

LCI Lake Water Quality Summary

General Information

Lake Name:

Fawn Lake

Location:

Partridge Run WMA, Albany County, NY

Basin:

Mohawk River Basin

Size:

8 hectares (20 acres)

Lake Origins:

Natural

Major Tributaries:

Small unnamed ponds

Lake Tributary to?:

Tributary to the Switz Kill

Water Quality Classification:

C (best intended use: secondary contact recreation)

Sounding Depth:

1.8 meters (5.9 feet)

Sampling Coordinates:

42.56197, -74.16771

Sampling Access Point:

DEC boat/fishing dock off Fawn Lake Road

Monitoring Program:

Lake Classification and Inventory (LCI) Survey

Sampling Date:

August 24, 2010

Samplers:

David Newman, NYSDEC Division of Water, Albany

Dan Hayes, NYSDEC Division of Water, Albany

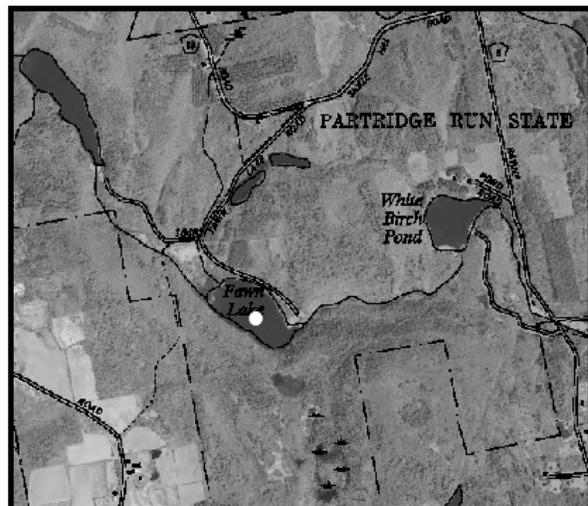
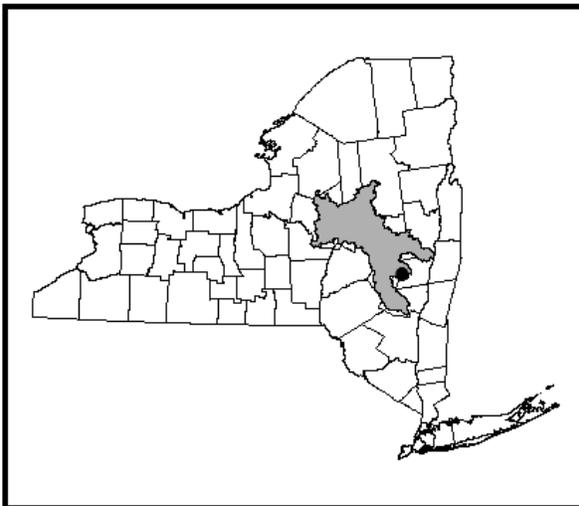
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Lake Map

(sampling location marked with a circle)



Background and Lake Assessment

Fawn Lake is one of nine small waterbodies in the Partridge Run Wildlife Management Area (WMA) in western Albany County. Fawn Lake is approximately 20 acres in size and is used for warmwater fishing both from the small dock and by boats, which can be hand carried from the small parking area. The shoreline as well as the larger watershed is predominately forested with some seasonal use roads and hiking trails. The WMA is used for “birdwatching, cross-country skiing, snowshoeing, hunting and trapping (NYSDEC Bureau of Wildlife 2010).” Due to a lack of water quality data in the Division of Water’s database, Fawn Lake was included in the 2010 Lake Inventory and Classification (LCI) screening program.

Fawn Lake can be characterized as *eutrophic*, or highly productive. The water clarity reading taken in late August (TSI < 52, typical mesoeutrophic waterbodies) was expected given the total phosphorus reading (TSI = 55, typical of *eutrophic* waterbodies) and the chlorophyll *a* reading (TSI = 52, typical of *eutrophic* waterbodies). These data indicate that baseline nutrients may support persistent algal blooms in the lake. The observation of specks of green algae in the water column would confirm that nutrient levels were supporting algal growth.

In late August, the water appeared brownish with submergent plants growing close to the surface through the lake. No exotic invasive species were observed in the lake, and at least five native aquatic plant species were observed to be growing in the lake: *Elodea canadensis* (common waterweed), *Potamogeton amplifolius* (largeleaf pondweed), *Potamogeton pusillus* (lesser pondweed), *Potamogeton zosteriformis* (flatstem pondweed), and an additional *Potamogeton sp.* (pondweed) that could not be identified to species. A more thorough plant specific survey may yield additional aquatic plants.

Like most shallow water bodies, Fawn Lake was not thermally stratified. Temperature and dissolved oxygen readings were consistent throughout the water column. pH readings indicate slightly alkaline water despite low alkalinity (buffering capacity to acidic inputs), and conductivity readings indicate soft water (low ionic strength). The conductivity and pH readings were similar to those seen in White Birch Pond (just downstream of Fawn Lake) and probably represent typical conditions for small waterbodies in this part of New York State.

Fawn Lake appears to be typical of shallow, soft water, weakly colored, slightly alkaline lakes. Other lakes with similar water quality characteristics support warmwater fisheries; due to the lack of cold (deep) water, the lake is unlikely to support a coldwater fishery. A fisheries survey in 1979 showed that the lake did support a self-sustaining warmwater fish population that included: chain pickerel, smallmouth bass, brown bullhead, yellow perch, pumpkinseed, and golden shiner (NYSDEC 2001). The *Helderbergs Unit Management Plan* suggests that the lake should be resurveyed to update the current status of fish populations in the lake (NYSDEC 2001).

The total phosphorus levels in the lake exceed the DEC’s guidance value. Organic nitrogen levels were in the intermediate range (neither high nor low), although nitrate and ammonia levels were low. Iron levels were elevated above the state’s water quality standard of 0.3mg/l and are likely to cause taste or odor issues in the lake. Chloride levels indicate there may be some minor

impact to the lake from road salting or runoff through developed areas. All of the other parameters analyzed were below established guidance values.

Evaluation of Lake Condition Impacts to Lake Uses

Potable Water (Drinking Water)

Fawn Lake is not classified to be used for potable water. Although LCI data are not sufficient to evaluate potable water use, these data suggest that substantial treatment would be needed to serve as a water supply, due to elevated iron and algae levels.

Contact Recreation (Swimming)

Fawn Lake is not classified for primary contact recreation (swimming and bathing). It is not known if people swim in the lake. Bacteria data are needed to evaluate the safety of Fawn Lake for swimming; however these data are not collected through the LCI. The data collected through the LCI indicate that swimming may be impaired by excessive aquatic plant growth.

Non-Contact Recreation (Boating and Fishing)

Fawn Lake is classified for secondary contact recreation (boating and fishing). Individuals were observed fishing from the shoreline of the lake during the sampling. It is believed that non-motorized boats may also be used for fishing. Excessive plant growth probably precludes the use of any type of motor on the lake. Due to the shallow depth of the lake it is unlikely that coldwater fish would be able to survive in the lake, but there were no indications of impacts to warmwater fish species.

Aquatic Life

These data did not indicate any impacts for aquatic life in lake. Additional biological studies would be needed to evaluate any impacts to aquatic life.

Aesthetics

Excessive plant growth close to the lake's surface may detract from the aesthetics of the lake.

Additional Comments

- An effort should be made to complete the recommendations laid out in the Helderbergs Unit Management Plan (NYSDEC 2001). These recommendations include: managing the lake to provide warmwater fishing opportunity to the public, maintaining existing angler access, conducting a fisheries survey and developing a management plan based on this survey.
- The Helderbergs Unit Management Plan (NYSDEC 2001) indicates that at one time the lake had a maximum depth of 12 feet. During the LCI survey, 6 feet was the maximum depth found, which may mean the lake is filling in with sediment (although the deepest portion of the lake may have been too small to detect during the LCI survey).
- 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. Maintaining information signs about invasive species and what

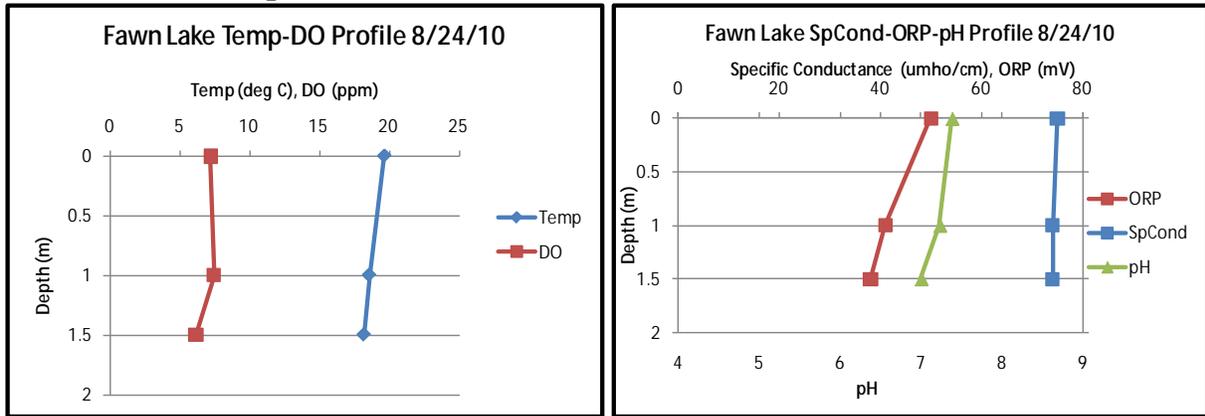
individuals can do to prevent the spread may help minimize the risk of the introduction of an invasive species.

Aquatic Plant IDs

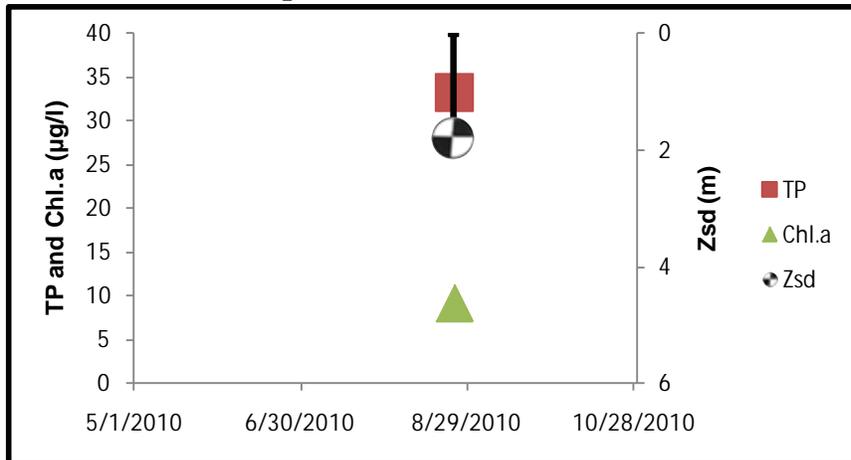
Exotic Plants: none observed

Native Plants: *Elodea canadensis* (common waterweed)
Potamogeton amplifolius (largeleaf pondweed)
Potamogeton pusillus (lesser pondweed)
Potamogeton zosteriformis (flatstem pondweed)
Potamogeton sp. (un-identified pondweed)

Time Series: Depth Profiles



Time Series: Trophic Indicators



* The Secchi disk was visible on the bottom of the lake preventing an accurate measurement of water clarity.

WQ Sampling Results

Surface Samples

	UNITS	Reading	Scientific Classification	Regulatory Comments
SECCHI	meters	> 1.79*	Mesoeutrophic	Readings does not violate DOH guidance value
TSI-Secchi		<51.6*	Eutrophic	No pertinent water quality standards
TP	mg/l	0.0333	Eutrophic	Sample exceeds guidance value
TSI-TP		54.7	Eutrophic	No pertinent water quality standards
TSP	mg/l	0.0185	High % soluble Phosphorus	No pertinent water quality standards
NOx	mg/l	0.0047	Low nitrate	Reading does not violate guidance
NH4	mg/l	0.02	Low ammonia	Reading does not violate guidance
TKN	mg/l	0.71	Intermediate organic nitrogen	No pertinent water quality standards
TN/TP	mg/l	47.22	Phosphorus Limited	No pertinent water quality standards
CHLA	ug/l	9.1	Eutrophic	No pertinent water quality standards
TSI-CHLA		52.3	Eutrophic	No pertinent water quality standards
Alkalinity	mg/l	28.6	Poorly Buffered	No pertinent water quality standards
TCOLOR	ptu	30	Weakly Colored	No pertinent water quality standards
TOC	mg/l	6.3		No pertinent water quality standards
Ca	mg/l	9.65	Does Not Support Zebra Mussels	No pertinent water quality standards
Fe	mg/l	0.851	Taste or odor likely	Reading violates water quality standards
Mn	mg/l	0.0583		Reading does not violate water quality standards
Mg	mg/l	1.53		Reading does not violate water quality standards
K	mg/l	0.209		No pertinent water quality standards
Na	mg/l	3.31		Reading does not violate water quality standards
Cl	mg/l	3.9	Minor road salt runoff	Reading does not violate water quality standards
SO4	mg/l	2.3		Reading does not violate water quality standards

* The Secchi disk was resting on the bottom of the lake at 1.79 meters preventing an accurate water clarity reading

Lake Perception

	UNITS	Reading	Scientific Classification	Regulatory Comments
WQ Assessment	1-5, 1 best	3	Definite Algal Greenness	No pertinent water quality standards
Weed Assessment	1-5, 1 best	3	Plants Grow to Lake Surface	No pertinent water quality standards
Recreational Assessment	1-5, 1 best	3	Slightly Impaired	No pertinent water quality standards

References

NYSDEC. 2001. Helderbergs Unit Management Plan. Available at

http://www.dec.ny.gov/docs/lands_forests_pdf/helderbergsump.pdf.

NYSDEC Bureau of Wildlife. 2010. List of New York State Wildlife Management Areas.

Available at <http://www.dec.ny.gov/outdoor/8297.html>.

Legend Information

General Legend Information

Surface Samples	= integrated sample collected in the first 2 meters of surface water
Bottom Samples	= grab sample collected from a depth of approximately 1 meter from the lake bottom
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