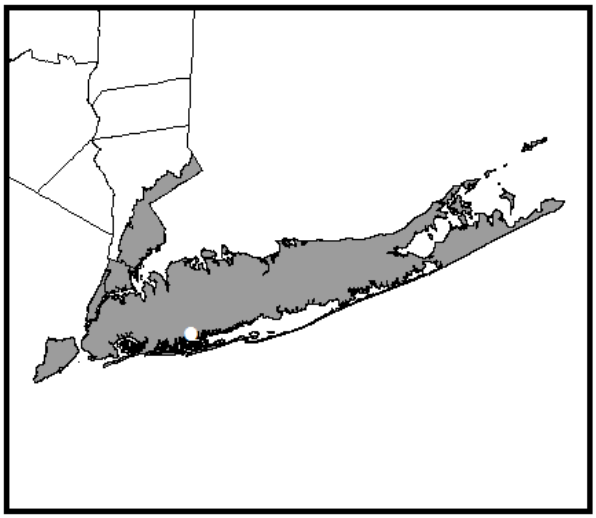
LCI Lake Water Quality Summary

General Information

Lake Name:	**Cammanns (Cammans, Camaans) Pond**
Location:	Cammanns Pond Park, Merrick, Town of Hempstead, Nassau County, New York
Basin:	Atlantic Ocean/Long Island Sound Basin
Size:	4.0 hectares (10 acres)
Lake Origins:	man-made / concrete dam
Major Tributaries:	storm water via underground pipe
Lake Tributary to?:	East Bay via a small canal
Water Quality Classification:	C (best intended use: secondary contact recreation)
Sounding Depth:	2 meters (6.6 feet)
Sampling Coordinates:	Latitude: 40.65391, Longitude: -73.55058 for June Latitude: 40.65143. Longitude: -73.54918 for July to Sept.
Sampling Access Point:	Parking area off Lindermere Drive and off Shore Drive
Monitoring Program:	Lake Classification and Inventory (LCI) Survey
Sampling Dates:	6/24/2009, 7/21/09, 8/19/2009, 9/21/2009
Samplers:	Scott Kishbaugh, NYSDEC Division of Water David Newman, NYSDEC Division of Water, Albany Steven Finnemore, NYSDEC Division of Water, Albany
Contact Information:	Scott Kishbaugh, NYSDEC Division of Water sakishba@gw.dec.state.ny.us; 518-402-8282

Lake Map

(sampling location marked with a circle)



Background and Lake Assessment

Cammanns Pond is located in the town of Merrick just south of the Sunrise Highway and just east of the Meadowbrook Parkway in a suburban county owned park. The pond's outlet flows into a small canal which empties into the East Bay. The majority of the water in the pond comes from storm water from the surrounding area. There is a small vegetated island at the northwestern end of the pond. The county manages a small parking area and walking path on the eastern shore of the pond as well as a small fishing platform at the southern end of the pond. Nassau County Park's website indicates the pond was originally created for drainage purposes.

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 a "Needs Verification" listing in The 2000 AO/LIS Waterbody Inventory and Priority Waterbodies List (WIPWL). The WIPWL states, "Aquatic life support and recreational uses (swimming, fishing, boating) in Cammanns Pond are thought to be affected by high nutrient loads, excessive aquatic weed growth, occasional algal blooms and reduced water clarity. Impacts from waterfowl are also a concern (NYSDEC 2002)."

From the data collected in 2009, Cammanns Pond can generally be characterized as *eutrophic*, or highly productive. The average water clarity reading (TSI < 72, typical of *eutrophic* lakes) was expected given the phosphorus reading (TSI = 74, typical of *eutrophic* lakes), and the chlorophyll *a* reading (TSI = 75, typical of *eutrophic* lakes). These data suggest that algal blooms were occurring in July and August and that baseline nutrient levels do support persistent algal blooms. Extreme algal densities are also possible, but it is not known if this potentially contributes toxic algae to the lake.

The pond had a brown turbid coloring to it for the entire summer. Bits of organic matter were observed flowing into the pond from a below surface inlet pipe at the north end of the pond. Water samples indicated high levels of chlorophyll *a* (algae) in the water column throughout the summer. These high algae levels contribute to the low water clarity readings, although suspended sediment and turbidity are also significant. No aquatic plants were observed in the pond. The lack of vegetation in the pond may be due to the low water clarity and/ or the high level of chloride. The pond was found to have a uniform shallow depth with the deepest point being ~ 2 meters in depth and was found near the pond's outlet.

Like most shallow ponds, Cammanns Pond does not exhibit thermal stratification, in which depth zones (warm water on top, cold water on the bottom during the summer) are establish. Temperature and dissolved oxygen readings are comparable throughout the water column. pH readings indicate alkaline water which is typical of lakes with high algae levels. Conductivity readings indicate extremely hard water (very high ionic strength). The conductivity and chloride levels were high enough to suspect that the pond may be tidally influenced, bringing saline water into the lake during very high tides or storm events.

Cammanns Pond appears to have substantially degraded water quality compared to other small urban ponds in Nassau County that were sampled as part of the 2009 LCI program. Due to the reduced water quality, the lake may not support many fish species, although fisheries habitat cannot be fully evaluated through this monitoring program. The DEC Fisheries website indicates the pond at one time supported white perch and American eel, although it is not known if these species still survive in the pond. Phosphorus, iron, manganese, magnesium, sodium, chloride and

sulfate levels all exceeded state guidance values or water quality standards during at least one sampling event. It is not known if levels of any of these parameters are impacting the aquatic life of the pond.

A sediment sample was taken from the pond and analyzed for contaminates as well as toxicity. Sediment from the pond was found to have levels of many polycyclic aromatic hydrocarbons (PAHs) above the Threshold Effect Concentration (TEC). The TEC represents the concentration below which adverse effects to sediment biota are not expected to occur. PAHs are released in the atmosphere when incomplete combustion of coal, oil, and gas are burned. The Microtox® analysis showed the sediment to be moderately toxic, although the high salinity may also be the cause of this toxicity.

Evaluation of Lake Condition Impacts to Lake Uses

Potable Water (Drinking Water)

Cammanns 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 algae levels, high nutrient levels, and elevated sodium, iron, magnesium, sulfate and manganese levels.

Contact Recreation (Swimming)

Cammanns Pond is not classified for contact recreation- swimming and bathing. It is unlikely that people currently swim in the pond. Bacteria data are needed to evaluate the safety to Cammanns Pond for swimming-these are not collected though the LCI. The data collected through the LCI show that the water clarity was consistently below the New York State Department of Health's standard of 1.2 meters to protect the safety of swimmers.

Non-Contact Recreation (Boating and Fishing)

The DEC fisheries website indicates that boating is prohibited on the lake, but shoreline fishing is allowed. These data did not indicate anything that would prevent the pond from being used for non-contact recreation. The small size, shallowness and reduced water clarity of the pond may deter individuals from wanting to boat on the lake. The overall water quality conditions of the pond may not support fish populations.

Aquatic Life

Chloride levels were high enough to be dangerous to fresh water aquatic life. Other parameters found at high levels through the LCI program may also impact the aquatic life of the pond, and the highly elevated levels of sediment hydrocarbons indicate at least the potential for heavy aquatic life impacts (as verified by the Microtox data) Additional biological studies would need to be conducted to fully evaluate impacts to aquatic life.

Aesthetics

Reduced water clarity and overall turbid color to the pond may detract from the aesthetic appeal of the pond.

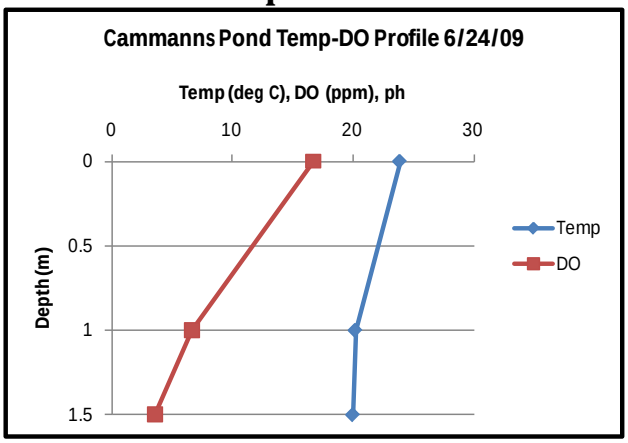
Additional Comments

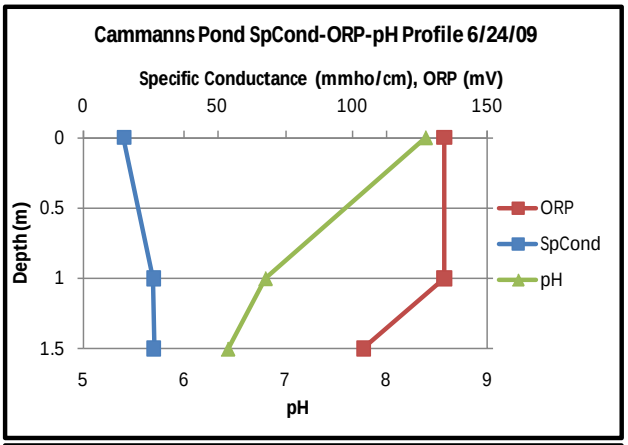
- Periodic surveillance for invasive exotic plant species may help to prevent the establishment and spread of any new invaders, given the escalating problems with exotic aquatic weeds. Informational signs about exotics invasive species and their impacts to aquatic ecosystems may help inadvertent introductions to the pond.
- More detailed biological monitoring would be needed to evaluate ecological impacts from the high pollutant levels in the lake and sediments.

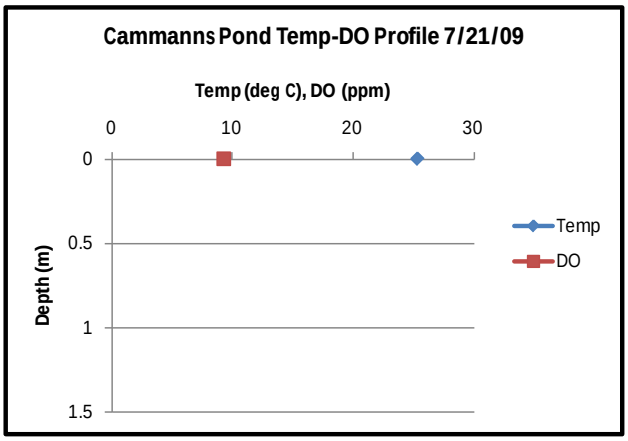
Aquatic Plant IDs

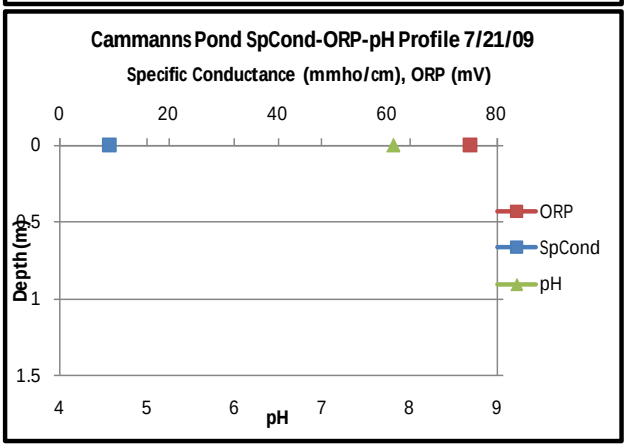
No aquatic plants exotic or native were observed.

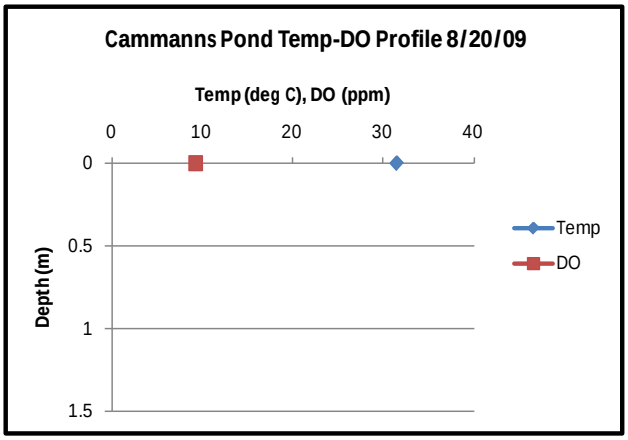
Time Series: Depth Profiles

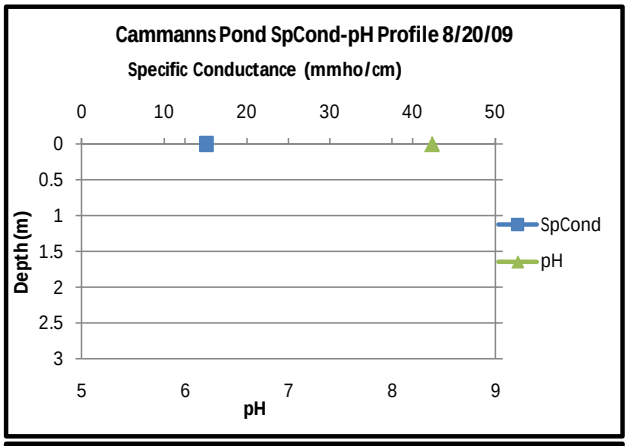


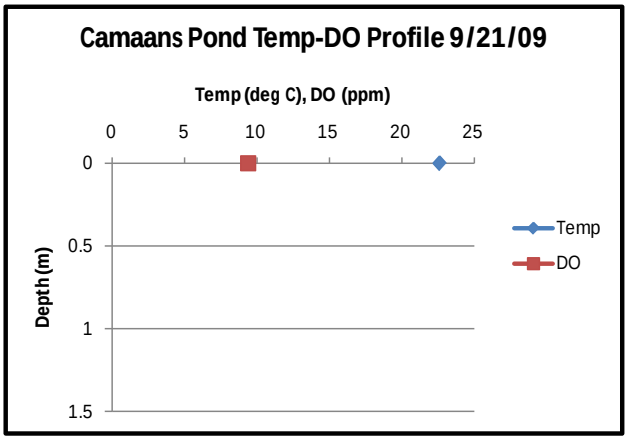


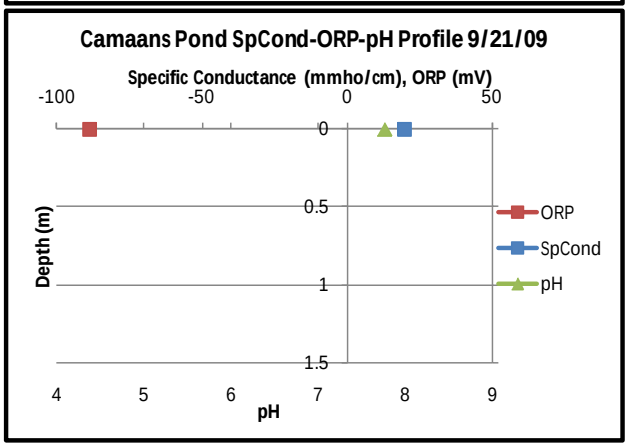






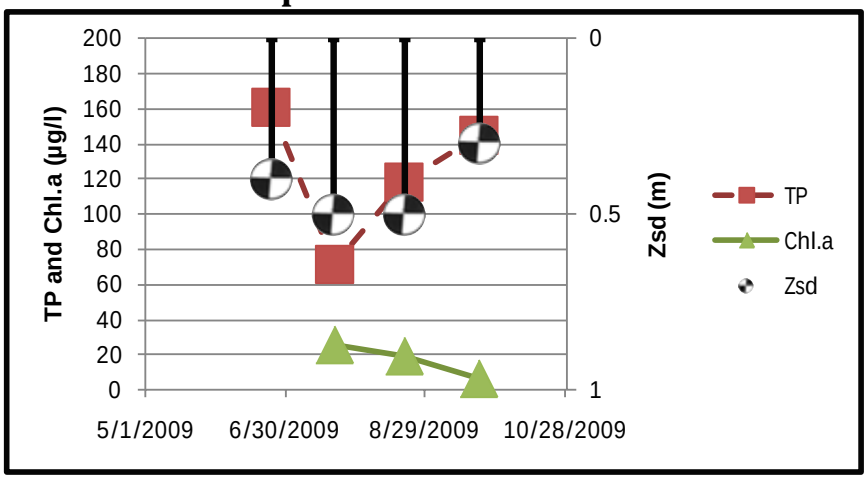






*Of note specific conductance (SpCond) was converted from the typical micro ohms to milliohms for graphical purposes.

Time Series: Trophic Indicators



WQ Sampling Results

Surface Samples

	UNITS	N	MIN	AVG	MAX	Scientific Classification	Regulatory Comments
SECCHI	meters	4	< 0.3*	< 0.43*	< 0.5*	Eutrophic	100% of readings violate DOH guidelines
TSI-Secchi			> 77.3*	> 72.2*	> 70.0*	Eutrophic	No pertinent water quality standards
TP	mg/l	4	0.0716	0.1239	0.161	Eutrophic	100% of readings violate DOH guidelines
TSI-TP			65.7	73.6	77.4	Eutrophic	No pertinent water quality standards
TSP	mg/l	4	0.011	0.0262	0.0399	Little available phosphorus	No pertinent water quality standards
NOx	mg/l	4	0.0068	0.0284	0.0793	Low nitrate	No readings violate DOH guidance value
NH4	mg/l	4	0.018	0.072	0.145	Low ammonia	No readings violate DOH guidance value
TKN	mg/l	4	0.87	1.21	1.6	Elevated organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	4	16.38	22.98	31.86	Nutrient Limitation Unclear	No pertinent water quality standards
CHLA	ug/l	3	6.9	17.63	26.2[3]	Eutrophic	No pertinent water quality standards
TSI-CHLA			49.5	58.8	62.6	Eutrophic	No pertinent water quality standards
Alkalinity	mg/l	4	69.6	84.5	96	Moderately Buffered	No pertinent water quality standards
TCOLOR	ptu	4	ND	16.9[@]	35	Weakly Colored	No pertinent water quality standards
TOC	mg/l	4	2.5	4.1	6.3		No pertinent water quality standards
Ca	g/l	4	73.8	143.3	226	Strongly Supports Zebra Mussels	No pertinent water quality standards
Fe	mg/l	4	0.19	0.318	0.66	Taste or odor likely	25% of readings violate DOH guidelines
Mn	mg/l	4	0.543	0.8555	1.27	Taste or odor likely	100% of readings violate DOH guidelines
Mg	g/l	4	181	432	727		50% of readings violate DOH guidelines
K	g/l	4	60.8	139.38	240		No pertinent water quality standards
Na	g/l	4	1640	3442.5	5450		100% of readings violate DOH guidelines
Cl	mg/l	4	2960	6272.5	10500	Dangerous to aquatic life	100% of readings violate DOH guidelines
SO4	mg/l	4	379	869.75	1500		100% of readings violate DOH guidelines

***** Accurate Secchi disk readings were not able to be taken due to the shallow nature of the pond at the sampling location. In all but one case the Secchi disk was visible on the bottom of the pond.
[@] The true color average was calculated with non-detects being treated as equal to half the detection limit or 2.5ptu.
[3]- an extremely high chlorophyll *a* reading (>>300 ug/l) was omitted from the calculations, although it is not known if this was representative of normal algae levels in the lake. If accurate, this represents an extreme algal bloom.

Lake Perception

	UNITS	N	MIN	AVG	MAX	Scientific Classification	Regulatory Comments
WQ Assessment	1-5, 1 best	4	4	4.5	5	High Algae Levels	No pertinent water quality standards
Weed Assessment	1-5, 1 best	4	1	1	1	Plants Usually Not Visible	No pertinent water quality standards
Recreational Assessment	1-5, 1 best	4	4	4.63	5	Substantially Impaired	No pertinent water quality standards

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(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(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), = (TKN + NOx)*2.2/TP
> 30 suggests phosphorus limitation, < 10 suggests nitrogen limitation

CHLA = chlorophyll *a*, micrograms per liter (µg/l) or parts per billion (ppb)
Detection limit = 2 µg/l; no NYS standard or guidance value

TSI-CHLA = Trophic State Index calculated from CHLA, = 9.81*ln(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 25ºC, milliohms per centimeter (mmho/cm)
Detection limit = 1 µmho/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.