Trophic State Index Surveys
Indian Lake
And
Stonycreek Lake
2007

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Introduction

Evaluations of Trophic Status Indices (TSI) were conducted on two lakes in Somerset County by Water Pollution Biologists Rick Spear, Gary Kenderes, and Marc Maestra, and Sewage Planning Supervisor Jack Crislip, all with the Pennsylvania Department of Environmental Protection (PADEP). Lake surveys to determine TSI were performed on Indian Lake and Stonycreek Lake in the spring, summer, and fall of 2007 after discussions with Jack Crislip concerning a housing development proposed waste treatment plant. Present TSI values for Indian and Stonycreek Lake were needed to address the continuing housing growth in the basin area of the lakes.

Indian and Stonycreek Lake are located in Somerset County East of Somerset Pennsylvania and just east of the town of Shanksville, surrounded by agricultural, reclaimed strip mine land, and forested land (Figure 1). Both lakes are located in the same basin adjoining each other, separated only by the constructed dam for Indian Lake, discharging water into Stonycreek Lake. Year round resident homes and summer homes surround both lakes up to the water edge. The major tributaries that feed into Indian Lake are Calendar Run and Clear Run. Stonycreek Lake receives water from Indian Lake and Boone Run. The outlet of Stonycreek Lake forms the stream Rhoads Creek which confluences with Stonycreek River.

Lake Survey Method

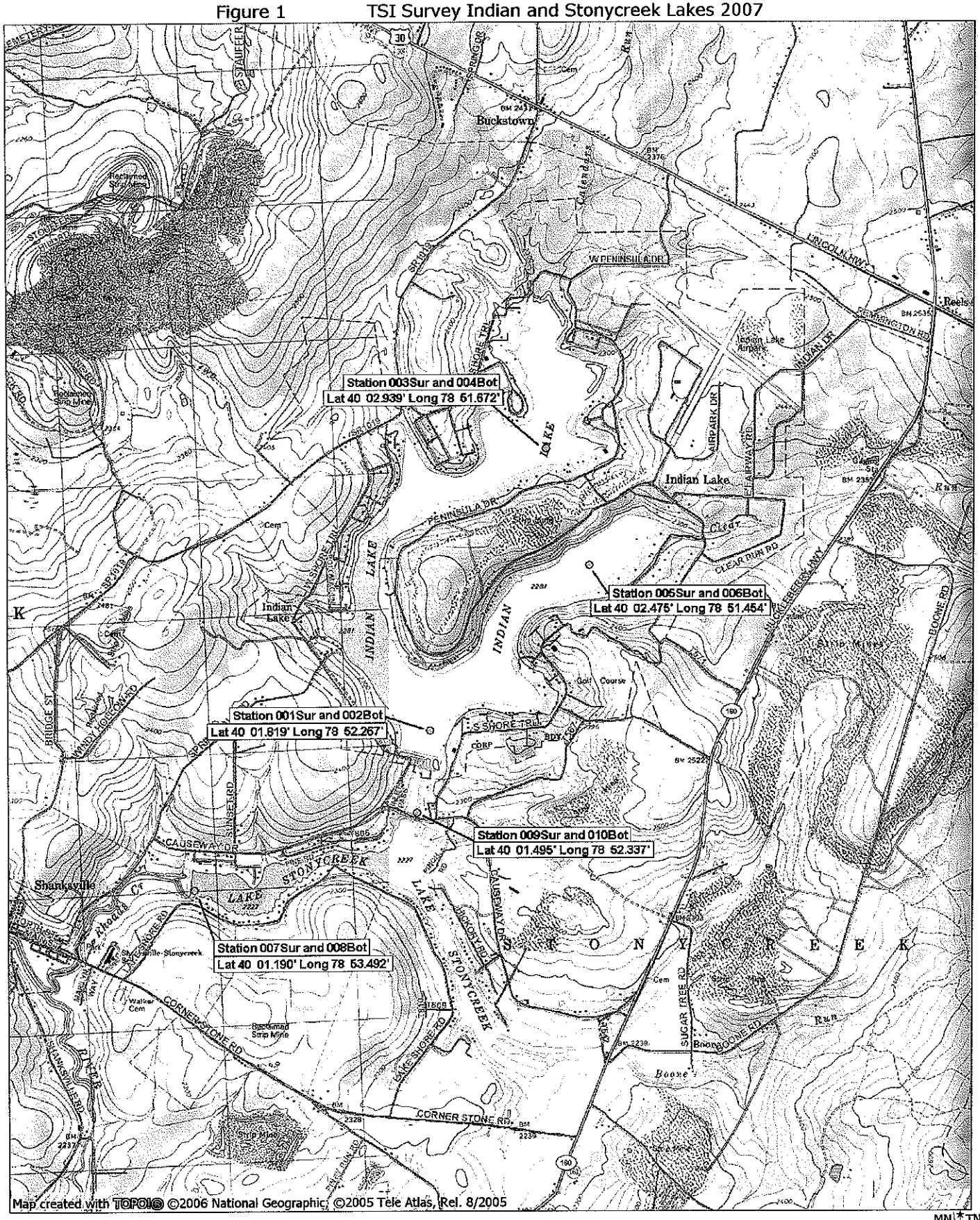
The lake surveys collected data on nutrients (phosphorus and nitrogen), chlorophyll-a, and water transparency (secchi disk reading). Water chemistry profiles including dissolved oxygen, pH, temperature, and conductivity were recorded.

There were three sample station locations chosen on Indian Lake. One station was located near the deepest depth which was at the dam outlet. The other two stations were located in the far reaches of each tributary feeding into the lake (Figure 1 and Attachment A - Photographs).

Stonycreek Lake had two sample station locations. One station was located at the dam outlet and the other was near the outlet of Indian Lake (Figure 1 and Attachment A - Photograph). The Boone Run reach was not sampled due to water depth of less than two feet, preventing boat access and being less than the minimum depth of ten feet for surface (Top) and bottom (Bott) water sample grabs.

Both Indian Lake and Stonycreek Lake were sampled on the same day of April 24, July 12, and November 7 of 2007. Surface water samples (Top) were collected 1 meter in depth and bottom water samples (Bot) were collected 1 meter off the bottom at each station location. Water chemistry profiles were record every meter to the lake bottom using the Quantum Hydolab Multimeter. Chlorophyll-a samples were collected just below water surface. All water samples were placed on ice and chlorophyll-a samples were placed on dry ice. All samples were shipped to the PADEP Lab in Harrisburg for analyses using Standard Analysis Code 038.

Figure 1 TSI Survey Indian and Stonycreek Lakes 2007



NATIONAL GEOGRAPHIC

0.0 0.5 1.0 miles
0.0 0.5 1.0 1.5 km

MN TN
10°
01/29/08

Stonycreek Lake field sampling, on November 7, was limited to collecting water at the surface station 007 and 009 as a result of a schedule drawdown of the lake (See Attachment A – Photographs). The boat launch was unusable, so access to station 007 and 009 was from shore, wading out or collecting from atop bridge crossing. No water column profile data could be collected at station location 007 and 009 in Stonycreek Lake during November.

In addition to Lake sampling throughout 2007, water samples were collected several times during the year for Indian Lake Borough on Clear Run and Calendar Run. The water samples were collected by Environmental Trainee Gary Martin of the PADEP and analyses were performed by PADEP Lab in Harrisburg using Standard Analysis Code 038.

Basin Geology

The general type of soils surrounding Indian and Stonycreek Lake are Rayne-Gilpin-Wharton-Cavode. All these soil types fall into a range of characteristics from deep to moderately deep, well drained to somewhat poorly drained soils located on nearly level to very steep hills and ridges. The parent bedrock material forming these soils from weathering conditions are shale, sandstone, and siltstone.

Indian Lake dominant soil types which surround the lake and the two major tributaries of Calendar Run and Clear Run are Rayne-Gilpin Channery Silt Loam, Rayne-Gilpin Very Stony Silt Loam, Udorthents-Mine Spoils, Cavode Silt Loam, Hazleton Very Stony Sandy Loam, and Ernest Silt Loam.

Stonycreek Lake and its major tributary of Boone Run are surrounded by the dominant soil types of Udorthents-Mine Spoils, Rayne-Gilpin Very Stony Silt Loam, Rayne-Gilpin Silt Loam, Cavode Silt Loam, Hazleton Very Stony Sandy Loam, and Brinkerton Silt Loam.

Both lakes have Udorthents-Mine Spoils either adjacent to the lakes or within their tributaries. Stonycreek Lake has more drainage land associated with mine spoils (16 %) when compared to Indian Lake (8%).

Basin Hydrology

Indian Lake water comes from the streams of Calendar Run and Clear Run within a drainage area of 13.7 square miles. The area covered by water is 498.7 acres with a storage capacity of 3,420 million gallons. Water detention time is 457 days with a mean depth of 12 meters. Chapter 93 – Water Quality Standards list Indian Lake use as Cold Water Fisheries (CWF).

Stonycreek Lake water comes from Indian Lake and Boone Run also within the 13.7 square miles of drainage area. The area covered by water is 165.97 acres with a storage capacity of 430 million gallons. Water detention time is 17.07 days with a mean depth of 1.5 meters. Chapter 93 – Water Quality Standards list Stonycreek Lake use as CWF.

Point Sources

The following point sources were obtained from PADEP records.

Indian Lake

Facility	Permit #
Indian Lake Boro Somerset County – Lakewood Sewage Treatment Plant (STP)	PA0030350
Mcclatchey residence STP	PAG046336
Sullivan single residence STP	PA0253243
Camp Allegheny STP	PA0110922
Shroyer single residence STP	PA0204820

Stonycreek Lake

Facility	Permit #
Glessner single residence STP	PAG046301
Mark Leonberger single residence STP	PAG046227
Kennedy single residence STP Printing Operations	PA0205184
Bandstra single residence STP	PAG046358

Non-Point Sources

Indian and Stonycreek Lakes are surrounded by wooded areas with crop fields up on the hill tops and slopes. Reclamation of surface coal mining lands can be found around the major tributaries of Clear Run and Boone Run. The presents of these human activities along with the close proximity of residential septic systems to the lakes can make available, sources of nutrients to both lakes.

Discussion

Indian and Stonycreek Lake are surrounded by upland forested rolling hills mixed with agricultural and reclaimed strip mine lands (Figure 1). Surrounding the lakes are residential homes used year round or for recreational purposes. Most of the home owners constructed boat docks along their water edge property. Indian Lake has a commercial marina close to the dam outlet area along with a boat ramp. Stonycreek Lake has a dirt boat ramp next to the dam which is used by the local residents only. Stonycreek Lake is a shallower lake than Indian Lake with a mean depth of 1.5 meters.

Indian Lake Water Column Profiles

Water chemistry profiles were collected at each station location for each lake survey performed in 2007. During the spring sample period, all sample station locations showed a temperature drop from 3 to 7 meters in depth (epilimnion). Dissolved oxygen only dropped at the bottom depth at all three station locations with the lowest reading at station location 001 and 002 (deepest) of 5.31 mg/l. The pH was consistent and specific conductivity increased at the bottom at all three spring profiles (See Attachment B – Water profiles and Charts).

The summer sample period showed the epilimnion range from 2 to 4 meters in depth. The pH was consistent at all three station locations and dissolved oxygen only dropped near the bottom at station 001 and 002 (deepest) with the lowest reading of 0.05 mg/l. Specific conductivity was mixed with higher and lower values to the bottom.

The water chemistry profiles collected in November sample period showed consistent values for temperature, pH and specific conductivity. Dissolved oxygen dropped only at the bottom for all three sample station locations with the lowest reading of 1.49 mg/l at station location 003 and 004.

Stonycreek Lake Water Column Profiles

Water chemistry profiles were collected at each station location for each lake survey performed in 2007 except the November sample period. The spring sample period showed the epilimnion at 1 meter at station location 007 and 008. Dissolved oxygen and pH was consistent. Specific conductivity increased at the bottom for both station locations. The summer sample period had profile values either consistent or dropped slightly at each station location (See Attachment B – Water profiles and Charts).

TSI Results

Results of the water samples collected in 2007 showed nitrogen and phosphorus amounts comparable for both lakes. The highest reading of total nitrogen and phosphorus for Indian Lake was 0.54 mg/l and 0.018 mg/l, respectfully. The highest reading of total nitrogen and phosphorus for Stonycreek Lake was 0.50 mg/l and 0.017 mg/l, respectfully. The average total nitrogen and phosphorus for Indian Lake was 0.35 mg/l and 0.0094 mg/l, respectfully. The average total nitrogen and phosphorus for Stonycreek Lake was 0.38 mg/l and 0.013 mg/l, respectfully. Indian and Stonycreek Lakes are phosphorus limited (See Attachment C).

Secchi disk readings for Indian Lake reached a depth of 5.5 meters during the fall sample at station location 005 and 006. Secchi disk readings for Stonycreek Lake reached a depth of 2.75 meters during the spring sample at station location 009 and 010. Alkalinity was slightly higher in Stonycreek Lake with a total year average of 26.08 mg/l compared to 21.64 mg/l for Indian Lake.

The average Trophic State index (TSI) on total phosphorus for 2007 calculated to 36.55 for Indian Lake and 40.59 for Stonycreek Lake. The average TSI score for chlorophyll a calculated to 47.37 for Indian Lake and 47.56 for Stonycreek Lake and the average TSI on secchi scored 40.12 for Indian Lake and 45.74 for Stonycreek Lake. These TSI results when reviewed together indicate that both lakes are mesotrophic (scores ranging between 40 and 50).

In addition to the lake data collected, the average TSI on phosphorus of Clear Run and Calendar Run combined, calculated to 48.21 (See Attachment C). This TSI score indicates mesotrophic influence.

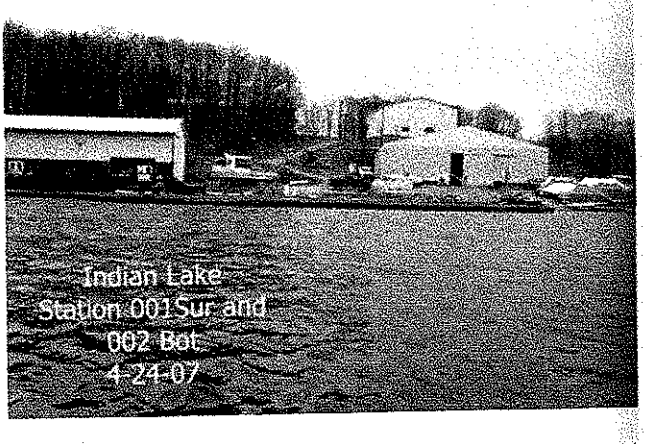
Summary

The water chemistry profiles collected throughout the year showed mostly normal lake stratification and indicated some evidence of eutrophication with lower dissolve oxygen and higher specific conductivity at bottom depths. All Trophic State Index scores calculated for Indian Lake, Stonycreek Lake, and the streams Clear Run and Calendar Run in 2007 range between 40 and 50. Indian Lake and Stonycreek Lake are presently mesotrophic. Indian Lake is one of the best scoring lakes in the Commonwealth of Pennsylvania.

cc Files

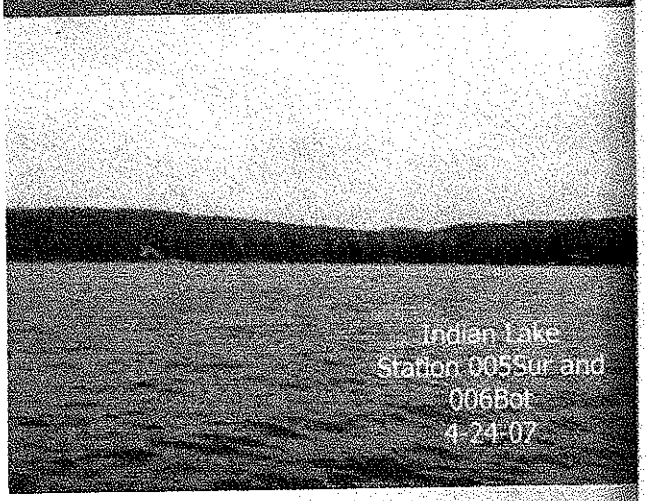
Attachment A

Digital Photographs of Indian Lake and Stonycreek Lake
Sampling Stations
2007


Indian Lake
Station 001Sur and
002 Bot
4-24-07

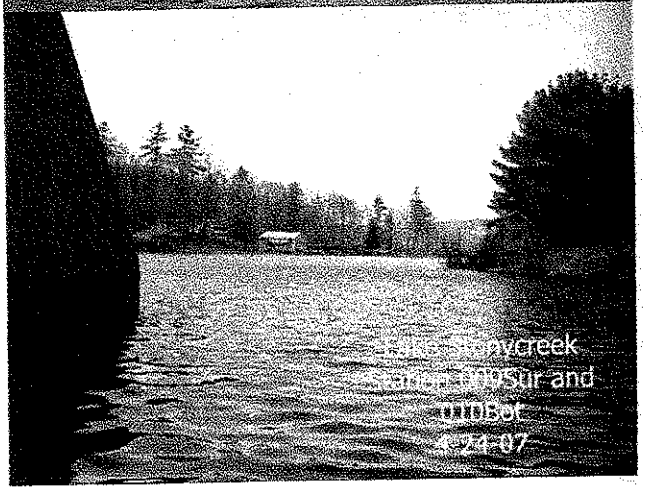

Indian Lake
Station 001Sur and
002Bot
4-24-07

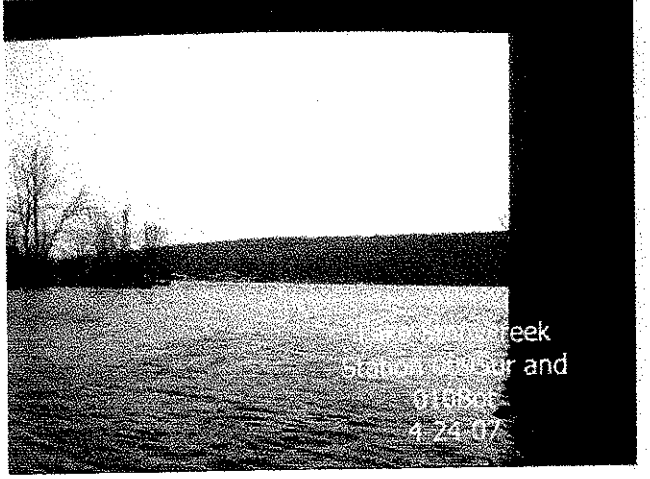

Indian Lake
Station 003Sur and
004Bot
4-24-07

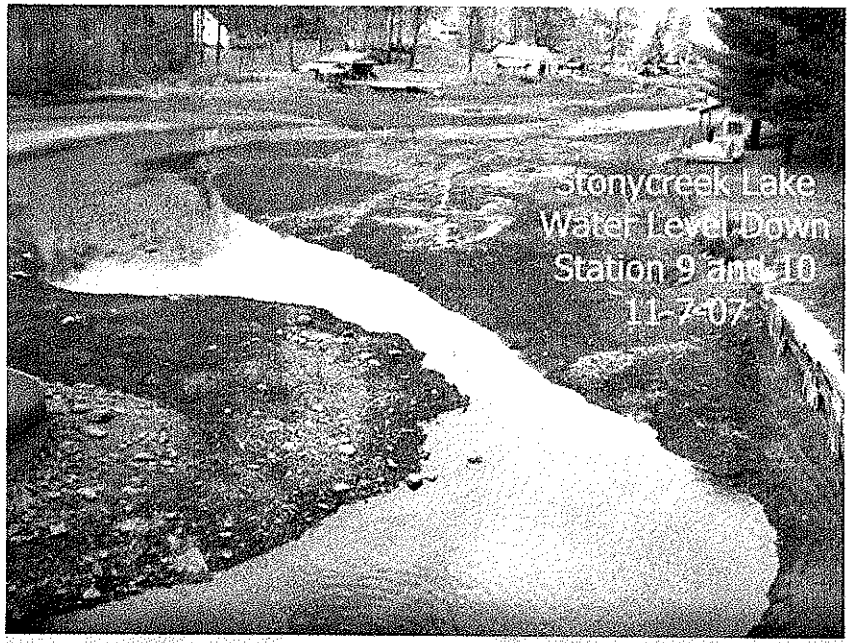

Indian Lake
Station 005Sur and
006Bot
4-24-07

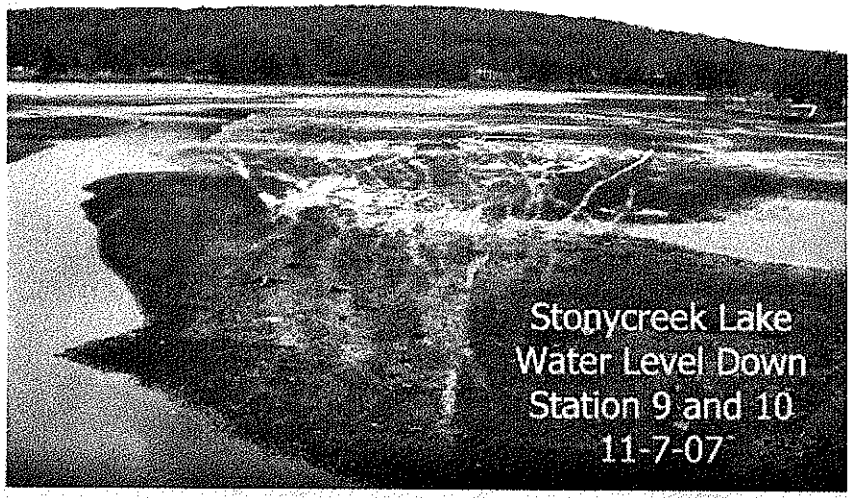

Indian Lake
Station 005Sur and
006Bot
4-24-07

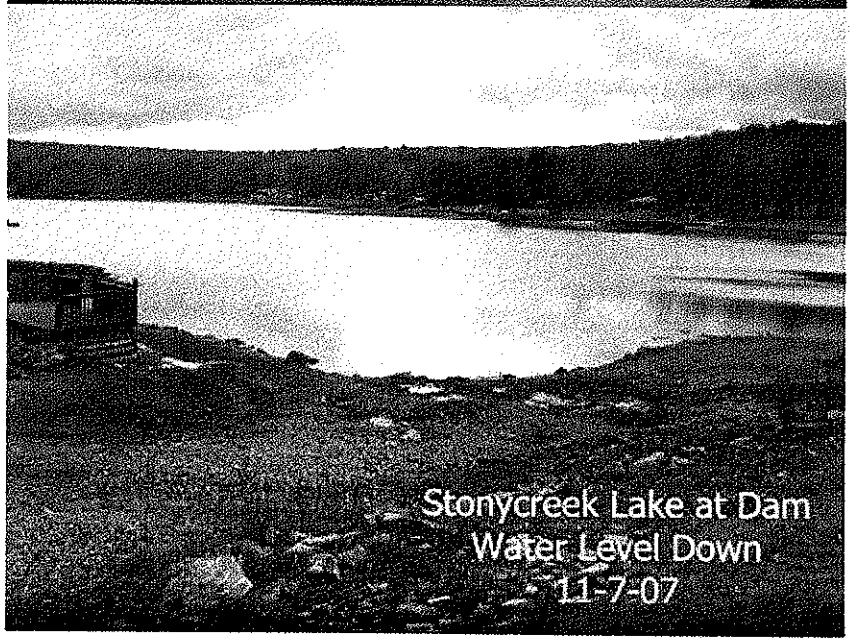

Lake Stonycreek
Station 007Sur and
008Bot
4-24-07

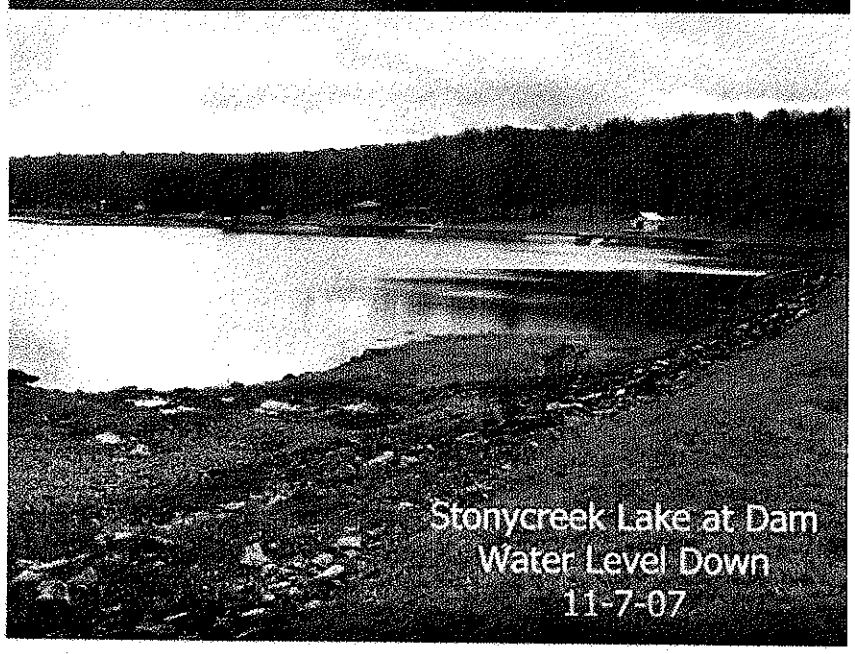

Lake Stonycreek
Station 009Sur and
010Bot
4-24-07


Lake Stonycreek
Station 009Sur and
010Bot
4-24-07


Stonycreek Lake
Water Level Down
Station 9 and 10
11-7-07


Stonycreek Lake
Water Level Down
Station 9 and 10
11-7-07


Stonycreek Lake at Dam
Water Level Down
11-7-07


Stonycreek Lake at Dam
Water Level Down
11-7-07

Attachment B

Indian Lake and Stonycreek Lake Water Column Profiles
And Chart Displays
2007

profile for

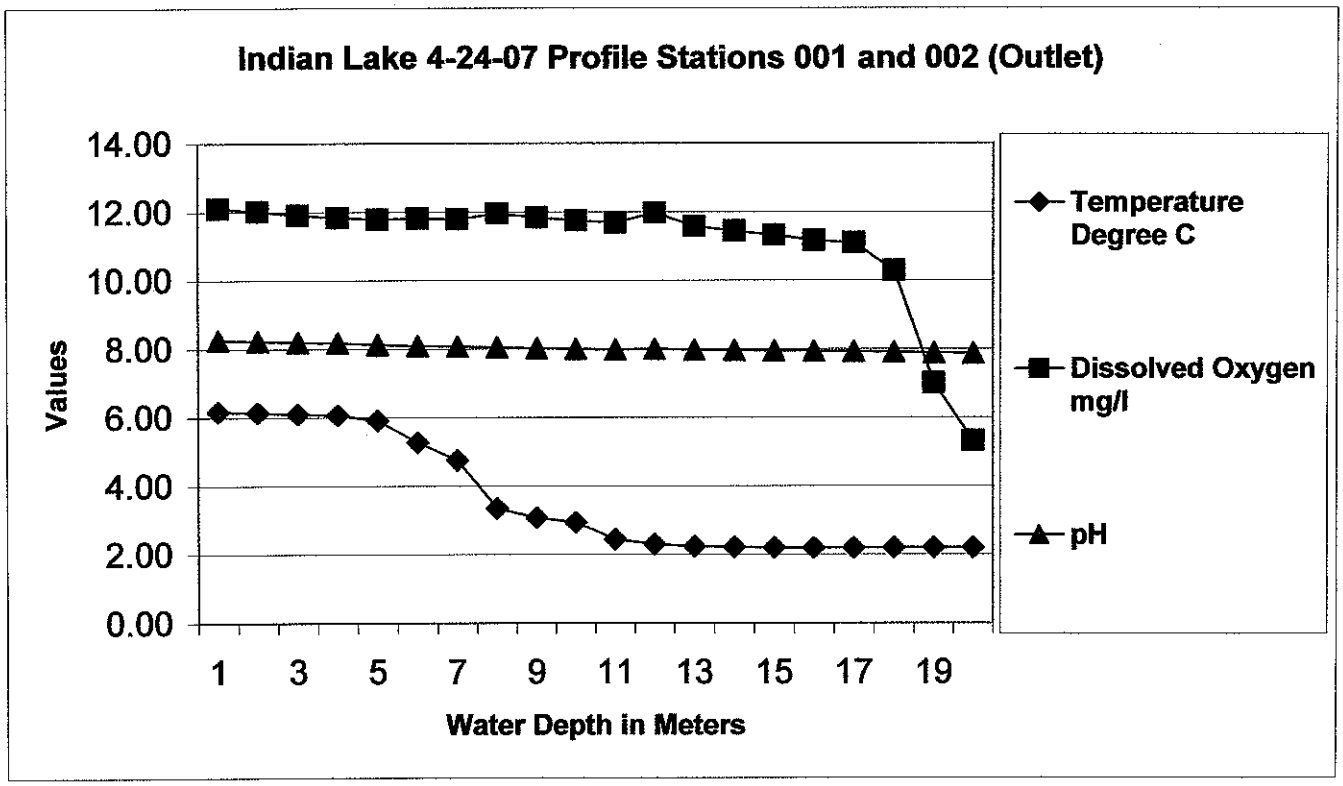
Indian Lake Spring	Date	Time	Station	Depth (m)	Temp. (C)	D.O. (mg/l)	pH	Sp. Cond. (mS/cm)
Lat 40 01.819	4/24/2007	1130	Deepest Part At Outlet	1	6.17	12.10	8.26	288
Long 78 52.267			001 Surface	2	6.14	12.01	8.23	287
			002 Bottom	3	6.10	11.90	8.19	287
				4	6.07	11.83	8.17	286
				5	5.91	11.78	8.13	287
				6	5.27	11.81	8.09	289
				7	4.75	11.78	8.07	293
Epilimnion				8	3.35	11.95	8.04	301
				9	3.08	11.83	8.02	300
				10	2.94	11.74	8.00	301
				11	2.44	11.68	7.98	310
				12	2.30	11.97	8.00	320
				13	2.24	11.58	7.97	325
				14	2.22	11.44	7.96	326
				15	2.20	11.32	7.94	329
				16	2.19	11.16	7.93	330
				17	2.19	11.09	7.92	330
				18	2.20	10.28	7.90	326
				19	2.20	7.00	7.89	326
				20	2.20	5.31	7.87	327
Indian Lake Spring	4/24/2007	1230	Second Site Near	1	9.56	11.96	8.23	242
			proposed development	2	9.27	11.74	8.20	242
Epilimnion			003 Surface	3	6.78	12.14	8.15	266
			004 Bottom	4	5.99	9.50	8.08	270
Indian Lake Spring	4/24/2007	1315	Third Site	1	7.43	12.19	8.24	303
				2	7.25	12.08	8.21	302
			005 Surface	3	6.64	12.08	8.17	298
			006 Bottom	4	6.25	12.04	8.16	291
Epilimnion				5	4.30	12.18	8.13	308
				6	3.48	12.16	8.12	307
				7	3.18	12.01	8.11	311
				8	3.36	11.04	8.10	305
				9	3.40	10.21	8.09	306

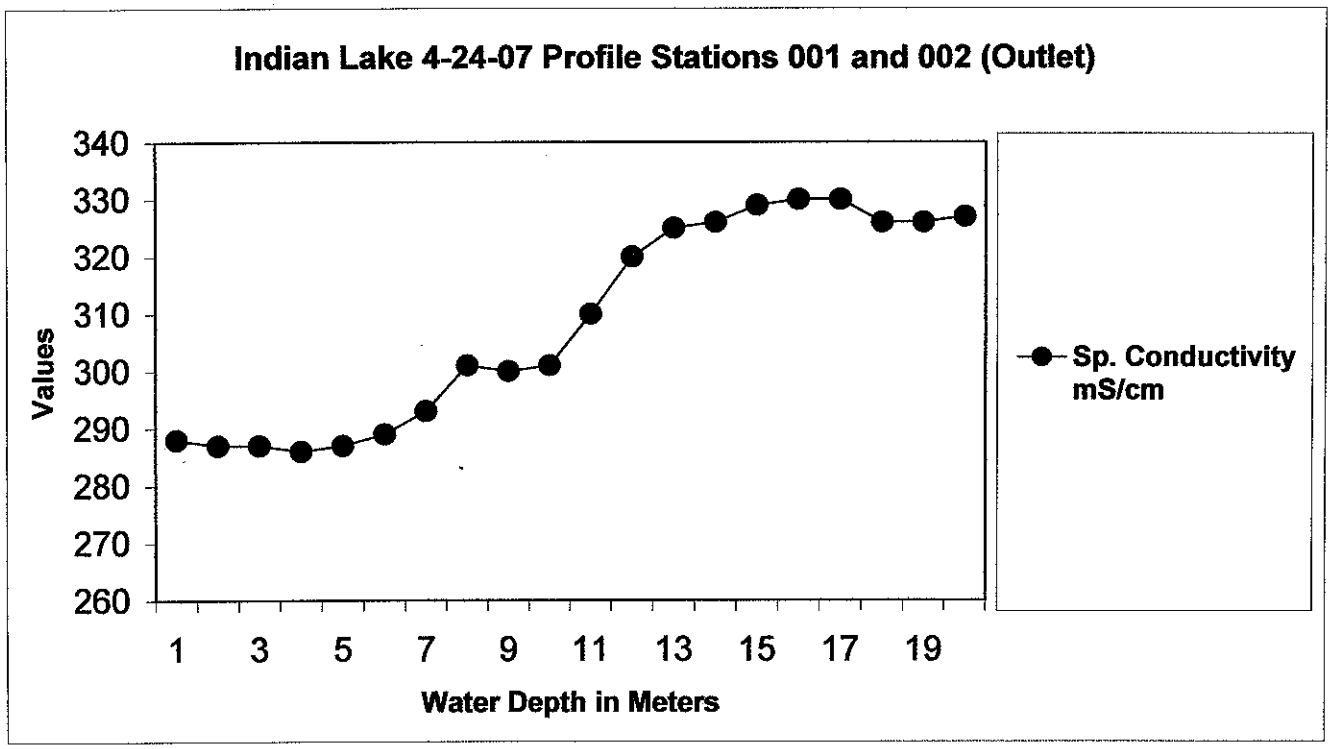
Indian Lake Summer	Date	Time	Station	Depth (m)	Temp. (C)	D.O. (mg/l)	pH	Sp. Cond. (mS/cm)
Lat 40 01.819 Long 78 52.267	7/12/2007	0945	Deepest Part At Outlet	1	23.24	8.95	7.90	373
			001 Surface	2	23.21	9.15	7.82	372
Epilimnion			002 Bottom	3	18.46	10.91	7.64	392
				4	9.72	12.50	7.55	333
				5	7.41	11.10	7.35	349
				6	7.05	9.69	7.21	349
				7	6.75	9.03	7.19	351
				8	6.67	8.49	7.15	348
				9	6.67	5.67	7.10	350
				10	6.68	2.86	7.10	350
				11	6.71	1.11	7.11	350
				12	6.72	0.76	7.11	350
				13	6.74	0.34	7.11	350
				14	6.75	0.21	7.11	350
				15	6.76	0.05	7.12	350

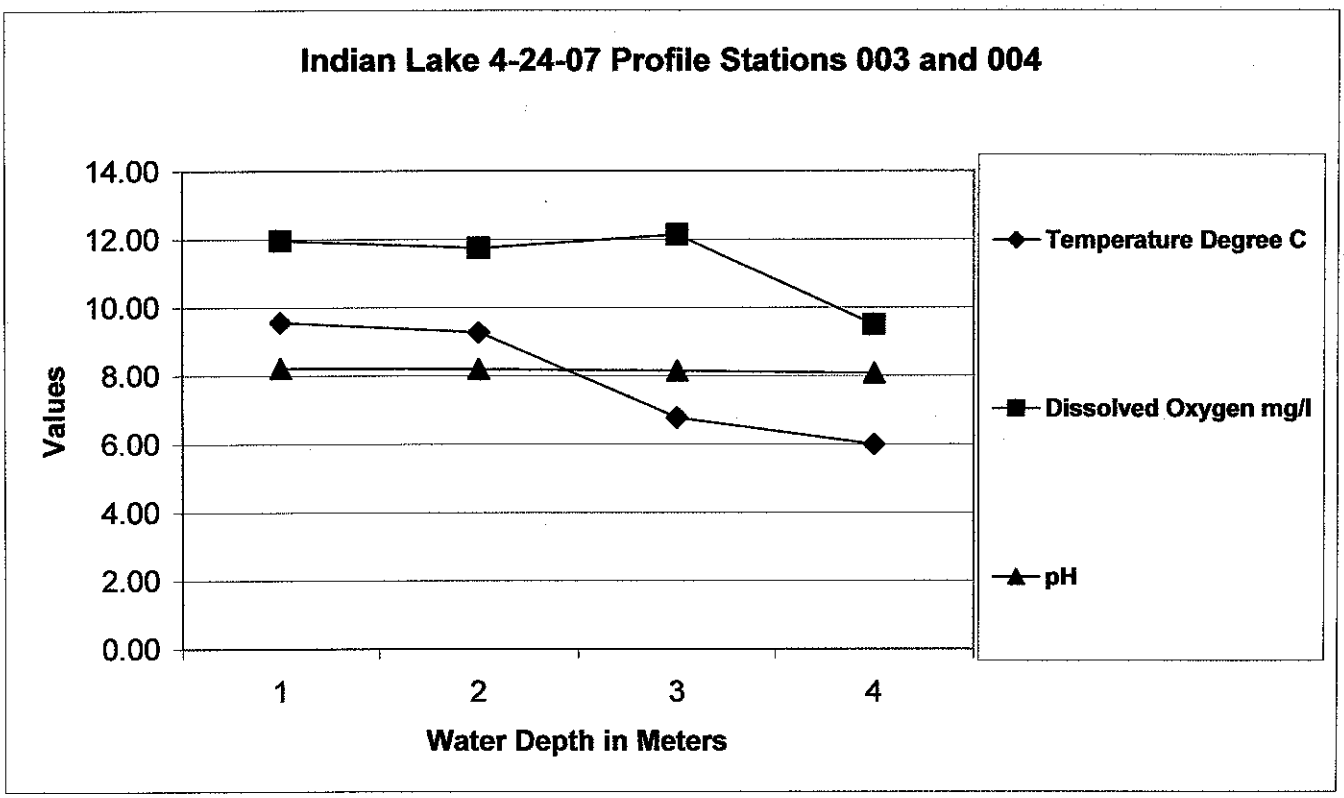
Indian Lake Summer	7/12/2007	1030	Second Site Near	1	23.93	11.30	7.98	346
			proposed development	2	23.78	11.45	7.87	345
			003 Surface	3	22.96	10.46	7.67	355
			004 Bottom	4	22.94	10.12	7.58	355
Indian Lake Summer	7/12/2007	1100	Third Site	1	23.94	11.58	7.88	383
				2	23.88	11.64	7.79	383
			005 Surface	3	23.69	11.60	7.72	384
			006 Bottom	4	22.86	11.75	7.63	385
Epilimnion				5	17.61	12.30	7.45	407
				6	15.16	12.16	7.26	391
				7	15.32	11.67	7.17	385

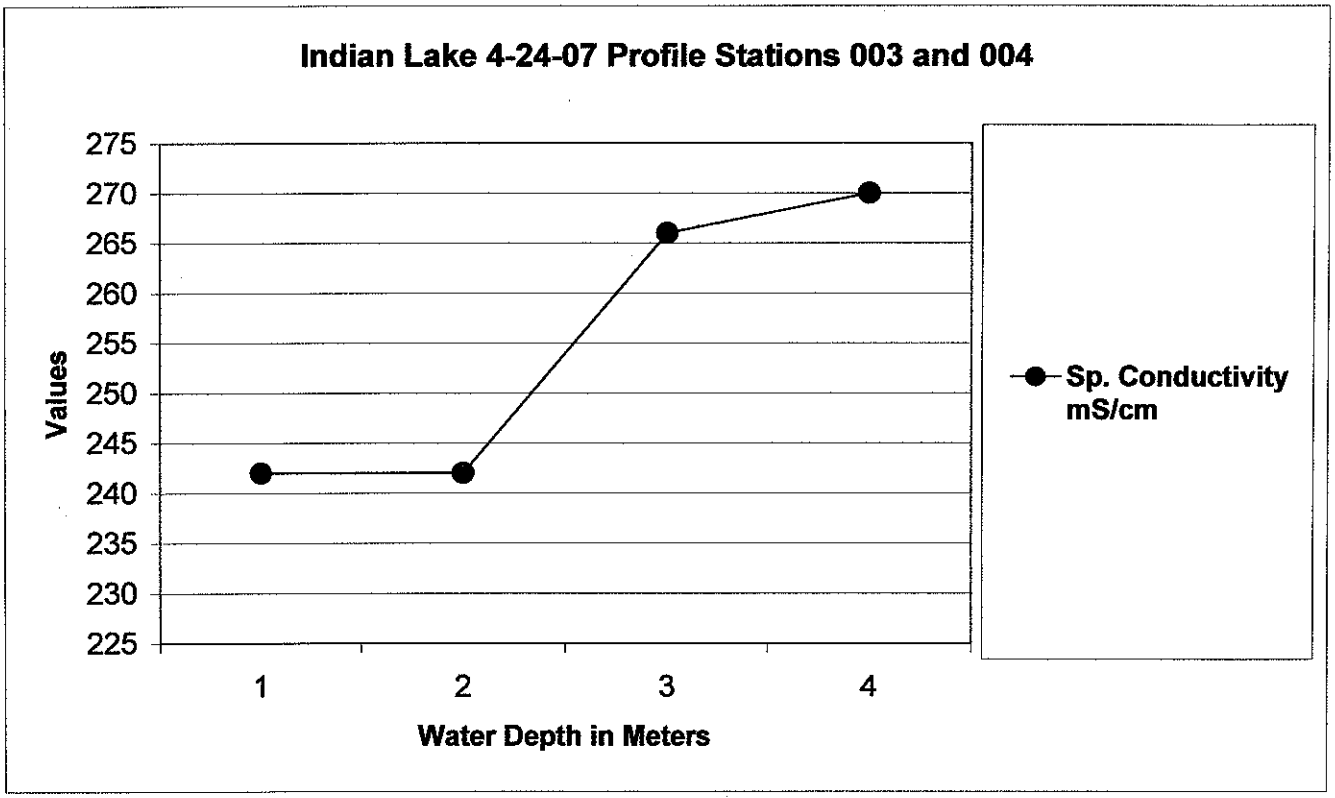
Indian Lake Fall	Date	Time	Station	Depth (m)	Temp. (C)	D.O. (mg/l)	pH	Sp. Cond. (mS/cm)
Lat 40 01.819	11/7/2007	0915	Deepest Part At Outlet	1	10.60	8.40	6.21	383
Long 78 52.267			001 Surface	2	10.65	8.31	6.28	383
			002 Bottom	3	10.65	8.25	6.34	383
				4	10.65	8.15	6.39	383
				5	10.65	8.15	6.41	383
				6	10.66	8.21	6.43	383
				7	10.65	8.04	6.44	383
				8	10.66	8.08	6.46	383
				9	10.65	8.01	6.47	383
				10	10.65	8.19	6.48	383
				11	10.61	8.05	6.50	383
				12	10.63	8.02	6.51	383
				13	10.48	6.72	6.59	383
Indian Lake Fall	11/7/2007	1000	Second Site Near	1	8.70	9.57	6.57	381
			proposed development	2	8.78	9.24	6.64	381
			003 Surface	3	8.80	1.49	6.69	380
			004 Bottom					
Indian Lake Fall	11/7/2007	1230	Third Site	1	10.27	8.84	6.59	395
				2	10.29	8.73	6.66	395
			005 Surface	3	10.29	8.73	6.66	395
			006 Bottom	4	10.30	8.68	6.69	395
				5	10.30	8.54	6.69	395
				6	10.30	8.62	6.69	395
				7	10.29	8.46	6.70	395
				8	10.30	1.86	6.62	395

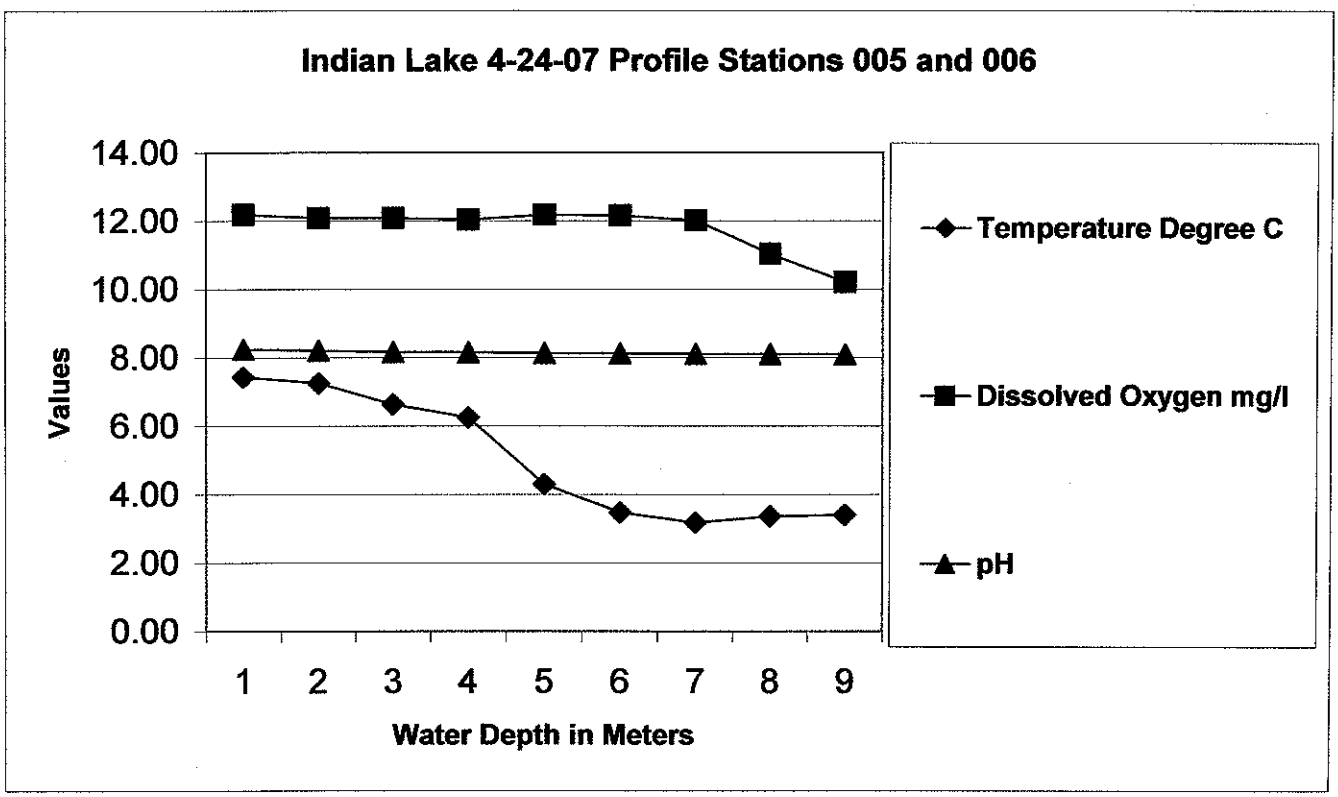
At Epilimnion the next D.O reading should be above 5.0(mg/l).

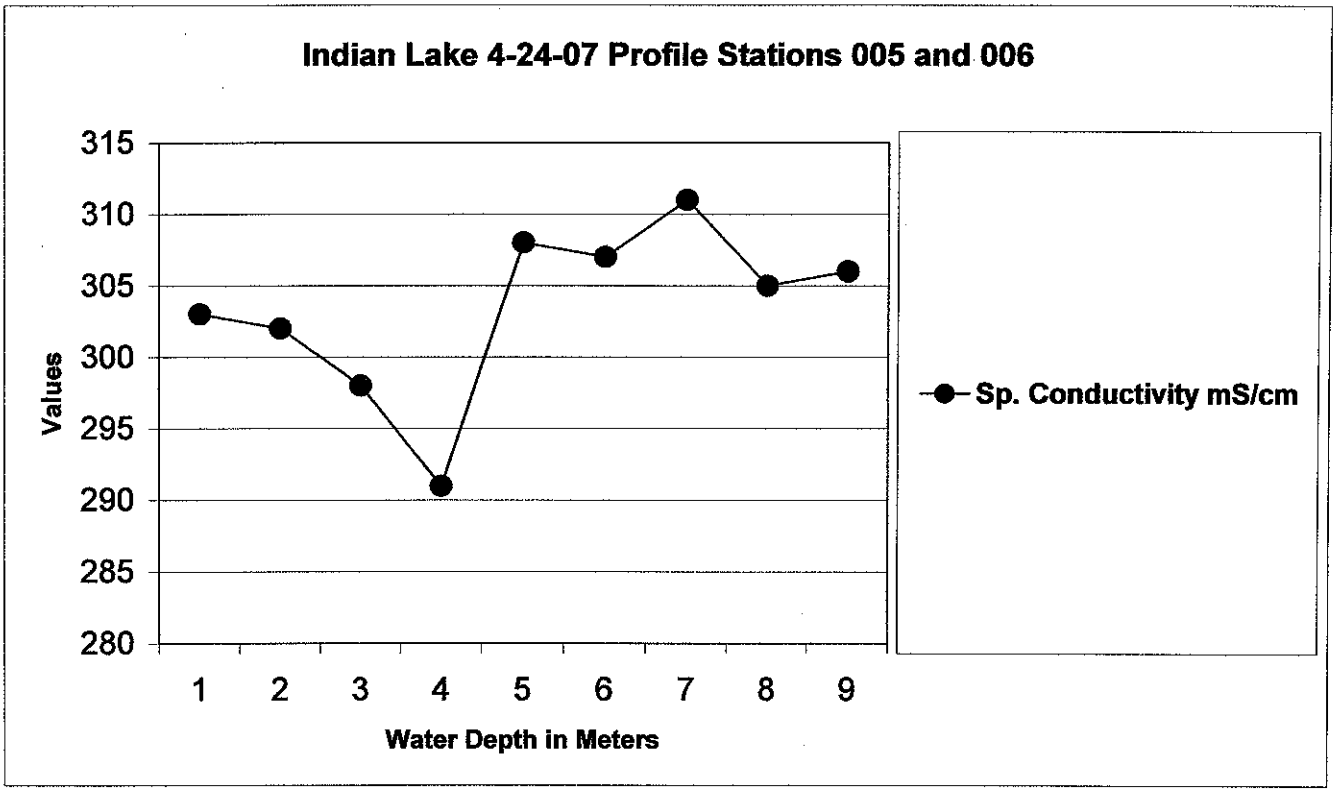

Indian Lake 4-24-07 Profile Stations 001 and 002 (Outlet)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Values
1 3 5 7 9 11 13 15 17 19
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH

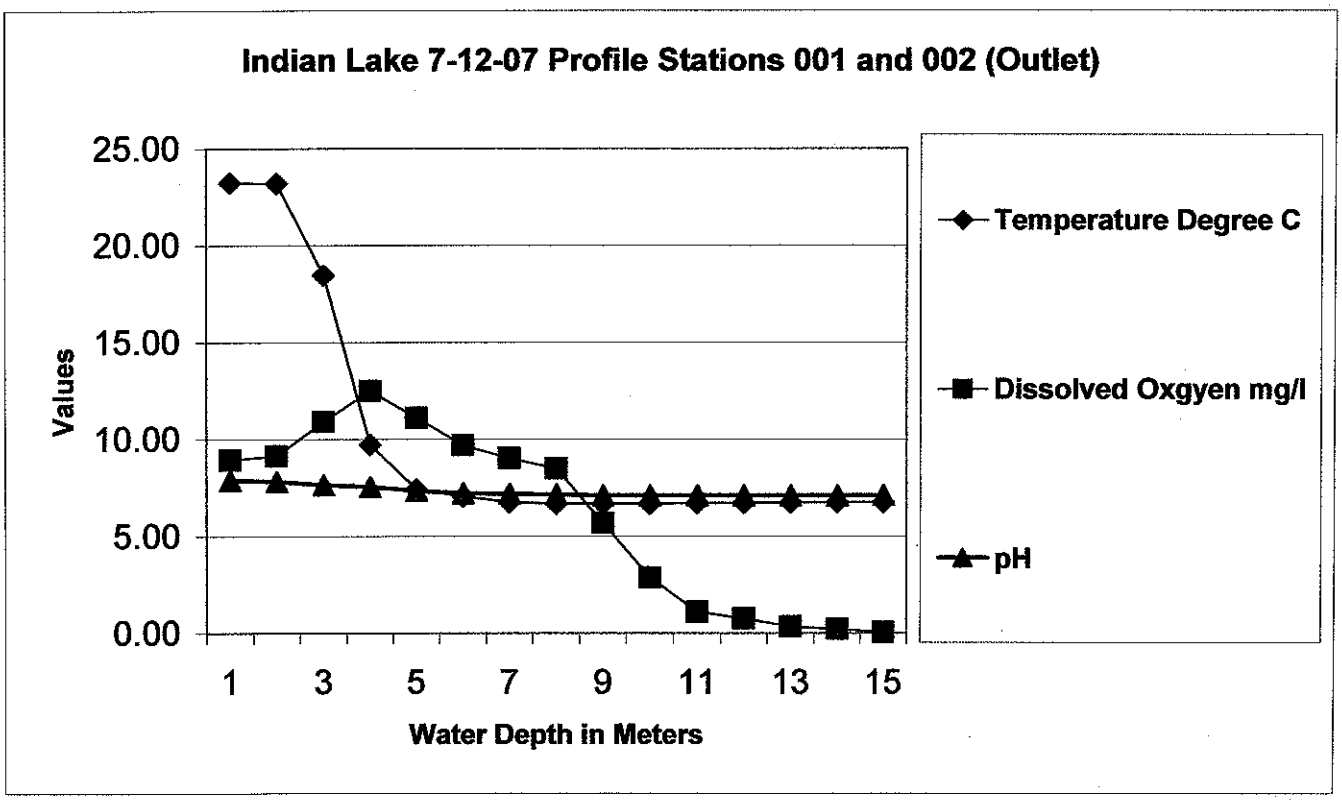

Indian Lake 4-24-07 Profile Stations 001 and 002 (Outlet)
340
330
320
310
300
290
280
270
260
Values
1 3 5 7 9 11 13 15 17 19
Water Depth in Meters
Sp. Conductivity mS/cm

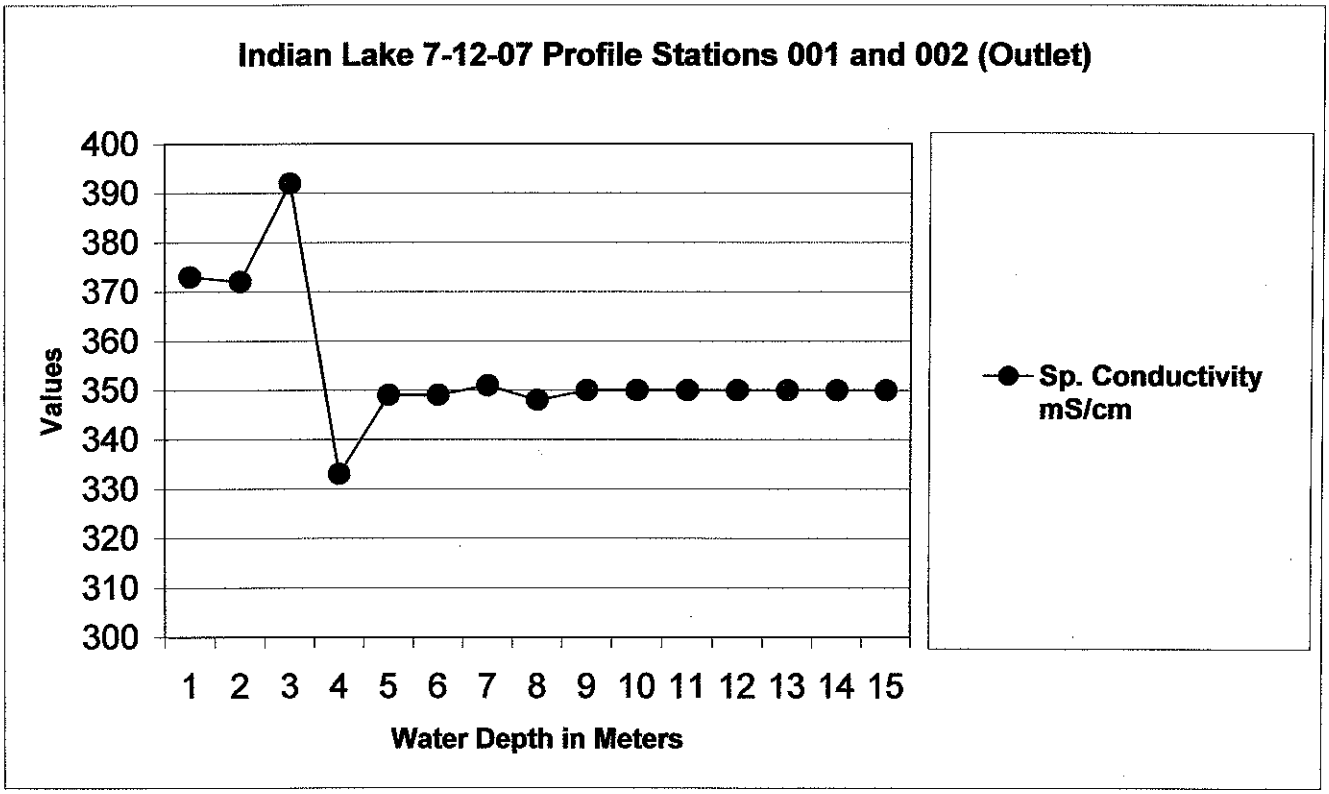

Indian Lake 4-24-07 Profile Stations 003 and 004
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Values
1
2
3
4
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH

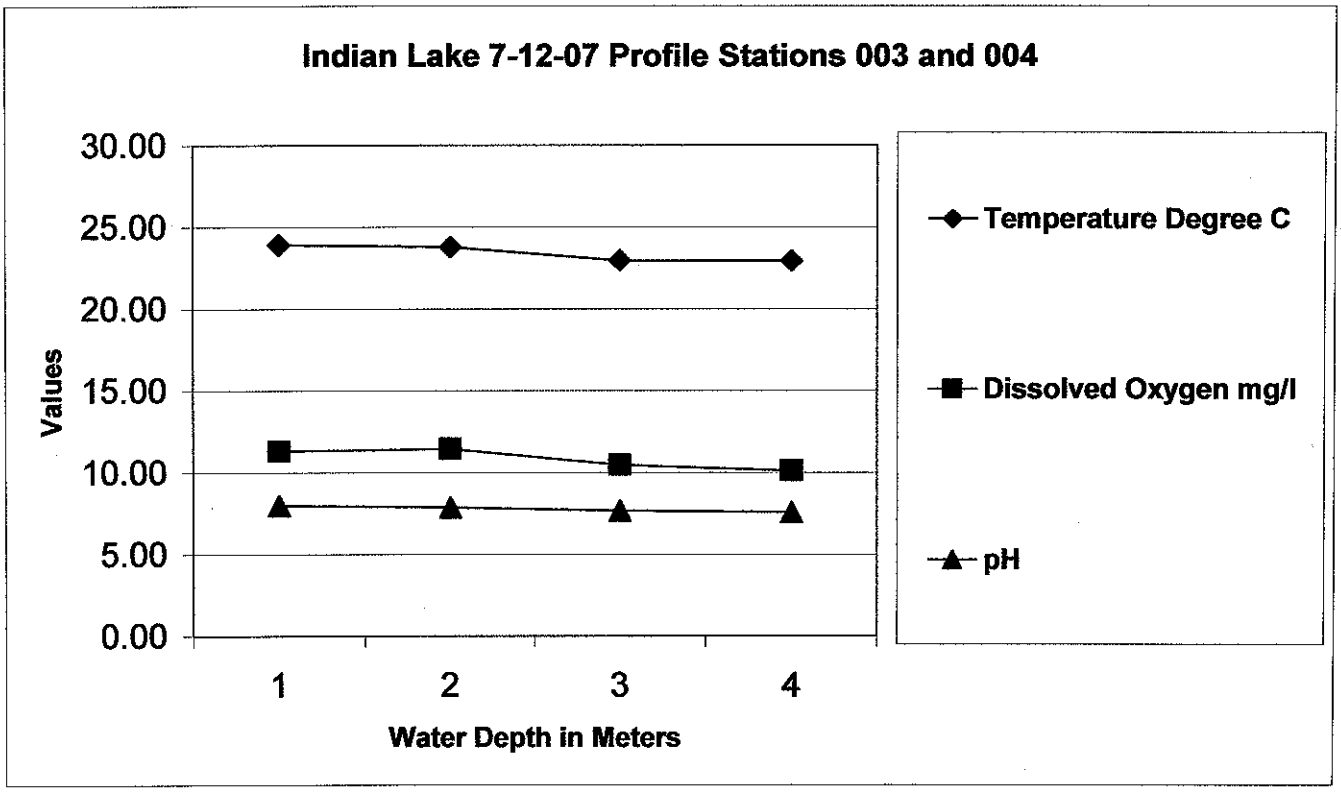

Indian Lake 4-24-07 Profile Stations 003 and 004
275
270
265
260
255
250
245
240
235
230
225
Values
1
2
3
4
Water Depth in Meters
Sp. Conductivity mS/cm

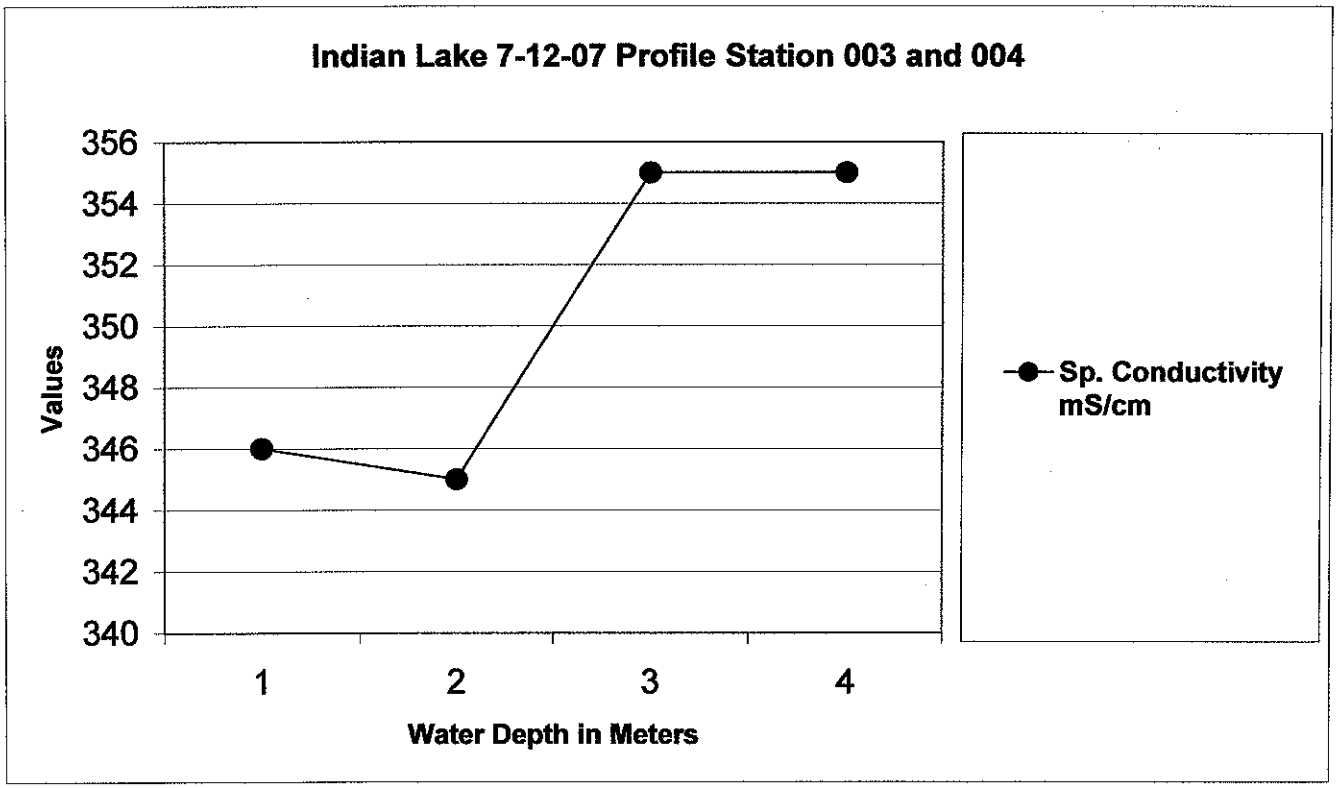

Indian Lake 4-24-07 Profile Stations 005 and 006
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Values
1
2
3
4
5
6
7
8
9
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH

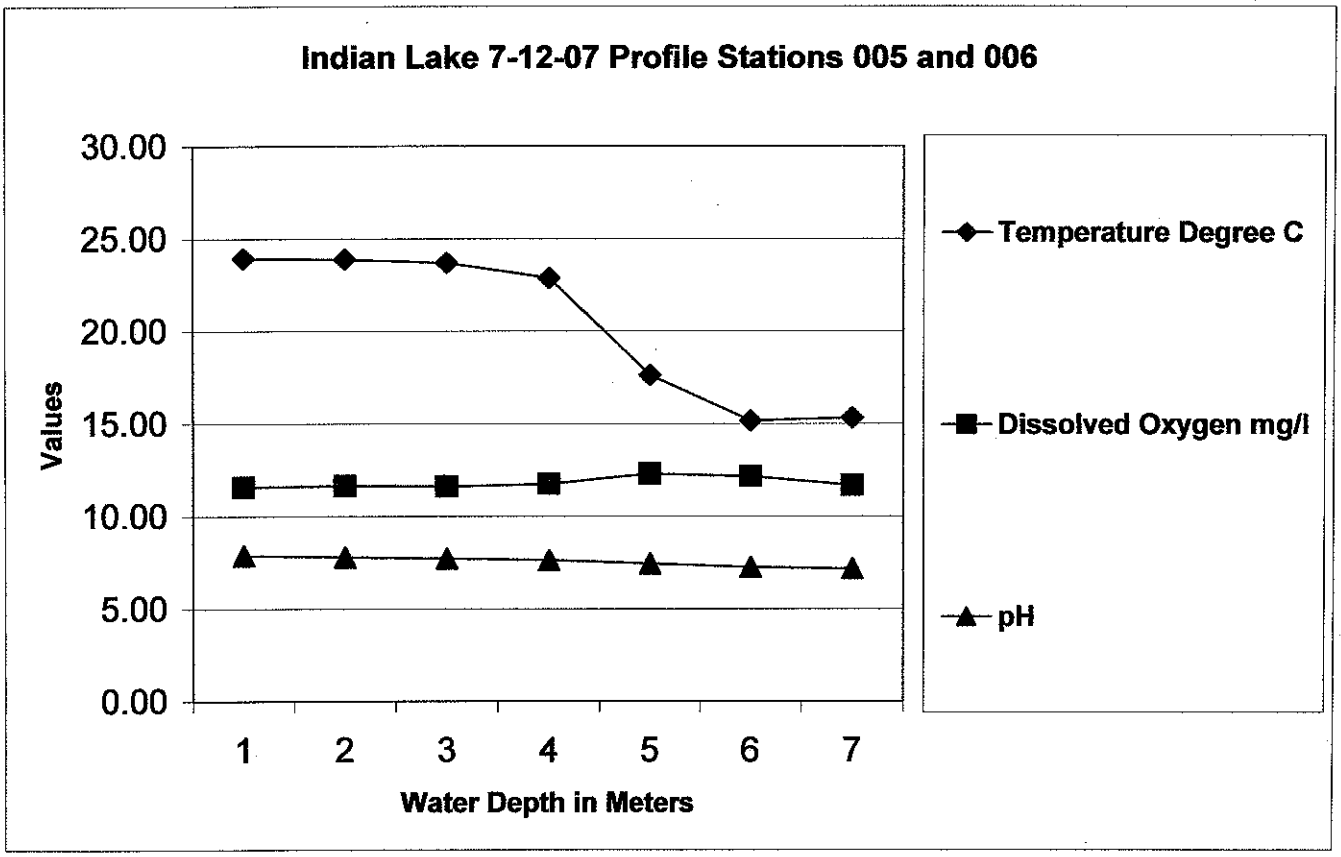

Indian Lake 4-24-07 Profile Stations 005 and 006
315
310
305
300
295
290
285
280
Values
1
2
3
4
5
6
7
8
9
Water Depth in Meters
Sp. Conductivity mS/cm

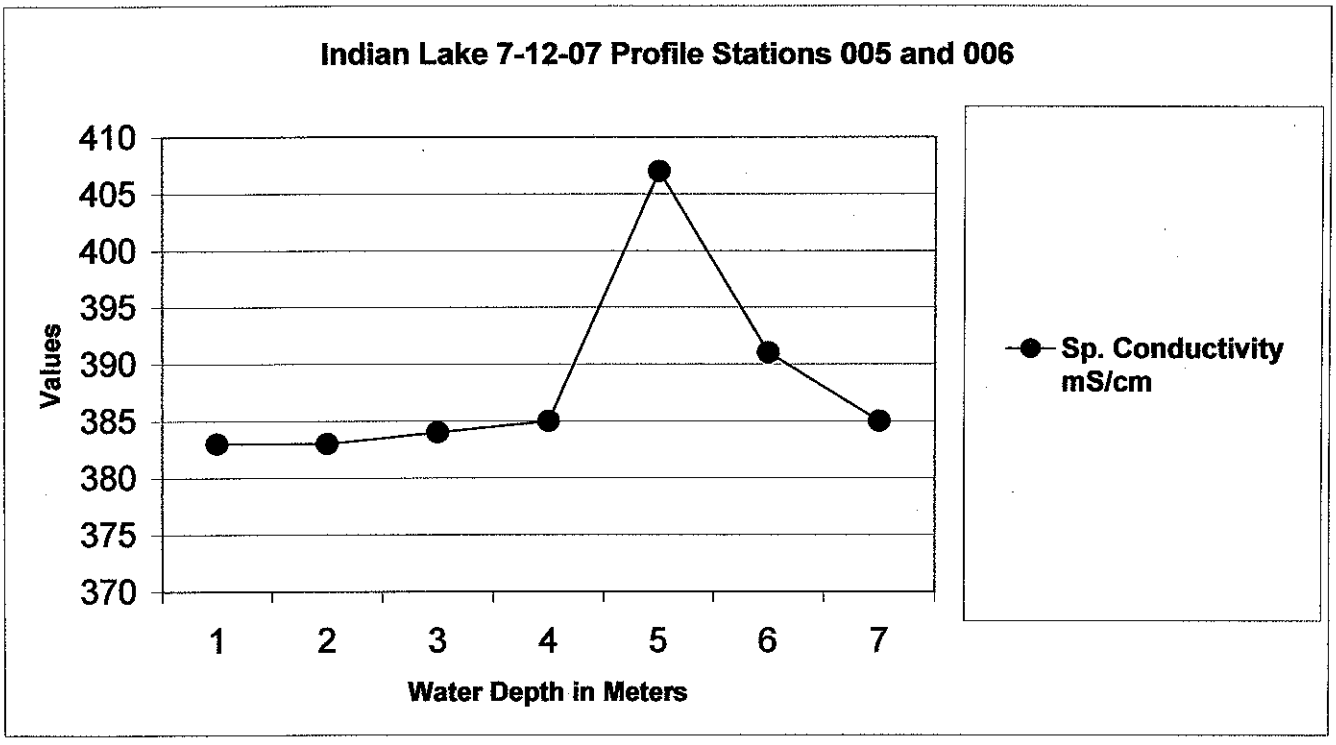

Indian Lake 7-12-07 Profile Stations 001 and 002 (Outlet)
25.00
20.00
15.00
10.00
5.00
0.00
Values
1
3
5
7
9
11
13
15
Water Depth in Meters
Temperature Degree C
Dissolved Oxgyen mg/l
pH


Indian Lake 7-12-07 Profile Stations 001 and 002 (Outlet)
400
390
380
370
360
350
340
330
320
310
300
Values
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Water Depth in Meters
Sp. Conductivity mS/cm


Indian Lake 7-12-07 Profile Stations 003 and 004
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Values
1
2
3
4
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH


Indian Lake 7-12-07 Profile Station 003 and 004
356
354
352
350
348
346
344
342
340
Values
1
2
3
4
Water Depth in Meters
Sp. Conductivity mS/cm


Indian Lake 7-12-07 Profile Stations 005 and 006
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Values
1
2
3
4
5
6
7
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH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410
405
400
395
390
385
380
375
370
Values
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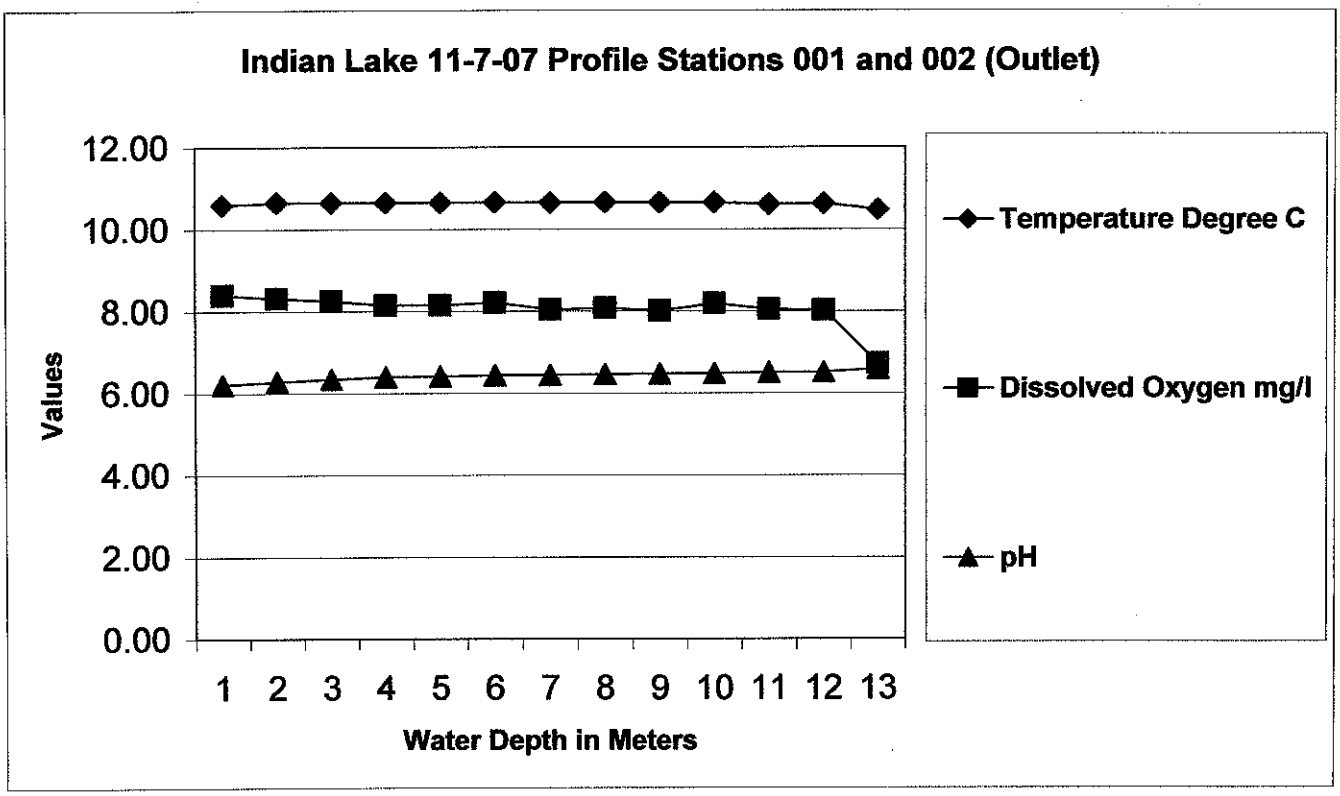
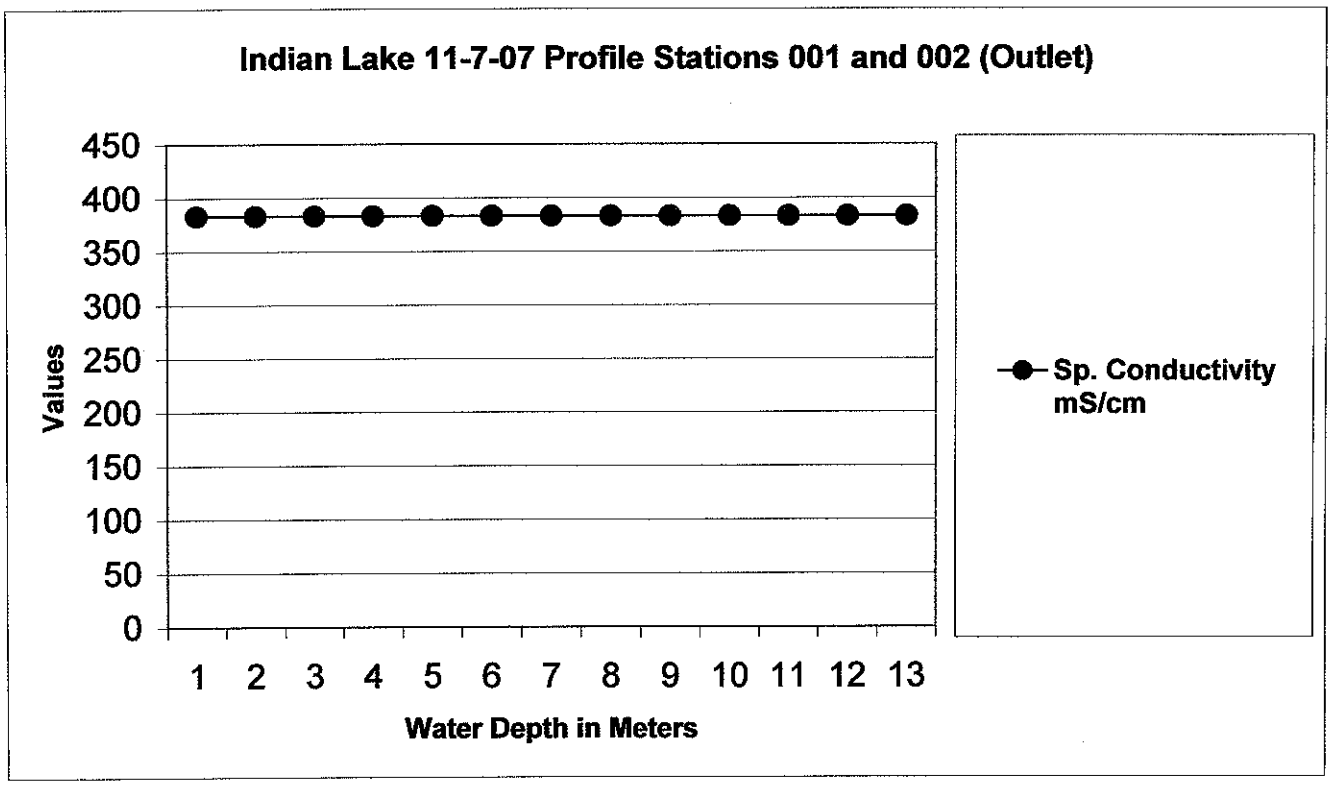
2
3
4
5
6
7
Water Depth in Meters
Sp. Conductivity mS/cm


Indian Lake 11-7-07 Profile Stations 001 and 002 (Outlet)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Values
1 2 3 4 5 6 7 8 9 10 11 12 13
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH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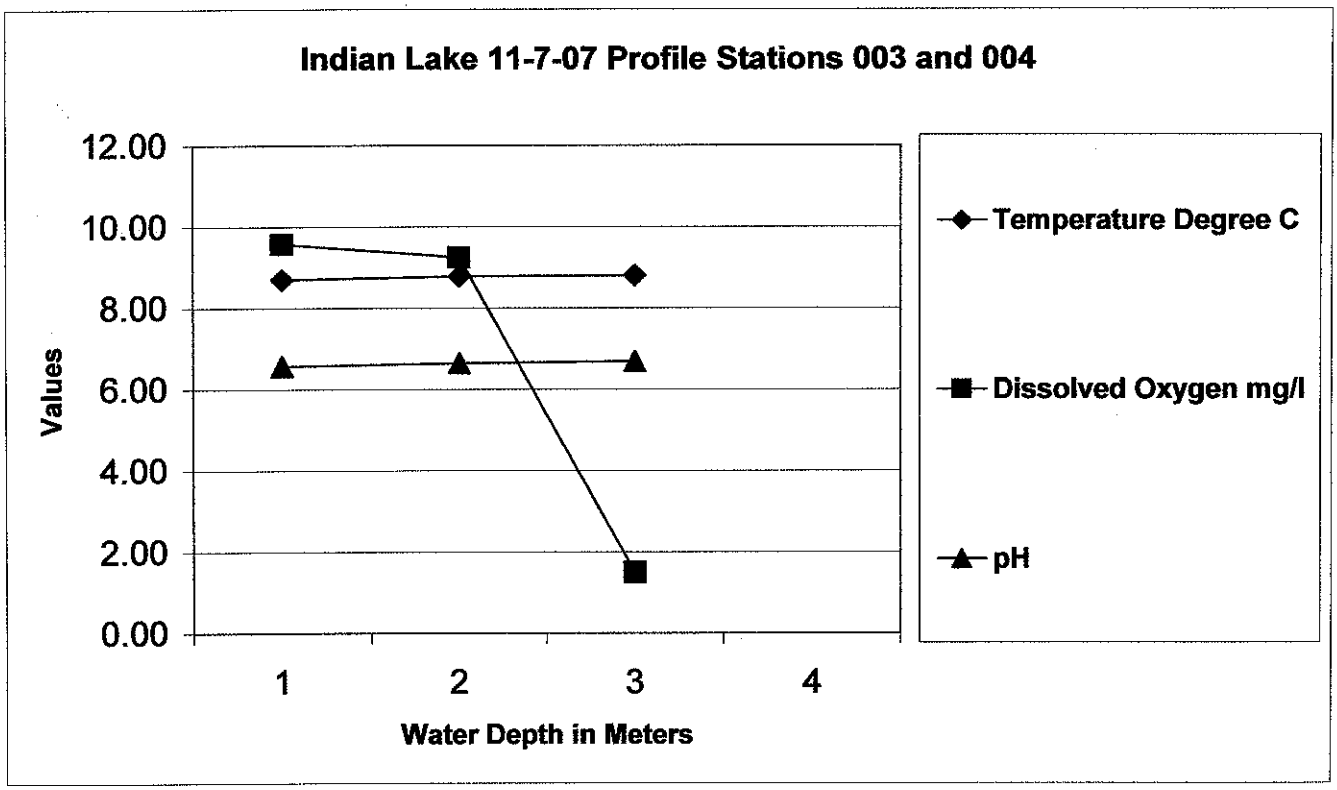
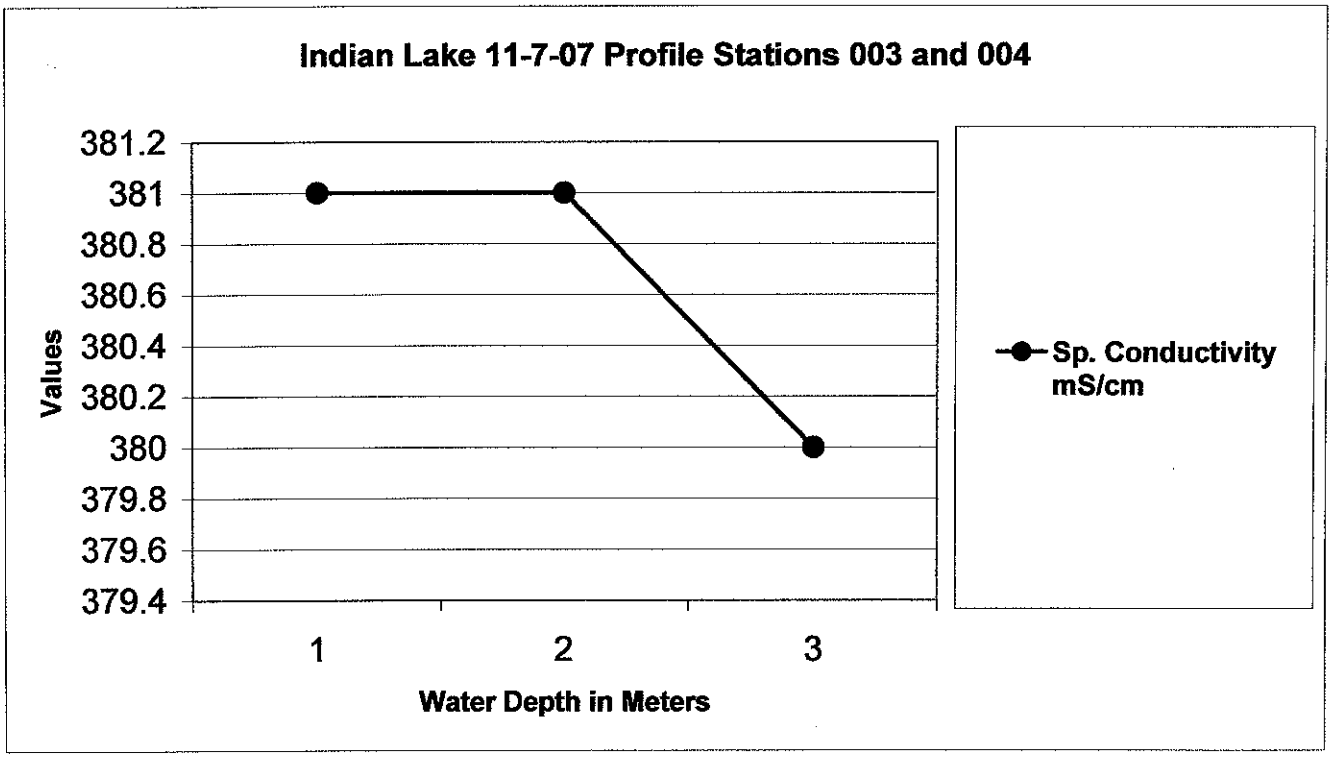
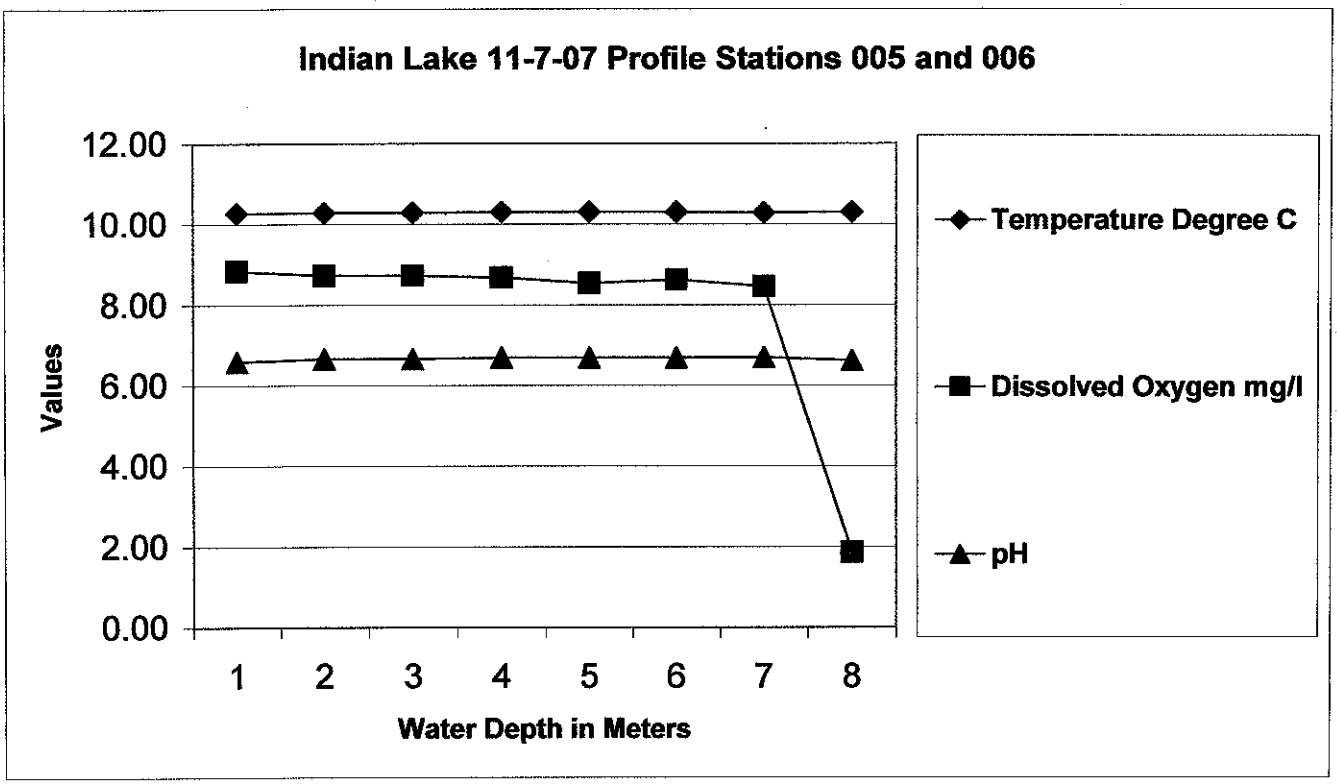
450
400
350
300
250
200
150
100
50
0
Values
1 2 3 4 5 6 7 8 9 10 11 12 13
Water Depth in Meters
Sp. Conductivity mS/cm


Indian Lake 11-7-07 Profile Stations 003 and 004
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Values
1
2
3
4
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH


Indian Lake 11-7-07 Profile Stations 003 and 004
381.2
381
380.8
380.6
380.4
380.2
380
379.8
379.6
379.4
Values
1
2
3
Water Depth in Meters
Sp. Conductivity mS/cm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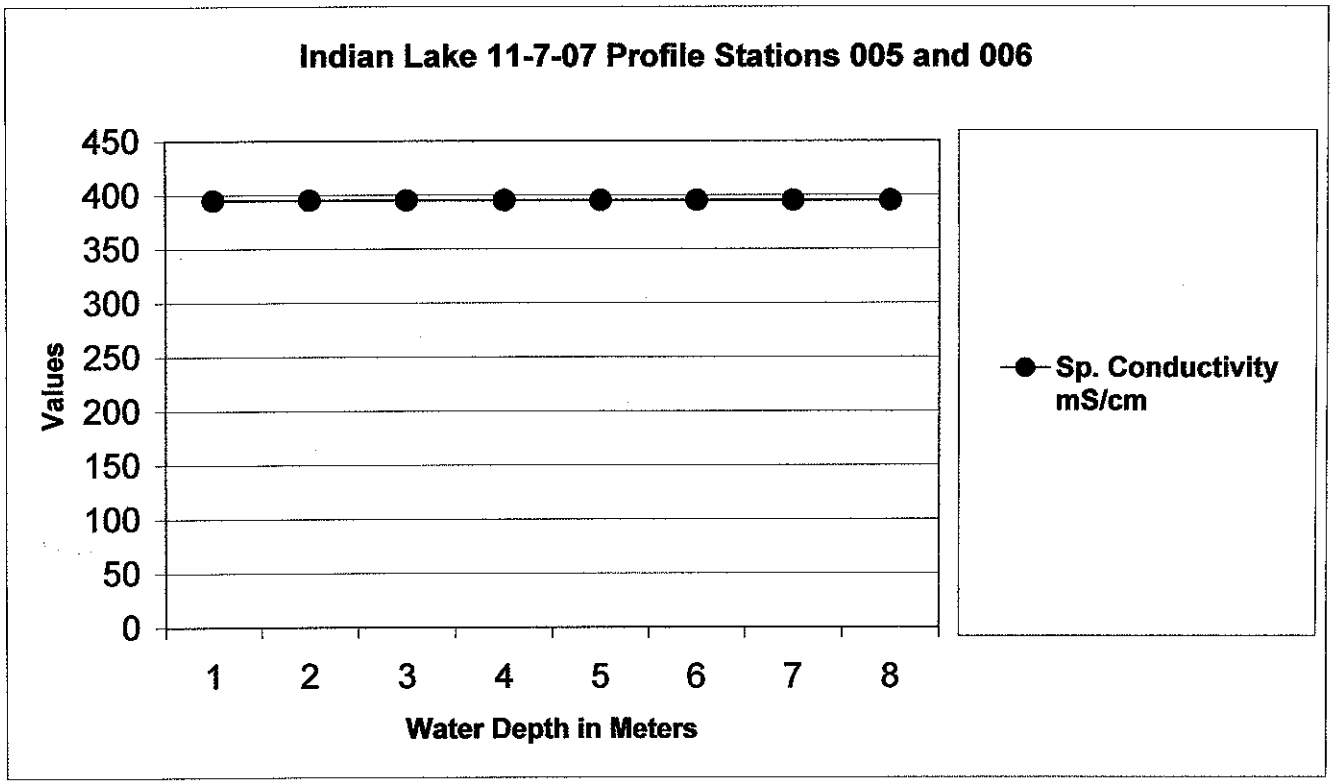
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Values
1
2
3
4
5
6
7
8
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH


Indian Lake 11-7-07 Profile Stations 005 and 006
450
400
350
300
250
200
150
100
50
0
Values
1
2
3
4
5
6
7
8
Water Depth in Meters
Sp. Conductivity mS/cm

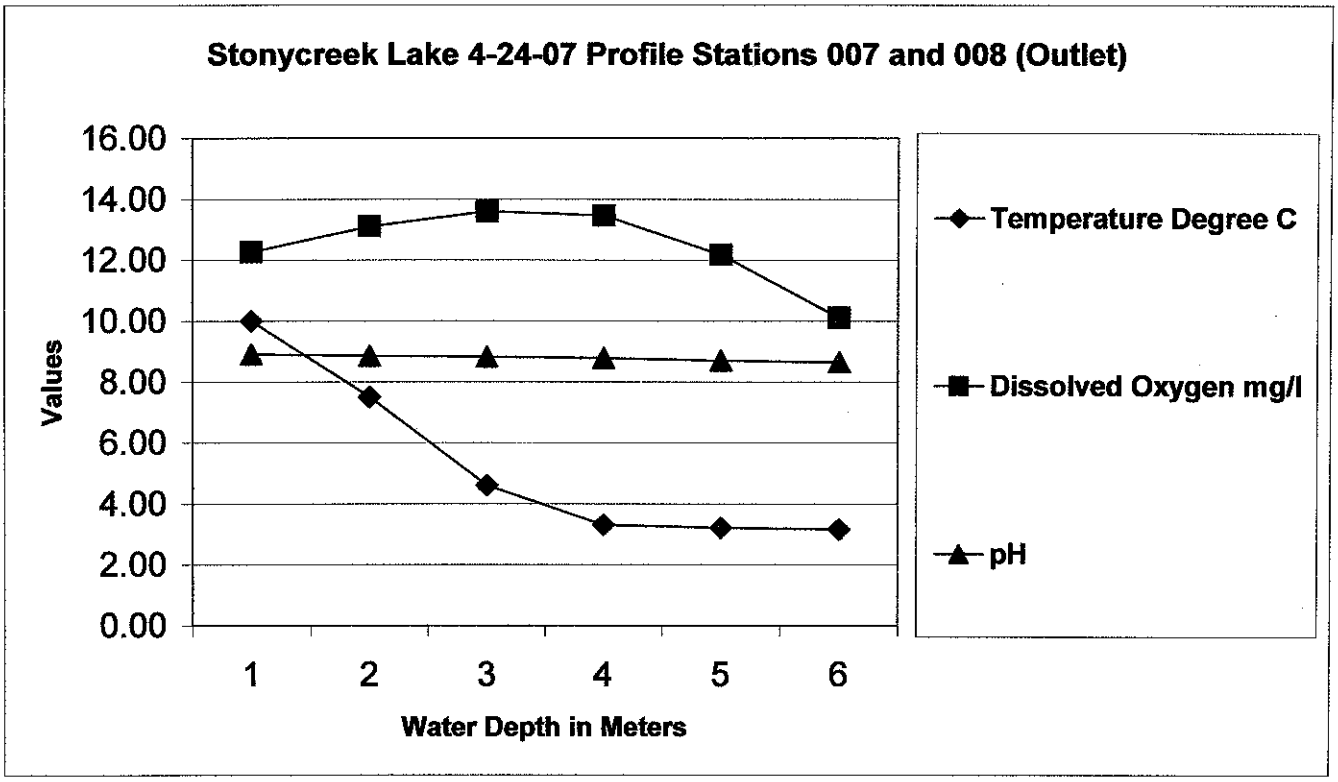
profile for

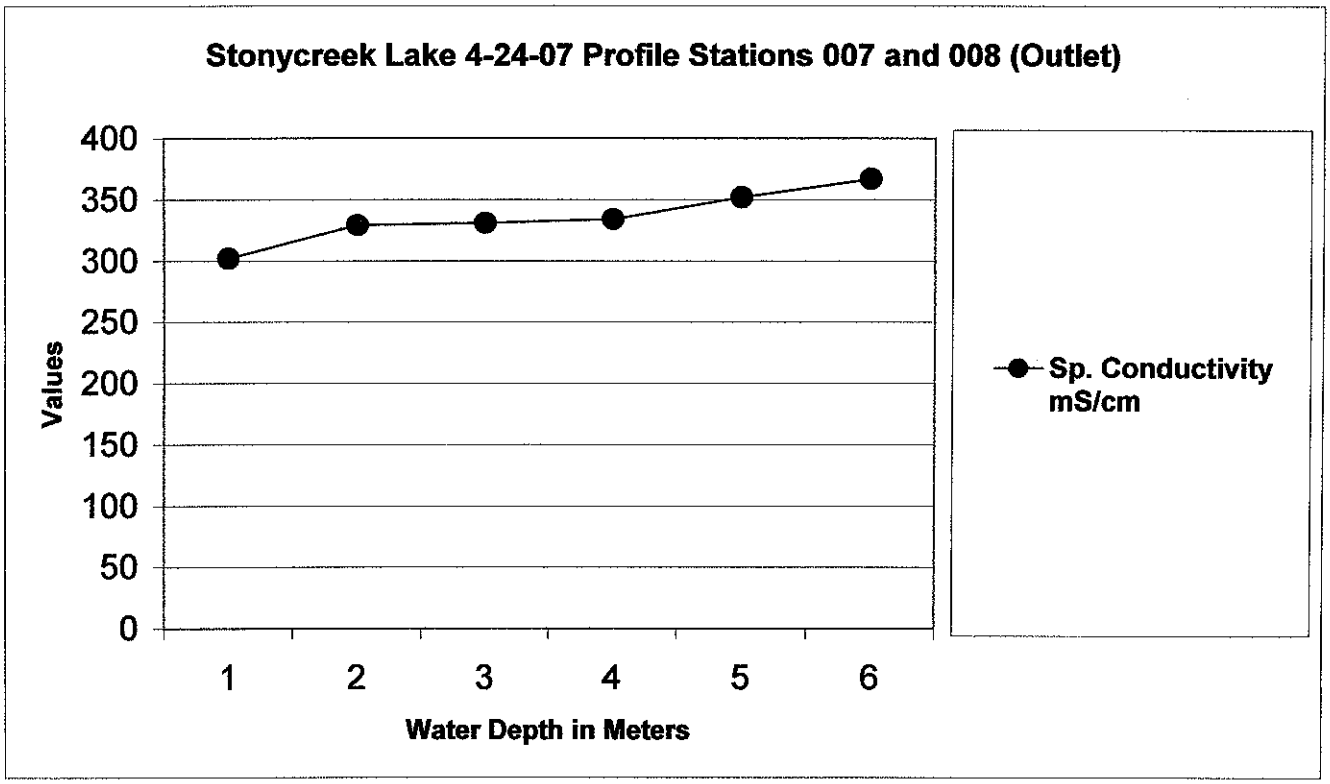
Lake Stony Creek Spring	Date	Time	Station	Depth (m)	Temp. (C)	D.O. (mg/l)	pH	Sp. Cond. (mS/cm)
Lat 40 01.190 Long 78 53.492	4/24/2007	1430	Deepest Part Near Outfall	1	10.00	12.26	8.91	302
Epilimnion			007 Surface	2	7.50	13.10	8.86	329
			008 Bottom	3	4.61	13.60	8.82	331
				4	3.31	13.46	8.78	334
				5	3.21	12.17	8.70	352
				6	3.16	10.10	8.65	367
Lake Stony Creek Spring	4/24/2007	1515	Second Site Under Bridge	1	7.88	11.70	8.89	288
			009 Surface	2	7.66	11.67	8.83	288
			010 Bottom	3	7.35	11.57	8.78	290

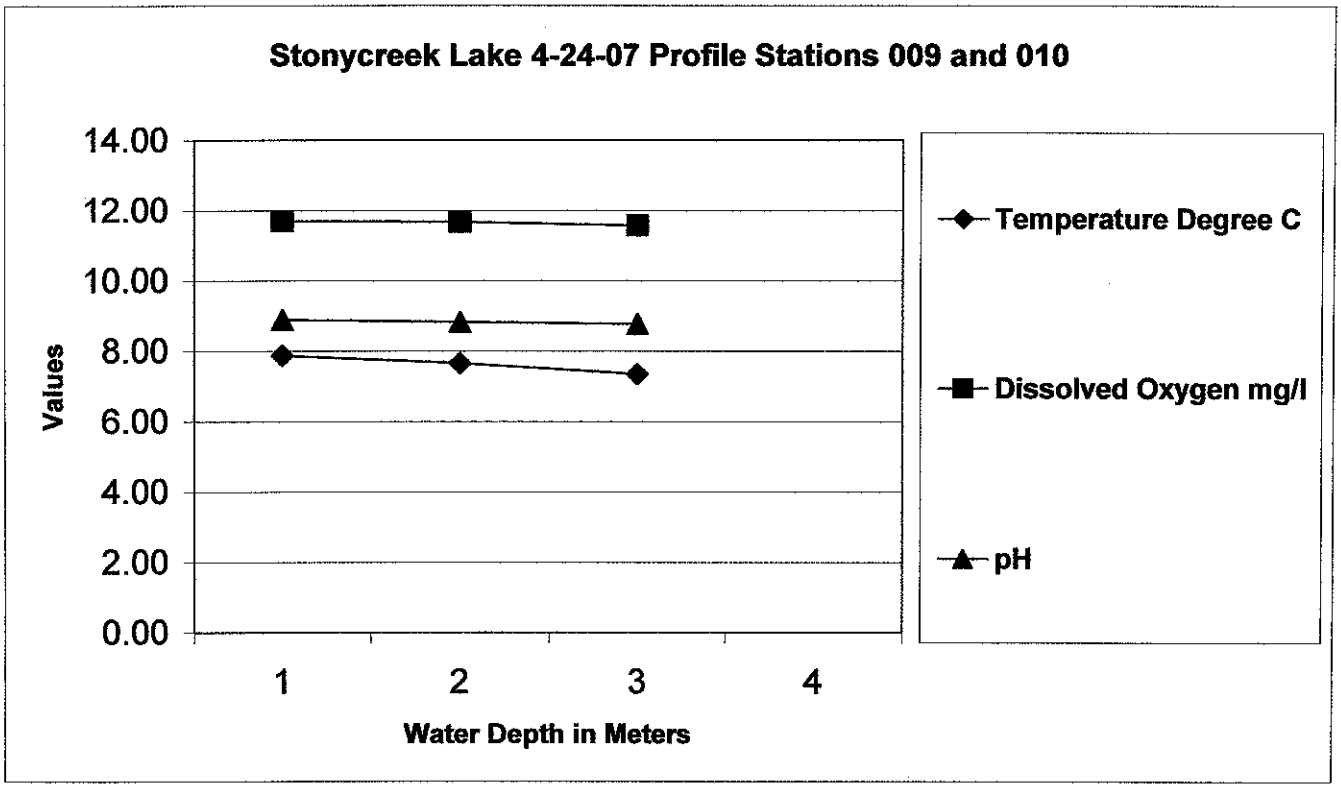
Lake Stony Creek Summer	Date	Time	Station	Depth (m)	Temp. (C)	D.O. (mg/l)	pH	Sp. Cond. (mS/cm)
Lat 40 01.190 Long 78 53.492	7/12/2007	1230	Deepest Part Near Outfall	1	24.25	10.76	8.21	*564
			007 Surface	2	24.01	10.89	8.03	*563
			008 Bottom	3	23.51	10.81	7.94	*558
				4	23.04	10.15	7.79	*555
Lake Stony Creek Summer	7/12/2007	1308	Second Site Under Bridge	1	22.84	10.60	8.29	*500
Epilimnion			009 Surface	2	15.59	9.76	7.93	356
			010 Bottom	3	14.85	7.27	7.67	424

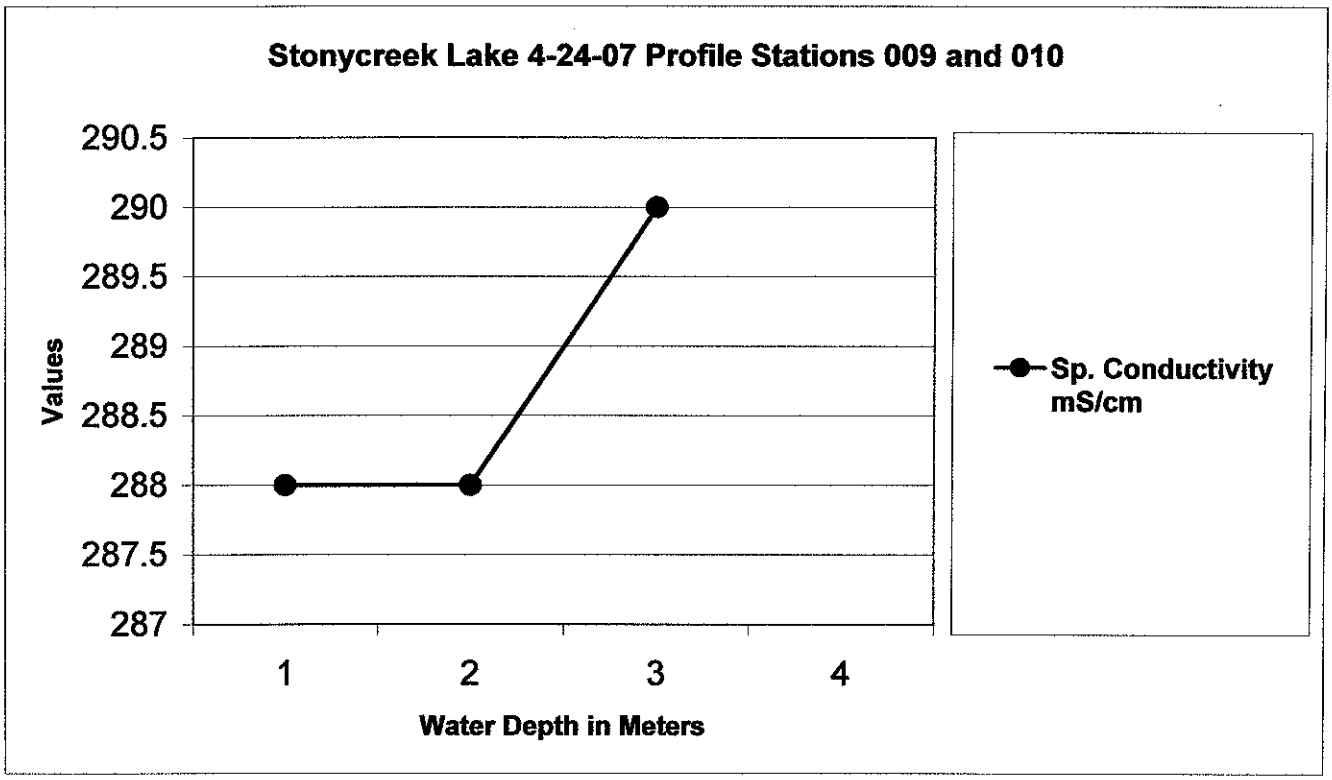
Lake Stony Creek Fall	Date	Time	Station	Depth (m)	Temp. (C)	D.O. (mg/l)	pH	Sp. Cond. (mS/cm)
Lat 40 01.190 Long 78 53.492	11/7/2007	0915	Deepest Part Near Outfall	1	5.94	9.95	6.35	*578
			007 Surface					
			008 Bottom					
Lake Stony Creek Fall	11/7/2007	1000	Second Site Under Bridge	1	7.18	9.36	6.38	384
			009 Surface					
			010 Bottom					

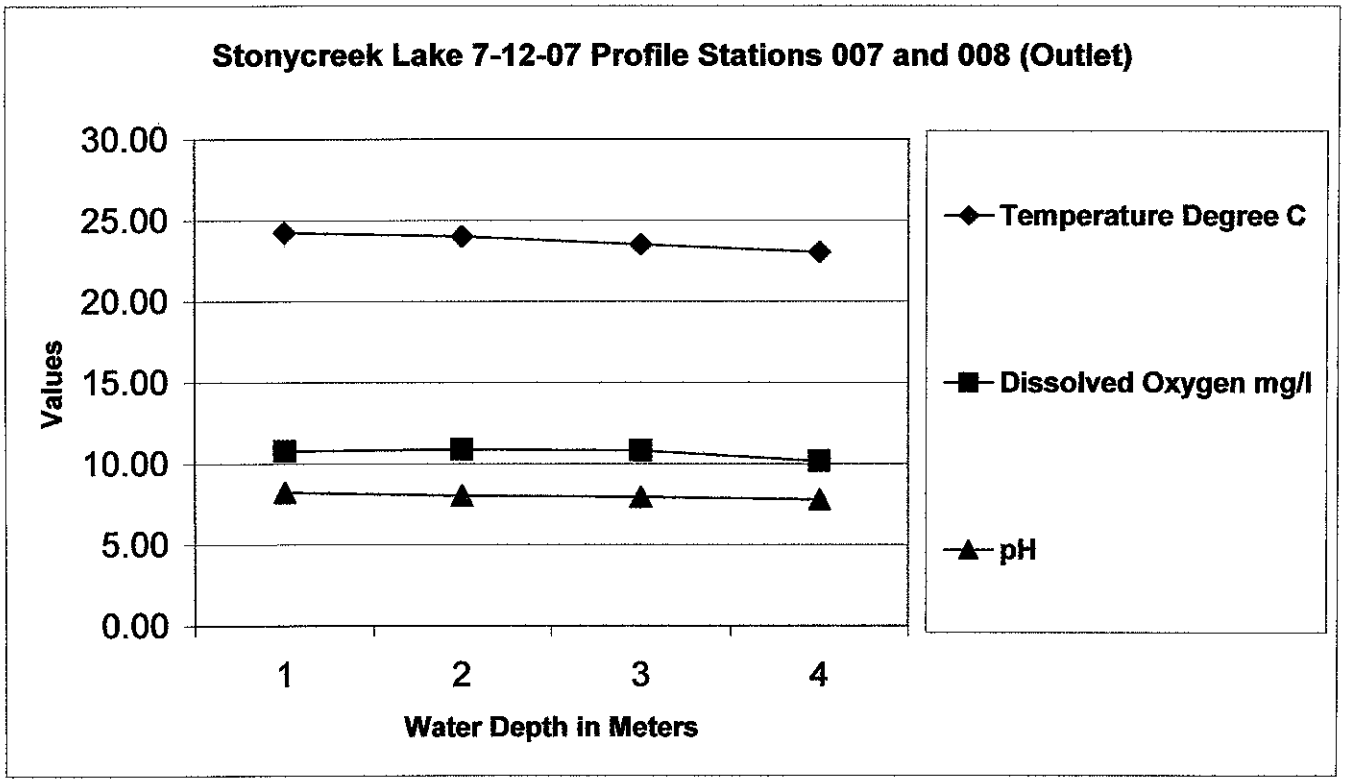
This Fall sample the Lake was Drawndown and thus unable to access by Boat. The Sample was taken from Shore near the station location for 007and 008 and from the bridge for 009 and 010.
At Epilimnion the next D.O reading should be above 5.0(mg/l).
*Numbers represent a higher conductuivity reading above 500.

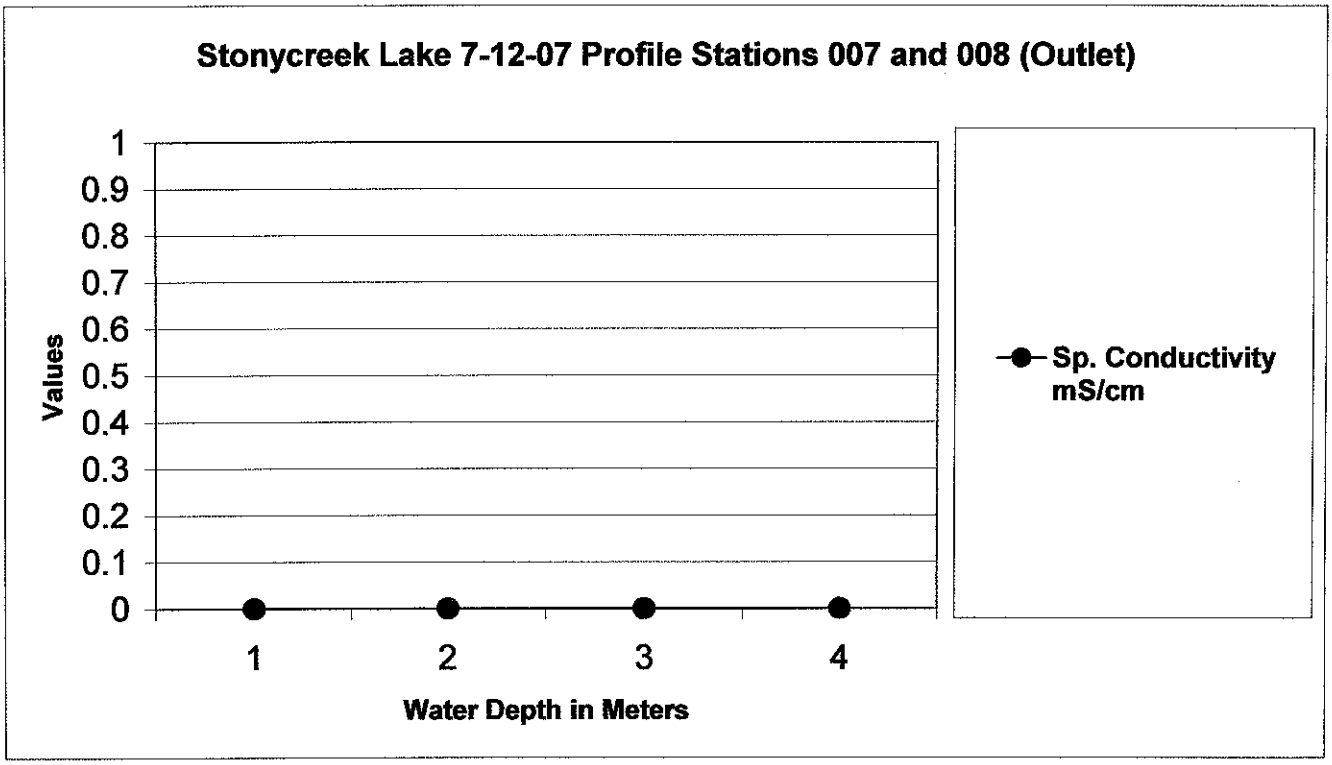

Stonycreek Lake 4-24-07 Profile Stations 007 and 008 (Outlet)
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Values
1
2
3
4
5
6
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH

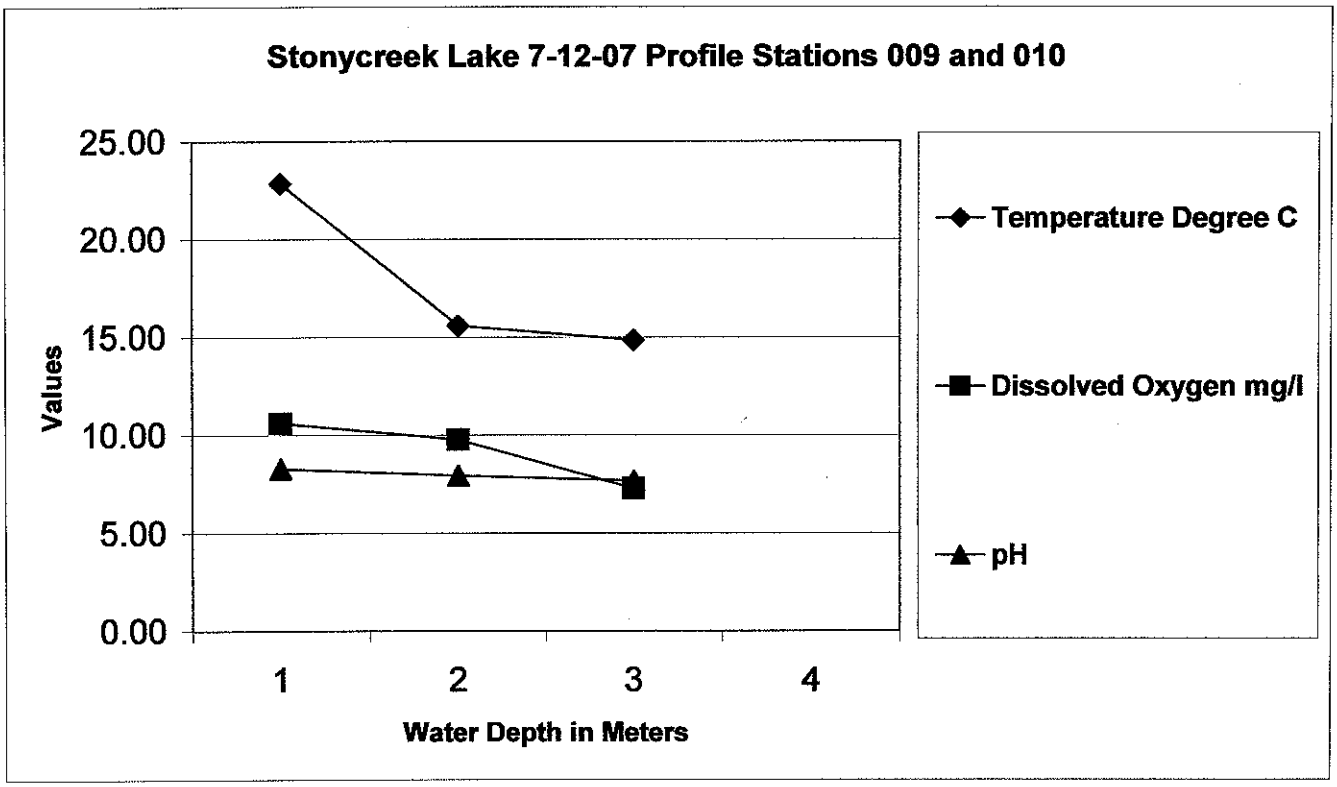

Stonycreek Lake 4-24-07 Profile Stations 007 and 008 (Outlet)
400
350
300
250
200
150
100
50
0
Values
1
2
3
4
5
6
Water Depth in Meters
Sp. Conductivity mS/cm

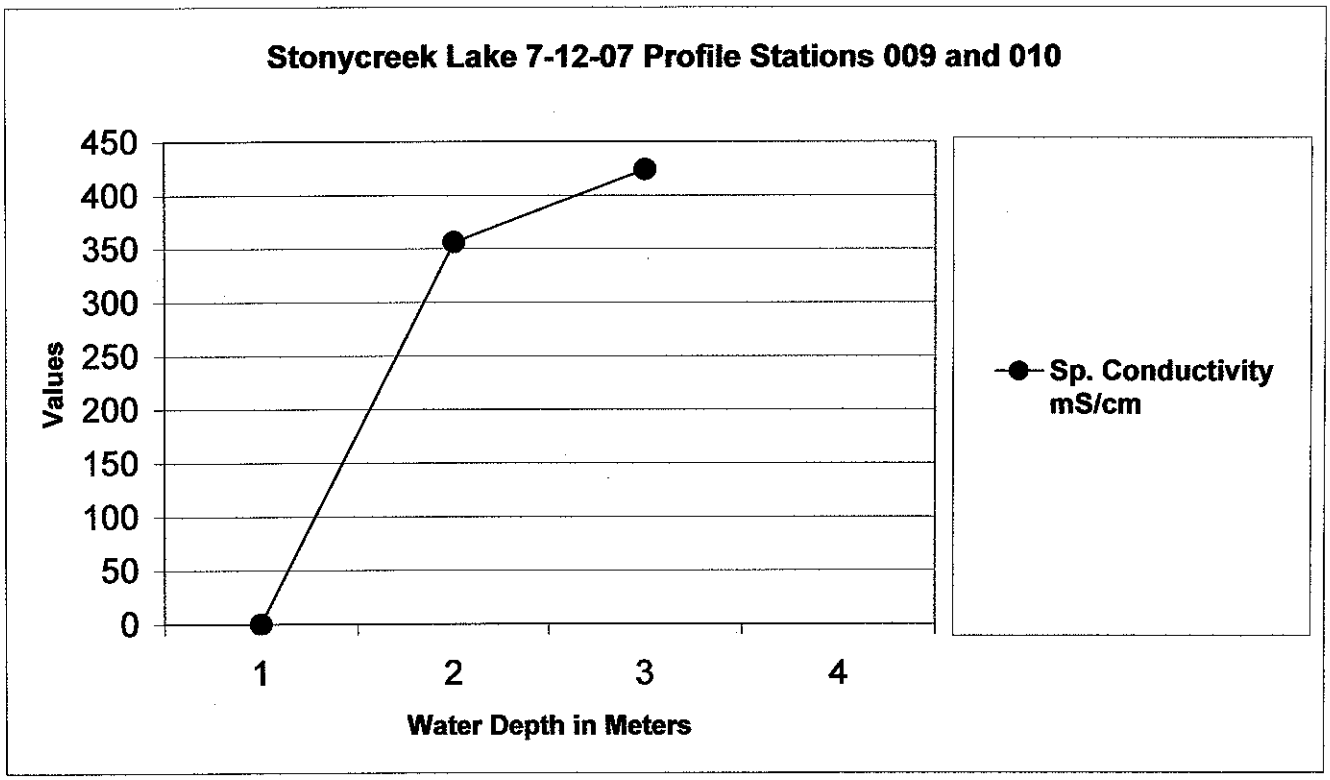

Stonycreek Lake 4-24-07 Profile Stations 009 and 010
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Values
1
2
3
4
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH


Stonycreek Lake 4-24-07 Profile Stations 009 and 010
290.5
290
289.5
289
288.5
288
287.5
287
Values
1
2
3
4
Water Depth in Meters
Sp. Conductivity mS/cm


Stonycreek Lake 7-12-07 Profile Stations 007 and 008 (Outlet)
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Values
1
2
3
4
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH


Stonycreek Lake 7-12-07 Profile Stations 007 and 008 (Outlet)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Values
1
2
3
4
Water Depth in Meters
Sp. Conductivity mS/cm


Stonycreek Lake 7-12-07 Profile Stations 009 and 010
25.00
20.00
15.00
10.00
5.00
0.00
Values
1
2
3
4
Water Depth in Meters
Temperature Degree C
Dissolved Oxygen mg/l
pH


Stonycreek Lake 7-12-07 Profile Stations 009 and 010
450
400
350
300
250
200
150
100
50
0
Values
1
2
3
4
Water Depth in Meters
Sp. Conductivity mS/cm

Attachment C

Standard Analysis 038 Water Chemistry Data Table
And Lake TSI Evaluation for Indian Lake, Stonycreek Lake,
And Calendar Run and Clear Run
2007

		Value	Date		Sample No	Station	Secchi (m)	Alk (mg/L)	TSS (mg/L)	TDS mg/L	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Chl-a (mg/L)	N to P ratio	TSI on TP	TSI on Chla	TSI on Secchi
	Drainage Area	13.7 Sq. Miles															
Indian Lake	County	Somerset	spring 1		001	top	3	17.20	1.70	180	0.47	0.011	0.0093	42.73	**38.74**	**52.45**	**44.15**
	Detention time	457 days			002	bott		16.60	1.70	188	0.42	0.007		60.00	**32.22**		
	Stor vol (MG)	3420	spring 2		003	top	1.6	16.80	1.70	216	0.52	0.012	0.001	43.33	**40.00**	**30.57**	**53.22**
	Depth @ dam	71 ft			004	bott		16.80	6.00	930	0.54	0.018		30.00	**45.85**		
	Depth @ mid		spring 3		005	top	2.1	18.00	1.70	270	0.42	0.012	0.001	35.00	**40.00**	**30.57**	**49.30**
	Mean Depth	12 meters			006	bott		16.60	4.00	256	0.44	0.013		33.85	**41.15**		
	Stream	Calendars Run	summer1		001	top	7	22.00	1.70	248	0.25	0.012	0.0071	20.83	**40.00**	**49.80**	**31.93**
	River Miles				002	bott		20.00	1.70	226	0.44	0.012		36.67	**40.00**		
	SWP	18E	summer 2		003	top	3	23.80	1.70	230	0.29	0.010	0.0116	29.00	**37.37**	**54.61**	**44.15**
	Acres	498.7			004	bott		24.00	1.70	236	0.22	0.007		31.43	**32.22**		
	DamPermit No	56-103	summer 3		005	top	5	21.80	1.70	278	0.28	0.007	0.001	40.00	**32.22**	**30.57**	**36.78**
	Classification/Use	1-2-1			006	bott		21.40	1.70	278	0.31	0.007		44.29	**32.22**		
	Status		fall1		001	top	5	25.80	4.00	346	0.27	0.007	0.0067	38.57	**32.22**	**49.23**	**36.78**
	Lat	40 01.7			002	bott		26.00	1.70	306	0.26	0.007		37.14	**32.22**		
	Long	78 52.3	fall 2		003	top	3.5	26.00	6.00	282	0.27	0.007	0.0061	38.57	**32.22**	**48.31**	**41.93**
		CWF			004	bott		26.00	6.00	284	0.28	0.007		40.00	**32.22**		
			fall 3		005	top	5.5	25.40	8.00	296	0.30	0.007	0.0061	42.86	**32.22**	**48.31**	**35.41**
					006	bott		25.40	1.70	296	0.27	0.007		38.57	**32.22**		
				Averages			**3.97**				**0.35**	**0.0094**	**0.00554444**	**36.76**	**36.55**	**47.37**	**40.12**
Stonycreek Lake	County	Somerset	Spring 1		007	top	1.5	16.40	4.00	240	0.50	0.015	0.001	33.33	**43.22**	**30.57**	**54.15**
	Detention time	17.07 days			008	bott		16.40	1.70	292	0.47	0.014		33.57	**42.22**		
	Stor vol (MG)	430	Spring 2		009	top	2.75	20.00	1.70	258	0.46	0.007	0.01	65.71	**32.22**	**53.16**	**45.41**
	Depth @ dam	30 ft			010	bott		17.80	1.70	218	0.47	0.007		67.14	**32.22**		
	Depth @ mid		Summer 1		007	top	4	29.40	1.70	414	0.25	0.017	0.0142	14.71	**45.03**	**56.60**	**40.00**
	Mean Depth	1.5 meters			008	bott		29.60	1.70	380	0.26	0.014		18.57	**42.22**		
	Stream	Rhoads Creek	Summer 2		009	top	2.5	30.20	1.70	454	0.30	0.015	0.0067	20.00	**43.22**	**49.23**	**46.78**
	River Miles				010	bott		35.20	1.70	380	0.36	0.017		21.18	**45.03**		
	SWP	18E	Fall 1		007	top	**	33.40	6.00	448	0.37	0.012	0.001	30.83	**40.00**	**30.57**	
	Acres	165.97			008	bott											
	Dam No	56-97	Fall 2		009	top	**	32.40	8.00	280	0.34	0.007	0.001	48.57	**32.22**	**30.57**	
	Classification/Use	1-2-2			010	bott											
	Status																
	Lat	40 01.1															
	Long	78 53.2		**Averages**			**2.688**				**0.38**	**0.013**	**0.00565**	**30.24**	**40.59**	**47.56**	**45.74**
	Drainage Area	26.0 Sq Miles															
		CWF															

zero chlorahyil-A entered as .001 for calculation.

<.01 TP's were made .007 for calculations

TSS <2 were made 1.7 for calculations

Do all calculations on average of the parameters, do not average TSIs

**Lake Stonycreek surface water grab 1 m below surface - (Note: Lake Stonycreek had a water release, lowering the water level to the point that boat access was unfeasible. Water sample was taken from shore close to station location. Bottom water grab was not taken along with secchi reading.) - Chlorophyll A sample taken at surface (300ml filtered) - Weather - Clouds and snow flurries - Cloud cover 50%, winds moderate from the north, snow flurries, air temp lower 30's degree F, surface turbulence choppy, No secchi reading taken.

		Value	Date	Time	Sample No.	Alk (mg/L)	TSS (mg/L)	TDS mg/L	Ammonia (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	N to P ratio	TSI on TP	TSI on Chla	TSI on Secchi	BOD5 INHIB (mg/L)	Total Residue (mg/l)
	Drainage Area	2.7 Sq. Miles															
Clear Run	County	Somerset	6/12/2007	940	001	40.60	16.00	908		0.17	0.007	24.29	**32.22**	**#REF!**	**#REF!**		924
	Detention time		7/11/2007	925	002	32.20	14.00	1310		0.14	0.007	20.00	**32.22**	**#REF!**	**#REF!**	1.50	
	River Miles		8/6/2007	1400	003	21.60	10.00	618	0.04	0.36	0.012	30.00	**40.00**				
Rain	SWP	18E	8/14/2007	1020	004	33.80	1.70	1420		0.26	0.007	37.14	**32.22**	**#REF!**	**#REF!**		
	Acres		8/22/2007	955	005	13.60	8.00	120		0.80	0.043	18.60	**58.41**				
	Lat		9/11/2007	902	006	30.20	20.00	772		0.28	0.018	15.56	**45.85**	**#REF!**	**#REF!**		
	Long		10/9/2007	925	007	41.40	1.70	1298		0.07	0.007	10.00	**32.22**				
		CWF															
Calendar Run	Drainage Area	2.6 Sq. Miles	6/12/2007	1038	001	20.20	14.00	106		0.62	0.017	36.47	**45.03**	**#REF!**	**#REF!**		120
Rain	County	Somerset	8/6/2007	1330	002	27.80	24.00	254	0.16	1.03	0.051	20.20	**60.87**	**#REF!**	**#REF!**	4.30	
	Detention time		8/22/2007	1038	003	10.00	1.70	256		0.36	0.018	20.00	**45.85**				
	River Miles		9/11/2007	933	004	20.20	24.00	146		0.54	0.032	16.88	**54.15**	**#REF!**	**#REF!**		
	SWP	18E			005												
	Acres				006												
	Lat			**Averages**						**0.45**	**0.0212**	**21.04**	**48.21**	**#REF!**	**#REF!**		
	Long																
		CWF															