oaks may be used by nesting red-shouldered hawk. Blue-spotted salamander (*Ambystoma laterale*), a state-rare species of Special Concern, breeds in calcareous swamps with areas of long-standing open water.

Indicators and Identification

Calcareous soils or bedrock substrates, presence of indicator plant species (see above), and absence of acidic indicator plants such as highbush blueberry, swamp azalea and sweet pepperbush. Sphagnum moss may be present, but not in large carpets or mounds (as in acidic bogs). Measured high pH values of water

and upper soil layers are suggestive, but pH values may be subject to short-term events such as sudden thaws and heavy rains.

Biodiversity Values

Regionally-rare mossycup oak is found primarily in calcareous swamps of the upper Harlem Valley (northern Dutchess and southern Columbia counties). State-Threatened swamp cottonwood (*Populus heterophylla*) occurs in western Dutchess County, and probably also in the study area (New York Natural Heritage Program data). Open swamps with substantial areas of low herbaceous vegetation may support state-endangered bog turtle (*Glyptemys muhlenbergii*). A regionally rare and declining butterfly, bronze copper (*Lycaena hyllus*), may occur in open calcareous swamps with its host, water dock (*Rumex orbicularis*). Rare plants of fens may also occur in open patches within calcareous swamps. The Great Swamp in Putnam County has several state-rare plant species, including dwarf huckleberry (*Gaylussacia dumosa*), southern dodder (*Cuscuta obtusiflora*), spotted pondweed (*Potamogeton pulcher*), and a non-tidal population of Long's bittercress (*Cardamine longii*) (G. Tucker, personal communication). Globeflower (*Trollius laxus*), hemlock-parsley (*Conioselinum chinense*), fen cuckooflower (*Cardamine pratense* var. *palustris*) and pink pyrola (*Pyrola asarifolia* var. *purpurea*) occur in calcareous swamps in southwestern Massachusetts, near the study area (Massachusetts Natural Heritage and Endangered Species Program 2005).

Substrates

Calcareous rock (dolostone, limestone and marble) or glacially-deposited sands and gravels derived from calcareous rock. In some cases the substrate is clay, glaciolacustrine silt, muck or (rarely) marl (see Fens profile in Kiviat and Stevens 2001).

Surface Waters

Some calcareous swamps are fed by waters emanating from springs percolating through calcareous bedrock, or groundwater flowing slowly over calcareous substrate (bedrock or dense mineral soil). Others develop on floodplains in oxbows, flood-scoured depressions or abandoned beaver impoundments. Depending on these and other factors, waters may be oxygen-rich (as from springs) or oxygen-poor (standing water). Water clarity varies according to levels of suspended particles and dissolved minerals. Calcareous water is not usually stained by humic substrates. Layering of waters is characteristic of some swamps and open wetlands; typically acidic waters (from precipitation or influenced by organic materials) overlie circumneutral or alkaline waters.

Extent

The Great Swamp (about 1700 ha [4,200 ac]) is largely calcareous, fed by waters flowing from nearby marble substrates. Small patches of calcareous swamp occur throughout the region, primarily in valleys.

Distribution

Calcareous valleys of southeastern Dutchess County, Columbia County and eastern Putnam County. Occurrence and distribution of calcareous swamps in Rensselaer County needs further study.

Quality

The Great Swamp is relatively undisturbed and intact. Many small examples are remnants of previously larger wetland areas fragmented by agriculture or development. Some large wetland mosaics (e.g. Drowned Lands, Town of Ancram, Neer wetlands, Town of Northeast) have patches of high-quality calcareous swamp. Swamps associated with fens and circumneutral bog lakes are likely to be calcareous.

Human Uses

Like other swamps, calcareous swamps in the past have been logged for timber or cordwood. Some cleared swamps were then ditched and drained for agricultural use. Some swamps continue to be used as pasturing areas for cows.

Sensitivities, Impacts

Acid precipitation and human-made pollutants can negatively affect the alkaline water chemistry that supports specialized plant species, including rarities. Alterations to site hydrology (primarily loss of water) can exacerbate chemical stress by increasing concentrations of dissolved chemicals, or by delivering pollutants into particularly vulnerable habitats. Calcareous wetlands appear less susceptible than more acidic wetlands to the establishment of purple loosestrife, but common reed and reed canary grass thrive in calcareous wetlands. Other invasive plants (e.e. Japanese stilt grass) may prove to be more effective invaders.

Conservation and Management

Adequate upland buffers may be especially critical in protecting calcareous swamps and other calcareous wetlands. Slopes adjacent to swamps often contain spring seeps which may supply a substantial proportion of a swamp's water supply. Removal of trees on slopes may alter hydrology in detrimental ways, such as increasing heat and evaporation, altering soil and water chemistry, or facilitating the establishment of invasive plants. Large natural buffers are also necessary to support populations of animals such as amphibians, which use swamps for breeding, but spend most of their lives in adjacent wooded uplands. Public use and access should be limited to areas of low sensitivity (e.g. dry, moderate slopes); development should be minimal and impacts carefully mitigated.

Examples on Public Access lands

Patterson Environmental Park (23 acres)
NYS Rt. 311, Patterson NY
(canoe access to Great Swamp)

References

- Edinger, G., D.J Evans, S. Gebauer, T.G. Howard, D.M. Hunt and A.M. Olivero. 2002. Ecological Communities of New York State, second edition. New York Natural Heritage Program, Albany NY. 134 p.
- Kiviat, E. 1984. Significant areas in the Town of Pawling, Dutchess Co., NY. Report to Town of Pawling Conservation Advisory Board, 3 p.

Kiviat, E. 1990. Bog turtle habitat assessment on a segment of the Iroquois Gas Pipeline route, Town of Dover, Dutchess County, New York. Report to Anne Mueser, 5 p.

Kiviat, E. and G. Stevens. 2001. Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Hudsonia, Ltd. Annandale, New York. 508 p.



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