Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh0@lehigh.edu, http://www.lehigh.edu/~brh0)
13Apr09: Station moved from dock from 2:30-3:30pm (problems with ice-shift anchors result in wind direction error until corrected on 10Jun09)
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

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).

5280	ft/mile	
1609.3	m/mile	

	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						
	43.9	51.1	37.3		1.20	4.2	28					47.6	47.8	47.8	47.6	47.7	47.5	47.7	47.6	47.1	47.0	46.7						
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	Tw10.2m	Tw11.5m	H310_z (m)	Lakelevel-mm (4oC)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
	6.6	**10.6**	**2.9**	**80.8**	**30.6**	**1.9**	**12.3**	**206.3**	**967.0**	**187945656**	**384**	**8.7**	**8.8**	**8.8**	**8.7**	**8.7**	**8.6**	**8.7**	**8.6**	**8.4**	**8.3**	**8.2**	**4.3**	**-2.6**	**30.6**	**12.5**	**17.4**	**23.2**

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%	11/1/2009	305	7.8	10.5	1.8	71.0	0.0	2.5	7.6	268	967.5	9746842	20	11	11	11.2	11.1	11.0	10.9	10.7	10.2	9.3	8.4	7.5	10.2	11.4	0.000	12.5	40.4	59.7
LC	100%	11/2/2009	306	4.7	11.5	-0.8	85.1	0.0	1.0	6.1	190	969.9	12944692	26	11	11	10.9	10.8	10.6	10.5	10.5	10.2	9.3	8.4	7.5	10.2	8.8	0.000	12.7	36.7	51.4
LC	100%	11/3/2009	307	6.2	11.5	2.3	79.0	0.0	2.0	9.7	277	966.0	7919271	16	10	11	10.6	10.5	10.4	10.4	10.4	10.2	9.3	8.3	7.5	10.2	7.2	0.000	12.7	35.3	51.2
LC	100%	11/4/2009	308	3.7	6.8	0.5	76.8	0.0	1.5	6.7	195	971.5	8828271	17	10	10	10.1	10.0	10.0	9.9	10.0	9.9	9.4	8.4	7.6	10.2	4.8	0.000	12.6	34.5	48.8
LC	100%	11/5/2009	309	3.6	7.2	1.3	86.8	2.1	2.2	10.9	253	966.3	7528958	15	10	10	9.8	9.7	9.7	9.7	9.7	9.7	9.4	8.4	7.6	10.2	3.8	2.100	12.7	34.0	50.9
#N/A	100%	11/6/2009	310	0.8	2.6	-2.2	80.5	0.0	3.0	8.5	306	970.4	3346687	7	9	9	9.1	9.1	9.1	9.0	9.1	9.1	9.0	8.7	7.8	10.2	3.6	2.100	12.6	30.5	60.5
LC	100%	11/7/2009	311	3.5	10.4	-4.1	72.7	0.0	1.7	7.7	214	969.3	11728105	23	9	9	8.7	8.7	8.6	8.6	8.6	8.6	8.4	8.4	8.0	10.2	0.1	2.100	12.5	33.1	53.3
LC	100%	11/8/2009	312	10.0	18.3	5.0	68.6	0.0	1.4	5.8	242	971.4	11771303	24	9	9	8.9	8.7	8.7	8.6	8.7	8.7	8.5	8.6	8.3	6.1	-1.1	2.100	12.7	25.3	34.8
ND	100%	11/9/2009	313	11.6	20.7	2.6	76.2	0.0	0.7	5.8	245	974.9	9591538	20	9	9	8.8	8.6	8.7	8.6	8.8	8.7	8.6	8.7	8.8	2.1	-2.1	2.100	12.6	11.0	12.0
ND	100%	11/10/2009	314	11.5	13.4	9.0	75.8	0.0	1.5	5.4	248	973.7	5390867	12	9	9	9.5	9.4	9.4	9.3	9.4	9.4	9.3	9.4	9.4	2.1	-2.5	2.100	12.6	10.8	11.8
ND	100%	11/11/2009	315	7.3	9.0	5.4	63.5	0.0	2.5	6.6	86	975.0	5807343	12	9	9	9.3	9.2	9.3	9.2	9.4	9.3	9.2	9.3	9.4	2.1	-4.7	2.100	12.6	11.4	12.4
ND	100%	11/12/2009	316	6.4	8.7	4.7	48.0	0.0	3.3	8.6	88	970.7	5375766	11	8	8	8.5	8.4	8.5	8.4	8.6	8.6	8.4	8.5	8.7	2.0	-8.9	2.100	12.5	11.6	12.6
ND	100%	11/13/2009	317	8.5	12.6	4.9	58.6	0.0	3.0	10.4	78	966.0	8029603	17	8	8	8.3	8.2	8.2	8.1	8.3	8.3	8.1	8.2	8.4	2.0	-12.5	2.100	12.5	11.2	12.1
ND	100%	11/14/2009	318	10.0	11.5	8.1	99.3	3.1	1.7	6.0	90	962.5	2069810	5	9	9	8.6	8.5	8.5	8.4	8.6	8.6	8.4	8.5	8.6	2.0	-10.2	5.200	12.6	10.9	11.9
ND	100%	11/15/2009	319	12.1	16.1	9.9	95.5	0.3	1.1	5.5	292	962.5	7293042	15	9	9	9.2	8.8	8.8	8.7	8.9	8.8	8.6	8.9	8.8	2.0	-7.8	5.500	12.6	10.6	11.6
ND	100%	11/16/2009	320	8.4	13.0	4.6	71.8	0.0	2.7	7.1	315	967.0	9442804	19	9	9	9.2	9.1	9.1	9.0	9.1	9.1	9.0	9.1	9.0	2.0	-8.6	5.500	12.6	11.3	12.4
ND	100%	11/17/2009	321	5.6	10.8	3.5	60.3	0.0	1.3	4.5	127	972.6	7559147	15	9	9	8.8	8.7	8.8	8.6	8.8	8.8	8.6	8.8	8.8	2.0	-11.5	5.500	12.6	11.8	12.9
ND	100%	11/18/2009	322	4.4	11.4	-0.6	82.6	0.0	0.7	4.8	148	976.6	9116533	18	8	8	8.4	8.3	8.3	8.2	8.4	8.3	8.2	8.3	8.5	2.0	-14.2	5.500	12.6	12.2	13.3
ND	100%	11/19/2009	323	7.9	13.1	3.2	100.5	8.2	1.2	5.6	99	972.0	2156987	5	8	9	8.6	8.4	8.5	8.4	8.6	8.5	8.4	8.5	8.5	2.0	-14.9	13.700	12.5	11.3	12.3
ND	100%	11/20/2009	324	8.6	13.0	3.6	84.2	12.6	1.8	7.5	269	964.5	5718423	12	9	9	8.7	8.6	8.6	8.5	8.7	8.6	8.5	8.6	8.6	2.1	3.1	26.300	12.5	11.3	12.4
ND	100%	11/21/2009	325	5.8	7.6	2.7	86.3	0.0	2.1	7.4	315	967.4	5231329	11	8	8	8.4	8.4	8.4	8.3	8.4	8.4	8.3	8.4	8.4	2.1	3.5	26.300	12.5	11.8	12.8
ND	100%	11/22/2009	326	5.3	6.5	2.3	92.4	0.0	1.7	4.9	184	973.2	1825092	4	8	8	8.1	8.1	8.2	8.0	8.2	8.2	8.1	8.1	8.2	2.1	1.8	26.300	12.5	11.8	12.8
ND	100%	11/23/2009	327	4.6	6.8	2.2	91.1	0.0	2.2	6.3	95	975.2	3776775	8	8	8	8.0	7.9	8.1	7.8	8.0	8.0	7.8	7.9	8.0	2.1	0.2	26.300	12.5	11.9	12.9
ND	100%	11/24/2009	328	6.9	11.0	5.2	98.9	0.2	1.0	3.6	91	969.6	3896860	8	8	8	8.1	8.1	8.2	8.0	8.2	8.2	8.0	8.1	8.1	2.1	0.0	26.500	12.5	11.5	12.5
ND	100%	11/25/2009	329	6.9	7.9	5.7	98.9	0.3	0.8	3.8	140	963.7	1749533	4	8	8	8.1	8.0	8.2	8.0	8.2	8.2	8.0	8.1	8.1	2.1	-0.3	26.800	12.5	11.5	12.5
ND	100%	11/26/2009	330	6.7	10.1	3.5	97.4	0.1	0.5	2.8	172	958.6	4421913	9	8	8	8.1	8.0	8.2	7.9	8.1	8.1	7.9	8.1	8.1	2.1	-0.8	26.900	12.5	11.6	12.6
ND	100%	11/27/2009	331	3.4	5.6	2.1	86.5	0.0	3.5	10.4	310	948.6	2807946	6	8	8	7.7	7.7	7.8	7.6	7.8	7.8	7.6	7.7	7.8	2.1	-2.5	26.900	12.5	12.1	13.2
ND	100%	11/28/2009	332	3.8	6.1	2.1	80.2	0.3	4.1	12.3	305	953.3	4273570	9	7	7	7.2	7.1	7.4	7.1	7.3	7.2	7.1	7.2	7.3	2.0	-6.2	27.200	12.5	12.1	13.1
ND	100%	11/29/2009	333	6.4	13.5	-0.6	73.7	0.0	1.1	6.3	257	957.7	7630937	15	7	7	7.0	6.9	7.4	6.9	7.1	6.9	6.8	6.9	7.1	2.0	-8.7	27.200	12.5	11.9	13.0
ND	100%	11/30/2009	334	6.3	11.9	0.2	82.1	3.4	2.1	7.6	292	952.9	965708	2	7	7	7.0	6.9	7.4	7.0	7.1	7.0	6.9	7.0	7.1	2.0	-7.6	30.600	12.5	11.7	12.8
	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: **3.88** Runoff & seepage as % of watershed area precip: **25.1%**

Grand sum/avg	**6.63**	**8.67**	**8.75**	**8.77**	**8.66**	**8.74**	**8.59**	**1.7**	**187945656**	**-25142**	**-19.4**	**30.6**	**29.8**	**-36.6**	**0.0**	**-43.5**
															SumTerrevap2=AirVPD,mbar*WS,m/s*sc	

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	Sum Out flow (lake mm)
11/1/2009	305	7.84	10.96	11.07	11.15	11.06	11.02	10.95	2.3	9746842	-1613	-3.445	0.0	1.0	-2.4	0.0	-2.2
11/2/2009	306	4.70	10.81	10.91	10.89	10.76	10.58	10.53	0.9	12944692	-979	-2.057	0.0	1.5	-1.4	0.0	-2.1
11/3/2009	307	6.30	10.40	10.51	10.56	10.47	10.43	10.38	1.9	7919271	-1314	-2.514	0.0	1.4	-1.9	0.0	-2.0
11/4/2009	308	3.71	9.97	10.08	10.11	10.03	9.97	9.92	1.4	8828271	-1269	-1.019	0.0	2.8	-1.9	0.0	-1.9
11/5/2009	309	3.61	9.61	9.74	9.80	9.73	9.70	9.67	2.0	7528958	-1401	0.914	2.1	2.7	-2.0	0.0	-1.9
11/6/2009	310	0.83	8.97	9.10	9.14	9.11	9.08	9.05	2.9	3346687	-2119	-2.672	0.0	2.2	-3.1	0.0	-1.8
11/7/2009	311	3.54	8.58	8.73	8.74	8.70	8.64	8.57	1.6	11728105	-1241	-3.058	0.0	0.2	-1.8	0.0	-1.5
11/8/2009	312	10.00	8.86	8.94	8.92	8.68	8.66	8.59	1.3	11771303	-433	-0.394	0.0	1.4	-0.6	0.0	-1.2
11/9/2009	313	11.56	9.06	8.85	8.79	8.64	8.69	8.59	0.6	9591538	-166	-1.301	0.0	0.1	-0.2	0.0	-1.2
11/10/2009	314	11.53	9.35	9.43	9.50	9.38	9.39	9.31	1.4	5390867	-286	-0.352	0.0	1.3	-0.4	0.0	-1.2
11/11/2009	315	7.25	9.13	9.25	9.30	9.22	9.29	9.19	2.3	5807343	-1458	-3.621	0.0	-0.3	-2.1	0.0	-1.2
11/12/2009	316	6.43	8.33	8.47	8.50	8.44	8.51	8.41	3.1	5375766	-2307	-4.851	0.0	-0.3	-3.4	0.0	-1.2
11/13/2009	317	8.54	8.14	8.25	8.28	8.18	8.22	8.11	2.7	8029603	-1306	-1.863	0.0	1.2	-1.9	0.0	-1.2
11/14/2009	318	10.01	8.51	8.51	8.59	8.47	8.54	8.45	1.6	2069810	135	5.027	3.1	2.9	0.2	0.0	-1.2
11/15/2009	319	12.10	9.34	9.23	9.22	8.80	8.78	8.70	1.0	7293042	201	-0.105	0.3	0.5	0.3	0.0	-1.2
11/16/2009	320	8.37	9.06	9.16	9.18	9.07	9.05	8.96	2.5	9442804	-1020	-1.898	0.0	0.8	-1.5	0.0	-1.2
11/17/2009	321	5.58	8.75	8.83	8.84	8.73	8.80	8.63	1.1	7559147	-1009	-2.601	0.0	0.1	-1.5	0.0	-1.2
11/18/2009	322	4.41	8.37	8.46	8.45	8.28	8.34	8.16	0.6	9116533	-589	-2.461	0.0	-0.4	-0.9	0.0	-1.2
11/19/2009	323	7.92	8.50	8.52	8.63	8.45	8.53	8.38	1.0	2156987	-4	5.589	8.2	-1.4	0.0	0.0	-1.2
11/20/2009	324	8.56	8.61	8.64	8.68	8.57	8.63	8.50	1.6	5718423	-473	13.605	12.6	3.5	-0.7	0.0	-1.8
11/21/2009	325	5.77	8.27	8.39	8.41	8.35	8.43	8.26	1.9	5231329	-703	-1.406	0.0	1.5	-1.0	0.0	-1.9
11/22/2009	326	5.33	8.02	8.13	8.14	8.09	8.23	8.05	1.5	1825092	-499	-1.582	0.0	0.9	-0.7	0.0	-1.8
11/23/2009	327	4.58	7.88	7.99	7.99	7.89	8.05	7.83	2.1	3776775	-737	-1.125	0.0	1.5	-1.1	0.0	-1.6
11/24/2009	328	6.88	8.03	8.11	8.12	8.06	8.22	8.04	0.9	3896860	-139	0.422	0.2	1.9	-0.2	0.0	-1.4
11/25/2009	329	6.86	8.01	8.09	8.11	8.04	8.20	8.03	0.7	1749533	-116	-0.633	0.3	0.5	-0.2	0.0	-1.2
11/26/2009	330	6.68	8.08	8.14	8.11	7.99	8.15	7.95	0.4	4421913	-119	-0.598	0.1	0.7	-0.2	0.0	-1.2
11/27/2009	331	3.42	7.64	7.75	7.73	7.68	7.77	7.63	3.3	2807946	-1531	-3.656	0.0	-0.2	-2.2	0.0	-1.2
11/28/2009	332	3.83	7.11	7.21	7.20	7.14	7.42	7.13	3.8	4273570	-1625	-3.129	0.3	0.1	-2.4	0.0	-1.2
11/29/2009	333	6.35	6.97	7.07	7.00	6.88	7.37	6.89	0.9	7630937	-453	-1.476	0.0	0.4	-0.7	0.0	-1.2
11/30/2009	334	6.33	6.88	6.97	6.98	6.93	7.43	6.96	1.9	965708	-568	2.812	3.4	1.3	-0.8	0.0	-1.2
#N/A																	

									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	16%		9	#N/A	#N/A		#N/A	#N/A
7.0%										
				4.184	<=CONVERT HEAT TO DEGREES				4.184	slope
				6000000	cm3/m2 (for 0-4m integrated depth)				6000000	intercept
	0.9									r2
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)
9065	-1451	7613	16.0%	0.36	10.93	10.77	(0.16)	(0.52)	-0.06	(0.46)
12039	-881	11158	7.3%	0.48	10.77	10.41	(0.36)	(0.84)	-0.04	(0.81)
7365	-1183	6182	16.1%	0.29	10.41	9.85	(0.56)	(0.85)	-0.05	(0.80)
8210	-1142	7068	13.9%	0.33	9.85	9.55	(0.29)	(0.62)	-0.05	(0.58)
7002	-1261	5741	18.0%	0.28	9.55	9.51	(0.04)	(0.32)	-0.05	(0.27)
3112	-1907	1205	61.3%	0.12	9.51	8.79	(0.72)	(0.85)	-0.08	(0.77)
10907	-1117	9790	10.2%	0.43	8.79	8.56	(0.22)	(0.66)	-0.04	(0.61)
10947	-390	10557	3.6%	0.44	8.56	8.77	0.21	(0.23)	-0.02	(0.21)
8920	-149	8771	1.7%	0.36	8.77	8.93	0.16	(0.20)	-0.01	(0.19)
5014	-258	4756	5.1%	0.20	8.93	9.59	0.66	0.46	-0.01	0.47
5401	-1312	4089	24.3%	0.22	9.59	8.81	(0.77)	(0.99)	-0.05	(0.94)
4999	-2077	2923	41.5%	0.20	8.81	8.12	(0.69)	(0.89)	-0.08	(0.81)
7468	-1175	6292	15.7%	0.30	8.12	8.36	0.23	(0.06)	-0.05	(0.02)
1925	122	2047	-6.3%	0.08	8.36	8.68	0.32	0.24	0.00	0.24
6783	181	6963	-2.7%	0.27	8.68	8.83	0.15	(0.12)	0.01	(0.13)
8782	-918	7863	10.5%	0.35	8.83	8.79	(0.04)	(0.39)	-0.04	(0.36)
7030	-908	6122	12.9%	0.28	8.79	8.50	(0.28)	(0.56)	-0.04	(0.53)
8478	-530	7948	6.3%	0.34	8.50	8.19	(0.31)	(0.65)	-0.02	(0.63)
2006	-3	2003	0.2%	0.08	8.19	8.39	0.20	0.12	0.00	0.12
5318	-425	4893	8.0%	0.21	8.39	8.36	(0.03)	(0.24)	-0.02	(0.22)
4865	-633	4233	13.0%	0.19	8.36	8.16	(0.20)	(0.40)	-0.03	(0.37)
1697	-449	1249	26.4%	0.07	8.16	7.86	(0.30)	(0.36)	-0.02	(0.35)
3512	-663	2849	18.9%	0.14	7.86	8.00	0.14	(0.00)	-0.03	0.02
3624	-125	3499	3.4%	0.14	8.00	8.23	0.23	0.09	0.00	0.09
1627	-104	1523	6.4%	0.06	8.23	8.02	(0.21)	(0.28)	0.00	(0.27)
4112	-107	4005	2.6%	0.16	8.02	8.04	0.02	(0.15)	0.00	(0.14)
2611	-1378	1233	52.8%	0.10	8.04	7.27	(0.77)	(0.87)	-0.05	(0.82)
3974	-1463	2512	36.8%	0.16	7.27	6.94	(0.33)	(0.49)	-0.06	(0.43)
7097	-408	6689	5.7%	0.28	6.94	7.09	0.15	(0.13)	-0.02	(0.11)
898	-512	386	57.0%	0.04	7.09	#N/A	#N/A	#N/A	-0.02	#N/A
	#N/A	#N/A		#N/A				#N/A	#N/A	