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Searching for Wildflowers



A FLORISTIC STUDY OF STRAWBERRY ISLAND IN THE UPPER NIAGARA RIVER, TONAWANDA, NY

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INTRODUCTION

Strawberry Island is one of several small islands in the upper Niagara River and lies within the Town of Tonawanda in Erie County. Radical changes in the size and shape of the island in the 20th century have been accomplished by equally striking changes in the flora of the island. Between 1860 and 1880, George Clinton and others frequently collected plants on the island, and Clinton's journal reflects the flora of that time. Recent collections by the author and others indicate the present flora is very different. Concern for the future of the island has been expressed by sportsmen and local conservationists, and currently a management plan has been established. The island belongs to the state and is overseen by the Office of Parks, Recreation and Historic Preservation of New York.

HISTORY OF THE ISLAND

The official survey of the Niagara River islands was completed in 1824 by James Tanner and included a brief survey and description of Strawberry Island. The island, estimated to be about 100 acres, was described as mostly marshland and the survey team was impeded in their efforts by high water levels. The island as a whole was considered to be worthless, except for one area acceptable for mowing. The island increased in size due to soil deposits from the digging of the Erie Canal in the early 1800s. Once more than 200 acres, the island is now about 25 acres (Vogel, 1995).

Between 1914 and the 1940s, the island was dredged for gravel until its size was reduced by about two thirds. Concern for the quality of drinking water was expressed when state officials questioned if the altered shape of the island could alter the pattern of water around Grand Island. Conservationists worried that altered water flow would ruin spawning grounds of muskellunge, yellow perch, and smallmouth bass around the island (Sanders, 1985).

Dredging continued until the early 1950s with the digging of a pit in the interior of the island which is today the area called Horseshoe Bay on the downstream side.

A sequence of the changes in size and shape can be seen in the map series from 1855 to 1965 in fig. 1. The original lens shape common to river islands was lost once dredging began at the head of the island. Erosion, especially from winter storms, has reduced the island to its present size. Strawberry Island is roughly U-shaped with a gravel beach at the up-stream end and high water levels threaten to cut off the down-stream arms.

EARLY BOTANICAL OBSERVATIONS

The earliest botanical collections from Strawberry Island were made by George W. Clinton and David F. Day in the 1860s. Accompanied by his man servant, Clinton made frequent botanical forays along the Niagara River, and often went by rowboat from the Black Rock dam to the islands in the upper river. In his journal, he recorded collections and sightings of plants in flower.

The Clinton Herbarium, at the Buffalo Museum of Science, is the main repository of Clinton's specimens, often unfortunately, without dates or locations. With either the date or location, it is possible to surmise the other through use of his journal. The journal has many entries from 1862 to 1867, and thereafter, there are sporadic entries into 1887. Other collectors on the island were David Day and Amiel Chamot. The head of the island (up-stream end), an area covered by sedges, was mowed for mattress filling (Clinton, 9/6/1862 entry). The vegetation on the island was primarily herbaceous, but there were some willows and shrubs such as red osier dogwood, ninebark, and wild rose. The island contained a marsh meadow community with orchids (northern green orchid, lady's tresses, and twayblade), gentians (bottle and fringed), grass-of-Parnassus, four-flowered loosestrife, calamint, gerardia, horse-tail, and grasses (switchgrass, Indian grass, and big bluestem). In moister areas, Clinton found wild rice, pickerel-weed, and smartweed. In the water near the shoreline were the emergent aquatic creeping spikerush, Braun's quill-wort and arrow-grass, as well as other aquatic species, water-lily, creeping spearwort, and lake-cress. Most of these observations are not vouchered with specimens. Other plants collected on Strawberry Island include Indian-paintbrush, Kalm's lobelia, and Illinois pondweed

PRESENT FLORA OF STRAWBERRY ISLAND

Interest in plant life on Strawberry Island was renewed with concern for the future of the island. During the summer of 1986 plants were collected in July and August by Cathy Carnes and the author. In September, 1990, further collections were made by the author. In all, 84 species were collected and the flora consisted of 8 tree, 4 shrub, 2 woody vine, 49 herbaceous perennial, 4 biennial, and 17 annual species. These specimens are housed in the Niagara University herbarium.

The flora of the present is very different from that of a century before. The vegetation along the southeastern shore consists of cottonwood, sandbar willow, choke cherry, and black

locust, red osier dogwood, elderberry and staghorn sumac. In open areas, alien weeds, bittersweet nightshade, burdock, and purple loosestrife are found with native perennials such as willowherb, boneset, and evening primrose. In the interior is a moist area of primarily bluejoint grass, swamp milkweed, monkeyflower, and spotted jewelweed. The gravel bar along the west side is also a site for pioneer weeds, black mustard, switchgrass, white sweet clover, and peppergrass, as well as wetland species of sedge, ditch stonecrop, Dudley's rush, and pale smartweed. Other shoreline or strand plants are gaura, silverweed, and clammyweed. On the east gravel bar were perennial herbs, creeping hedge-nettle, wild germander, obedient plant, and blue vervain. Graminoids included prairie cordgrass and tussock sedge.

Emergent aquatic species were few and sparse. Along the mud shore of Horseshoe Bay was water-plantain, and in shallow water in the bay are found tapegrass, naiad, horned pondweed, and several species of pondweed.

FLORISTIC CHANGES IN STRAWBERRY ISLAND

The dredging of gravel from Strawberry Island coupled with subsequent shoreline erosion over the last 130 years have led to a flora very different from that which George Clinton visited in the 1860's. Using his observations and collections as a data base, it can be shown that the flora in Clinton's time was 97% native species. Ten of the plants mentioned by Clinton are now considered rare in the Niagara Frontier area (Zander & Pierce, 1979). None are extant at present on Strawberry Island.

There are only four species known from the 1860's flora that are still found on Strawberry Island. They are obedient plant, naiad, hard-stemmed bulrush, and horned pondweed. The composition of the present flora is similar to that of the mainland along the river and consists of approximately 71% native species. One of these, rose-mallow, is listed by Zander & Pierce (1979) as rare in the Niagara Frontier. Missing are many of the submerged, floating, and emergent aquatic species formerly found in shallow water around the island. Stuckey (1971) recorded similar changes in aquatic vegetation in Put-in-Bay, Ohio, at the western end of Lake Erie. In his study he documented the loss of native species over a 70-year period, with a corresponding addition of alien species. He attributed these changes to deteriorative water quality, increased silt, loss of shoreline habitats, and pollution from human habitation. It appears that similar changes have occurred in the Niagara River as well.

SPECIES OF VASCULAR PLANTS ATTRIBUTED TO STRAWBERRY ISLAND

*denotes a historic specimen from the Clinton Herbarium

The nomenclature used in preparation of this list is that of Mitchell, 1986.

DICOTYLEDONS RANUNCULACEAE (Crowfoot Family)

Thalictrum revolutum DC. Waxy Meadow-rue
CAROPHYLLACEAE (Pink Family)
Saponaria officinalis L. Bouncing-bet
POLYGONACEAE (Buckwheat Family)
Polygonum convolvulus Black Bindweed
P. hydropiper L. Smartweed
P. lapathifolium L. Pale Smartweed
P. persicaria L. Lady's Thumb
P. punctatum Ell. Dotted Smartweed
MALVACEAE (Mallow Family)
Hibiscus moscheutos L. Rose-mallow
VIOLACEAE (Violet Family)
Viola soraria Willd. Common Violet
SALICACEAE (Willow Family)
Populus deltoides Bartr. ex Marsh. Cottonwood
Salix exigua Nutt. Sandbar Willow
S. nigra Marsh. Black Willow
CAPPARIDACEAE (Caper Family)
Polanisia dodecandra (L.) DC Clammyweed
BRASSICACEAE (Mustard Family)
*Armoracia aquatica (Eat.) Wieg. Lake-cress
Brassica nigra (L.) Koch Black Mustard
Lepidium virginicum L. Peppergrass
Rorippa palustris (L.) Besser Marsh Watercress
PRIMULACEAE (Primrose Family)
*Lysimachia quadriflora Sims Four-flowered Loosestrife
SAXIFRAGACEAE (Saxifrage Family)
*Parnassia glauca Raf. Grass-of-Parnassus
Penthorum sedoides L. Ditch Stonecrop
ROSACEAE (Rose Family)
Fragaria virginiana Mill. Wild Strawberry
*Physocarpus opulifolius (L.) Maxim. Ninebark
Potentilla anserina L. Silverweed
Prunus virginiana L. Choke-cherry
Rubus occidentalis L. Black Raspberry
FABACEAE (Bean Family)
*Astragalus neglecta (T. & G.) Sheldon Milk Vetch
Melilotus alba Desr. ex Lam. White Sweetclover
Robinia pseudo-acacia L. Black Locust
HALORAGACEAE (Water Milfoil Family)
Myriophyllum exalbescens Fern. Water Milfoil
LYTHRACEAE (Loosestrife Family)
Lythrum salicaria L. Purple Loosestrife
ONAGRACEAE (Evening Primrose Family)
Epilobium ciliatum Raf. Willow-herb

E. hirsutum L. Fireweed
Gaura biennis L. Guara
Ludwigia palustris (L.) Ell. Water Purslane
Oenothera biennis L. Evening Primrose
 CORNACEAE (Dogwood Family)
Cornus sericea L. Red Osier Dogwood
 VITACEAE (Grape Family)
Vitis riparia Michx. Frost Grape
 ACERACEAE (Maple Family)
Acer negundo L. Box Elder
A. platanoides L. Norway Maple
 ANACARDIACEAE (Sumac Family)
Rhus typhina L. Staghorn Sumac
 SIMAROUBACEAE (Quassia Family)
Ailanthis altissima (Mill.) Swingle Tree-of-Heaven
 BALSAMINACEAE (Touch-me-not Family)
Impatiens capensis Meerb. Spotted Jewelweed
 APOCYNACEAE (Dogbane Family)
Apocynum cannabinum L. Indian Hemp
 ASCLEPIADACEAE (Milkweed Family)
Asclepias syriaca L. Common Milkweed
 SOLANACEAE (Nightshade Family)
Lycium barbatum L. Matrimony Vine
Solanum dulcamara L. Bittersweet Nightshade
 CONVOLVULACEAE (Morning-glory Family)
Calystegia sepium (L.) R. Br. Hedge Bindweed
Cuscuta gronovii Wilid. ex Schultz Dodder
 VERBENACEAE (Verbena Family)
Verbena hastata L. Blue Vervain
 LAMIACEAE (Mint Family)
Nepeta cataria L. Catnip
Phystostegia virginiana (L.) Benth. Obedient Plant
Scutellaria galericulata L. Common Skullcap
 LAMIACEAE (Mint Family) Cont'd
Stachys tenuifolia Wilid. Creeping Hedge-nettle
Teucrium canadense L. Wild Germander
 PLANTAGINACEAE (Plantain Family)
Plantago majaor L. Common Plantain
 SCROPHULARIACEAE (Figwort Family)
 *Agalinus purpurea (L.) Pennell Gerardia
 *Castilleja coccinea (L.) Spreng. Indian-Paintbrush
Linaria vulgaris L. Butter-and-eggs
Mimulus ringens L. Monkeyflower
 CAMPANULACEAE (Bluebell Family)
 *Lobelia kalmii L. Kalm's Lobelia

CAPRIFOLIACEAE (Honeysuckle Family)

Sambucus canadensis L. Black Elderberry

ASTERACEAE (Aster Family)

Arctium minus (Hill) Bernh. Common Burdock

Aster lateriflorus (L.) Britt. Calico Aster

A. novae-angliae L. New England Aster

Cirsium arvense (L.) Scop. Canada Thistle

Conyza canadensis (L.) Cronq. Horseweed

Erechtites hieracifolia (L.) Raf. ex DC. Pilewort

Eupatorium perfoliatum L. Thoroughwort

Helenium autumnale L. Sneezeweed

Lactuca serriola L. Prickly Lettuce

Solidago canadensis L. Canada Goldenrod

Tussilago farfara L. Coltsfoot

Xanthium strumarium L. Cocklebur

MONOCOTYLEDONS

ALISMATACEAE (Water-plantain Family)

Alisma plantago-aquatica L. Water-plantain

HYDROCHARITACEAE (Frog's-bit Family)

Vallisneria americana Michx. Tapegrass

POTAMOGETONACEAE (Pondweed Family)

Potamogeton crispus L. Curly Pondweed

*P. illinoensis Morong Illinois Pondweed

P. pectinatus L. Sago Pondweed

P. pusillus L. Small Pondweed

NAJADACEAE (Naiad Family)

Najas flexilis (Willd.) Rostk. & Schmidt Naiad

ZANNICHELLIACEAE (Horned Pondweed Family)

Zannichellia palustris L. Horned Pondweed

JUNCACEAE (Rush Family)

Juncus tenuis Willd. Path-rush

CYPERACEAE (Sedge Family)

Carex stricta Lam. Tussock Sedge

Cyperus bipartitus Torr. Sedge

C. strigosus L. Galingale

Scirpus acutus Muhl. ex Bigel. Hard-stem Bulrush

S. atrovirens Willd. Bulrush

POACEAE (Grass Family)

*Andropogon gerardii Vitm. Big Bluestem

Calamagrostis canadensis (Michx.) Beauv. Bluejoint Grass

Leersia oryzoides (L.) Sw. Rice Cutgrass

Panicum capillare L. Witch Grass

Poa palustris L. Meadow-grass

Setaria glauca (L.) Beauv. Foxtail

Spartina pectinata Link. Prairie Cordgrass
PONTEDERIACEAE (Pickerel-weed Family)

Pontederia cordata L. Pickerel-weed
IRIDACEAE (Iris Family)

Iris versicolor L. Blue Flag
ORCHIDACEAE (orchid Family)

Liparis loeselii (L.) Rich. Yellow Twayblade

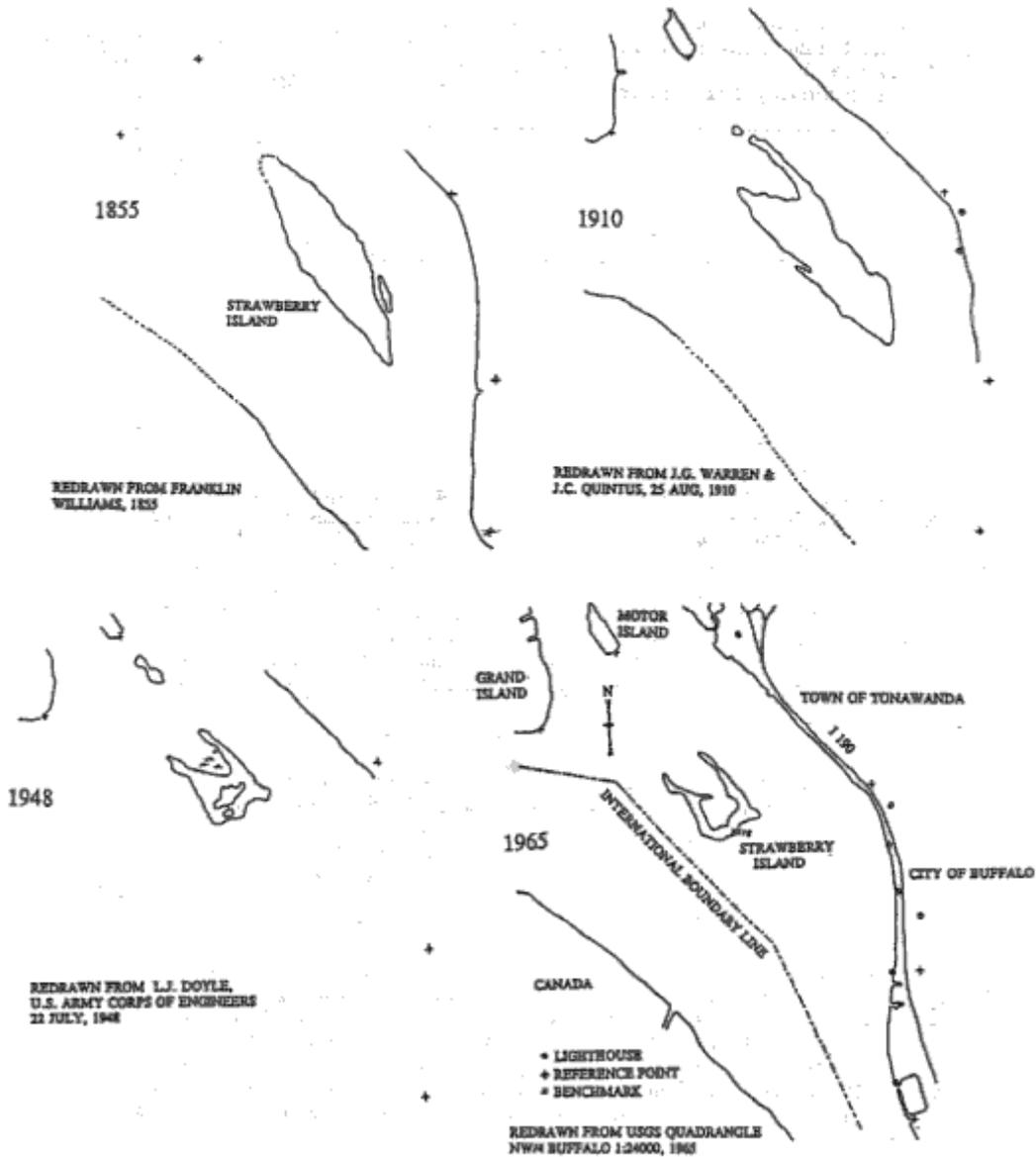
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LITERATURE CITED

- Clinton, George W. 1862-1887. Personal journal. Buffalo Museum of Science.
- Mitchell, Richard S. 1985. A Checklist of New York State Plants. New York State Museum, Bulletin 458. Albany, NY.
- Sander, John. 1985. Sander's Fishing Guide & Services Directory, Western New York edition. Amherst, NY. 216 pp.
- Stuckey, Ronald L. 1971. Changes of vascular aquatic flowering plants during 70 years in Put-in-Bay Harbor, Lake Erie. Ohio. The Ohio Journal of Science 71(6):321-342.
- Vogel, Mike. 1995. Island rescue, in Buffalo News. Sept 24, section C, pp 1, 9.
- Zander, Richard H., and Gary J. Pierce. 1979. Flora of the Niagara Frontier Region. Bull. Buffalo Soc. Nat. Sciences 16 (suppl.2). Buffalo, NY. 110 pp.

FIG. 1. CHANGES IN THE SHAPE AND SIZE OF STRAWBERRY ISLAND



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