1993 CSLAP Results: Lake Waccabuc

Parameter

pH		Min	Avg	Max
	1993	7.64	7.87	8.06
	1986-93	6.11	7.47	9.02

Comments:
pH was well within the acceptable ranges for most aquatic organisms, and showed little fluctuation as the season progressed. Readings were much more consistent in 1993 than in previous years.

Conductivity		Min	Avg	Max
(µmho/cm)	1993	168	169	170
	1986-93	123	140	173

Comments:
Conductivity was stable throughout the sampling season, and typical of a moderately softwater lake. The average conductance was higher than in any previous year, continuing a trend of slightly increasing conductance over time (although readings were very stable over the course of the 1993 sampling season).

Color		Min	Avg	Max
(platinum	1993	3	5	7
color units)	1986-93	3	11	23

Comments:
Color increased as the season progressed, and is indicative of a lake with low levels of dissolved organic matter. The average color was the lowest seen at Lake Waccabuc since CSLAP sampling began at the lake in 1986. As such, dissolved organic matter is not at a level which could affect the transparency of the lake.

NO_3		Min	Avg	Max
(mg/l)	1993	0.06	0.06	0.06
	1986-93	<0.02	0.02	0.16

Comments:
The only reading of the season was above detection limits, although it was within the range of values previously detected at the lake. It remains unlikely, however, that nitrate serves as a controlling nutrient for algae growth in Lake Waccabuc.

total phosphorus		Min	Avg	Max
(mg/l)	1993	0.011	0.015	0.026
	1986-93	0.003	0.017	0.037

Comments:
Phosphorus concentrations were consistent until mid-September, the higher October reading may be indicative of the effects of fall turnover (destratification) at the Lake, in which phosphorus-laden hypolimnetic waters mix with the surface waters. This trend was observed in previous years at Lake Waccabuc. Phosphorus levels in 1993 were slightly lower, but otherwise very similar to those measured in recent CSLAP sampling seasons, and are typical of a lake with a moderately biological productivity.

chlorophyll *a*		Min	Avg	Max
(µg/l)	1993	2.01	12.4	26.2
	1986-93	0.17	8.1	26.2

Comments:
Chlorophyll *a* levels, as an indication of algae growth, was typical of a lake with a moderate to high amount of biological productivity, indicating slightly more algae growth than would be expected in other lakes with comparable phosphorus concentrations. However, it does appear that phosphorus serves as the limiting nutrient for the lake. Both the average and the high reading for the lake in 1993 were the highest since CSLAP sampling began at the lake, and levels increased as the season progressed (also consistent with the seasonal increase in phosphorus).

Secchi disk		Min	Avg	Max
transparency (meters)	1993	2.2	2.9	3.8
	1986-93	1.5	2.9	4.8

Comments:
Transparency readings showed no particular seasonal trends this season, and generally were clearest in mid-summer. These clarity readings are typical of a moderately productive lake and are within the range seen in previous seasons at Lake Waccabuc, despite the higher phosphorus concentrations and algal productivity. Although there was not a strong statistical correlation between chlorophyll *a* and water clarity, it is likely that the transparency is most influenced by algae suspended in the water column.

Physical Condition/		Min	Avg	Max
Recr. Assessment	QA			
	QB			
	QC			

Comments:
Field observations were not collected in 1993.

Aquatic Vegetation

Location 1: not reported: July 12. 1993

	Shallow Water	Moderate Depth	Deep Water
Depth (m)	not reported	not reported	not sampled
Distance to shore (f)	not reported	not reported	not sampled
Submergents:			
Most Abundant:	*Potamogeton amplifolius* (largeleaf pondweed)	*Myriophyllum spicatum* (Eurasian watermilfoil)	not sampled
Others:	*Potamogeton robbinsii* (Robbins' pondweed)	none reported	not sampled
Emergents:	none reported	none reported	not sampled
Overall Abundance of Submergents	not reported	not reported	

General Comments

Unlike most CSLAP lakes, Lake Waccabuc appeared to possess higher algae growth in 1993, despite phosphorus readings that would be considered typical for the lake. The higher chlorophyll *a* readings - whether considering a seasonal average or peak ('bloom") reading- may have been the result of either more "favorable" weather conditions or a higher percentage of dissolved (and therefore biologically available) phosphorus. The latter may come from an increase in phosphorus loading from the bottom sediments, which appears to be causing an increase in phosphorus levels in the surface waters after the lake turns over in the fall. However, this increase in algal productivity did not translate to lower water clarity, and it is not clear if public perception and use of the lake was similarly (un)affected. The lake association is advised to investigate the connection between changes in traditional water quality indicators, such as algae, clarity, and nutrient concentrations, and public opinion of the lake and its potential for recreational use. This can be done by completing the field perception survey during each sampling session.

LName	Date	Zbot	Zsd	TAir	TH_2O	Zsamp	TotP	$N0_3$	TColor	pH	Cond25	Chl.*a*	QA	QB	QC	QD
LWaccabuc	7/9/93	13.2	3.35	38	30	1.5	0.013		3	7.88	168	2.01				
LWaccabuc	7/28/93	13.5	3.65	24	24	1.5	0.012		3	7.77	170	9.21				
LWaccabuc	8/4/93	13.5	2.65	23	25	1.5	0.011		5	7.64	170	6.04				
LWaccabuc	8/29/93	13.5	2.35	25	26	1.5	0.013		4	8.06	170	12.3				
LWaccabuc	9/19/93	13.5	2.7	16	19	1.5	0.017		6	8.01	170	18.8				
LWaccabuc	10/17/93	13.5	2.9	18	13	1.5	0.026	0.06	7	7.99	168	26.2				

QA= survey question re: physical condition of lake: (1) = crystal clear ....(5) = severe algae levels
QB survey question re: aquatic plant populations of lake: (1) = none visible ....(5) = dense growth completely covering lake surface
QC survey question re: recreational suitability of lake: (1) = couldn't be nicer ....(5) = recreation impossible
QD survey question re: factors affecting answer QC: (1) = poor water clarity, (2) excessive weeds; (3) too much algae/odor; (4) = lake looks bad; (5) = poor weather; (6) = other

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GENUS NAME: Myriophyllum

COMMON NAME: water milfoil

ECOLOGICAL VALUE: like most submergents, *Myriophyllum* harbors aquatic insects, provides hiding, nurseries, and spawning areas for amphibians and fish, and provides some food for waterfowl However, some species may dominate a water system, restricting boat traffic, recreational activities and water movement. While infestations of milfoil create favorable shelter for small fishes and invertebrates, it also commonly crowds out more desirable waterfowl plants

DEGREE OF NUISANCE: *Myriophyllum* is itself a native genus to New York lakes, although some species are not indigenous to many lakes. Some species are quite uncommon and could even be considered endangered, while others establish easily and become abundant to nuisance levels

COMMENTS: while some species of *Myriophyllum* have earned a reputation for aggressive and opportunistic growth, most of the species in this genus are not nearly so robust, and often peacefully coexist with other submergent plants. The individual species within the *Myriophyllum* genus are superficially similar, so complete plants, including flowers (often pink) and fruits, are often needed for positive identification. The leaf structures and patterns of the milfoil closely resemble those of the *Ceratophyllum* (coontail) and *Utricularia* (bladderwort), and as a result, these plants are often confused for each other, particularly when viewed from a slight distance. Peak growth for most species is in mid-summer. *Myriophyllum* spreads and reproduces vegetatively. *Myriophyllum alterniflorum*, found in some CSLAP lakes but not collected via this program, is on the NYS Rare Native Plant list.

GENUS NAME: Potamogeton

COMMON NAME: pondweed

ECOLOGICAL VALUE: Like all submergents, *Potamogeton* harbors aquatic insects, provides hiding, nurseries and spawning areas for amphibians and fish, and provides some food for waterfowl. The leaves are eaten by bluegills, while the foliage and especially the seeds are used for food by muskrats and waterfowl. *Potamogeton* is often a favorite food of wildfowl and eaten heavily by beaver, deer, and moose, sometimes eaten whole, and sometimes in parts (all species are edible). *Potamogeton* can soften water, removing lime and carbon dioxide and depositing marl.

DEGREE OF NUISANCE: Most of the *Potamogeton* are native to New York, and only infrequently are present at nuisance levels. However, in some instances, nuisance growth does occur, particularly with those species either not native to a lake, or those introduced to shallow parts of the littoral zone previously uninhabited by vegetation.

COMMENTS: *Potamogeton* is a highly variable genus within the pondweed family. Species within the genus often are characterized by two leaf types-firm floating leaves and thin emersed leaves. Many mature species have flowers borne in spikes (for wind pollination), conspicuous in early summer. Identification of the individual species can be extremely difficult, particularly among the narrow-leaved pondweeds. The *Potamogeton*, are distinguished from the other genus within the pondweed family by having alternate leaves (unlike the Zanichellia and *Najas*), and by their presence in fresh or estuarine waters (unlike the *Zostera*). There are nearly 30 species found within New York State, some quite rare and others extremely common. *Potamogeton ogdenii*, Ogden's pondweed, is on the NYS Endangered Native Plant List. *Potamogeton hillii*, Hill's pondweed, is on the NYS Threatened Native Plant list, and three pondweeds (*P. alpinus*, northern pondweed, *P. confervoides*, an unnamed pondweed, and *P. filiformis* var. *occidentalis*, sheathed pondweed) are all on the NYS Rare Native Plant list.

SPECIES NAME: Potamogeton robbinsii

COMMON NAME: Robbins pondweed

ECOLOGICAL VALUE: see above; *P. Robbinsii* provides food and shelter for fish, particularly for northern pike and food for ducks. It is tough, and probably not eaten by wildfowl

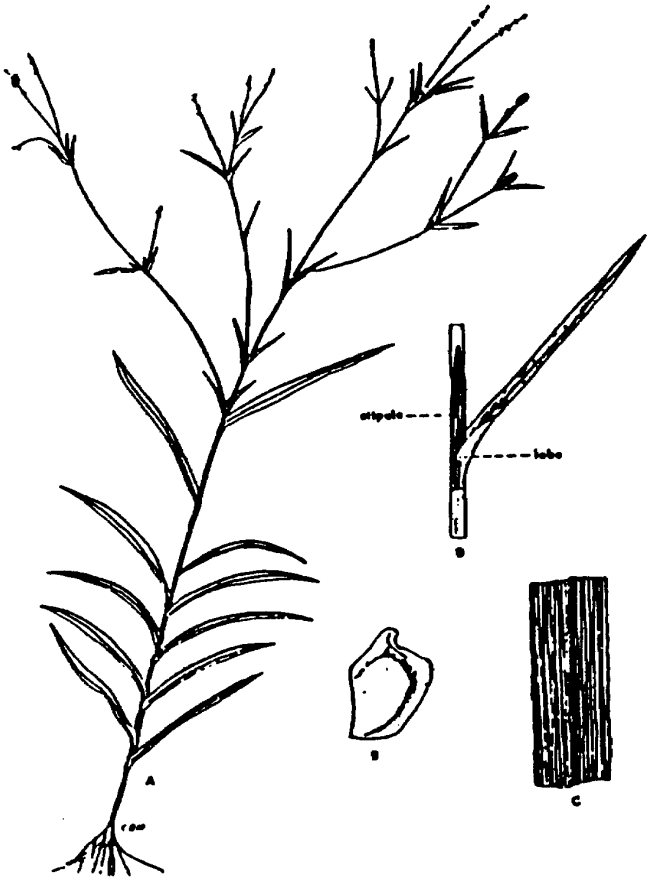
DISTRIBUTION: found in deep water and slow streams from Labrador west to British Columbia, south to New Jersey, Indiana, Alabama, Utah, and California, with the greatest abundance in the northeastern states

DISTRIBUTION IN NY STATE: occasional to common to locally abundant and weedy, primarily in the Hudson River and Great Lakes basins, the Finger Lakes, and the Adirondacks

DISTRIBUTION IN CSLAP: very common, particularly in the Upper Hudson River basin

DEGREE OF NUISANCE: *P. robbinsii* may be frequent or common, but only occasionally is it present at nuisance levels

COMMENTS: there is at least one sub variety of *P. robbinsii*- this is limited primarily to local occurrences. *P. robbinsii* is unique among the pondweeds in possessing rigid, flattened leaf structures, growing at deeper depths than other species, and generally sterile (plants flower, but do not fruit, near the surface)



Potamogeton robbinsii

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SPECIES NAME: Potamogeton amplifolius

COMMON NAME: large leaf pondweed, bass weed, muskie weed

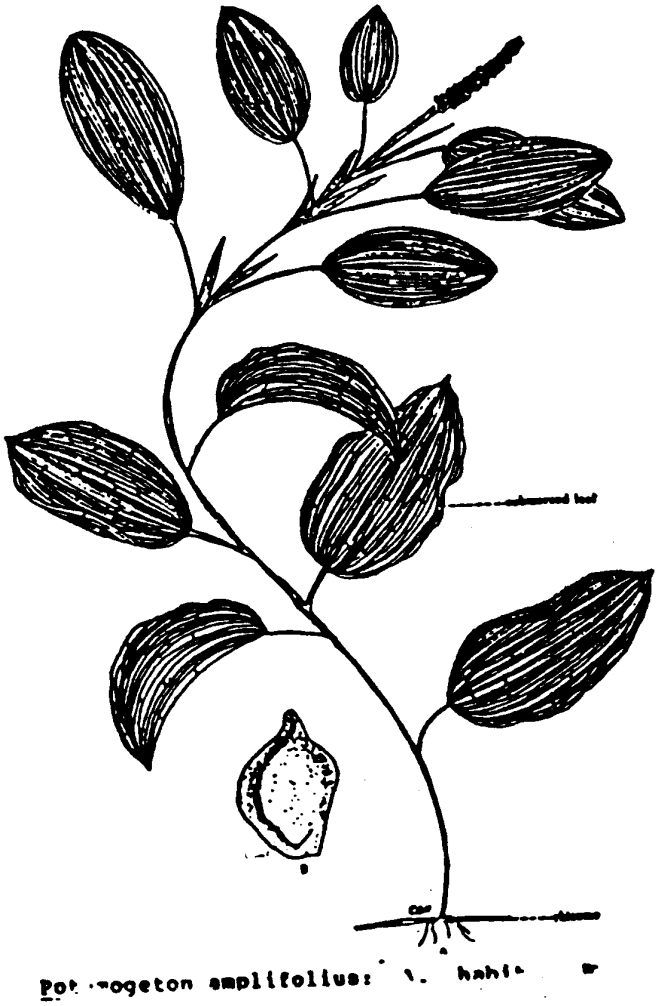
ECOLOGICAL VALUE: see above; this species provides shady cover for perch and bluegills. Snails are often found on the underside of leaves. This is also a particularly good duck food.

DISTRIBUTION: Common in shallow and deep water from Nova Scotia west to British Columbia, south to Virginia, Georgia, Alabama, Arkansas, and Oklahoma, with scattered locations near the west coast. It is most abundant in the Great Lakes basin and northeast US.

> DISTRIBUTION IN NEW YORK: Common and often abundant in the deep water of lakes and streams throughout the state (except Long Island, perhaps due to water depth)
>
> DISTRIBUTION IN CSLAP: Common particularly along the whole eastern side of New York (from the northern Adirondacks to Putnam County)

DEGREE OF NUISANCE: Occasionally grows in abundance, but rarely abundant at depths or locations necessary for nuisance conditions.

COMMENTS: this is considered (with *P. pectinatus* and *P. natans*) one of the major pondweeds for wildlife management



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