10260

QEA
Quantitative Environmental Analysis, LLC.

September 14, 1998

Mr. Mike Erickson
Limno-Tech, Inc.
501 Avis Drive
Ann Arbor, MI 48108

Dear Mike:

The enclosed summary presents our most recent efforts to estimate tributary sediment loading in Reaches 2 to 7 (Thompson Island dam to Waterford). As we discussed during our phone conversation on September 11, the load estimation method involves adjusting the exponent in the rating curve of each tributary to achieve the desired annual sediment load. The resulting exponents range from about 1.6 to 2.0 (except for Fish Creek), which is consistent with data-based rating curves for Upper Hudson River tributaries. The total annual loads were estimated using a trapping efficiency of 8.5% (see QEA memo of 5/21/98). We can discuss this method during tomorrow's phone call.

Sincerely,

QEA, LLC

Kirk

C. Kirk Ziegler

CKZ:smn
Enclosure
GENhud

cc: Doug Tomchuk, USEPA
Ed Garvey, TAMS
Bill Ports, NYSDEC
John Haggard, GE
Angus MacBeth, Sidley & Austin

322768

305 West Grand Avenue • Montvale, NJ 07645
TEL: (201) 930-9890 • FAX: (201) 930-9805

290 Elwood Davis Road • Liverpool, NY 13088
TEL: (315) 453-9009 • FAX: (315) 453-9010

TRIBUTARY SEDIMENT LOADING ESTIMATION METHOD (R1 → R7)

REACHES 5, 6 & 7

MEAN LOW FLOW TSS IN BATTEN KILL IS 6.1 mg/l (LTI MEMO, 9/9/98)

ASSUME RATING CURVE OF THE FORM:

$$C_{TRIB} = \begin{cases} 6.1 & , \quad Q_{TRIB} \le \bar{Q}_{TRIB} \\ 6.1\left(\frac{Q_{TRIB}}{\bar{Q}_{TRIB}}\right)^{n_{TRIB}} & , \quad Q_{TRIB} > \bar{Q}_{TRIB} \end{cases}$$

WILL ADJUST n_{TRIB} SO THAT DESIRED SEDIMENT LOAD/YIELD IS ACHIEVED FOR EACH TRIB

FROM 5/21/98 WRITE UP:

$L_{R5-R7} = 48{,}400 \ \frac{MT}{yr}$

$Y_{R5-R7} = 81 \ \frac{MT}{mi^2\text{-}yr}$

FOR PERIOD 3/10/77 → 6/30/92 (5592 DAYS)

TRIB	$\bar{Q}_{TRIB}$ (cfs)	DA (mi^2)	L_{TRIB} ($\frac{MT}{yr}$)	n_{TRIB}
DD7	21	15	1214	1.97
DD6	23	16	1295	2.00
BATTEN KILL	601	431	34,884	1.98
FISH CREEK	342	49*	3966	0.88
FLATELT BROOK	14	8	647	1.64
DD5	136	79	6394	1.63
TOTAL	1137	598	48,400	

* EFFECTIVE DA FOR SEDIMENT LOADING

322769

REACHES 2, 3 & 4

MEAN LOW FLOW TSS IN HOOSIC RIVER IS 8.1 $\frac{mg}{l}$
(LTI MEMO, 9/9/98)

ASSUME RATING CURVE OF THE FORM:

$$C_{TRIB} = \begin{cases} 8.1 & , \quad Q_{TRIB} \leq \bar{Q}_{TRIB} \\ 8.1 \left(\frac{Q_{TRIB}}{\bar{Q}_{TRIB}} \right)^{n_{TRIB}} & , \quad Q_{TRIB} > \bar{Q}_{TRIB} \end{cases}$$

FROM 5/21/98 WRITE UP:

$$L_{R2-R4} = 110,900 \ \frac{MT}{yr}$$

$$Y_{R2-R4} = 132 \ \frac{MT}{mi^2\text{-}yr}$$

} FOR PERIOD 3/10/77 → 6/30/92

TRIB	$\bar{Q}_{TRIB}$	DA(mi^2)	L_{TRIB} $\left(\frac{MT}{yr}\right)$	n_{TRIB}
HOOSIC RIVER	1353	720	95,286	1.67
DD4	20	13	1720	1.59
ANTHONY KILL	96	63	8337	1.61
DD3	20	13	1720	1.59
DEEP KILL	25	16	2117	1.60
DD2	20	13	1720	1.59
	1426	838	110,900	

FRACTION OF ANNUAL SEDIMENT LOAD DELIVERED DURING HIGHER FLOWS ($Q_{TRIB} > \bar{Q}_{TRIB}$):

TRIB	HIGHER FLOW FRACTION
DD7	0.97
DD6	0.97
BATTEN KILL	0.97
FISH CREEK	0.84
FLATELY BROOK	0.96
DD5	0.96
HOOSIC RIVER	0.97
DD4	0.98
ANTHONY KILL	0.98
DD3	0.98
DEEP KILL	0.98
DD2	0.98