Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh0@lehigh.edu, http://www.lehigh.edu/~brh0)
Station moved to dock on 9Nov08, between 11:38 and 12:30pm EDT
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

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						
	18.4	26.0	10.0		0.74	3.2	27					32.1	36.4	37.1	37.6	38.4	38.4	38.2	38.2	37.7	37.8	38.1						
Month summary	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	Tw02.1m	Tw02.6m	H310_z (m)	Lakelevel-mm (4oC)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
	-7.5	**-3.3**	**-12.2**	**81.1**	**18.7**	**1.4**	**12.2**	**201.7**	**960.8**	**171154423**	**347**	**0.1**	**2.5**	**2.9**	**3.1**	**3.6**	**3.6**	**3.5**	**3.4**	**3.2**	**3.2**	**3.4**	**2.0**	**20.4**	**18.7**	**12.3**	**14.8**	**15.5**

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
LC	100%	1/1/2009	1	-11.4	-8.4	-14.1	71.3	0.0	3.4	12.2	297	966.8	7063446	13	1	3	2.6	2.7	3.2	3.2	3.1	3.2	2.9	2.9	3.1	2.1	69.9	0.000	12.5	15.6	16.9
LC	100%	1/2/2009	2	-4.2	-0.6	-10.5	70.9	0.0	1.0	7.9	230	956.5	2694601	6	0	3	2.7	2.8	3.5	3.4	3.4	3.4	3.1	3.1	3.2	2.1	62.2	0.000	12.6	14.0	15.4
LC	100%	1/3/2009	3	-3.8	-1.9	-6.7	72.4	0.0	3.6	10.5	313	960.4	5488262	11	1	3	2.7	2.8	3.3	3.3	3.2	3.3	3.0	3.0	3.3	2.1	55.3	0.000	12.5	14.0	15.3
LC	100%	1/4/2009	4	-4.7	1.4	-11.5	73.4	0.0	1.3	6.3	277	963.8	6081254	12	0	3	2.7	2.9	3.5	3.5	3.5	3.5	3.1	3.2	3.3	2.1	48.0	0.000	12.6	14.2	15.6
LC	100%	1/5/2009	5	1.0	2.8	-2.9	73.4	0.6	1.9	7.2	297	960.4	3425019	7	0	3	2.8	3.0	3.5	3.5	3.5	3.5	3.2	3.2	3.4	2.1	42.5	0.600	12.7	13.1	14.3
LC	100%	1/6/2009	6	-4.4	-2.1	-6.0	67.6	0.0	1.0	4.2	157	960.6	3280733	7	0	3	2.8	3.0	3.6	3.6	3.6	3.5	3.2	3.4	3.4	2.1	37.6	0.600	12.6	14.0	15.3
LC	100%	1/7/2009	7	-1.2	0.7	-4.6	99.4	2.6	0.9	6.0	41	941.1	845778	2	0	3	2.9	3.1	3.6	3.6	3.6	3.5	3.2	3.3	3.4	2.1	46.0	3.200	12.5	13.3	14.4
LC	100%	1/8/2009	8	-3.2	-0.5	-6.6	86.2	0.0	0.0	0.0	0	942.6	4048138	11	0	3	2.9	3.0	3.5	3.5	3.4	3.4	3.1	3.2	3.4	2.1	44.2	3.200	12.5	13.9	14.8
LC	100%	1/9/2009	9	-6.6	-4.0	-9.0	81.5	0.0	0.0	0.0	0	960.3	5708231	14	0	3	2.9	3.1	3.5	3.6	3.5	3.5	3.2	3.3	3.4	2.1	37.7	3.200	12.4	14.6	15.9
LC	100%	1/10/2009	10	-8.8	-6.6	-11.7	96.1	0.0	0.0	0.0	0	966.3	2260827	6	0	3	2.9	3.1	3.7	3.7	3.6	3.6	3.3	3.3	3.4	2.1	33.6	3.200	12.5	15.0	16.1
LC	100%	1/11/2009	11	-8.0	-5.8	-13.8	96.8	0.0	0.0	0.0	0	958.3	3989857	10	0	3	3.0	3.1	3.6	3.6	3.6	3.5	3.2	3.3	3.4	2.1	37.1	3.200	12.4	14.7	15.3
LC	100%	1/12/2009	12	-9.0	-3.6	-15.2	90.6	0.0	0.4	5.5	94	965.3	5628162	13	0	3	3.0	3.2	3.7	3.7	3.6	3.6	3.3	3.3	3.5	2.1	31.5	3.200	12.4	15.3	15.9
LC	100%	1/13/2009	13	-3.9	0.0	-10.2	89.3	0.0	1.2	10.9	234	960.8	3180058	7	0	3	3.0	3.1	3.7	3.6	3.6	3.5	3.2	3.3	3.5	2.1	26.2	3.200	12.5	14.0	15.2
LC	100%	1/14/2009	14	-11.5	-2.6	-14.0	72.6	0.0	2.8	11.7	268	961.4	5435012	11	0	3	3.0	3.1	3.6	3.6	3.5	3.5	3.2	3.2	3.4	2.1	21.2	3.200	12.4	15.6	15.9
LC	100%	1/15/2009	15	-13.6	-10.4	-18.7	90.0	0.0	1.4	7.4	192	966.3	4584381	8	0	3	3.0	3.1	3.6	3.6	3.6	3.5	3.2	3.3	3.4	2.1	18.5	3.200	12.5	16.1	15.9
LC	100%	1/16/2009	16	-17.1	-13.9	-20.4	83.7	0.0	1.3	7.2	274	974.3	6210404	13	0	2	2.9	3.2	3.6	3.6	3.5	3.5	3.2	3.3	3.4	2.1	14.9	3.200	12.4	17.3	16.9
LC	100%	1/17/2009	17	-16.0	-9.9	-22.3	75.4	0.0	0.9	4.4	212	972.8	7249868	14	0	2	2.9	3.2	3.7	3.6	3.5	3.5	3.2	3.2	3.4	2.1	11.3	3.200	12.3	16.9	17.0
LC	100%	1/18/2009	18	-8.0	-4.0	-12.4	94.5	0.0	0.6	4.1	104	957.5	970301	2	0	2	2.9	3.1	3.6	3.6	3.5	3.5	3.2	3.2	3.4	2.1	12.0	3.200	12.4	14.7	15.4
LC	100%	1/19/2009	19	-7.7	-3.8	-12.5	90.5	0.0	0.6	4.5	227	949.9	2189793	4	0	2	2.9	3.1	3.6	3.6	3.5	3.5	3.2	3.2	3.4	2.1	10.4	3.200	12.4	14.9	14.8
LC	100%	1/20/2009	20	-11.1	-6.0	-18.5	85.3	0.0	1.9	8.2	264	952.0	4361169	11	0	2	2.9	3.1	3.6	3.6	3.5	3.4	3.2	3.2	3.4	2.1	6.7	3.200	12.3	15.8	15.3
LC	100%	1/21/2009	21	-10.5	-7.4	-12.8	75.9	0.1	2.3	7.4	297	957.7	7806764	15	0	2	2.9	3.1	3.6	3.6	3.4	3.4	3.2	3.2	3.4	2.1	3.4	3.300	12.3	15.3	15.7
LC	100%	1/22/2009	22	-6.5	-0.7	-10.9	82.6	0.0	1.5	7.6	269	959.9	6326041	13	0	2	2.9	3.1	3.6	3.6	3.4	3.4	3.2	3.2	3.4	2.1	0.1	3.300	12.3	14.6	15.3
LC	100%	1/23/2009	23	-2.1	6.3	-12.3	79.5	8.9	0.7	5.7	195	958.3	6381548	13	0	2	2.9	3.2	3.6	3.6	3.5	3.4	3.2	3.2	3.4	2.0	-2.9	12.200	12.4	14.2	15.1
LC	100%	1/24/2009	24	-5.5	5.0	-16.6	67.3	1.8	3.6	11.2	308	962.1	8656197	16	0	2	2.9	3.1	3.5	3.5	3.3	3.4	3.1	3.1	3.4	2.0	-5.7	14.000	12.6	14.4	15.1
LC	100%	1/25/2009	25	-14.0	-7.6	-21.1	83.0	0.0	1.1	7.1	239	969.8	8916335	17	0	2	2.8	3.2	3.6	3.6	3.5	3.5	3.2	3.2	3.5	2.0	-8.1	14.000	12.6	16.6	16.9
LC	100%	1/26/2009	26	-10.7	-5.2	-16.7	74.6	0.0	0.8	5.2	246	972.9	10640684	20	0	2	2.8	3.2	3.6	3.6	3.5	3.4	3.2	3.2	3.5	2.0	-10.3	14.000	12.6	15.7	16.4
LC	100%	1/27/2009	27	-7.2	-4.4	-9.2	65.1	0.0	1.2	4.9	239	974.9	7493748	15	0	2	2.8	3.2	3.6	3.6	3.5	3.4	3.2	3.2	3.4	2.0	-12.5	14.000	12.7	14.5	15.4
LC	100%	1/28/2009	28	-4.1	1.2	-8.0	96.4	3.9	2.2	12.0	149	957.9	634692	2	0	2	2.8	3.1	3.5	3.5	3.4	3.3	3.1	3.1	3.4	2.1	-2.0	17.900	12.7	13.9	14.8
LC	100%	1/29/2009	29	-6.2	-3.1	-8.9	76.8	0.7	2.4	10.7	287	958.6	11044228	21	0	2	2.8	3.2	3.5	3.5	3.4	3.4	3.2	3.1	3.4	2.1	4.6	18.600	12.6	14.5	14.7
LC	100%	1/30/2009	30	-4.4	-0.7	-8.0	80.0	0.1	1.6	7.7	263	957.2	7791240	15	0	2	2.8	3.2	3.6	3.6	3.4	3.4	3.2	3.2	3.4	2.1	0.8	18.700	12.7	14.1	14.7
LC	100%	1/31/2009	31	-9.3	-6.8	-12.0	72.7	0.0	2.0	9.9	283	959.5	10767650	20	0	2	2.8	3.2	3.6	3.5	3.4	3.4	3.2	3.1	3.5	2.0	-2.6	18.700	12.7	15.1	14.9

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: 3.88 — Runoff & seepage as % of watershed area precip: 59.5%

1.000 <=SCALE ADJ (1.0=no adjustment)
4.184 joule/calorie (= joule/degree for 1cm3)
Note: first adju

SumTerrevap2=AirVPD,mbar*WS,m/s*sc

0.9 — 50.0% <=%R that optimizes Tair-Tsurf

4.184 <=CONVERT HEAT TO DEGREES
6000000 cm3/m2 (for 0-4m integrated depth)

0.00000
0
0.05672

Data

DATE	DayOfYr	AvgTair C	AvgTw 0.1m	AvgTw0.5 m	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	Sum Out flow (lake mm)	sum in+out (mm)	Sum H evap (KJ/m^2)	solar heat absorbed - evap loss (KJ/m^2)		% of absorbed solar heat lost via evap	evap loss (degC 0-6m)	solar heat - evap loss (degC 0-6m)	starting Tw (0-6m)	ending Tw (0-6m)	actual Tw chg, 0-6m	non-evap heat exchange to balance solar heat gain (oC, 0-	residual lake exchange (non-evap xchg minus
Grand sum/avg		**-7.54**	**0.08**	**2.45**	**2.86**	**3.08**	**3.57**	**3.56**	**1.3**	**171154423**	**-22301**	**-78.9**	**18.7**	**43.0**	**-32.2**	**0.0**	**-109.0**	**-79.5**	**-20071.3**	**65505.9**		**29%**	**-0.8**	**2.6**	**3**	**#N/A**	**#N/A**	**#N/A**	**#N/A**
1/1/2009	1	-11.39	0.66	2.56	2.61	2.72	3.23	3.24	3.2	7063446	-1879	-8.894	0.0	0.1	-2.7	0.0	-6.7	-9.355	-1691	1841		47.9%	-0.07	0.1	2.8	3.0	0.21	0.14	(0.14)
1/2/2009	2	-4.22	0.45	2.61	2.66	2.78	3.47	3.43	0.8	2694601	-505	-6.925	0.0	-0.4	-0.7	0.0	-5.8	-6.925	-455	892		33.8%	-0.02	0.0	3.0	3.0	(0.01)	(0.04)	0.04
1/3/2009	3	-3.84	0.56	2.62	2.68	2.78	3.34	3.33	3.4	5488262	-1198	-7.136	0.0	0.5	-1.7	0.0	-5.9	-7.136	-1078	1666		39.3%	-0.04	0.1	3.0	3.0	0.00	(0.06)	0.06
1/4/2009	4	-4.73	0.34	2.70	2.74	2.91	3.54	3.51	1.2	6081254	-598	-6.785	0.0	-0.8	-0.9	0.0	-5.1	-6.785	-538	2502		17.7%	-0.02	0.1	3.0	3.2	0.13	0.03	(0.03)
1/5/2009	5	0.99	0.38	2.75	2.80	2.95	3.53	3.55	1.8	3425019	-313	-5.308	0.6	-0.8	-0.5	0.0	-4.7	-5.308	-281	1431		16.4%	-0.01	0.1	3.2	3.2	0.05	(0.01)	0.01
1/6/2009	6	-4.43	0.27	2.79	2.84	3.05	3.61	3.61	1.0	3280733	-510	0.281	0.0	5.1	-0.7	0.0	-4.1	0.281	-459	1181		28.0%	-0.02	0.0	3.2	3.3	0.06	0.02	(0.02)
1/7/2009	7	-1.19	0.21	2.82	2.87	3.05	3.64	3.61	0.8	845778	-133	8.226	2.6	10.0	-0.2	0.0	-4.2	8.226	-120	303		28.4%	0.00	0.0	3.3	3.2	(0.07)	(0.08)	0.08
1/8/2009	8	-3.24	0.42	2.82	2.89	2.99	3.46	3.49	0.0	4048138	-220	-7.207	0.0	-2.4	-0.3	0.0	-4.5	-7.207	-198	1826		9.8%	-0.01	0.1	3.2	3.2	(0.00)	(0.08)	0.08
1/9/2009	9	-6.62	0.38	2.86	2.93	3.05	3.55	3.56	0.0	5708231	-409	-6.433	0.0	-1.3	-0.6	0.0	-4.5	-6.433	-368	2486		12.9%	-0.01	0.1	3.2	3.3	0.09	(0.01)	0.01
1/10/2009	10	-8.76	0.17	2.89	2.95	3.14	3.68	3.66	0.0	2260827	-428	2.074	0.0	6.6	-0.6	0.0	-3.9	2.074	-385	745		34.1%	-0.02	0.0	3.3	3.3	0.03	(0.00)	0.00
1/11/2009	11	-8.01	0.10	2.86	2.95	3.14	3.64	3.64	0.0	3989857	-382	-1.969	0.0	2.6	-0.6	0.0	-4.0	-1.969	-344	1651		17.3%	-0.01	0.1	3.3	3.3	(0.02)	(0.08)	0.08
1/12/2009	12	-9.04	0.04	2.78	2.95	3.17	3.70	3.68	0.3	5628162	-517	-6.047	0.0	-0.4	-0.7	0.0	-4.9	-6.047	-465	2349		16.5%	-0.02	0.1	3.3	3.3	0.02	(0.08)	0.08
1/13/2009	13	-3.91	0.04	2.68	2.95	3.12	3.69	3.64	0.8	3180058	-338	-4.640	0.0	0.0	-0.5	0.0	-4.1	-4.640	-305	1285		19.2%	-0.01	0.1	3.3	3.2	(0.10)	(0.15)	0.15
1/14/2009	14	-11.50	0.06	2.63	2.95	3.09	3.59	3.56	2.6	5435012	-1445	-4.605	0.0	1.7	-2.1	0.0	-4.2	-4.605	-1300	1417		47.8%	-0.05	0.1	3.2	3.3	0.05	(0.00)	0.00
1/15/2009	15	-13.57	-0.03	2.53	2.95	3.15	3.57	3.62	1.3	4584381	-966	-2.496	0.0	2.9	-1.4	0.0	-4.0	-2.496	-869	1423		37.9%	-0.03	0.1	3.3	3.3	0.01	(0.05)	0.05
1/16/2009	16	-17.07	-0.04	2.47	2.94	3.15	3.65	3.60	1.2	6210404	-1100	-3.586	0.0	0.9	-1.6	0.0	-2.9	-3.586	-990	2115		31.9%	-0.04	0.1	3.3	3.3	(0.01)	(0.09)	0.09
1/17/2009	17	-15.99	-0.08	2.42	2.94	3.17	3.66	3.62	0.7	7249868	-920	-3.445	0.0	1.3	-1.3	0.0	-3.4	-3.445	-828	2797		22.8%	-0.03	0.1	3.3	3.2	(0.04)	(0.15)	0.15
1/18/2009	18	-7.97	-0.09	2.37	2.93	3.14	3.64	3.59	0.4	970301	-425	2.601	0.0	6.7	-0.6	0.0	-3.5	2.601	-382	103		78.8%	-0.02	0.0	3.2	3.3	0.02	0.02	(0.02)
1/19/2009	19	-7.68	-0.10	2.32	2.92	3.14	3.65	3.60	0.5	2189793	-456	-3.726	0.0	-0.6	-0.7	0.0	-2.5	-3.726	-411	684		37.5%	-0.02	0.0	3.3	3.2	(0.03)	(0.05)	0.05
1/20/2009	20	-11.14	-0.10	2.29	2.91	3.13	3.59	3.57	1.8	4361169	-1028	-3.551	0.0	0.0	-1.5	0.0	-2.1	-3.551	-925	1256		42.4%	-0.04	0.1	3.2	3.2	(0.01)	(0.06)	0.06
1/21/2009	21	-10.46	-0.10	2.25	2.89	3.15	3.56	3.55	2.1	7806764	-1145	-3.269	0.1	0.1	-1.7	0.0	-1.8	-3.269	-1030	2873		26.4%	-0.04	0.1	3.2	3.2	0.00	(0.11)	0.11
1/22/2009	22	-6.49	-0.11	2.21	2.88	3.15	3.57	3.56	1.3	6326041	-617	-3.164	0.0	-0.7	-0.9	0.0	-1.6	-3.164	-555	2608		17.5%	-0.02	0.1	3.2	3.2	0.01	(0.10)	0.10
1/23/2009	23	-2.08	-0.12	2.17	2.87	3.15	3.64	3.60	0.6	6381548	-263	-2.953	8.9	-9.9	-0.4	0.0	-1.6	-2.953	-237	2954		7.4%	-0.01	0.1	3.2	3.2	(0.04)	(0.16)	0.16
1/24/2009	24	-5.54	-0.08	2.15	2.87	3.11	3.50	3.46	3.3	8656197	-1252	-2.601	1.8	-0.4	-1.8	0.0	-2.2	-2.601	-1127	3201		26.0%	-0.04	0.1	3.2	3.2	0.02	(0.10)	0.10
1/25/2009	25	-13.99	-0.14	2.11	2.84	3.18	3.62	3.59	1.0	8916335	-910	-2.074	0.0	1.6	-1.3	0.0	-2.4	-2.074	-819	3639		18.4%	-0.03	0.1	3.2	3.2	0.01	(0.14)	0.14
1/26/2009	26	-10.69	-0.16	2.07	2.83	3.17	3.62	3.62	0.7	10640684	-726	-2.320	0.0	1.1	-1.0	0.0	-2.4	-2.320	-653	4667		12.3%	-0.03	0.2	3.2	3.2	(0.02)	(0.21)	0.21
1/27/2009	27	-7.18	-0.16	2.05	2.83	3.16	3.58	3.62	1.1	7493748	-708	-1.933	0.0	1.5	-1.0	0.0	-2.4	-1.933	-637	3110		17.0%	-0.03	0.1	3.2	3.2	0.01	(0.11)	0.11
1/28/2009	28	-4.12	-0.14	2.03	2.82	3.14	3.54	3.53	2.0	634692	-422	20.565	3.9	19.7	-0.6	0.0	-2.4	20.565	-380	-63		119.7%	-0.02	(0.0)	3.2	3.1	(0.15)	(0.15)	0.15
1/29/2009	29	-6.20	-0.07	2.08	2.82	3.16	3.51	3.48	2.2	11044228	-925	-4.711	0.7	-1.7	-1.3	0.0	-2.4	-4.711	-832	4690		15.1%	-0.03	0.2	3.1	3.2	0.16	(0.03)	0.03
1/30/2009	30	-4.38	-0.10	2.07	2.81	3.21	3.58	3.55	1.4	7791240	-535	-3.375	0.1	-0.3	-0.8	0.0	-2.4	-3.375	-482	3414		12.4%	-0.02	0.1	3.2	3.2	(0.03)	(0.16)	0.16
1/31/2009	31	-9.29	-0.09	2.06	2.81	3.22	3.56	3.54	1.8	10767650	-1029	-3.480	0.0	0.3	-1.5	0.0	-2.4	-3.611	-926	4458		17.2%	-0.04	0.2	3.2	#N/A	#N/A	#N/A	#N/A