ANALYSIS OF PETER LAKE AND ED'S BOG

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UNDERC 1982
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INTRODUCTION

In this paper, I will present and discuss all the information which I have obtained from Peter Lake and Ed's Bog during my participation in UNDERC 1982.

Peter Lake is about ten meters in depth in the middle, but is shallow at the sides with a very abundant murophyte population. Trees along the edge include black spruce and tamarack. Peter is fed by its sister lake Paul. It was extensively limed between 1951 and 1954 in a study by Stross and Hasler to determine the effects of lime on lake metababraw.

scientific names

Ed's Bog covers an area of about 30 X 10 meters and is 8 meters deep. It has a very thick bog mat and the growth of trees is very close to the water's edge. The majority of the trees surrounding the bog are black spruce and tamarack.

DISCUSSION - Should come after the data are presented

Peter Lake has a relatively low color as compared to Ed's Bog. The relatively high productivity in Peter as compared to Ed's Bog can be explained by the color as well as the turbidity. Turbidity is caused by particles suspended in water. Because turbidity, or cloudiness, reduces the penetration of sunlight, it makes the zone of photosynthesis relativlely shallow and is generally unfavorable to productivity. To determine the transparency of water, it is customary to make a Secchi disk reading. The visibility of the disk is not only affected by the turbidity, but also by the color of the water. Color results from dissolved or colloidal substances extracted from leaves or other decaying organic matter. Distinction must be made however, between "apparent color" and "true color". Apparent color is derived partly from the true color and partly from suspended matter. True color is the color of the water minus the turbidity factor.

Nitrogen is found in all natural waters. Nitrogenous materials are brought in by tributary waters. They are also derived from organic matter in the water as products of bacterial decompositions. From the data collected, Peter Lake has more nitrates than does Ed's Bog. Therefore, I would assume that Peter has more decomposition occurring. This makes sense due to the fact that Peter has a greater producitivity than Ed's Bog. More nitrates are found in the hypolimnion as opposed to the epilimnion due to a slight sedimentation of organic matter. Most higher plants use nitrates predominantly in the formation of plant proteins.

Phosphates are also requirements of plants for making proteins. Phosphates and nitrates are key substances in organic production. When dead organisms sink to the bottom of a lake, they carry with them a substantial proportion of the available phosphorus. Consequently, the deeper water usually has a higher concentration of phosphates. However, if a lake has been turned over, the upper and lower portions of the water will have fairly equal concentrations. This seems to be the case with Peter Lake. Ed's Bog does not have a turnover capacity since it is well protected from the wind.

Sulfur, which is essential to the formation of proteins, is usually always present in natural waters. It promotes the formation of chlorophyll. However, in all the lakes I studied, there was usually no sulfate reading. However, I can conclude that the sulfate concentration was not very high since a high proportion of sulfate is usually indicative of industrial pollution. Also due to the presence of hydrogen sulfide in both bodies of water, I must conclude that sulfate was present. Hydrogen sulfide is one of the end products of bacterial decomposition under anaerobic conditions and it is a reduced form of sulfate.

Iron plays a part in chlorophyll formation and is therefore a requirement of green plants. It also seems to play a part in the metabolism of phosphorus. The data shows that Peter Lake has more available iron since it has a greater plant production. Also since vegetation grows in the epilimnion, there is a depleted supply of iron in that region.

The pH is a measure of hydrogen-ion concentration. Ed's Bog, which is a typical bog, has a lower pH than Peter Lake. All bogs have sphagnum which contains uronic acids. These uronic acids release hydrogen-ions which bind to calcium and magnesium to create a buffering effect. Therefore bogs contain low amounts of calcium and magnesium and are hydrogen-ion rich and cation poor making them acidic. The decomposition process is also showed down which means that many organic compounds are present which causes the bog matt to grow.

Bogs don't have much phytoplankton productivity. Therefore Peter is much more abundant in plankton than is Ed's Bog. As can be seen by the oxygen-temperature profiles, the temperatures of both Ed's Bog and Peter Lake both tapered off at a normal rate to produce three stratifications. However, the oxygen level of the bog decreased dramatically with increased depth whereas it produced a slight oxygen bulge in Peter. This oxygen bulge is due to phytoplankton producing photosynthesis. Ed's Bog contains no oxygen below two meters since light cannot penetrate very deep to produce photosynthesis. Thus, the oxygen supply is used up.

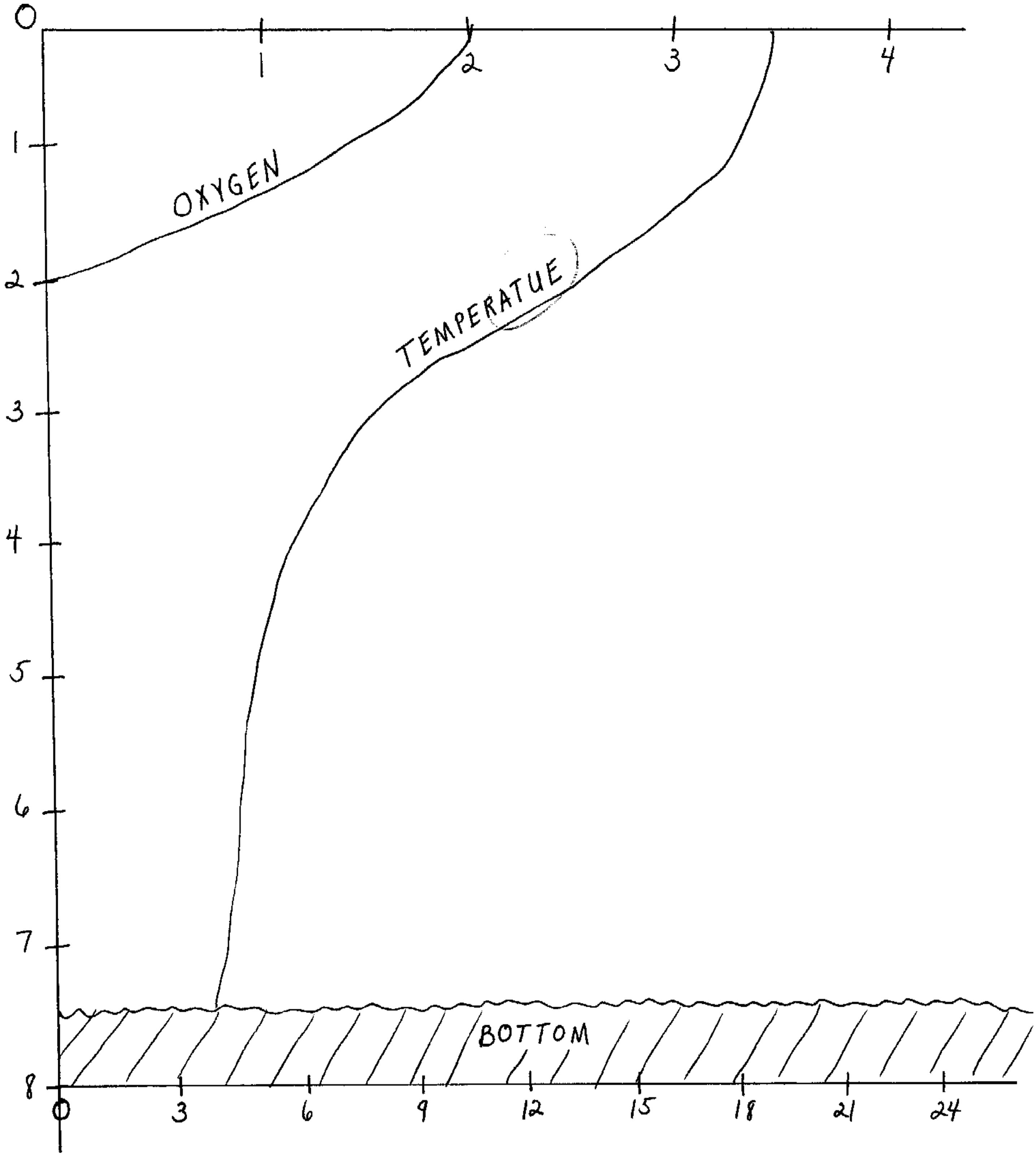
ED'S BOG

(CHEMICAL DATA)

	EPI	HYPO
COLOR - APP	90	140
COLOR - TRUE	90	125
SECCHI DISK	1.4	—
SULFATES	0	0
NITRATES	0.5 mg/l	0.6 mg/l
PHOSPHATE (ORTHO)	0.08 mg/l	0.1 mg/l
PHOSPHATE (TOTAL)	0.18 mg/l	0.15 mg/l
IRON	0.1 mg/l	0.4 mg/l
pH	5.4	4.9
METHYL ORANGE ACIDITY	0	0
PHEN ACIDITY	21 mg/l	53 mg/l
ALKALINITY	3.3 mg/l	6.7 mg/l
Ca⁺⁺ HARDNESS	5 mg/l	5 mg/l
Mg⁺⁺ HARDNESS	5 mg/l	0 mg/l
OTAL	10 mg/l	5 mg/l
SPECIFIC CONDUCTANCE	15	17

ED'S BOG

(OXYGEN-TEMPERATURE PROFILE)



ED'S, BOG

(PLANKTON / PER ml)

PHYTOPLANKTON

Keratella - 2849
Peridinium tabulatum - 231
Mougestia - 132
Anacystis - 55
Microspora - 55
Desmidium - 44
Ulothrix - 33
Eudorina - 22
Zygnema - 22

ZOOPLANKTON

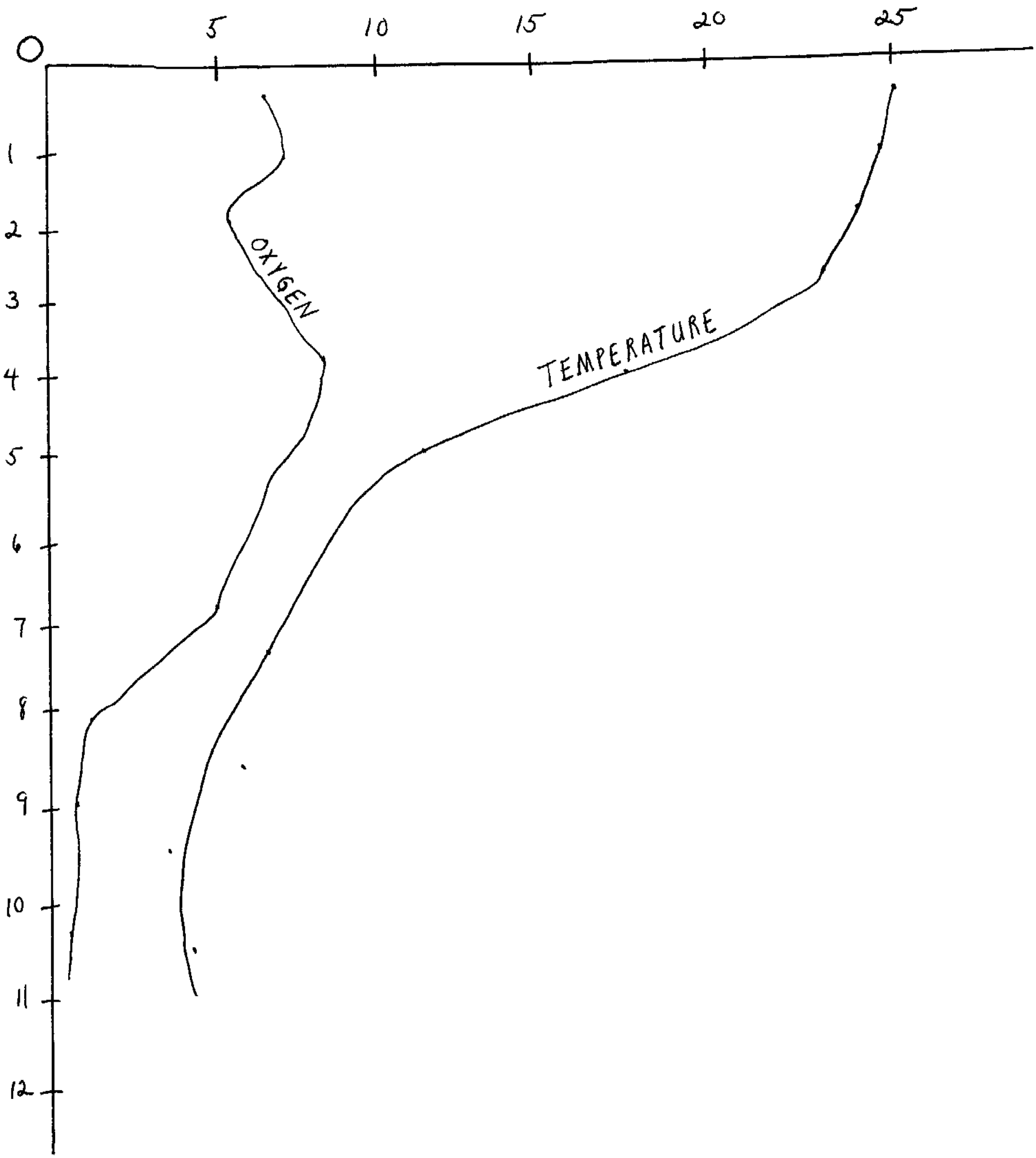
Daphnia - 198
Bosmina - 132
Diaptomus - 44
Cyclops - 22
Chaoborus larvae - 11

PETER LAKE

(CHEMICAL DATA)

	EPI	HYPO
COLOR	10	25
SECCHI DISC	5	—
SULFATES	0	0
NITRATES	0.1 mg/l	2.5 mg/l
PHOSPHATE (ORTHO)	0.85 mg/l	1.10 mg/l
PHOSPHATE (TOTAL)	0.9 mg/l	0.5 mg/l
IRON	0.1 mg/l	1.8 mg/l
pH	7	6.5
METHYL ORANGE ACIDITY	0	0
PHEN ACIDITY	10 mg/l	10 mg/l
ALKALINITY	10 mg/l	20 mg/l
HARDNESS Ca#	10 mg/l	10 mg/l
Mg#	10 mg/l	20 mg/l
TOTAL	20 mg/l	30 mg/l
SPECIFIC CONDUCTANCE	30 µ	50

PETER LAKE
(OXYGEN-TEMPERATURE PROFILE)



PETER LAKE

(PLANKTON) per ml

PHYTOPLANKTON

Dinobryon - 9174
Oocystis - 264
Keratella - 99
Sphaerocystis - 77
Zygnema - 55
Polyarthra - 66
Staurastrum - 22
Ceratium - 22
Spyrogyra - 11
Arthrodesmus - 11

ZOOPLANKTON

Bosmina - 132
Nauplius larvae - 77
Diaptomus - 44
Daphnia - 11