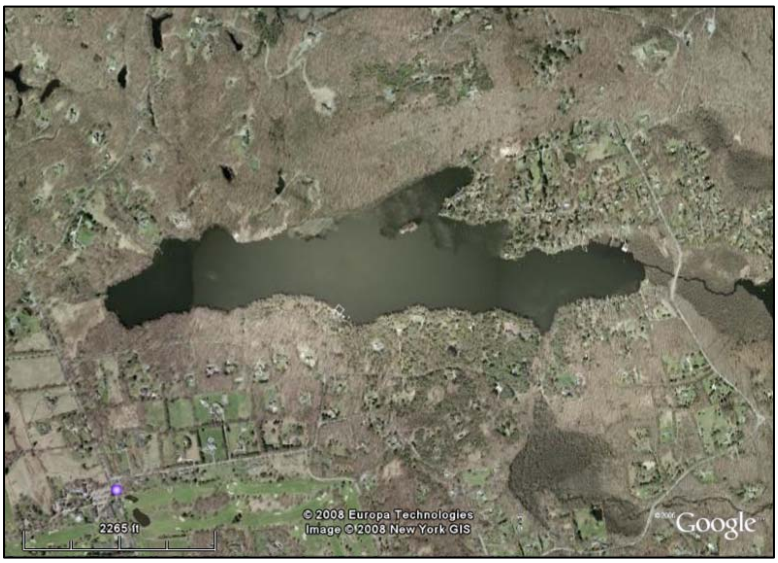
Lake Waccabuc



Surface water quality classification: Class A

Morphology Summary:

Characteristic	Units	Value	Source
Surface area	hectares	56	Cedar Eden 2004
Watershed area	hectares	298	EcoLogic 2008 (excl lake)
Volume	mgal	3,696	Cedar Eden 2004
Elevation	m	144	NYSDEC 2007
Maximum depth	m	14.2	CSLAP Sampling
Average Depth	m	7.1	Cedar Eden 2004

Lake Inlet: at the eastern end via channel from Lake Oscaleta and two streams which drain the extreme northwest and southwest portions of the watershed. There are also more than ninety storm drains that flow into the lake. (Cedar Eden 2002).

Lake Outlet: Waccabuc River along the southeastern shore.

Recreational impacts: The limited recreational use impacts were associated with poor clarity and high algae levels. (NYSDEC 2007).

Lakeshore Development: High density residential development along the northeastern shore, in addition to a small cluster of homes along the southeastern end of the lake. For the most part, the northwest and southwestern shores are undeveloped, and include some conservancy land along the southwest shore. A steeply sloping ridge runs next to the lake along the central north shore (Cedar Eden 2002)

Figure 1
Lake Waccabuc
Bathymetry

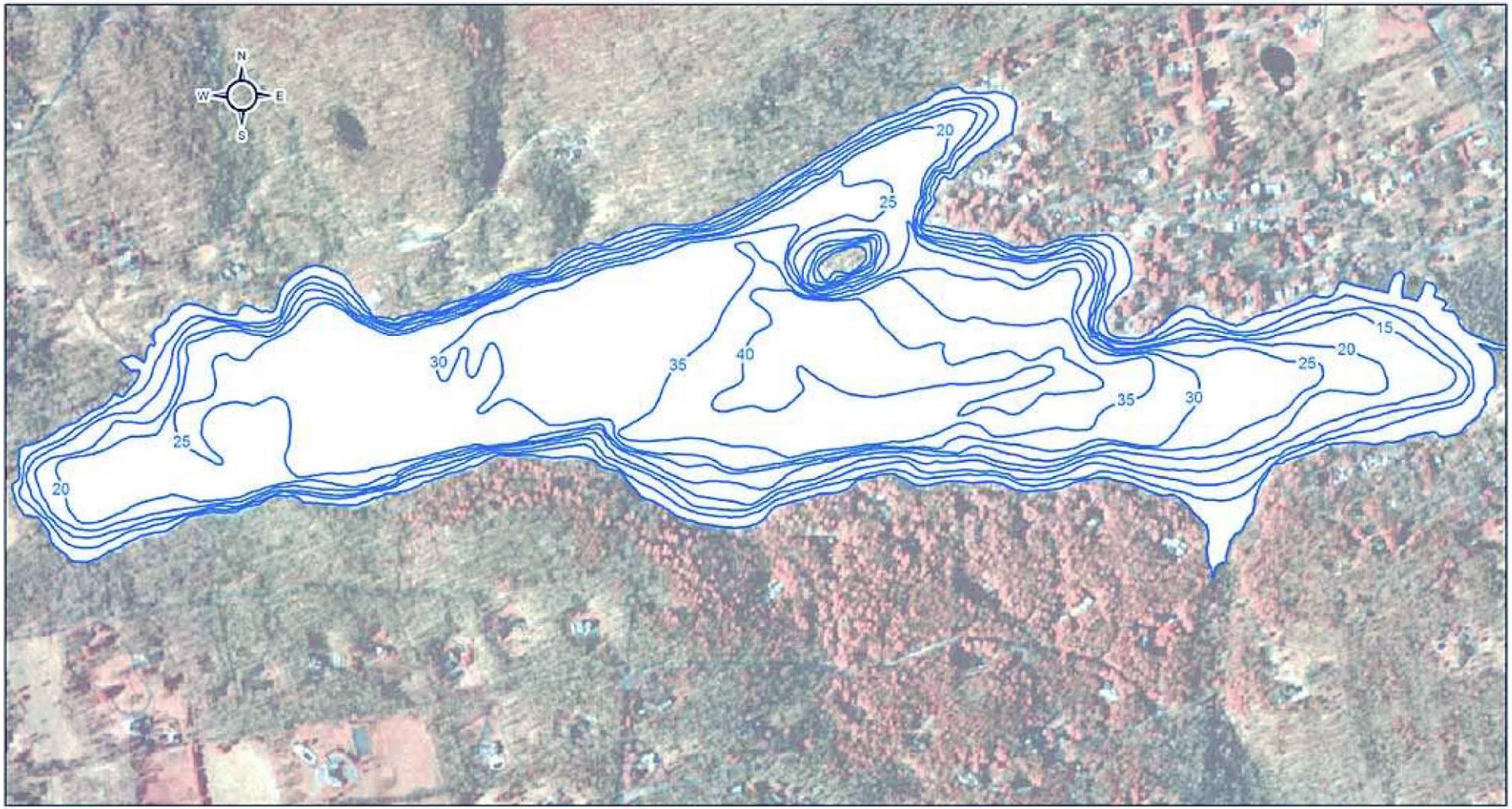
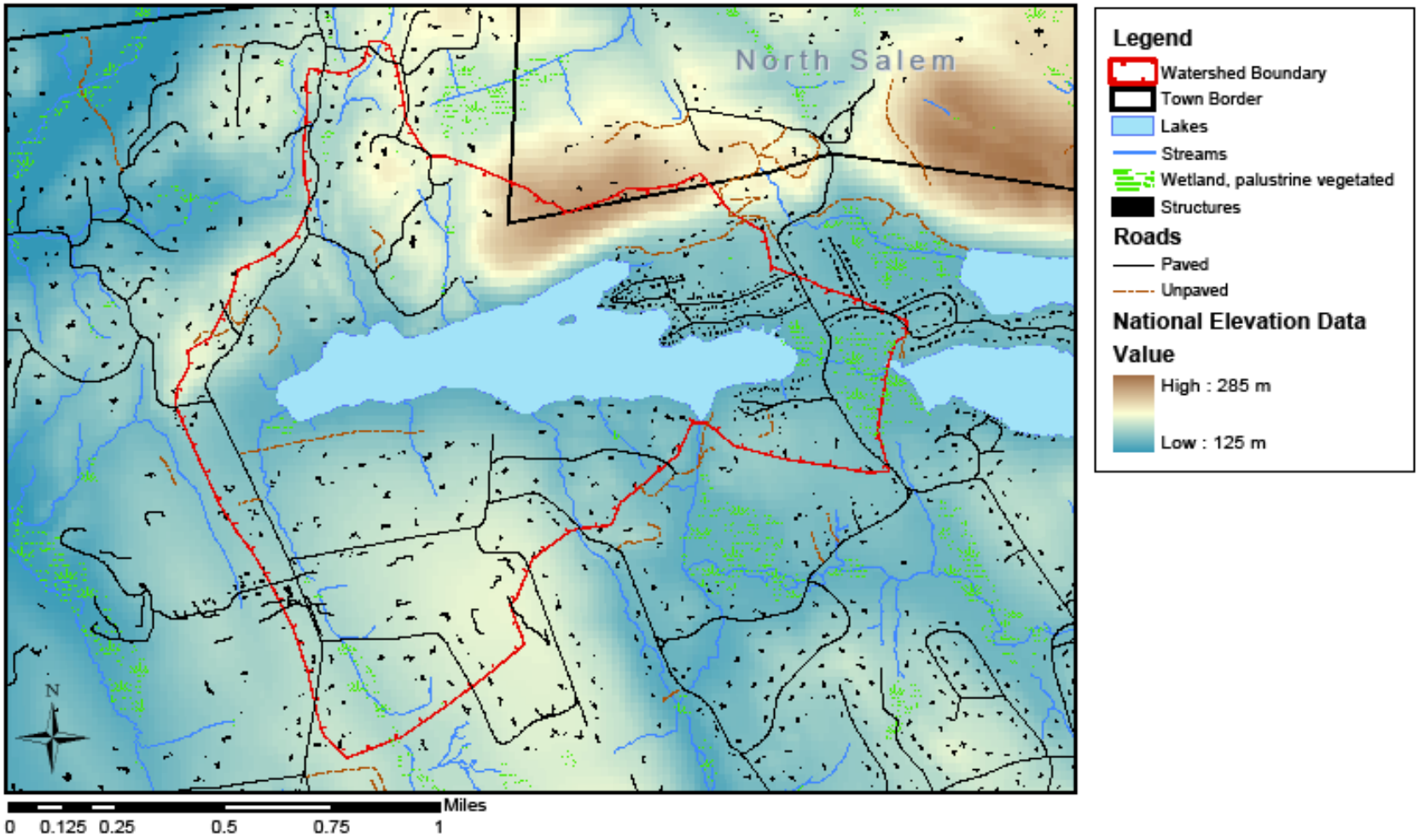


Figure 4.3 Bathymetric Map of Lake Waccabuc

Data Source: J. Gullen, 1967; digitized to fit by CEE LLC

Figure 2
Lake Waccabuc
Topographic and Human Features



Sources:
Lakes, Streams, Wetlands, Roads and Structures - On-line at Westchester County web site http://giswww.westchestergov.com/. Municipal planimetric datasets were photogrammetrically derived from the county's 2004 base map project and meet National Map Accuracy Standards at 1"=100'.
National Elevation Dataset - U.S. Geological Survey (USGS), EROS Data Center, 1999. On-line at http://gisdata.usgs.net/ned/. Geographic coordinate system. Horizontal datum of NAD83. Vertical datum of NAVD88.

Historical water quality data summary:

Data were collected under the Citizen Statewide Lake Assessment Program (CSLAP), as well as by the Three Lakes Council and other entities over time. Depths ranging from 0 to 15 meters (both upper and lower waters), including some half-meter increment profiles. Table A below summarizes samples collected between January and December of each year; the statistics represent averages of sample results for the time period for all depths, unless otherwise noted. Table B below summarizes samples collected during the summer, defined as the period between June 15 and September 15 each year.

A. Representing samples collected between January and December each year.

Parameter (units)	Time Period	Number of Samples	Minimum	Maximum	Average
Alkalinity (mg/l)	1936	6	15	34	21
	1972-1976	52	19	55	33
	2002-2007	8	28	46	43
Calcium (mg/l)	2006-2007	4	13.78	14.87	14.45
Chlorophyll-α (mg/m^3)	1976-1979	20	0.81	21.65	7.28
	1980-1989	67	0.17	24.4	6.69
	1990-1996	34	2.01	26.2	9.62
	2002-2007	42	0.90	39.8	10.69
Color (platinum color units)	1986-1989	46	3	23	11
	1990-1996	34	3	20	9
	2006-2007	16	9	29	15
Conductivity	1972-1976	52	86	144	115
	1986-1989	47	123	156	134
	1990-1996	32	136	190	165
	2002-2007	41	142	218	182
Fe++ (mg/l)	1975	10	0.025	0.40	0.14
Mn++ (mg/l)	1975	10	0.02	1.15	0.42
pH (std units)	1936	6	6.4	8.0	7.45
	1972-1976	56	6.2	7.36	6.81
	1986-1989	48	6.11	9.02	7.76
	1990-1996	33	5.85	8.79	7.77
	2002-2007	29	6.0	9.92	8.0
Phaeophytin-α (mg/m^3)	2002-2006	21	0.005	3.1	0.41
Secchi depth (m)	1972-1979	103	0.90	6.0	2.99
	1980-1989	114	1.2	4.68	2.58
	1990-1996	38	2	5	3.34
	2002-2007	86	1.1	4.7	2.32
Temperature:					
Surface (°C) (min depth sampled)	1936	1 (0 m)	27.8	27.8	27.8
	1974-1979	33 (0-1 m)	12	28.2	22.2
	1981-1989	85 (0-1.5 m)	7	29	22
	1990-1996	40 (0-1.5 m)	13	30	23
	2002-2007	80 (0-1 m)	4.2	29.3	19.7
Depth >8 m (°C)	1936	1 (14 m)	7.8	7.8	7.8
	1974-1979	27 (8-15 m)	7	11.8	8.9
	1981-1983	39 (12-14 m)	5.5	11	7.8
	1991-1992	5 (12-15 m)	5.0	9.0	7.8
	2002-2007	78 (12-14 m)	4.2	10.6	6.8

A. Representing samples collected between January and December each year.

Parameter (units)	Time Period	Number of Samples	Minimum	Maximum	Average
Dissolved Oxygen:					
Surface (mg/l) (min depth sampled)	1936	1 (0 m)	7.9	7.9	7.9
	1972-1979	34 (0-1m)	7.4	14	9.18
	1980-1983	44 (0-1m)	4.6	13.5	8.91
	1991-1992	5 (0-0.3m)	7.0	8.8	8.2
	2002-2007	80 (0-1m)	5.83	14.68	10.3
Depth >8 m (mg/l)	1936	1 (14m)	0	0	0
	1972-1979	29 (8-15m)	0	6.2	3.01
	1980-1983	44 (8-14m)	0.05	9.8	2.36
	1991-1992	5 (12-15m)	0.90	2.2	1.32
	2002-2007	76 (12-14m)	0	10.83	1.60
Nutrients *Total Phosphorus:*					
Surface (mg/l) (min depth sampled)	1986-1989	47 (1.5 m)	0.003	0.037	0.018
	1990-1996	34 (1.5 m)	0.010	0.030	0.016
	2003-2007	10 (1.5 m)	0.024	0.062	0.038
Depth >8 m (mg/l)	1975	14 (12 m)	0.029	0.345	0.164
	1986	1 (13.5 m)	0.12	0.12	0.12
	2003-2007	12 (11-12.5 m)	0.046	0.49	0.242
Soluble Reactive P (mg/l)	1975	14	0.01	0.364	0.132
Nitrate Nitrogen (mg/l)	1973-1975	60	0.0005	0.294	0.078
	1986-1989	35	0.01	0.72	0.049
	1990-1996	8	0.01	0.06	0.01
	2003-2007	21	0.0025	0.13	0.024
Total Kjeldahl Nitrogen (mg/l)	1975	13	0.45	1.93	1.08
	2002-2007	12	0.44	1.1	0.76
Ammonia Nitrogen (mg/l)	1973-1975	60	0.04	1.84	0.88
	2006-2007	16	0.006	0.10	0.03

B. Representing samples collected between June 15 and September 15 each year.

Parameter (units)	Time Period	Number of Samples	Minimum	Maximum	Average
Chlorophyll-α (mg/m^3)	1979	10	0.81	21.65	7.28
	1980-1989	41	0.17	24.4	6.46
	1990-1996	27	2.01	14	8.35
	2002-2007	27	1.58	39.8	11.9
Phaeophytin-α (mg/m^3)	2002-2006	14	0.005	1.4	0.32
Secchi depth (m)	1972-1979	45	0.9	5.6	2.66
	1980-1989	74	1.4	4.68	2.73
	1990-1996	29	2	5	3.34
	2002-2007	32	1.1	3.85	2.39

B. Representing samples collected between June 15 and September 15 each year.

Parameter (units)	Time Period	Number of Samples	Minimum	Maximum	Average
Dissolved Oxygen:					
Surface (mg/l)	1936	1 (0 m)	7.9	7.9	7.9
(min depth sampled)	1972-1979	22 (0-1 m)	7.4	11.2	9.11
	1980-1983	27 (0-1 m)	4.6	12.6	8.33
	1991-1992	3 (0 m)	8	8.8	8.4
	2002-2007	29 (0 m)	8.22	12.37	9.58
Depth >8 m (mg/l)	1936	1 (14 m)	0	0	0
	1972-1979	19 (8-14 m)	0	6.2	3.17
	1980-1983	27 (8-14 m)	0.05	5.7	2.25
	1991-1992	3 (12-14 m)	0.9	2.2	1.37
	2002-2007	26 (12-14 m)	0	1.9	0.34
Nutrients					
Total Phosphorus:					
Surface (mg/l)	1986-1989	38 (1.5 m)	0.003	0.037	0.017
(min depth sampled)	1990-1996	27 (1.5 m)	0.01	0.03	0.015
	2002-2007	24 (1.5 m)	0.011	0.047	0.027
Depth >8 m (mg/l)	1975	5 (12 m)	0.128	0.345	0.227
	1986	1 (13.5 m)	0.12	0.12	0.12
	2002-2007	26 (11-12.5 m)	0.079	0.45	0.258
Soluble Reactive P (mg/l)	1975	5	0.158	0.364	0.230
Nitrate Nitrogen (mg/l)	1973-1975	23	0.0005	0.136	0.066
	1986-1989	28	0.01	0.72	0.054
	1990-1996	7	0.01	0.01	0.01
	2003-2007	14	0.0025	0.135	0.022
Total Kjeldahl Nitrogen (mg/l)	1975	4	1.22	1.46	1.30
	2002-2007	9	0.607	1.1	0.793
Ammonia Nitrogen (mg/l)	1973-1975	23	0.56	1.54	0.10
	2006-2007	11	0.006	0.1	0.029

Note: A system of hypolimnetic aerators was installed in 1973 and were generally in operation from late spring until early fall. The aerators were updated in 2001 with the installation of new diffusers (Cedar Eden 2002). The aerators were not working properly in 2004, due either to design or sizing (Cedar Eden 2004). Use of the aerators was discontinued in 2005 (Cedar Eden 2006).

Sediment data summary: Composite samples collected May 29, 2008 (EcoLogic, 2008):

Parameter	Analytical Method	Result (mg/kg dry wt)
Pesticides/PCBs	EPA 8081/8082	ND
TCL Volatiles	EPA 8260B	ND
TCL PAHs	EPA 8270	ND
RCRA Total Metals	EPA 6010	
Arsenic		ND
Barium		ND
Cadmium		ND

Parameter	Analytical Method	Result (mg/kg dry wt)
Chromium		ND
Copper		1.5
Lead		4.2
Selenium		ND
Silver		ND
RCRA Mercury	EPA 7471	ND
Total Organic Carbon	EPA 9060	366,000
Total Solids	SM 18-20 2540B	6.9%
ND – non-detect. Analytes reported as less than the method detection limit.		

Sediment Contaminant Analysis: Interest has been expressed in exploring the feasibility of dredging. A composite sediment sample was collected on August 13, 2008 (EcoLogic, 2008) to estimate the quality of the sediments with respect to disposal options. Results are summarized in Table C, in the context of NYSDEC Screening levels. A complete set of results is attached to the end of this report. (Attachment 2 - 2008 Water Quality and Sediment Sampling Locations and Laboratory Analysis Reports)**.** The NYSDEC screening levels are separated into three Classes: A, B, and C:

- **Class A - No Appreciable Contamination (No Toxicity to aquatic life).**
  If sediment chemistry is found to be at or below the chemical concentrations which define this class, dredging and in-water or riparian placement at approved locations can generally proceed.

- **Class B - Moderate Contamination (Chronic Toxicity to aquatic life).**
  Dredging and riparian placement may be conducted with several restrictions. These restrictions may be applied based upon site-specific concerns and knowledge coupled with sediment evaluation.

- **Class C - High Contamination (Acute Toxicity to aquatic life).**
  Class C dredged material is expected to be acutely toxic to aquatic biota and therefore, dredging and disposal requirements may be stringent. When the contaminant levels exceed Class C, it is the responsibility of the applicant to ensure that the dredged material is not a regulated hazardous material as defined in 6NYCRR Part 371. This TOGS does not apply to dredged materials determined to be hazardous.

Table C. Lake Waccabuc sediment analytical results, with NYSDEC Sediment Quality Threshold Values for Dredging, Riparian or In-water Placement. Threshold values are based on known and presumed impacts on aquatic organisms/ecosystem.

Compound	Required Method Detection Limit	Threshold Values			Waccabuc Results	Threshold Class
		Class A	Class B	Class C		
Metals (mg/kg dry wt) – EPA Method 6010B						
Arsenic	1.0	< 14	14 – 53	> 53	ND	A
Cadmium	0.5	< 1.2	1.2 - 9.5	> 9.5	ND	A
Copper*	2.5	< 33	33 – 207	> 207	1.5	A
Lead	5.0	< 33	33 – 166	> 166	4.2	A
Mercury[+]	0.2	< 0.17	0.17 - 1.6	> 1.6	ND	A
PAHs and Petroleum-Related Compounds (mg/kg dry wt) – EPA Methods 8020, 8021, 8260 and 8270						
Benzene	0.002	< 0.59	0.59 - 2.16	> 2.16	<0.030	A
Total BTEX*	0.002	< 0.96	0.96 - 5.9	> 5.9	<0.030	A
Total PAH[1]	0.33	< 4	4 - 35	> 35	<0.7	A
Pesticides (mg/kg dry wt) – EPA Methods 8081						
Sum of DDT+DDD+DDE[+]	0.029	< 0.003	0.003 - 0.03	> 0.03	ND	A
Mirex*[+]	0.189	< 0.0014	0.0014 - 0.014	> 0.014	na	--
Chlordane*[+]	0.031	< 0.003	0.003 - 0.036	> 0.036	ND	A
Dieldrin	0.019	< 0.11	0.11 -0. 48	> 0.48	ND	A
Chlorinated Hydrocarbons (mg/kg dry wt) – EPA Methods 8082 and 1613B						
PCBs (sum of aroclors)[2]	0.025	< 0.1	0.1 - 1	> 1	ND	A
2,3,7,8-TCDD*[3] (sum of toxic equivalency)	0.000002	< 0.0000045	0.0000045 - 0.00005	> 0.00005	na	--

na – not analyzed. ND – not detected

[+]Threshold values lower than the Method Detection Limit are superseded by the Method Detection Limit.

* Indicates case-specific parameter. The analysis and evaluation of these case specific analytes is recommended for those waters known or suspected to have sediment contamination caused by those chemicals. These determinations are made at the discretion of Division staff.

[1] For Sum of PAH, see Appendix E of TOGS 5.1.9. For Lake Kitchawan, each of the 18 PAH compounds were reported as non-detect (<0.7 mg/kg).

[2] For the sum of the 22 PCB congeners required by the USACE NYD or EPA Region 2, the sum must be multiplied by two to determine the total PCB concentration. For Lake Kitchawan, seven Aroclors were each reported as <0.2 mg/kg; this value is reported above.

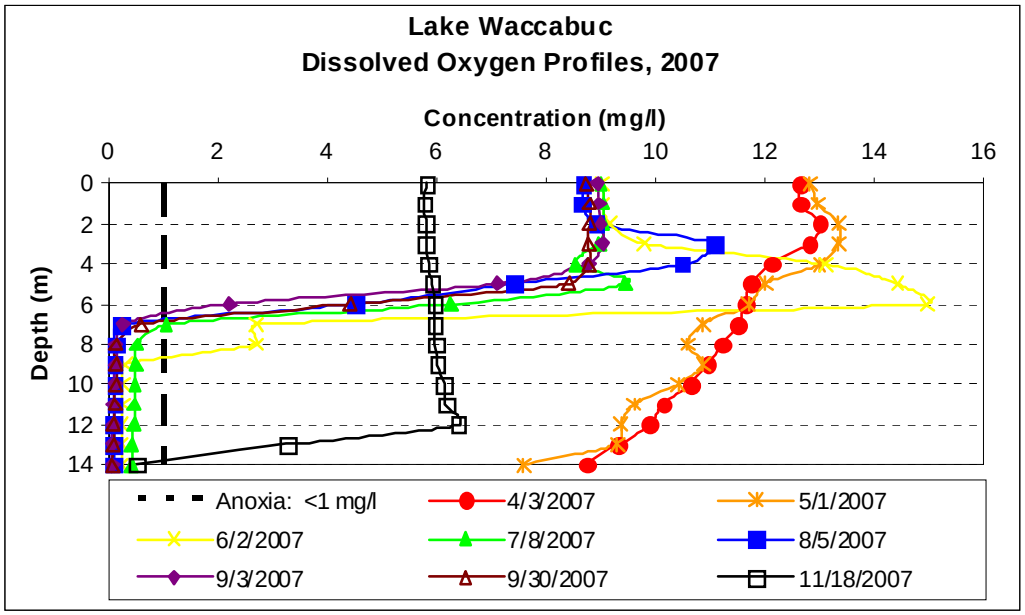
[3] TEQ calculation as per the NATO - 1988 method (see Appendix D of TOGS 5.1.9).

Note: The proposed list of analytes can be augmented with additional site specific parameters of concern. Any additional analytes suggested will require Division approved sediment quality threshold values for the A, B and C classifications.

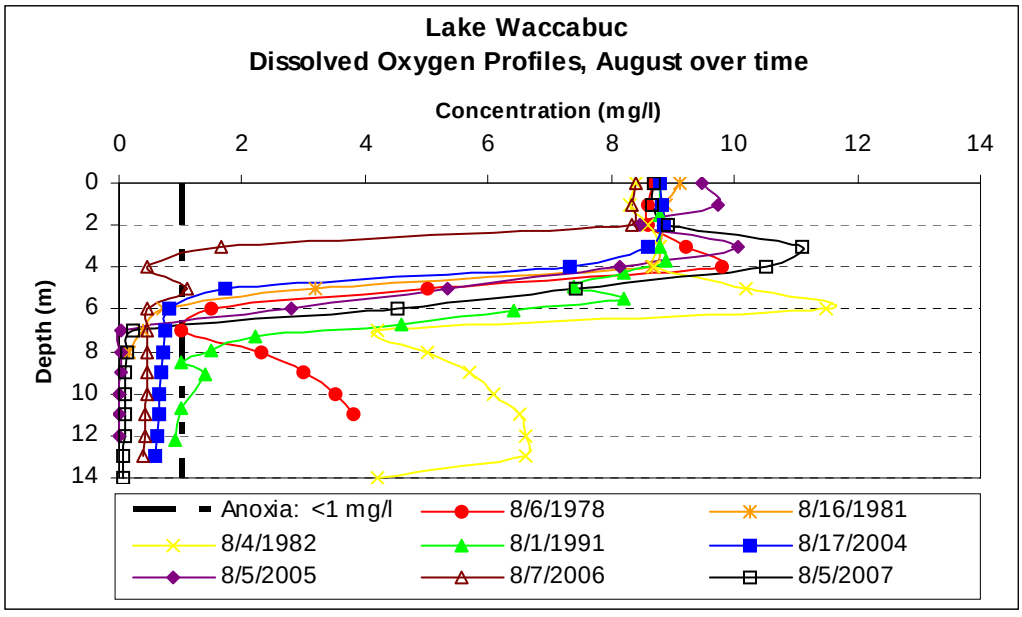
Source:

Table 2, NYSDEC Division of Water, Technical & Operational Guidance Series (TOGS) 5.1.9, In-Water and Riparian Management of Sediment and Dredged Material, November, 2004

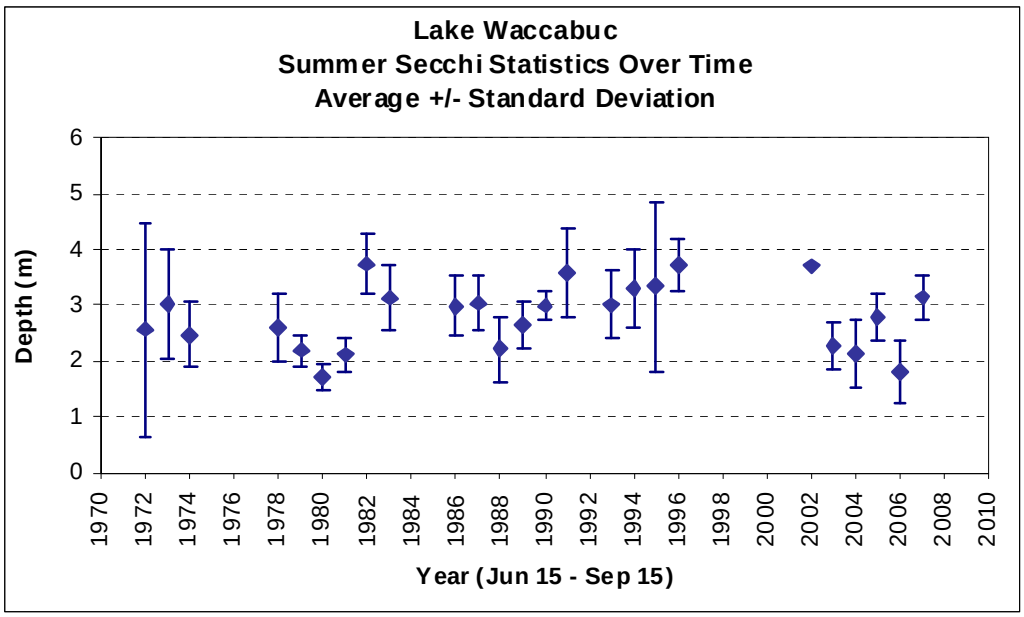
Anoxia: Dissolved oxygen decreases in lower waters, resulting in anoxic conditions from June through September at depths greater than 6 meters. By November, turnover has occurred, resulting in higher DO concentrations at depth and lower DO concentrations at surface.



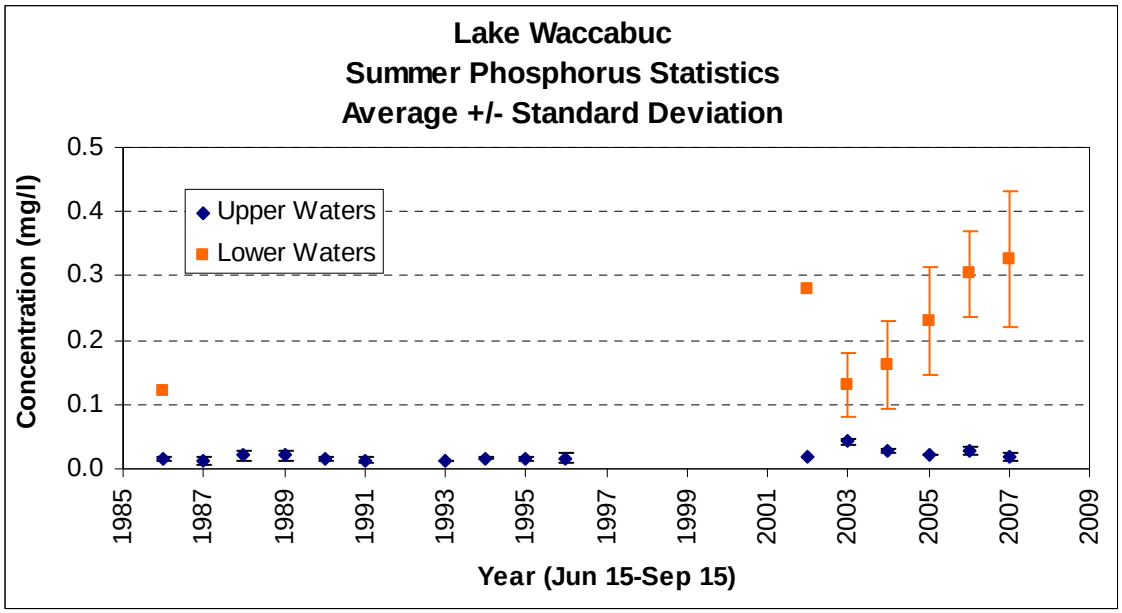
Anoxic conditions are evident in dissolved oxygen profiles collect in the month of August dating back to 1978.



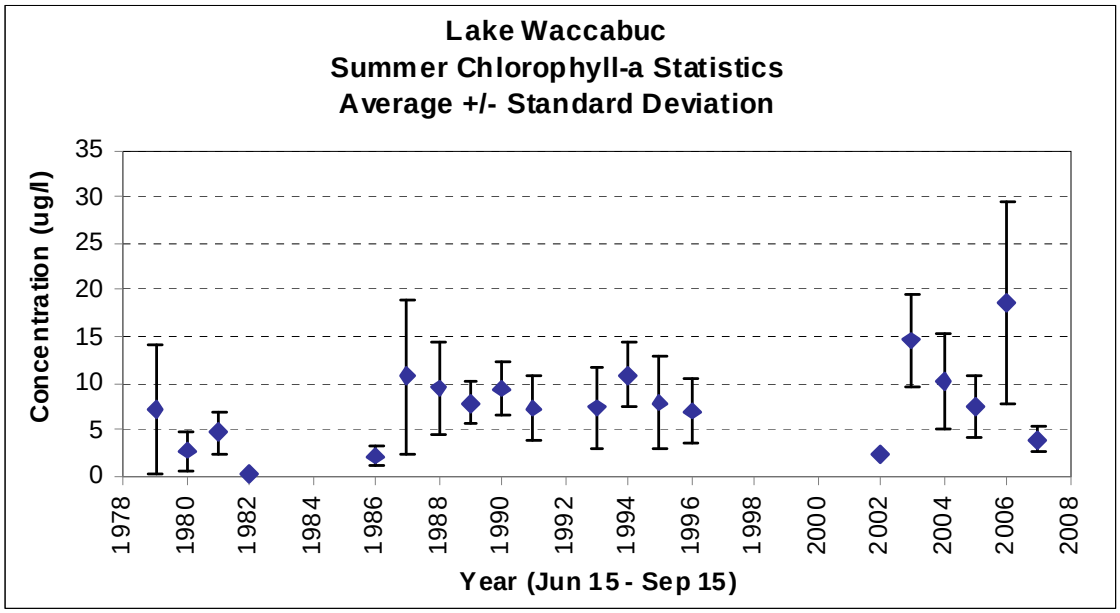
Water Clarity: Averages over time are generally between 2.0 to 4.0 meters. The historical variability around the mean is similar to recent years.



Phosphorus Concentrations: Summer phosphorus concentrations in upper waters have been fairly stable since 1985, with low variability. Phosphorus concentrations in lower waters are consistently higher than for samples collected in the upper waters. Averages in lower waters appear to be increasing in recent years.



Chlorophyll-α: Chlorophyll-α concentrations are, on average, slightly higher in recent years as compared with the previous two decades. The standard deviations show considerable variability over time.



Trophic Status:

Parameter	Trophic State (shading indicates match to Lake)				Lake Waccabuc*
	Oligotrophic	Mesotrophic	Eutrophic	Hypereutrophic	
Summer average Total Phosphorus, upper waters (µg/l)	<10	10-35	35 -100	>100	27
Summer chlorophyll-a, upper waters (µg/l)	<2.5	2.5 - 8	8 - 25	>25	12
Peak chlorophyll-a (µg/l)	<8	8-25	25-75	>75	39.8
Average Secchi disk transparency, m	>6	6-3	3-1.5	<1.5	2.4
Minimum Secchi disk transparency, meters	>3	3-1.5	1.5-0.7	<0.7	1.1
Dissolved oxygen in lower waters (% saturation)	80 - 100	10-80	Less than 10	Zero	2.52

*Summer (June 15 to September 15) averages for the period 2002 to 2007. DO percent saturation in lower waters calculated using data collected June 15 to September 15, at depths >= 12 m.

Aquatic Habitat:

- Phytoplankton in 2003 was dominated by Bluegreen group from June through September (#cells/ml ranged from 21,178-51,903). (Cedar Eden 2004)

- Zooplankton in 2003 were dominated by Rotifers in June and July, accounting for 70% and 59% of the zooplankton community, respectively. In September, Cladocerans (*Bosmina*) dominated (68%). (Cedar Eden 2004)

- Aquatic plants in July 2003 were most abundant in the shallow east end and coves, while steep shores limited vegetation establishment elsewhere. Plants at the east end inlet were characterized by Eurasian water milfoil (*Myriophyllum spicatum*), bassweed, coontail, and Robin's pondweed. Eurasian water milfoil was well-established along most of the shoreline, interspersed with white and yellow water lilies. (Cedar Eden 2004).

List of Aquatic Plants identified in 2003:

Scientific Name	Common Name
Brasena schreberi	Watershield
Ceratophyllum spp.	Coontail
Decodon spp.	Three-way sedge
Eleochaaris quadrangulata	Four-edge sedge
Eleocharis spp.	Spike-rush
Elodea canadensis	Canadian waterweed
Iris spp.	Iris
Lemna spp.	Duckweed
Lythrum salicaria	Purple loosestrife

Scientific Name	Common Name
Myriophyllum spicatum.	Eurasian watermilfoil
Nuphar spp.	Yellow water lily
Nympheae spp.	White water lily
Pontederia cordata	Pickerelweed
Potamogeton amplifolius	Bassweed
Potamogeton robensii	Robin's Pondweed
Sagittaria spp.	Arrowhead
Scirpus spp.	Bulrush

Note: A 2008 macrophyte survey conducted by Allied Biological has identified the exotic invasive plant Brazilian elodea (*Egeria densa*) in the north bay of Lake Waccabuc. Management alternatives are being considered.

Invasive Species: Early Detection List for eight regions in New York State, published by the Invasive Species Plant Council of New York State. Obtained on-line (11/29/07). Lower Hudson region list:

Scientific Name	Common Name
Heracleum mantegazzianum	Giant Hogweed
Wisteria floribunda	Japanese Wisteria, Wisteria
Digitalis grandiflora (D. pupurea)	Yellow Foxglove, Foxglove
Geranium thunbergii	Thunberg's Geranium
Miscanthus sinensis	Chinese Silver Grass, Eulalia
Myriophyllum aquaticum	Parrot-feather, Waterfeather, Brazilian Watermilfoil.
Pinus thunbergiana (P. thunbergii)	Japanese Black Pine
Prunus padus	European Bird Cherry
Veronica beccabunga	European Speedwell

Endangered Species:

- US Fish and Wildlife Service

Scientific Name	Common Name	Federal Status
Reptiles		
Clemmys muhlenbergii	Bog Turtle	Threatened, Westchester Co.
Birds		
Haliaeefus leucocephalus	Bald Eagle	Threatened, entire state
Mammals		
Myotis sodalist	Indiana Bat	Endangered, entire state
Felix concolor couguar	Eastern Cougar	Endangered, entire state (probably extinct)
Plants		
Isotria medeoloides	Small Whorled Pogonia	Threatened, entire state
Platanthera leucophea	Eastern Prairie Orchid	Threatened, not relocated in NY
Scirpus ancistrochaetus	Northeastern Bulrush	Endangered, not relocated in NY

- New York Natural Heritage Program

Scientific Name	Common Name	NY Legal Status
Reptiles		
Glyptemys muhlenbergii (formerly Clemmys muhlenbergii)	Bog Turtle	Endangered
Birds		
Oporornis formosus	Kentucky Warbler	Protected
Butterflies and Skippers		
Satyrium favonius ontario	Northern Oak Hairstreak	Unlisted
Dragonflies and Damselflies		
Enallagma laterale	New England Bluet	Unlisted
Plants		
Asclepias purpurascens	Purple Milkweed	Unlisted
Eleocharis quadrangulata	Angled Spikerush	Endangered

Water Balance:

USGS Mean Annual (inches/year)		Volume (acre-ft/year)
Precipitation (P)	48	562
Evaporation (ET)	22	258
Runoff (R)	26	1,597

Water Budget:	
Inflow to Lake [R+(P-ET)]	1,528 mgal/year
Lake Volume	3,696 mgal
Flushing Rate	0.4 times/year
Residence Time	2.4 years

Phosphorus Budget:

(A) Watershed Land Cover: 2001 National Land Cover Data Set (MRLC). Includes phosphorus export coefficient (kg/ha/year) and estimated phosphorus export.

Description	Watershed (acres)	Cover (%)	Phosphorus Export Coeff.	Estim. P Export kg/year	Estim. P Export Percent
Open water (all)	135	15	0.30	16	28
Developed, open space	234	26	0.20	19	32
Developed, low intensity	4.0	0.43	0.30	0.48	0.82
Developed, moderate intensity	1.0	0.11	0.50	0.20	0.34
Deciduous forest	400	44	0.07	11	19
Evergreen forest	70	7.7	0.20	5.7	10
Mixed forest	3.6	0.39	0.09	0.13	0.22
Shrub/scrub	10	1.1	0.28	1.2	2.0
Grassland/herbaceous	15	1.6	0.28	1.7	2.9
Pasture/hay	16	1.8	0.30	2.0	3.4
Woody wetlands	22	2.4	0.09	0.80	1.4
Emergent herbaceous wetlands	2.4	0.27	0.10	0.10	0.17
Total Acres	**913**	**100**		**58**	**100**

(B) Septic: Septic systems serve the communities along the shoreline (Cedar Eden 2002).

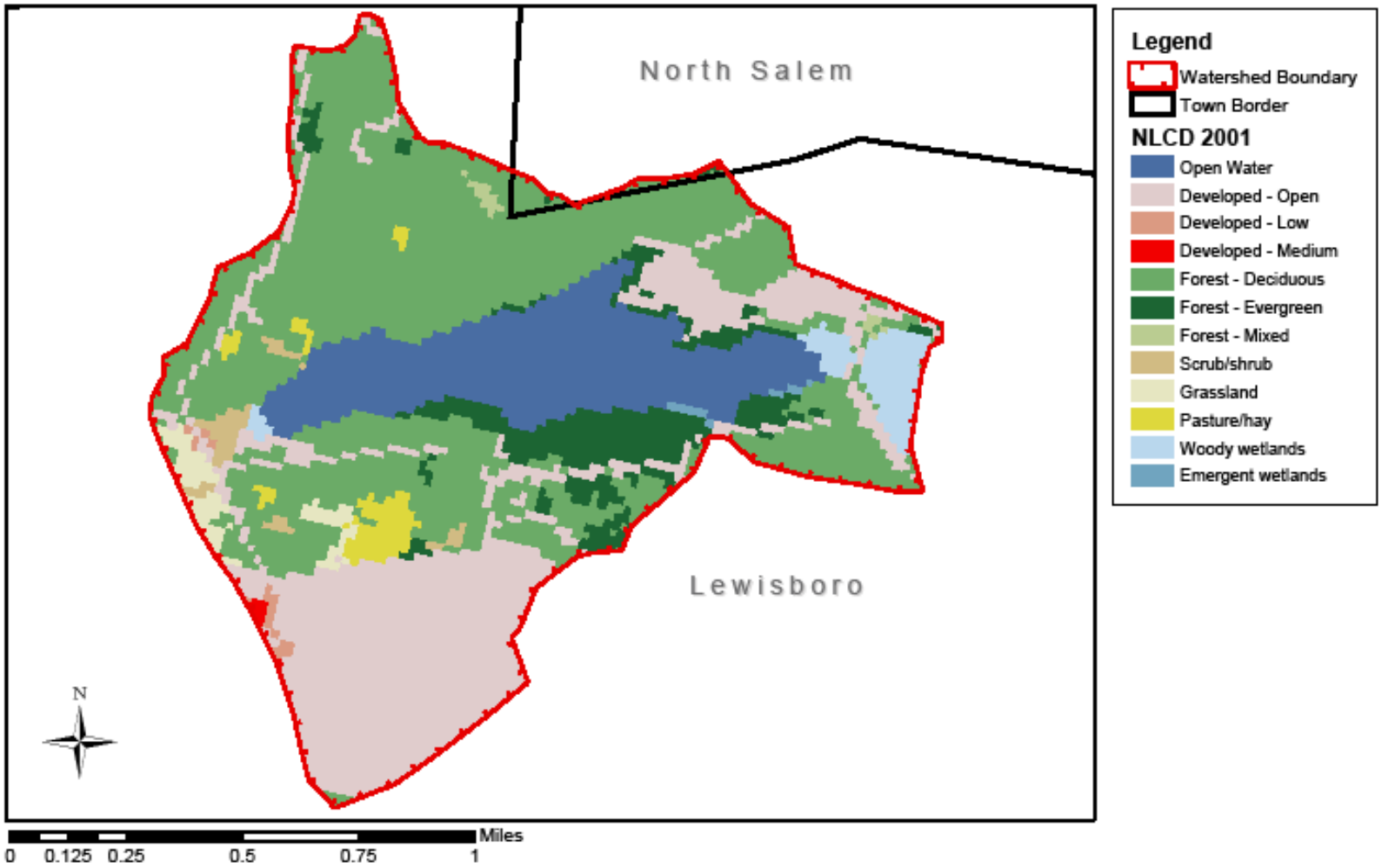
Estimated population on septic by soil suitability class with US 2000 Census household size for 100-meter buffer of surface water.

Class	N Structures	Average Household	Estimated Population
Not limited	21	2.5	53
Somewhat limited	142	2.5	355
Very limited	72	2.5	180
Total	**235**		**588**

Estimated Phosphorus export by Soil Suitability class for 100-meter buffer of surface water, with failure rate of 5%.

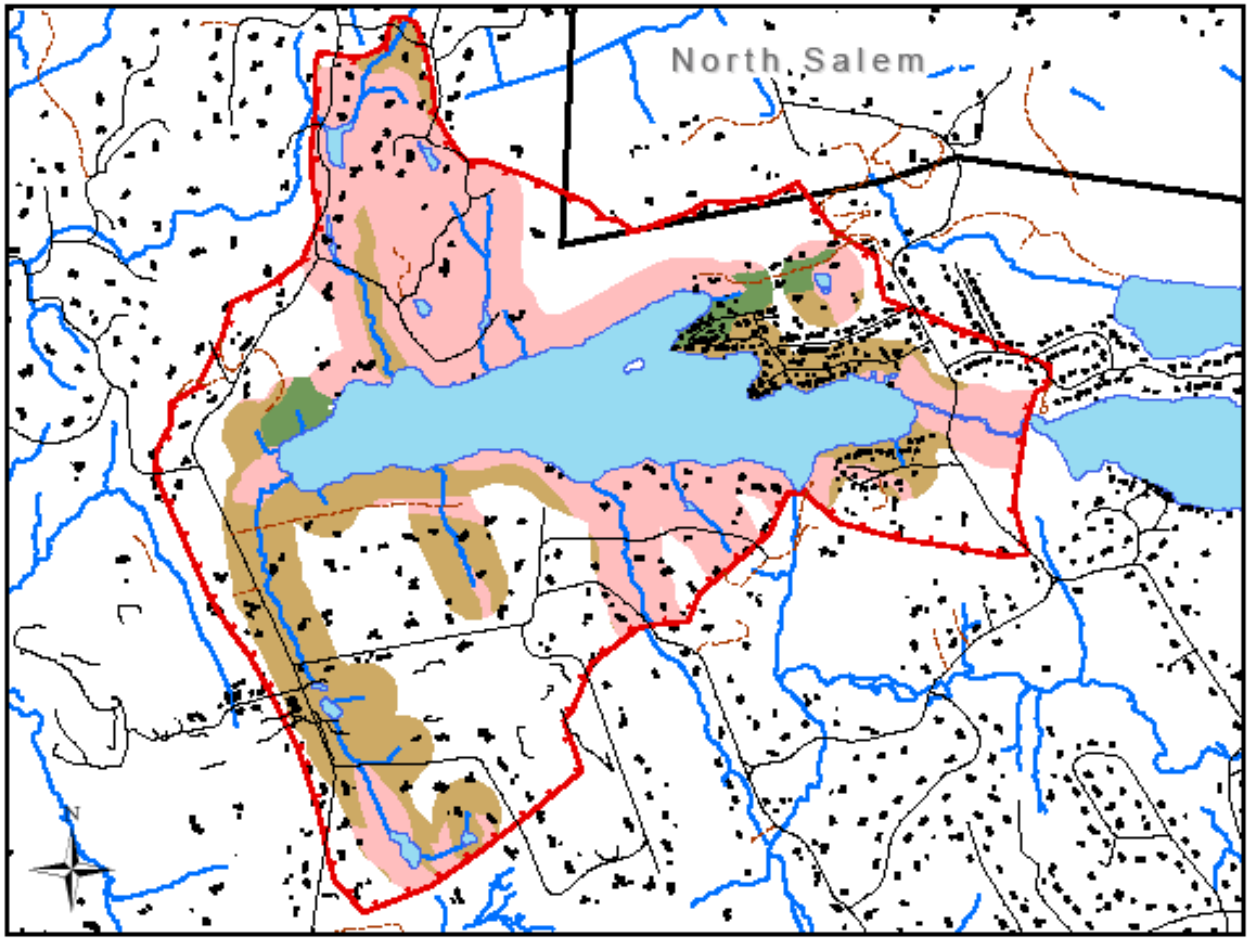
Class	Population	P per cap	Transport	kg/year
Not limited	50	0.6	10%	3.0
Somewhat limited	337	0.6	30%	61
Very limited	171	0.6	60%	62
Failed systems (5%)	30	0.6	100%	18
Total	**588**			**144**

Figure 3
Lake Waccabuc
National Land Cover Dataset 2001



Source:
National Land Cover Database zone 65 Land Cover Layer. On-line at http://www.mrlc.gov
The National Land Cover Database 2001 land cover layer for mapping zone 65 was produced through a cooperative project conducted by the Multi-Resolution Land Characteristics (MRLC) Consortium. Minimum mapping unit = 1 acre. Geo-referenced to Albers Conical Equal Area, with a spheroid of GRS 1980, and Datum of NAD83.

Figure 4
Lake Waccabuc
Soil Septic Suitability, 100-Meter Stream Buffer Within the Watershed



Legend
- Watershed Boundary
- Town Border
- Lakes
- Streams
- Structures

Roads
- Paved
- Unpaved

Septic Suitability
- Not limited
- Somewhat limited
- Very limited

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect septic absorption fields:

"Not limited" - the soil has features that are very favorable. Good performance and very low maintenance can be expected.

"Somewhat limited" - the soil has features that are moderately favorable. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected.

"Very limited" - the soil has one or more features that are unfavorable. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Sources:
Lakes, Streams, Wetlands, Roads and Structures - On-line at Westchester County web site http://giswww.westchestergov.com/. Municipal planimetric datasets were photogrammetrically derived from the county's 2004 base map project and meet National Map Accuracy Standards at 1"=100'.
Soil Survey of Westchester County - Compiled by Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. On-line at http://soildatamart.nrcs.usda.gov/. Accessed November 28, 2007. *"Septic tank absorption fields" are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health.*

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(C) Point Sources: The outlet of Lake Oscaleta flows to Lake Waccabuc.

Estimated point source load of phosphorus

Source	Estim. Volume input (m^3/year)	Surface Average P 2002-2007 (ug/l)	Estimated P load (kg/year)
Lake Oscaleta	3,438,272	24	83

(D) Summary of Phosphorus Input to the Lake:

Source	Input (kg/year)
Watershed Land Cover	59
Point Sources	83
Septic within 100m of surface water	143
Internal loading (sediment)	260
Total	**544**

Phosphorus Mass Balance: Empirical estimates of net loss from system based on mean depth and water residence time.

$$p = W'/10+H\rho$$

where:

p = summer average in-lake TP concentration, ug/l
W′ = areal loading rate, g/m^2/year
H = mean depth, m
ρ = flushes per year

Parameter	Units	Result
W′	g/m^2/year	957
H	m	7.1
ρ	flushes per year	2.4
p	**ug/l**	**35**
Summer average TP 2002-2007, upper waters:		**27 ug/l**

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US Fish and Wildlife Service. 2007. US Fish and Wildlife Service State Listing. List filtered to species with possible presence in the Town of Lewisboro. Obtained from web site on 11/28/07. Web site: http://www.fws.gov/northeast/Endangered/.