The Fish Fauna of Cranberry Bog, Town of Burlington, Otsego County, N.Y.

Steven M. Foster*

ABSTRACT

In June 1995 a baseline fish survey of Cranberry Bog was conducted in order to identify the species present, relative abundance, age, and growth. No fish were found in the bog tributaries. Pumpkinseed, yellow perch, and creek chubs were found at the bog outlet at the headwaters of Mill Creek. The bog fish fauna consisted of pumpkinseed, yellow perch, brown bullhead, and chain pickerel. The bog shallows contained the highest fish densities and were dominated by young-of-the-year. Evidence of winter kill, skewed population structure, low diversity, and poor growth indicate that the fish habitat of Cranberry Bog is less than optimal.

INTRODUCTION

Recently over 1000 acres of land under conservation easement, protected by the Peterson Family Trust were developed to form the Greenwoods Conservancy (Town of Burlington, Otsego County). In 1994 the Biological Field Station (BFS) began managing Greenwoods Conservancy for environmental research and education. The conservancy is currently used in the environmental research and/or educational programs of several secondary schools and colleges.

Research was initiated in 1994 by the BFS to characterize the flora and fauna on conservancy property. Cranberry Bog is a seventy-acre wetland whose shores and watershed are located within the Conservancy. This study of the fish community of Cranberry Bog was initiated as part of the larger surveys. No systematic studies of the fish of the bog had been conducted prior to this work.

The objective of this study is to characterize the fish fauna of Cranberry Bog, including species present, relative abundance, diversity, and community structure. Further, the size distribution, age, and growth of fish in Cranberry Bog were observed and recorded.

**This work serves to fulfill, in part, the requirements for the award of Eagle Scout. Current Address: Bard College, Annandale-on-Hudson, N.Y.*

MATERIALS AND METHODS

Field data were collected during the last two weeks of June 1995. A Smith-Roote backpack shocker was used to survey the fish in the tributaries feeding the bog and the bog outlet at the headwaters of Mill Brook. A 25-foot fine mesh shore seine (5' deep, 3/8" stretch mesh) was used to sample shallow, weedy, inshore areas of the bog. A 150 foot haul seine (8' deep, 5/8" stretch mesh) was used to sample fish in deeper, nearshore areas. And, a 300 foot trammel net (8' deep, 12 outer mesh 1" inner mesh) was used to sample fish in the deepest part of the bog, adjacent to the beaver dam (Figure 1).

Fish captured were anesthetized with MS-222, counted, measured, scaled, and released at the point of capture. Scales were taken at the midline, behind the operculum, and read on at 42X using a microfiche reader. Back calculation of growth followed the methods described in Nielson & Johnson (1983).

RESULTS

Fish Fauna of Bog Inlet Streams and Outlet

No fish were captured in the small tributary streams of Cranberry Bog. Inlet streams were intermittent, drying up completely by late summer. Tributary streams sampled in June were extremely small and shallow and provided minimal fish habitat.

The outlet of Cranberry Bog flows under a road crossing where a culvert forms an insurmountable falls at the headwaters of Mill Brook. The plunge pool at the outlet was electrofished for 500 seconds, and 2 creek chubs (*Semotolis atromaculatus*), 11 pumpkinseed (*Lepomis gibbosus*) and 5 yellow perch (*Perca flavescens*) were captured. Age of pumpkinseed ranged from 1-3 years (40-81mm) while yellow perch were age-0 (29-36mm).

Fish Fauna of Cranberry Bog

Distribution and Abundance

Four species of fish were captured in Cranberry Bog: brown bullhead (*Ictalurus nebulosus*), chain pickerel (*Esox niger*), pumpkinseeds (*Lepomis gibbosus*), and yellow perch (*Perca flavescens*). The pumpkinseed sunfish were the most abundant species caught, followed by yellow perch, chain pickerel and bullhead (Table 1). Numerically, pumpkinseed were clearly the dominant species (67% of the total fish captured), particularly in the bog shallows. Yellow perch dominated nearshore waters of moderate depth, although numerically, they were relatively evenly

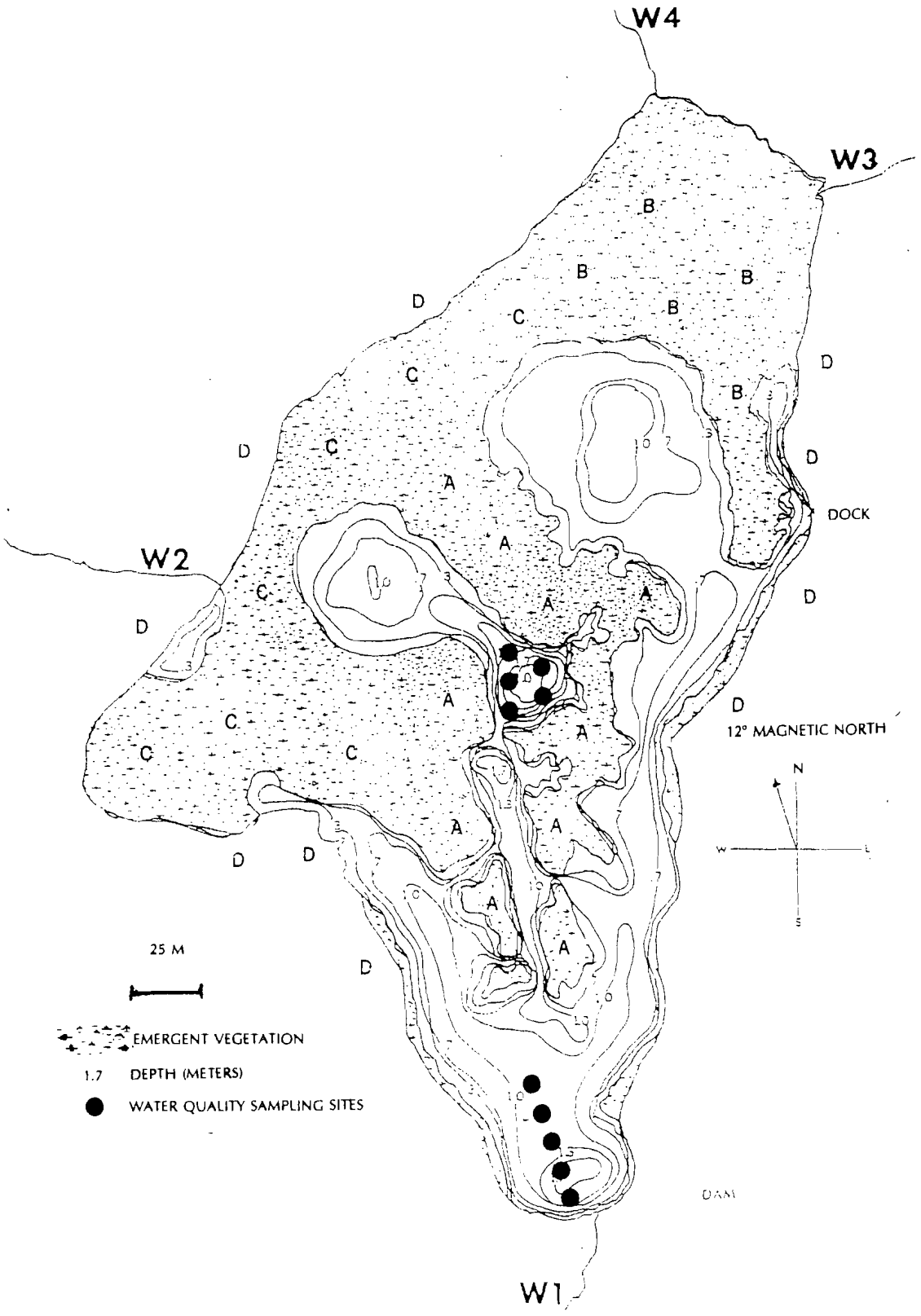

Figure 1. Cranberry Bog, Greenwoods Conservancy.

distributed throughout the bog (Table 1). Large chain pickerel were the most frequently captured species in the bog's deepest waters.

Table 1: Fish captured in various habitats in Cranberry Bog in June 1995.

Species	Shallow Waters	Nearshore Waters	Deep Waters	% Total
Brown Bullhead	3	1	3	4
Chain Pickerel	6	1	12	11
Pumpkinseed	111	1	5	67
Yellow Perch	11	11	9	18

Population Structure:

In Cranberry Bog the maximum age was 4 years for chain pickerel and 5 years for yellow perch and the pumpkinseed (Table 2).

Population structure of species found in Cranberry Bog was difficult to estimate since different gear and fishing effort were used to collect size and age data (Table 2). However, most of the bog consisted of shallows (Figure 1 shaded areas), and most of the fish captured were young-of-the-year. Thus the estimate of age structure shown in Table 2 should be reasonably accurate.

Table 2: Estimated per cent of various age classes for fishes captured in Cranberry Bog in June 1995.

	Age					
	0	1	2	3	4	5
Chain Pickerel	32	21	11	32	5	
Pumpkinseed	85	3	3	3	2	3
Yellow Perch	35	8	20	20	12	4

Growth

Scales were used to back-calculate the growth of non-young-of-the-year fish (Table 3). However, a high proportion of scales were reabsorbed and thus unreadable.

Table 3 Average total length at age for species sampled Cranberry Bog, 1995 (numbers in parentheses indicate sample sizes)

Species	Age 1	2	3	4	5
C. Pickerel	140mm (9)	205mm (8)	283mm (6)		
Pumpkinseed	23mm (18)	47mm (14)	75mm (10)	94mm (6)	104mm (4)
Yellow Perch	35mm (26)	70mm (23)	96mm (14)	121mm (5)	147mm (2)

DISCUSSION

Dystrophic bodies of water such as Cranberry Bog characteristically have low fish diversity. The four species occurring in Cranberry Bog are commonly found in shallow, warm, standing bodies of water in New York State (Smith, 1985). They are hardy species, tolerant of adverse environmental conditions (Scott & Crossman, 1973).

Extensive shallows and high organic content make Cranberry Bog vulnerable to winter kill. Numerous dead fish found at the bog just after ice-out (J.R. Foster, 1995) indicate that the bog winterkilled in 1995.

The feeding niches are filled primarily by generalists. Pumpkinseeds feed primarily in the shallows on insects and their larvae, as well as plankton. Yellow perch have a similar diet but feed primarily in open water. Adult perch may also feed on smaller, younger fish. Brown bullhead are the benthic feeders of the bog, feeding on benthic invertebrates, fish eggs, and detritus (Scott & Crossman, 1973). Chain pickerel, a common shallow water predator, is the major fish predator of the bog.

Normally in an unfished population, age structure will be dominated by larger older fish. This was not the case in Cranberry Bog, where young-of-the-year fish dominated. Relatively few old fish were present indicating a high natural mortality rate.

While the growth of chain pickerel was similar to that described by McCabe (1942), pumpkinseed and yellow perch showed evidence of stunting. Pumpkinseeds had the most severe growth retardation, growing slower than even northern populations (Reid, 1930). Slow growth was observed even in the first year and is most likely due to an overcrowding and competition for food. Yellow perch were also stunted, yet not so severely as the pumpkinseeds. Retarded development in perch occurs only in the later years of life, after the age of three (Smith, 1939). A high incidence of reabsorbed scales, further indicates that all fishes in the bog experienced periods of starvation or injury.

In summary, the evidence of winter kill, skewed population structure, low diversity, and poor growth indicate that the fish habitat of Cranberry Bog is less than optimal.

ACKNOWLEDGEMENTS

The help of Drs. J. Foster and W. Harman, and students Ken Heavey, John Urban, Ann Mary Myers, Emily Simpson, and Carrie Miller was appreciated. Equipment to carry out this study was provided by the Biological Field Station and the SUNY College of Agriculture and Technology at Cobleskill.

LITERATURE CITED

Foster, J. R. 1995. Personal communication. BFS visiting researcher, summer, 1995.

Nielson, L. A. and D. L. Johnson. 1983. Fisheries Techniques. Southern Printing Com., Inc. Blacksburg, Virginia. 458 pp.

McCabe, B. C. 1958. Esox niger LeSeur. Tabular treatment of life history and ecology of the Chain Pickerel. Nat. Acad. Sci. Comm. Handb. Biol. Data. 45 p.

Nielson, L. A. and D. L. Johnson. 1983. Fisheries Techniques. Southern Printing Com., Inc. Blacksburg, Virginia. 458 pp.

Reid, H. 1930. A study of Eupomotis gibbosus (L.) as occurring in Chamcook Lakes, N.B. Contrib. Can. Biol. Fish. 5(16): 457-466.

Smith, C. L. 1985. The inland fishes of New York State. Department of Environmental Conservation. 522 pp.

Smith, M. W. 1939. The fish population of Lake Jesse, Nova Scotia. Proc. Nova Scotia Inst. Sci. (for 1937-38) 19(4): 389-427.

Scott, W. B. and E. J. Crossman. 1973. Freshwater Fishes of Canada. Fisheries Research Board of Canada. Ottawa, Ontario. pp.n 372-374, 601-603, 715-717, 757-759.