

LCI Lake Water Quality Summary

General Information

Lake Name: Smith (Roosevelt) Pond

Location: Reverend Arthur Mackey Sr. Park, Roosevelt, Town of Roosevelt, Suffolk County, New York

Basin: Atlantic Ocean/Long Island Sound Basin

Size: 2.6 hectares (6.4 acres)

Lake Origins: man-made

Major Tributaries: East Meadow Brook

Lake Tributary to?: East Meadow Brook

Water Quality Classification: C (best intended use: secondary contact recreation)

Sounding Depth: 1.3 meters (4.25 feet)

Sampling Coordinates: Latitude: 40.68106, Longitude: -73.57364

Sampling Access Point: Reverend Arthur Mackey Sr. County Park

Monitoring Program: Lake Classification and Inventory (LCI) Survey

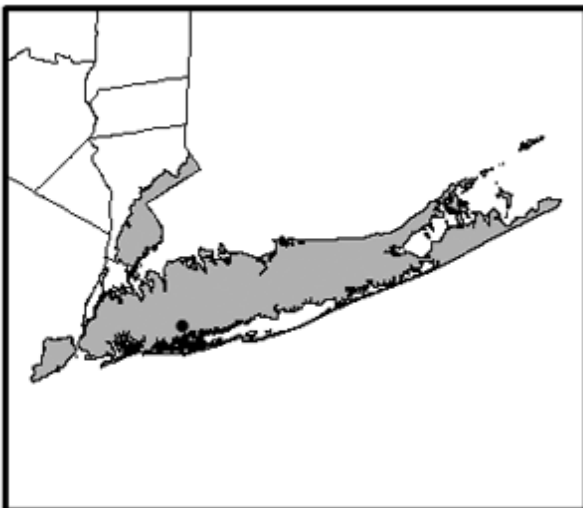
Sampling Dates: 6/24/2009, 7/21/09, 8/20/2009, 9/21/2009

Samplers: Scott Kishbaugh, NYSDEC Division of Water
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Lake Map

(sampling location marked with a circle)



Background and Lake Assessment

Smith Pond, also known as Roosevelt Pond is a small suburban/urban pond in Reverend Arthur Mackey Sr. County Park in the town of Roosevelt. The park is used by individuals from the local neighborhoods for the tennis and basketball courts, baseball field, and for walking along the paved path along the western side of the pond. Park visitors also fish in the pond. Water enters the pond via East Meadow Brook, which originates near Eisenhower Park and flows along the Meadowbrook Parkway. There is a small impoundment, Mullener's Pond, which the brook flows through before reaching Smith Pond. The course of the East Meadow Brook is mostly forested; however, much of the water in the brook comes from runoff associated with the large residential areas on either side of the Meadowbrook Parkway.

The pond was included in the New York State DEC Division of Water's 2009 intensive (monthly sampling) Lake Classification and Inventory (LCI) survey of the Atlantic Ocean/ Long Island Sound (AO/LIS) basin. Inclusion in the survey was based on an "Impacted Segment" listing in The 2000 AO/LIS Waterbody Inventory and Priority Waterbodies List (WIPWL). The WIPWL states:

Fish consumption in Smith/Roosevelt Pond is impaired due to a specific NYS DOH health advisory that recommends eating no more than one meal per month of carp or goldfish and to eat no American eel because of elevated chlordane (2000-01 NYS DOH Health Advisories).

Aquatic life support and recreational uses (swimming, fishing, boating) in the pond are affected by high nutrient loads, excessive aquatic weed growth and occasional algal blooms. The pond is included in the Nassau County Suburban Pond Management Plan. The county received Clean Water/Clean Air Bond Act funding in 2000 to dredge, install sediment traps and conduct streambank stabilization to control erosion. (Nassau County WQCC, 1998).

There continues to be a fish consumption advisory that recommends eating no more than one meal per month of carp or goldfish and to eat no American eel because of elevated chlordane (2009-2010 NYS DOH Health Advisories).

Smith Pond can generally be characterized as *eutrophic*, or highly productive. The average water clarity reading (TSI = 57, typical of *eutrophic* ponds) was expected given the average phosphorus reading (TSI = 56, typical of *eutrophic* ponds), but higher than expected given the chlorophyll *a* reading (TSI = 50, typical of *mesoeutrophic* ponds). These data suggest that baseline nutrient levels may support persistent algal blooms, although algae production does not appear to be limited by phosphorus.

The pond was observed to have a slight brown color throughout the summer. The water clarity reading in June and July were greater than 1 meter. *Ceratophyllum demersum* (coontail) and *Elodea canadensis* (common waterweed), both common native submergent plant species, were identified in the pond. Neither of these plants was observed to be in excess and no floating leaf plants were observed. These findings are not consistent with the "excessive aquatic weed growth" listing in the WIPWL and may be due to restoration efforts by the county. A more detailed plant specific survey would be needed to rule out the presence of any invasive species.

Like most shallow water bodies, Smith Pond does not exhibit thermal stratification, in which depth zones (warm water on top, cold water on bottom during the summer) are established. Temperature and dissolved oxygen readings were comparable throughout the water column. pH readings indicate alkaline waters, which is typical of ponds exhibiting high algae levels. The conductivity readings indicate hard water (high ionic strength). High conductivity levels were typical among other ponds sampled in Nassau County and can be attributed to high levels of dissolved salts associated with runoff from developed areas.

Smith Pond appears to be typical of other suburban/urban hardwater, highly colored, alkaline ponds. Other ponds with similar water quality characteristics often support warmwater fisheries. Although fisheries habitat cannot be fully evaluated through this monitoring program, the DEC Fisheries website does indicate that the pond at least historically supported a wide variety of warm water fish species. Coldwater fish species are unlikely to be supported, given the lack of cold water necessary to protect any salmonids or aquatic life susceptible to high summer temperatures.

Total phosphorus levels exceeded the state guidance value throughout the summer and may support persistent algal blooms in the pond. Iron levels were also above the state drinking water standards. Sodium and chloride levels were both high, indicating impacts from road salting and or stormwater runoff from developed areas.

Evaluation of Lake Condition Impacts to Lake Uses

Potable Water (Drinking Water)

Smith Pond is not classified for use as a potable water supply. Although the LCI data are not sufficient to evaluate potable water use, these data suggest that the lake water would require substantial treatment to serve as a potable water supply. Surface water withdrawals may be impacted by elevated phosphorus, sodium, and iron levels.

Contact Recreation (Swimming)

Smith Pond is not classified for contact recreation. It is not known if people currently or historically swam in the pond. Bacteria data are needed to evaluate the safety of Smith Pond for swimming-these are not collected through the LCI program. The water clarity reading taken in June and July were at or above the State Department of Health's guidance value of 1.2 meters to protect the safety of swimmers.

Non-Contact Recreation (Boating and Fishing)

Smith Pond is classified for non-contact recreation. Boats are currently prohibited but several people were seen fishing from the shoreline of the pond. These data did not indicate any stressors to non-contact recreation. The DEC Fisheries website indicated that the pond historically supported largemouth bass, bluegill, pumpkinseed, carp, goldfish, and American eel. A fish survey would need to be conducted to determine if these species are still supported in the pond. There continues to be a fish consumption advisory that recommends eating no more than one meal per month of carp or goldfish and to eat no American eel because of elevated chlordane (2009-2010 NYS DOH Health Advisories).

Aquatic Life

There were no direct observations of threats to aquatic life; however, there is a fish consumption advisory pertaining to elevated chlordane levels which may adversely affect aquatic life. Additional biological studies would be needed to look at stressors to aquatic life.

Aesthetics

These data did not indicate any water quality related parameters that would detract from the aesthetic appeal of the pond. The July 7, 2009 *Healthy Nassau* article indicates that the county recently made improvements to the pond and park, including the construction of a sedimentation basin and new pond wall, hydraulic dredging, planting of native emergent vegetation as well as upland shrubs along the pond's shoreline. These improvements have probably improved the enjoyment of the pond and park by individuals from the surrounding neighborhoods.

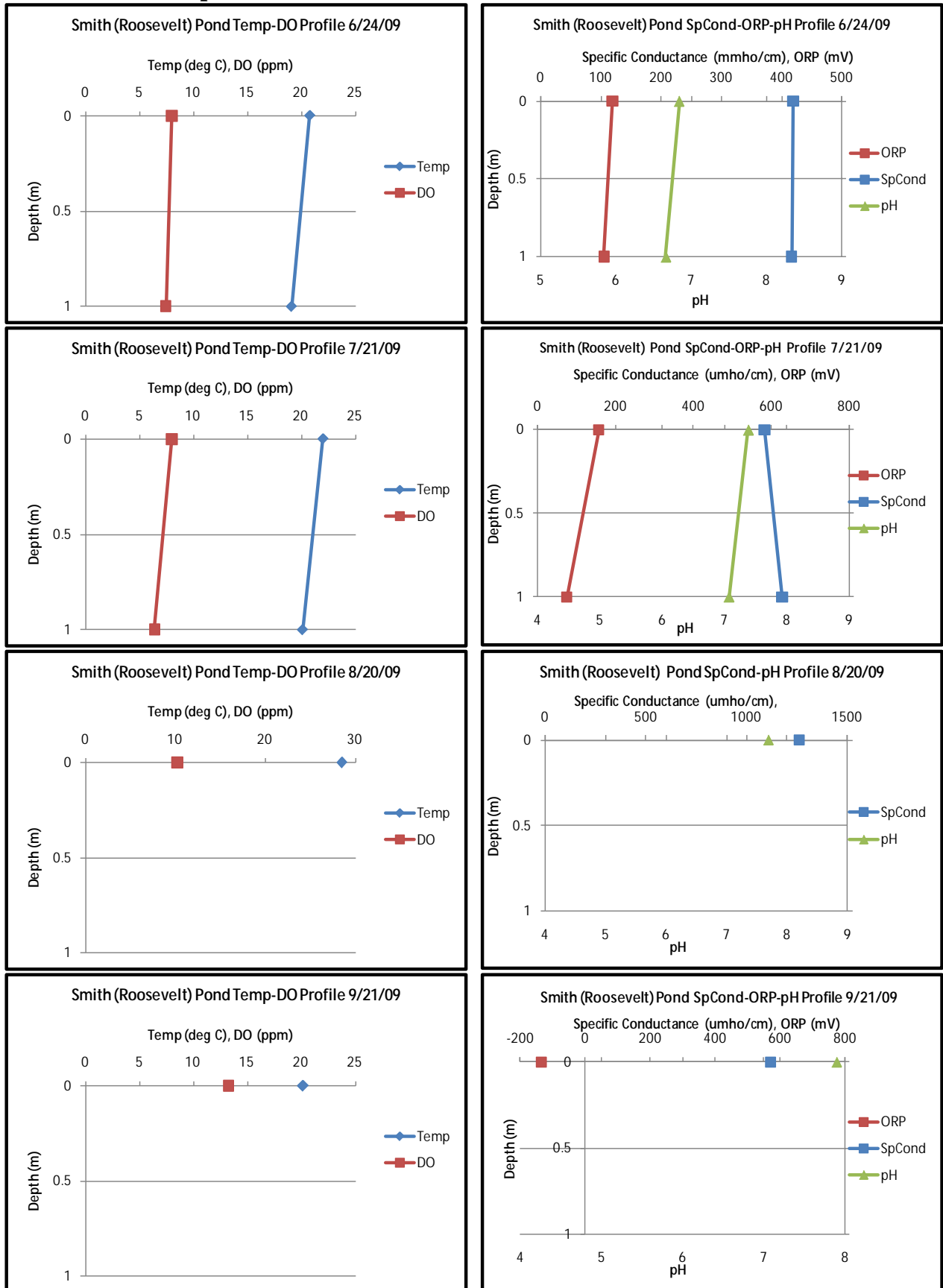
Additional Comments

- Periodic surveillance for invasive exotic plant species may help to prevent the establishment and spread of any new invaders, given the escalating problems with exotic aquatic weeds on Long Island.

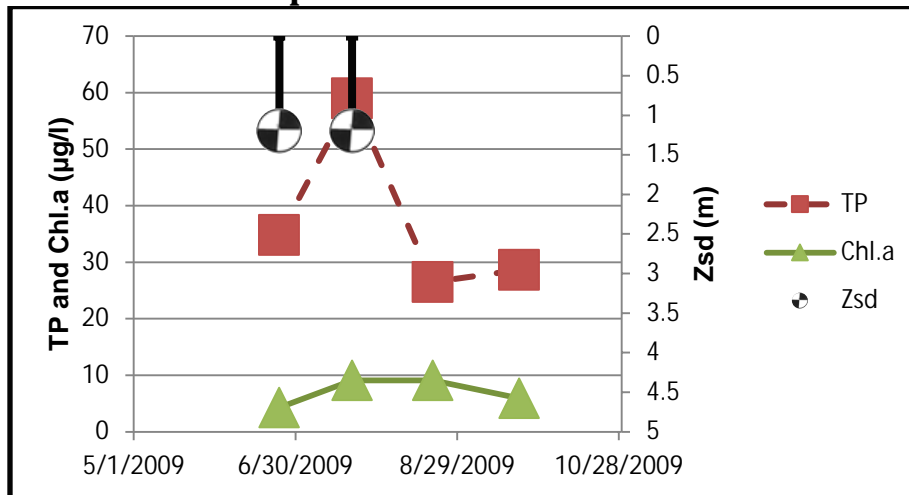
Aquatic Plant IDs

Exotic Plants:	None observed
Native Plants	<i>Ceratophyllum demersum</i> (coontail) <i>Elodea canadensis</i> (common waterweed)

Time Series: Depth Profiles



Time Series: Trophic Indicators



WQ Sampling Results

Surface Samples

	UNITS	N	MIN	AVG	MAX	Scientific Classification	Regulatory Comments
SECCHI	meters	2	0.5	0.85	1.2	Eutrophic	50% of readings violate DOH guidelines
TSI-Secchi			70.0	62.3	57.4	Eutrophic	No pertinent water quality standards
TP	mg/l	4	0.0265	0.0372	0.059	Eutrophic	100% of readings violate DOH guidelines
TSI-TP			51.4	56.3	62.9	Eutrophic	No pertinent water quality standards
TSP	mg/l	4	0.0093	0.0096	0.0099	High % soluble Phosphorus	No pertinent water quality standards
NOx	mg/l	4	0.643	0.8423	1.08	Elevated nitrate	No readings violate DOH guidance value
NH4	mg/l	4	0.022	0.064	0.124	Low ammonia	No readings violate DOH guidance value
TKN	mg/l	4	0.41	0.57	0.86	Intermediate organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	4	62.72	88.32	102.62	Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	4	4.3	7.1	9.1	Mesotrophic	No pertinent water quality standards
TSI-CHLA			44.9	49.8	52.3	Mesotrophic	No pertinent water quality standards
Alkalinity	mg/l	4	35.2	38.8	44	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	4	15	31.3	60	Highly Colored	No pertinent water quality standards
TOC	mg/l	4	3.3	4.1	6.1		No pertinent water quality standards
Ca	mg/l	4	16.4	19.4	22.5	Minimally Supports Zebra Mussels	No pertinent water quality standards
Fe	mg/l	4	0.707	0.939	1.15	Taste or odor likely	100% of readings violate DOH guidelines
Mn	mg/l	4	0.119	0.1255	0.136		No readings violate DOH guidance value
Mg	mg/l	4	3.71	4.54	5.48		No readings violate DOH guidance value
K	mg/l	4	2.17	2.53	2.91		No pertinent water quality standards
Na	mg/l	4	78	108.45	140		100% of readings violate DOH guidelines
Cl	mg/l	4	140	176.75	221	Significant road salt runoff	No readings violate DOH guidance value
SO4	mg/l	4	12.3	15	17.5		No readings violate DOH guidance value

Lake Perception

	UNITS	N	MIN	AVG	MAX	Scientific Classification
WQ Assessment	1-5, 1 best	4	3	3.75	4	High Algae Levels
Weed Assessment	1-5, 1 best	4	1	2.5	3	Plants Grow to Lake Surface
Recreational Assessment	1-5, 1 best	4	4	4	4	Substantially Impaired

Legend Information

General Legend Information

Surface Samples	= integrated sample collected in the first 2 meters of surface water
N	= number of samples
SECCHI	= Secchi disk water transparency or clarity - measured in meters (m)
TSI-SECCHI	= Trophic State Index calculated from Secchi, = $60 - 14.41 * \ln(\text{Secchi})$

Laboratory Parameters

ND	= Non-Detect, the level of the analyte in question is at or below the laboratory's detection limit
TP	= total phosphorus- milligrams per liter (mg/l) Detection limit = 0.003 mg/l; NYS Guidance Value = 0.020 mg/l
TSI-TP	= Trophic State Index calculated from TP, = $14.42 * \ln(\text{TP} * 1000) + 4.15$
TSP	= total soluble phosphorus, mg/l Detection limit = 0.003 mg/l; no NYS standard or guidance value
NOx	= nitrate + nitrite nitrogen, mg/l Detection limit = 0.01 mg/l; NYS WQ standard = 10 mg/l
NH4	= total ammonia, mg/l Detection limit = 0.01 mg/l; NYS WQ standard = 2 mg/l
TKN	= total Kjeldahl nitrogen (= organic nitrogen + ammonia), mg/l Detection limit = 0.01 mg/l; no NYS standard or guidance value
TN/TP	= Nitrogen to Phosphorus ratio (molar ratio), = $(\text{TKN} + \text{NOx}) * 2.2 / \text{TP}$ > 30 suggests phosphorus limitation, < 10 suggests nitrogen limitation
CHLA	= chlorophyll <i>a</i> , micrograms per liter ($\mu\text{g/l}$) or parts per billion (ppb) Detection limit = 2 $\mu\text{g/l}$; no NYS standard or guidance value
TSI-CHLA	= Trophic State Index calculated from CHLA, = $9.81 * \ln(\text{CHLA}) + 30.6$
ALKALINITY	= total alkalinity in mg/l as calcium carbonate Detection limit = 10 mg/l; no NYS standard or guidance value
TCOLOR	= true (filtered or centrifuged) color, platinum color units (ptu) Detection limit = 5 ptu; no NYS standard or guidance value
TOC	= total organic carbon, mg/l Detection limit = 1 mg/l; no NYS standard or guidance value
Ca	= calcium, mg/l Detection limit = 1 mg/l; no NYS standard or guidance value
Fe	= iron, mg/l Detection limit = 0.1 mg/l; NYS standard = 0.3 mg/l
Mn	= manganese, mg/l Detection limit = 0.01 mg/l; NYS standard = 0.3 mg/l
Mg	= magnesium, mg/l Detection limit = 2 mg/l; NYS standard = 35 mg/l
K	= potassium, mg/l Detection limit = 2 mg/l; no NYS standard or guidance value
Na	= sodium, mg/l Detection limit = 2 mg/l; NYS standard = 20 mg/l
Cl	= chloride, mg/l Detection limit = 2 mg/l; NYS standard = 250 mg/l

SO4 = sulfate, mg/l
Detection limit = 2 mg/l; NYS standard = 250 mg/l

Field Parameters

Depth = water depth, meters
Temp = water temperature, degrees Celsius
D.O. = dissolved oxygen, in milligrams per liter (mg/l) or parts per million (ppm)
NYS standard = 4 mg/l; 5 mg/l for salmonids
pH = powers of hydrogen, standard pH units (S.U.)
Detection limit = 1 S.U.; NYS standard = 6.5 and 8.5
SpCond = specific conductance, corrected to 25°C, micromho per centimeter ($\mu\text{mho/cm}$)
Detection limit = 1 $\mu\text{mho/cm}$; no NYS standard or guidance value
ORP = Oxygen Reduction Potential, millivolts (MV)
Detection limit = -250 mV; no NYS standard or guidance value

Lake Assessment

WQ Assessment = **water quality assessment**, 5 point scale, 1= crystal clear, 2 = not quite crystal clear, 3 = definite algae greenness, 4 = high algae levels, 5 = severely high algae levels
Weed Assessment = **weed coverage/density assessment**, 5 point scale, 1 = no plants visible, 2 = plants below surface, 3 = plants at surface, 4 = plants dense at surface, 5 = plants cover surface
Recreational Assessment = **swimming/aesthetic assessment**, 5 point scale; 1 = could not be nicer, 2 = excellent, 3= slightly impaired, 4 = substantially impaired, 5 = lake not usable

References

NYSDEC. 2002. The 2000 Atlantic Ocean/ Long Island Sound Basin Waterbody Inventory and Priority Waterbodies List. NYSDEC, Albany, NY.
Available online at <http://www.dec.ny.gov/docs/water_pdf/pwlatlv202.pdf>.

NYSDOH. 2009. Chemicals in Sportfish and Game 2009-2010 Health Advisories. NYSDOH, Albany, NY.
Available online at <<http://nyhealth.gov/environmental/outdoors/fish/fish.htm>>.