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17 June 1983

Fisheries
Biology
Resource Planning
Vessel Surveys

MEMO TO: Wm. Weiss, Institute for Water Quality Research

FROM: T. Kelly *TM*

SUBJECT: Results of Lake Bellaire inflows and outflow, 9 June 1983

I carried out sampling of Grass Creek, the Intermediate River, (two stations) and the Grass River on 9 June 1983. P. Peterson assisted with field work. A boat and motor was provided by Folto's Marina of Bellaire. Water samples were collected for phosphorus, Cl., and BOD analysis. BOD analyses were done by the Traverse City STP. A summary of results is given below. Copies of my field notes are attached to this memo.

LB-1 Grass Creek at C.R. 620 culvert.

Air temp.: 17.0 C

Water temp.: 10.0 C

BOD: 1.0 mg/l

Q: 0.57 cfs

Water was clear. Three brook lamprey (Lampetra appendix) were collected. Sculpins and one brook trout were also captured and released.

LB-2 Intermediate River at C.R. 620 bridge, Bellaire

Air temp.: 19.6 C

Water temp.: 14.5 C

BOD: 1.1 mg/l

Q: 244.5 cfs

LB-3 Intermediate River just upstream from Lake Bellaire

Water temp.: 15.5 C

BOD: 1.1 mg/l

Q: 173.8 cfs

Water clear, light brown tint. Strong wind blowing upstream from Lake Bellaire. Bald eagle seen overhead.

LB-4 Grass River at outlet of Lake Bellaire

Water Temp.: 15.0 C

BOD: 1.1 mg/l

Q: 289.7 cfs

Water clear, light green tint. Wind wsw at 8-12 mph.

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Comments

Note that the discharge (Q) at LB-3 was 30% less than at LB-2 upstream. I think this was due to 1) wind and waves from Lake Bellaire retarding downstream flow and/or 2) inadequate profiling of bottom to obtain accurate cross section area. The river bottom is very irregular in this reach.

Stream channel widths at stations LB-3 and LB-4 could not be obtained on 9 May 1983. Discharge calculations were completed with width measurements taken on 9 June. Due to the shape of the banks and shore vegetation the effective width of the channels was about the same on both dates. Discharge at LB-3 was calculated at 377.5 cfs and LB-4 at 347.8 cfs. Both these figures are suspect as they are considerably below the 489.1 cfs calculated for LB-2 (upstream) which I feel is the most reliable station due to its relatively uniform bottom and stable working platform (the bridge). The marsh areas surrounding LB-3 and LB-4 were flooded on 9 May after two days of rains (1.5 inches at Traverse City) and it is likely that Lake Bellaire had not reached equilibrium with respect to outflow and inflow after the heavy rains. With a rising lake level the relationship of inflow to outflow would not be linear.

cc: T. Comfort/P. Peterson

PS: I have turned over to Ray Canale the frozen Cl and P samples.

I hope to do the open water sampling of Lake Bellaire the week of June 20.

TOM

DATE 6-10-83

BIOCHEMICAL OXYGEN DEMAND

CITY OF TRAVERSE CITY
SEWAGE PLANT

SAMPLE	1	1	2	2	3	3	4	4		
BOTTLE NO.	156	149	135	126	122	106	89	11		
% DILUTION	100%	100%	100%	100%	100%	100%	100%	100%		
BURET	AFTER									
BURET	BEFORE									
INITIAL d.o.	10.4	10.4	10.4	10.2	9.1 10.0	9.1 10.0	10.2	10.0		
URET	AFTER									
URET	BEFORE									
FINAL D.O.	9.4	9.7	9.3	9.1	8.9	8.9	9.1	9.0		
D.O. DEPLETION	1.0	.7	1.1	1.1	1.1	1.1	1.1	1.0		
BOD OF SAMPLE	1	.7	1.1	1.1	1.1	1.1	1.1	1		
% REMOVAL OF BOD										

REMARKS _____

METHOD USED _____

ANALYST _____

in 6-10-83

out 6-15-83