

NATIONAL WETLANDS INVENTORY REPORT

NORTHEAST REGION

Wetlands Inventory of
Saratoga National Historical Park



March 2000



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Wetlands Inventory of Saratoga National Historical Park

by

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Introduction

The U.S. Fish and Wildlife Service is conducting an inventory of the nation's wetlands through its National Wetlands Inventory Program (NWI). The primary products of the NWI are large-scale wetland maps, digital data, and reports on wetland status and trends. To date, approximately 90 percent of the conterminous United States has been mapped, with digital wetland data produced for about 30 percent of the lower 48 states. To accomplish the NWI, the Service relies on cooperative funding. In 1995, the National Park Service provided cost sharing funds to the Service for conducting a wetlands inventory for the Saratoga National Historical Park in eastern New York. The Service produced a set of large-scale (1:24,000) NWI maps and corresponding digital data (for geographic information system usage) for the Park. The purpose of this report is to summarize the results of the NWI for Saratoga National Historical Park.

Study Area

Saratoga National Historical Park occurs in the eastern part of Saratoga County, New York. The majority of the Park is located in Stillwater, while three small parcels (the Saratoga Monument, Schuyler House, and the Garbor Tract) are located in Schuylerville and Victory Mills. The Park is represented on six U.S. Geological Survey topographic maps: Saratoga Springs, Round Lake, Quaker Springs, Mechanicville, Schuylerville, and Schaghticoke.

Methods

The wetlands inventory was conducted through conventional mapping techniques based on air photointerpretation. The source imagery for the project was 1985/86, 1:58,000 color infrared photography.¹ More recent (1994/5) 1:40,000 color infrared photography served as collateral imagery to update the inventory results. Wetlands were classified using the federal mapping standard: "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin et al. 1979). The target mapping unit was 0.5 acres for wetlands within the Park, meaning that most wetlands larger than this size should be inventoried, recognizing constraints of photointerpretation techniques (e.g., drier-end wetlands may be missed). Wetlands were typed as to ecological system, subsystem, class, subclass, and water regime, with special modifiers applied to characterize human and beaver activities in wetlands. During the photointerpretation phase of the project, field work was performed to understand the relationship between photo-signatures and the variety of wetland types present on Park property. Field work was conducted on October 24, 1994 and from September 28-29, 1995. The location of several known vernal pools were recorded on the aerial photo-overlays based on site information provided by Park personnel.

After performing photointerpretation, standard NWI maps were prepared. Draft maps were sent to the National Park Service for review and comment and a field trip was performed to verify map

¹The quality of the 1:58,000 photos was not particularly good. Supplemental photography and additional field work helped improved the interpretations.

accuracy and completeness. Final maps were prepared and were later digitized to create a digital wetland database for GIS applications. Digital data for all NWI maps in the project area are available through the NWI web site at www.nwi.fws.gov. A digital database was created and queried to summarize wetlands inventory results for the Park. Digital wetland data for mapped wetlands in the Park were expanded to include attributes for hydrogeomorphic properties (landscape position, landform, and water flow path) following Tiner (1997): "Keys to Landscape Position and Landform Descriptors for U.S. Wetlands (Operational Draft)." These descriptors are useful for interpreting wetland functions since many wetland functions are strongly correlated with these variables.

Data for Park boundaries was provided by the Park in an ARC-VIEW format. These data were combined with the NWI digital coverage to produce special wetland maps for the Park and to generate summary statistics on the acreage of wetlands and deepwater habitats within the Saratoga National Historical Park.

Results

Wetland Types

All of the wetlands on the Saratoga National Historical Park are freshwater wetlands. These wetlands may be associated with one of three ecological systems: Riverine, Lacustrine, and Palustrine. Riverine wetlands are shallow water wetlands within channels of rivers and streams. Vegetated riverine wetlands are typically either aquatic beds (in slow-flowing waters) or non-persistent emergent wetlands dominated by plants like pickerelweed with leaves and stems (above-ground parts) that die-back each year. Lacustrine wetlands are represented by the same types as riverine wetlands, with emergent wetlands restricted to non-persistent types. Wetlands dominated by persistent vegetation (trees, shrubs, and persistent emergents) are classified as palustrine wetlands. Figures 1–6 show examples of wetlands in the Park and vicinity. Wetland plants may be identified using field guides (e.g., Tiner 1988, 1999).

Forested wetlands are characterized by trees such as American elm, red maple, green ash, swamp white oak, black willow, and silver maple. Shrubs in these wetlands may include winterberry, speckled alder, silky dogwood, red-panicked (or gray) dogwood, maleberry, and nannyberry. Forest herbs include clearweed, false nettle, sedges, ferns (e.g., marsh, royal, and sensitive), smartweeds, and beggar-ticks. Emergent wetlands are represented by herbaceous (nonwoody) species like wool-grass, reed canary grass, bluejoint grass, rice cutgrass, broad-leaved cattail, and various flowering herbs (e.g., swamp aster, boneset, Joe-Pye-weeds, and goldenrods). Deciduous shrubs form wet thickets or scrub-shrub wetlands. Typical shrubs include speckled alder, broad-leaved meadowsweet, steplebush, and silky dogwood. Buttonbush is a shrub found in standing water along pond shores and in wetter woodland depressions.

A comprehensive botanical survey of the wetlands was not in the scope of work for this mapping project, but a list of plant observed in the Park's wetlands is included as an appendix to this

Figures 1-6. Examples of wetlands in and around Saratoga National Historical Park.



Figure 1. Palustrine emergent wetland along the Old Champlain Canal at the Saratoga National Historical Park. (National Park Service photo)



Figure 2. Grazed wet meadow in Stillwater. (Ralph Tiner photo)

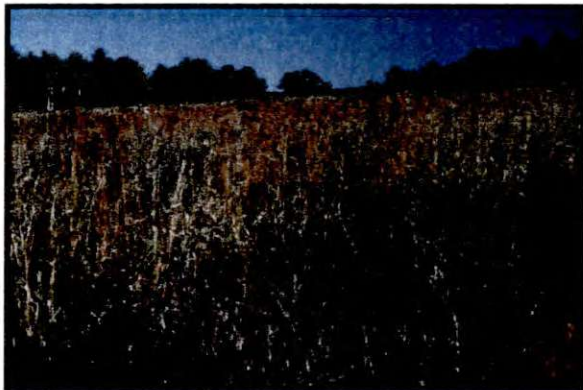


Figure 3. Wool-grass dominates this palustrine emergent wetland. (Ralph Tiner photo)



Figure 4. Green ash dominates this forested wetland at Saratoga National Historical Park. (Ralph Tiner photo)



Figure 5. Floodplain wetland along the Hudson River. (Ralph Tiner photo)



Figure 6. Beaver-influenced wetland at Saratoga National Historical Park. (Ralph Tiner photo)

report. A survey of the vascular flora of the Park was conducted by Dr. Richard Stalter, Patrick Lynch, and James Schaberl from 1987-1990 and the results were published as "Vascular flora of Saratoga National Historical Park, New York" (Stalter et al. 1993).

Wetlands may also be categorized by their hydrogeomorphic characteristics - landscape position (association with a waterbody), landform (shape of the wetland), and water flow path (flow of water) (Tiner 1997). For the Park, two landscape positions were common: lotic (associated with rivers and streams) and terrene (headwater and isolated wetlands). Since no large lakes occurred within the Park boundaries, lentic wetlands associated with lakes were not present. From the landform standpoint, wetlands may be classified as basin (depression), slope (generally >3% slope), floodplain (area of alluvial deposition, e.g., along the Hudson River), flat (broad level landform), fringe (in shallow water zone of lakes, rivers, streams, and ponds), and island (surrounded by water). Basin, floodplain, and slope wetlands occur within the Park. Considering the flow of water associated with wetlands, three types are common in the Park: 1) throughflow (associated with rivers and streams), 2) outflow (sources of streams; water exiting but no major surface flow into wetland), and 3) isolated (depressions surrounded by upland with no apparent surface inflow).

Maps

A set of six 1:24,000 NWI maps were produced for the Saratoga National Historical Park: Saratoga Springs, Round Lake, Quaker Springs, Mechanicville, Schuylerville, and Schaghticoke. The maps show the general boundaries of wetlands and deepwater habitats greater than 1-3 acres in size, but for the Park, wetlands 0.5 acres and larger were targeted for inventory. Linear wetlands and watercourses were also mapped where readily observed. NWI maps are available for purchase from: Cornell Institute for Resource Information Systems (IRIS), Resource Information Lab, Cornell University, 302 Rice Hall, Ithaca, NY 14853; 607-255-4864.

Color-coded computer-generated wetland maps were prepared for the Park. One map shows wetlands classified by the official U.S. Fish and Wildlife Service wetland classification system (Cowardin et al. 1979), while the other shows wetlands classified by hydrogeomorphic characteristics of landscape position, landform, and water flow path (Tiner 1997). These maps are contained within a folder that accompanies this report.

Wetland Acreage Summaries

A total of 175.9 acres of wetlands were inventoried on the Park, excluding linear wetlands (too narrow to map as polygonal features). This amounts to about 6 percent of the Park. All of these wetlands are palustrine wetlands (see Table 1 for details). Forested wetlands were the predominant type, occupying 120 acres and representing 68 percent of the Park's wetlands. Palustrine emergent wetlands (marshes and wet meadows) totaled only 24 acres which accounted for 14 percent of the Park's wetlands, while 14 acres or 8 percent of the Park's wetlands were mixed stands of forested and scrub-shrub wetlands. The remaining wetlands were 6.6 acres of

palustrine scrub-shrub wetlands, 6.1 acres of ponds, 4.8 acres of mixed emergent/shrub wetlands, and 0.5 acre of farmed wetland.

Significantly modified wetlands on the Park include the following: 84.1 acres of impounded wetlands, 9.3 acres of partly drained wetlands, and 0.2 acres of excavated wetlands. Their total represents 53 percent of the Park's wetland acreage and at least, some of these wetlands may be candidates for some type of restoration.

Linear wetlands (narrow wetlands too small to map as polygons) were represented by the following: 38.5 miles of palustrine emergent wetland, 0.1 mile of farmed wetland, 81.9 miles of forested wetland, 0.3 mile of mixed shrub/emergent wetland, 37.5 miles of scrub-shrub wetland, 11.2 miles of unconsolidated bottom (narrow ponds and wide ditches), and 41.5 miles of intermittent streambed. In addition, there were 94.2 miles of perennial stream (6.6 miles of lower perennial and 87.6 miles of upper perennial).

Wetlands were also classified by hydrogeomorphic properties. This classification allowed individual wetlands to be identified. For the Saratoga National Historical Park, a total of 49 wetlands were mapped, excluding linear wetlands. Fifty-nine percent (or 29) of these wetlands were lotic wetlands associated with rivers and streams, while the remainder (41% or 20 wetlands) were terrene wetlands (isolated or headwater outflow wetlands). Fifteen wetlands were significantly impacted by human actions (diked, excavated, or partly drained), so these actions have affected about a third of the Park's wetlands and about half of the acreage. As mentioned previously, many of these wetlands may represent opportunities for wetland restoration. Eight wetlands were fragmented by roads. Fourteen wetlands were headwater wetlands.

From an acreage standpoint, about 79 percent of the Park's wetland acreage occurred along rivers and streams. Half of the acreage (51%) consisted of lotic river floodplain wetlands along the Hudson River, while 21 percent occurred as lotic stream basin (depressional) wetlands along streams. Under natural conditions, both of these types are likely to be significant for temporary storage of floodwaters and are important for reducing the risk of flood damage downstream. Many of them have been diked, thereby restricting flood storage to water that enters through existing culverts during high flows in the Hudson River.

Only 12 acres of lotic stream wetlands were found on sloping terrain. Most of these slope wetlands were designated as headwater wetlands. They are likely to be groundwater discharge sites important for streamflow maintenance.

Terrene wetlands are either headwater wetlands or isolated wetlands surrounded by upland. About 12 acres were headwater wetlands serving as sources of various streams and therefore important for streamflow maintenance and for maintaining fish habitat downstream. Isolated wetlands accounted for 15 percent (or 26 acres) of the Park's wetland acreage. Some of these may be connected to other wetlands through seasonal overflows and intermittently flowing drainageways in late winter and early spring, yet they remain relatively isolated for much of the

year. Some isolated wetlands may possess vernal pools that are essential breeding grounds for certain amphibians like salamanders, wood frogs, and spring peepers.

Table 1. Wetland acreage summary for Saratoga National Historical Park.

<u>Wetland Type (Map Code)</u>	<u>Acreage</u>
Palustrine Emergent Wetlands	
saturated (PEM1B; PEM1Bd)	8.3
seasonally flooded (PEM1C)	3.4
seasonally flooded/saturated (PEM1E; PEM1Ed; PEM1Eh)	12.3
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Total	24.0
Palustrine Scrub-shrub Wetlands	
temporarily flooded (PSS1A)	2.7
seasonally flooded (PSS1C)	0.5
seasonally flooded/saturated (PSS1E)	1.5
semipermanently flooded (PSS1Fh)	1.9
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Total	6.6
Palustrine Mixed Emergent/Scrub-shrub Wetlands	
seasonally flooded (PEM1/SS1C)	0.4
seasonally flooded/saturated (PSS1/EM1E)	4.4
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Total	4.8
Palustrine Deciduous Forested Wetlands	
temporarily flooded (PFO1A)	3.2
saturated (PFO1B)	10.2
seasonally flooded (PFO1C; PFO1Ch)	41.5
seasonally flooded/saturated (PFO1E; PFO1Eh)	65.0
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Total	119.9
Palustrine Mixed Forested/Scrub-shrub Wetlands	
seasonally flooded/saturated (PFO1/SS1E; PFO1/SS1Eh; PSS1/FO1E)	14.0
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Total	14.0
Palustrine Farmed Wetlands (Pf)	0.5
Palustrine Unconsolidated Bottom Wetlands (ponds)	
semipermanently flooded (PUBFh; PUBFx)	5.2
permanently flooded (PUBHh)	0.9
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Total	6.1
GRAND TOTAL (All Wetlands)	175.9

Table 2. Wetlands of the Saratoga National Historical Park classified by hydrogeomorphic characteristics.

<u>Wetland Type (Map Code)</u>	<u>Acreage</u>	<u>No. of Wetlands</u>
Lotic Wetlands		
River Floodplain (LR1FP; LR1FPba; LR1FPbahi; LR1FPflhi; LR1FPphi; LR1FPfbIShifg)	89.4	13
Stream Basin (LS1BA; LS1BAhi;LS1BAhw)	36.8	11
Stream Slope (LS2SL; LS2SLhw; LS3SLhw)	12.0	5
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Total	138.2	29
Terrene Wetlands		
Basin Isolated (TEBAIS; TEBAISfg; TEBAIShi)	26.0	15
Basin Outflow (TEBAOUhw; TEBAOUhwfg)	5.2	4
Slope Outflow (TESLOUhw)	6.5	1
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Total	37.7	20
GRAND TOTAL (All Wetlands)	175.9	49

Acknowledgments

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Wetland photointerpretation was performed by Irene Huber, formerly of the U.S. Fish and Wildlife Service, and now working for the University of Massachusetts-Amherst. Glenn Smith performed quality control of the wetland photointerpretation. Map production and digital database construction was done by the U.S. Fish and Wildlife Service's National Wetlands Inventory Center at St. Petersburg, Florida. Some of the individuals involved in the project were Don Woodard, Becky Stanley, Greg Pipkin, and Kurt Snider. Matt Starr (U.S. Fish and Wildlife Service) performed GIS analysis and produced maps and statistics included in this report. Gabe DeAllessio (U.S. Fish and Wildlife Service) scanned the wetland photographs included in this report.

We also extend special thanks to Chris Martin and James Schaberl of the Saratoga National Historical Park for their help in the field and in reviewing draft National Wetlands Inventory maps. Their assistance helped us produce better wetland maps. Chris also provided GIS coverages of Park boundaries, other Park maps, and photographs of wetlands in the Park for possible use in this report.

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Appendix. List of Wetland Plants Observed at Saratoga National Historical Park.

Appendix. List of Wetland Plants Observed at Saratoga National Historical Park. (Note: This listing does not represent a comprehensive listing of wetland plants in the Park, but only those recorded at field check sites; undoubtedly some common wetland species are not included.)

Trees

American Elm (*Ulmus americana*)
Black Willow (*Salix nigra*)
Gray Birch (*Betula populifolia*)
Green Ash (*Fraxinus pennsylvanica*)
Quaking Aspen (*Populus tremuloides*)
Silver Maple (*Acer saccharinum*)
Swamp White Oak (*Quercus bicolor*)

Shrubs

Broad-leaved Meadowsweet (*Spiraea latifolia*)
Buttonbush (*Cephalanthus occidentalis*)
Common Buckthorn (*Rhamnus cathartica*)
Maleberry (*Lyonia ligustrina*)
Nannyberry (*Viburnum lentago*)
Northern Arrowwood (*Viburnum recognitum*)
Red Osier (*Cornus stolonifera*)
Red-panicled Dogwood (*Cornus foemina*)
Silky Dogwood (*Cornus amomum*)
Smooth Winterberry (*Ilex laevigata*)
Speckled Alder (*Alnus rugosa*)
Steeplebush (*Spiraea tomentosa*)

Woody Vines

Grape (*Vitis* sp.)
Japanese Honeysuckle (*Lonicera japonica*)
Swamp Dewberry (*Rubus hispidus*)

Aquatics

Duckweeds (*Lemna* spp.)

Ferns

Marsh Fern (*Thelypteris thelypteroides*)
Royal Fern (*Osmunda regalis*)

Sensitive Fern (*Onoclea sensibilis*)

Grasses

Bluejoint Grass (*Calamagrostis canadensis*)
Lowland Broomsedge (*Andropogon glomeratus*)
Manna Grass (*Glyceria striata*)
Panic Grass (*Panicum* sp.)
Reed Canary Grass (*Phalaris arundinacea*)
Rice Cutgrass (*Leersia oryzoides*)
Spreading Bent-grass (*Agrostis stolonifera*)
Timothy (*Phleum pratense*)
Wild Millet (*Echinochloa crus-galli*)

Bulrushes

Green Bulrush (*Scirpus atrovirens*)
Wool-grass (*Scirpus cyperinus*)

Other Sedges

Bearded Sedge (*Carex comosa*)
Bladder Sedge (*Carex intumescens*)
Broom Sedge (*Carex scoparia*)
Fringed Sedge (*Carex crinita*)
Fox Sedge (*Carex vulpinoidea*)
Hop Sedge (*Carex lupulina*)
Lurid Sedge (*Carex lurida*)
Spike-rushes (*Eleocharis* spp.)
Three-way Sedge (*Dulichium arundinaceum*)

Rushes

Soft Rush (*Juncus effusus*)

Other Grasslike Plants

Broad-leaved Cattail (*Typha latifolia*)
Bur-reed (*Sparganium americanum*)
Water Horsetail (*Equisetum fluviatile*)

Flowering Herbs

Arrow-leaved Tearthumb (*Polygonum sagittatum*)
Bedstraw (*Galium* sp.)
Blue Flag (*Iris versicolor*)
Blue Vervain (*Verbena hastata*)
Boneset (*Eupatorium perfoliatum*)
Bugleweed (*Lycopus virginicus*)
Buttercup (*Ranunculus* sp.)
Clearweed (*Pilea pumila*)
Devil's Beggar-ticks (*Bidens frondosa*)
False Nettle (*Boehmeria cylindrica*)
Grass-leaved Goldenrod (*Euthamia graminifolia*)
Joe-Pye-weed (*Eupatoriadelphus* sp.)
Ladies'-tresses (*Spiranthes* sp.)
New England Aster (*Aster novae-angliae*)
Nodding Beggar-ticks (*Bidens cernua*)
Pinkweed (*Polygonum pennsylvanicum*)
Purple Loosestrife (*Lythrum salicaria*)
Rough-stemmed Goldenrod (*Solidago rugosa*)
Skullcap (*Scutellaria* sp.)
Swamp Aster (*Aster puniceus*)
Swamp Beggar-ticks (*Bidens connata*)
Swamp Candles (*Lysimachia terrestris*)
Tall Goldenrod (*Solidago altissima*)
Turtlehead (*Chelone glabra*)
Water Peppers (*Polygonum hydropiperoides* and *P. hydropiper*)
Water Purslane (*Ludwigia palustris*)
