Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh0@lehigh.edu, http://www.lehigh.edu/~brh0)
31October2010: platform moved to dock
The water level sensor (referenced to dock) settles for several days after moving platform to lake center and thus underestimates water level during this period.
Adjusted Tw sensors 13Nov07 based on comparison of depths and vs PUV & YSI sonde profiles (note that Tw at 11.3m matches PUV Tw at 12.5, probably within sediment boundary layer)
Tw12 adjusted to match others on bottom after moved to dock
Beaver dam bypass pipe installed 6Oct

5280 ft/mile
1609.3 m/mile

H310 sensor depth & Lake level are based on differential pressure
sensor with ca 0.1mm resolution & vertical position referenced to bottom of lake.
Sensor PSIG converted to depth using density of water at 4oC (1.43321 psi/m)
Lake level is referenced also to lower frame of dock at SE corner (2003-May2005)
(Actual water level at dock varies seasonally with density of water column and hourly from
precip, runoff, evaporation, seepage & outflow. Outflow also varies with status of beaver dam).

	Tair avg F	Tair max F	Tair min F		Rain-in	WS-mph	WS max mph					Tw 0.1m F	Tw 0.5m F	Tw 1m F	Tw 2m F	Tw 3m F	Tw 4m F	Tw 5m F	Tw 6m F	Tw 8m F	Tw 10m F	Tw 12m F						
	33.0	65.1	9.8		6.00	4.7	27					35.5	39.1	39.3	38.8	39.6	39.1	39.5	39.4	39.6	38.7	39.8						
Month summa avg Tw	Tair avg-C	Tair Hi-C	Tair Min-C	RHair-%	Rain-mm	WS-m/s	WS Max-m/s	WDIR-deg	Barom-mb	Sum Rad W/m2	Sum PAR uM/m2/s	Tw 0.1m	Tw 0.5m	Tw 1m	Tw 2m	Tw 3m	Tw 4m	Tw 5m	Tw 6m	Tw 8m	Tw02.3m	Tw02.8m	H310_z (m)	Lakelevel-mm (4oC)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
4.0	0.5	18.4	-12.3	75.8	152.5	2.1	12.1	233.1	966.3	387555634	767	1.9	3.9	4.0	3.8	4.2	3.9	4.2	4.1	4.2	3.7	4.3	2.3	64.6	154.2	12.5	30.1	14.5

month (All)

Data

Location	% records	Date	Day of Yr	Tair avg-C	Tair Hi-C	Tair Min-C	RHair-%	Rain-mm	WS-m/s	WS Max m/s	WDIR-deg	Barom-mb	Sum Rad J/m2	Sum PAR Mol/m2	Tw 0.1m	Tw 0.5m	Tw 1m	Tw 2m	TW3m	TW4m	TW5m	TW6m	TW8m	TW H310-C	TW12m	H310 depth-m (4oC)	Lakelevel-mm (4oC)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
ND	100%	3/1/2011	60	-1.7	2.5	-4.2	64.2	0.0	2.8	10.9	298	968.6	16351168	31	0.20	4.06	4.13	3.70	4.14	3.89	4.10	4.09	4.27	3.6	4.38	2.3	38.0	0.000	12.5	25.1	21.0
ND	100%	3/2/2011	61	0.0	5.2	-8.8	56.1	0.0	3.3	12.1	279	966.5	14342550	28	0.47	4.05	4.17	3.89	4.25	3.99	4.21	4.19	4.35	3.7	4.44	2.3	33.5	0.000	12.7	22.9	14.7
ND	100%	3/3/2011	62	-8.3	-3.2	-12.3	57.1	0.0	2.0	8.8	268	980.6	18732798	35	0.53	4.08	4.20	3.94	4.32	4.03	4.25	4.24	4.36	3.7	4.45	2.3	27.8	0.000	12.6	19.6	15.7
ND	100%	3/4/2011	63	-2.7	3.1	-9.3	64.2	0.0	0.9	6.6	151	981.3	15574797	31	0.60	4.10	4.23	4.02	4.40	4.11	4.33	4.32	4.49	3.8	4.61	2.3	23.2	0.000	12.6	20.4	14.6
ND	100%	3/6/2011	65	6.1	10.2	0.2	98.7	42.7	1.6	6.0	266	960.7	2338428	6	0.48	4.14	4.29	3.93	4.37	4.05	4.25	4.23	4.36	3.8	4.48	2.3	43.1	44.400	12.6	30.4	14.9
ND	100%	3/7/2011	66	-2.5	0.4	-5.5	83.6	7.5	4.2	12.1	311	961.9	18481271	36	0.32	4.06	4.18	3.93	4.34	4.06	4.28	4.23	4.35	3.8	4.47	2.4	97.8	51.900	12.5	28.7	15.3
ND	100%	3/8/2011	67	-1.3	6.1	-8.5	63.7	2.1	0.6	3.8	158	978.2	16816391	33	0.34	4.05	4.09	3.90	4.40	4.09	4.30	4.24	4.28	3.8	4.40	2.3	74.3	54.000	12.6	26.5	14.9
ND	100%	3/9/2011	68	-0.7	2.5	-3.4	74.2	0.0	2.1	8.6	89	978.9	6360079	14	0.45	4.16	4.24	3.91	4.39	4.02	4.28	4.22	4.37	3.8	4.49	2.3	57.7	54.000	12.6	23.4	14.4
ND	100%	3/10/2011	69	3.6	7.9	-0.5	98.8	60.4	2.8	8.7	88	965.9	3409820	8	0.68	4.10	4.22	3.90	4.35	4.02	4.26	4.20	4.35	3.8	4.48	2.3	66.5	114.400	12.6	28.2	13.7
ND	100%	3/11/2011	70	4.0	9.2	-0.6	88.8	15.8	1.7	7.8	231	955.5	6465661	14	0.20	4.00	4.21	3.89	4.40	4.10	4.34	4.29	4.37	3.8	4.49	2.4	152.7	130.200	12.6	38.2	15.2
ND	100%	3/12/2011	71	4.0	9.5	-0.9	74.7	0.0	1.7	6.8	249	956.8	11820381	24	0.49	4.13	4.22	4.02	4.49	4.20	4.41	4.35	4.47	3.9	4.62	2.4	111.8	130.200	12.5	37.2	13.9
ND	100%	3/13/2011	72	3.0	6.0	1.4	75.3	0.0	2.6	8.8	294	963.8	4285874	9	0.68	4.13	4.20	3.80	4.40	4.03	4.29	4.25	4.40	3.8	4.53	2.4	95.9	130.200	12.6	34.2	13.8
ND	100%	3/14/2011	73	-0.2	1.4	-3.7	80.2	0.0	2.3	7.7	290	973.2	7550962	16	0.72	4.21	4.29	3.89	4.44	4.06	4.31	4.27	4.41	3.9	4.54	2.4	86.4	130.200	12.5	31.0	14.1
ND	100%	3/15/2011	74	0.8	7.6	-6.5	78.3	0.2	0.7	6.2	166	975.8	17702313	35	2.23	4.31	4.39	3.96	4.46	4.12	4.33	4.31	4.42	3.9	4.60	2.3	78.1	130.400	12.6	32.6	14.1
ND	100%	3/16/2011	75	4.5	9.4	0.8	92.6	2.9	1.3	5.9	185	966.9	8079411	17	1.86	4.18	4.32	4.02	4.51	4.16	4.41	4.36	4.49	4.0	4.60	2.3	74.5	133.300	12.6	36.0	13.5
ND	100%	3/17/2011	76	7.0	14.2	-0.6	76.7	0.0	1.2	6.4	257	968.0	18464387	37	2.74	4.29	4.37	4.05	4.53	4.19	4.45	4.41	4.50	4.0	4.64	2.3	71.6	133.300	12.6	36.9	13.7
ND	100%	3/18/2011	77	13.7	18.4	8.5	52.9	0.0	2.3	10.2	270	960.7	13152665	27	3.41	4.37	4.39	4.08	4.51	4.25	4.49	4.44	4.52	4.0	4.67	2.3	68.1	133.300	12.7	37.5	13.3
ND	100%	3/19/2011	78	2.0	8.5	-2.1	73.8	0.0	3.5	9.6	320	971.7	5454742	11	3.64	4.02	4.13	3.90	4.28	3.97	4.23	4.18	4.25	3.8	4.42	2.3	63.4	133.300	12.6	31.5	13.8
ND	100%	3/20/2011	79	1.0	8.6	-5.9	58.1	0.0	0.9	4.3	181	980.4	21365960	41	2.75	4.04	4.11	3.85	4.32	4.06	4.31	4.28	4.33	3.8	4.49	2.3	58.2	133.300	12.5	31.4	14.0
ND	100%	3/21/2011	80	1.1	3.2	-0.7	100.7	10.3	0.8	5.7	134	965.5	2609506	7	2.75	4.04	4.16	3.93	4.35	4.07	4.28	4.21	4.31	3.8	4.43	2.3	63.2	143.600	12.5	29.9	13.9
ND	100%	3/22/2011	81	2.1	4.3	0.3	85.6	0.0	2.8	9.9	320	962.1	4792568	10	3.26	3.73	3.85	3.63	4.08	3.76	3.98	3.92	3.95	3.6	4.08	2.3	62.3	143.600	12.5	33.0	13.8
ND	100%	3/23/2011	82	-1.5	0.2	-3.1	100.4	0.0	1.3	5.8	96	955.9	753170	2	2.72	3.65	3.83	3.67	4.19	3.85	4.07	4.01	4.09	3.6	4.22	2.3	68.6	143.600	12.5	29.6	14.1
ND	100%	3/24/2011	83	-2.3	1.2	-4.5	81.7	8.1	2.9	8.0	244	954.0	17973742	35	3.35	3.55	3.68	3.55	4.04	3.74	3.99	3.94	3.94	3.5	4.12	2.3	72.2	151.700	12.5	30.8	14.1
ND	100%	3/25/2011	84	-4.7	-1.9	-7.1	71.6	0.1	2.7	9.2	311	961.0	18936501	37	3.14	3.33	3.44	3.27	3.76	3.45	3.70	3.64	3.60	3.3	3.80	2.3	65.1	151.800	12.7	29.1	14.8
ND	100%	3/26/2011	85	-5.5	-1.7	-9.3	70.6	0.0	2.7	8.6	298	962.7	22896347	43	3.05	3.34	3.47	3.34	3.78	3.48	3.71	3.67	3.67	3.3	3.85	2.3	59.2	151.800	12.6	27.4	14.9
ND	100%	3/27/2011	86	-4.2	-0.1	-7.6	63.4	0.7	3.2	10.1	315	961.8	23292081	44	3.14	3.34	3.47	3.32	3.74	3.45	3.68	3.64	3.64	3.3	3.79	2.3	53.4	152.500	12.6	27.9	14.7
ND	100%	3/28/2011	87	-3.2	2.0	-8.1	57.8	0.1	3.4	10.4	316	962.8	23626991	45	3.17	3.32	3.42	3.22	3.64	3.34	3.57	3.52	3.53	3.2	3.68	2.3	47.5	152.600	12.6	29.7	14.6
ND	100%	3/29/2011	88	-1.0	3.8	-5.4	64.8	0.0	3.0	9.8	309	966.3	23263061	45	3.33	3.49	3.58	3.37	3.75	3.47	3.68	3.63	3.67	3.3	3.82	2.3	42.6	152.600	12.6	30.0	14.2
ND	100%	3/30/2011	89	2.4	9.1	-3.8	67.9	0.1	0.8	4.5	205	965.6	19164289	38	3.82	4.03	4.03	3.84	4.11	3.94	4.15	4.12	4.22	3.6	4.38	2.3	40.2	152.700	12.6	31.3	13.6
ND	100%	3/31/2011	90	1.2	2.6	0.2	98.4	1.5	1.0	4.5	92	956.8	3497719	8	3.96	4.09	4.19	3.95	4.35	4.08	4.29	4.24	4.34	3.8	4.45	2.3	40.8	154.200	12.6	31.3	13.7
	0%																													

Lake water & energy budget daily summary from hourly data (negative values: loss from lake; runoff & seepage term is residual after adjusting lake level change for all others)

Ratio of lake watershed to lake area: **2.61767578** Runoff & seepage as % of watershed area precip: **92.6%**

Grand sum/avg	**0.73**	**1.91**	**3.95**	**4.05**	**3.80**	**4.24**	**3.94**	**1.8**	**399862318**	**-17101**	**2.1**	**154.2**	**372.6**	**-24.8**	**0.0**	**0.0**	SumTerrevap2=AirV PD,mbar*WS,m/s*s

1.000 <=SCALE ADJ (1.0=no adjustment)

4.184 joule/calorie (= joule/degree for 1cm3)

Nominal diffuse %R from water=7% | #N/A | #N/A | 5% | | 4 | 3.9 | 0.4 | | #N/A | -13.7

4.184 <=CONVERT HEAT TO DEGREES | 4.184 | intercept

7% | 0.9 | | | 6000000 cm3/m2 (for 0-4m integrated depth) | 6000000 | r2

Data

DATE	DayOfYr	AvgTair C	AvgTw 0.1m	AvgTw0.5m	Avg Tw1m	Avg Tw2m	Avg Tw3m	Avg Tw4m	AvgWS CSI m/s	SumRad J/m2	SumH Evap (*0.9=KJ/m2)	Sum Lk_lvl chg (mm)	SumRain mm	Sum Runoff & seepage, mm	SumLake evap (mm)	Sum Terrevap2	Solar Heat input (absorbed from solar rad), KJ/m2)	Sum H evap (KJ/m^2)	solar heat absorbed - evap loss (KJ/m^2)	% of absorbed solar heat lost via evap	Solar Heat input (absorbed from solar rad), Tw 0-6m)	starting Tw (0-6m)	ending Tw (0-6m)	actual dTw, 0-6m	RESID1: NON-SOLAR FLUX (Heat flux to offset absorbed solar to match dTw)	evap loss (degC 0-6m)	RESID2: NON-SOLAR FLUX to offset absorbed solar to match dTw LESS EVAP (degC 0-6m)
3/1/2011	60	-1.75	0.20	4.06	4.13	3.70	4.14	3.89	2.5	16351168	-853	-3.199	0.0	3.8	-1.2	0.0	15207	-768	14439	5.1%	0.61	3.77	3.93	0.16	(0.44)	-0.03	(0.41)
3/2/2011	61	-0.01	0.47	4.05	4.17	3.89	4.25	3.99	3.0	14342550	-1133	-5.800	0.0	1.6	-1.6	0.0	13339	-1019	12319	7.6%	0.53	3.93	4.00	0.07	(0.46)	-0.04	(0.42)
3/3/2011	62	-8.29	0.53	4.08	4.20	3.94	4.32	4.03	1.9	18732798	-1224	-4.816	0.0	2.2	-1.8	0.0	17422	-1101	16320	6.3%	0.69	4.00	4.08	0.07	(0.62)	-0.04	(0.58)
3/4/2011	63	-2.71	0.60	4.10	4.23	4.02	4.40	4.11	0.3	15574797	-465	-4.957	0.0	0.6	-0.7	0.0	14485	-418	14066	2.9%	0.58	4.08	4.09	0.01	(0.57)	-0.02	(0.55)
3/6/2011	64	6.24	0.76	4.11	4.20	4.00	4.35	4.07	0.7	12306685	371	2.496	1.7	4.9	0.5	0.0	11445	334	11779	-2.9%	0.46	4.09	4.03	(0.06)	(0.51)	0.01	(0.53)
3/7/2011	65	6.05	0.48	4.14	4.29	3.93	4.37	4.05	1.1	2338428	388	67.777	42.7	32.8	0.6	0.0	2175	350	2524	-16.1%	0.09	4.03	4.03	(0.00)	(0.09)	0.01	(0.10)
3/8/2011	66	-2.46	0.32	4.06	4.18	3.93	4.34	4.06	4.0	18481271	-894	-4.746	7.5	19.1	-1.3	0.0	17188	-804	16383	4.7%	0.68	4.03	4.06	0.03	(0.66)	-0.03	(0.63)
3/9/2011	67	-1.34	0.34	4.05	4.09	3.90	4.40	4.09	0.5	16816391	-330	-21.479	2.1	-8.2	-0.5	0.0	15639	-297	15342	1.9%	0.62	4.06	4.07	0.02	(0.60)	-0.01	(0.59)
3/10/2011	68	-0.68	0.45	4.16	4.24	3.91	4.39	4.02	1.9	6360079	-441	-12.655	0.0	-2.8	-0.6	0.0	5915	-397	5518	6.7%	0.24	4.07	4.00	(0.07)	(0.31)	-0.02	(0.29)
3/11/2011	69	3.64	0.68	4.10	4.22	3.90	4.35	4.02	2.6	3409820	584	80.643	60.4	34.5	0.8	0.0	3171	526	3697	-16.6%	0.13	4.00	3.99	(0.01)	(0.14)	0.02	(0.16)
3/12/2011	70	3.97	0.20	4.00	4.21	3.89	4.40	4.10	1.4	6465661	260	-3.937	15.8	102.2	0.4	0.0	6013	234	6247	-3.9%	0.24	3.99	4.11	0.12	(0.12)	0.01	(0.13)
3/13/2011	71	3.97	0.49	4.13	4.22	4.02	4.49	4.20	1.3	11820381	-111	-27.737	0.0	17.3	-0.2	0.0	10993	-100	10893	0.9%	0.44	4.11	4.06	(0.06)	(0.49)	0.00	(0.49)
3/14/2011	72	2.97	0.68	4.13	4.20	3.80	4.40	4.03	2.3	4285874	-257	-9.949	0.0	18.6	-0.4	0.0	3986	-231	3755	5.8%	0.16	4.06	4.03	(0.02)	(0.18)	-0.01	(0.17)
3/15/2011	73	-0.25	0.72	4.21	4.29	3.89	4.44	4.06	2.2	7550962	-432	-9.316	0.0	12.4	-0.6	0.0	7022	-389	6633	5.5%	0.28	4.03	4.06	0.02	(0.26)	-0.02	(0.24)
3/16/2011	74	0.75	2.23	4.31	4.39	3.96	4.46	4.12	0.4	17702313	-278	-6.679	0.2	9.9	-0.4	0.0	16463	-250	16213	1.5%	0.66	4.06	4.17	0.11	(0.55)	-0.01	(0.54)
3/17/2011	75	4.52	1.86	4.18	4.32	4.02	4.51	4.16	1.0	8079411	151	-1.476	2.9	10.1	0.2	0.0	7514	136	7650	-1.8%	0.30	4.17	4.15	(0.02)	(0.32)	0.01	(0.32)
3/18/2011	76	6.99	2.74	4.29	4.37	4.05	4.53	4.19	1.0	18464387	18	-3.375	0.0	10.1	0.0	0.0	17172	16	17188	-0.1%	0.68	4.15	4.30	0.15	(0.54)	0.00	(0.54)
3/19/2011	77	13.71	3.41	4.37	4.39	4.08	4.51	4.25	2.0	13152665	215	-4.078	0.0	7.8	0.3	0.0	12232	194	12426	-1.6%	0.49	4.30	4.20	(0.09)	(0.58)	0.01	(0.59)
3/20/2011	78	2.00	3.64	4.02	4.13	3.90	4.28	3.97	3.3	5454742	-1046	-5.800	0.0	6.4	-1.5	0.0	5073	-941	4132	18.6%	0.20	4.20	3.85	(0.35)	(0.55)	-0.04	(0.51)
3/21/2011	79	0.97	2.75	4.04	4.11	3.85	4.32	4.06	0.6	21365960	-508	-4.043	0.0	6.0	-0.7	0.0	19870	-457	19413	2.3%	0.79	3.85	4.16	0.31	(0.48)	-0.02	(0.46)
3/22/2011	80	1.08	2.75	4.04	4.16	3.93	4.35	4.07	0.4	2609506	-121	8.156	10.3	8.7	-0.2	0.0	2427	-109	2318	4.5%	0.10	4.16	4.08	(0.08)	(0.18)	0.00	(0.17)
3/23/2011	81	2.12	3.26	3.73	3.85	3.63	4.08	3.76	2.6	4792568	-534	-4.008	0.0	7.1	-0.8	0.0	4457	-481	3976	10.8%	0.18	4.08	3.77	(0.32)	(0.49)	-0.02	(0.48)
3/24/2011	82	-1.54	2.72	3.65	3.83	3.67	4.19	3.85	1.3	753170	-407	14.132	0.0	27.2	-0.6	0.0	700	-367	334	52.3%	0.03	3.77	3.91	0.14	0.11	-0.01	0.13
3/25/2011	83	-2.33	3.35	3.55	3.68	3.55	4.04	3.74	2.7	17973742	-1259	-5.800	8.1	1.7	-1.8	0.0	16716	-1133	15583	6.8%	0.67	3.91	3.48	(0.42)	(1.09)	-0.05	(1.05)
3/26/2011	84	-4.72	3.14	3.33	3.44	3.27	3.76	3.45	2.5	18936501	-1478	-6.679	0.1	6.6	-2.1	0.0	17611	-1330	16281	7.6%	0.70	3.48	3.41	(0.07)	(0.77)	-0.05	(0.72)
3/27/2011	85	-5.51	3.05	3.34	3.47	3.34	3.78	3.48	2.5	22896347	-1590	-5.871	0.0	6.0	-2.3	0.0	21294	-1431	19863	6.7%	0.85	3.41	3.26	(0.15)	(1.00)	-0.06	(0.94)
3/28/2011	86	-4.21	3.14	3.34	3.47	3.32	3.74	3.45	2.9	23292081	-1825	-5.730	0.7	4.5	-2.6	0.0	21662	-1643	20019	7.6%	0.86	3.26	3.33	0.07	(0.79)	-0.07	(0.73)
3/29/2011	87	-3.15	3.17	3.32	3.42	3.22	3.64	3.34	3.1	23626991	-1889	-5.765	0.1	4.2	-2.7	0.0	21973	-1700	20273	7.7%	0.88	3.33	3.38	0.05	(0.83)	-0.07	(0.76)
3/30/2011	88	-0.96	3.33	3.49	3.58	3.37	3.75	3.47	2.7	23263061	-1399	-3.902	0.0	4.8	-2.0	0.0	21635	-1259	20376	5.8%	0.86	3.38	3.62	0.24	(0.62)	-0.05	(0.57)
3/31/2011	89	2.43	3.82	4.03	4.03	3.84	4.11	3.94	0.6	19164289	-390	-0.492	0.1	6.3	-0.6	0.0	17823	-351	17472	2.0%	0.71	3.62	4.19	0.56	(0.15)	-0.01	(0.13)
#N/A	90	1.20	3.96	4.09	4.19	3.95	4.35	4.08	1.0	3497719	-226	1.160	1.5	6.1	-0.3	0.0	3253	#N/A	#N/A		#N/A				#N/A	#N/A	