

Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh@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 40C (1.43321 psalm)  
 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).

Month summary	Tair avg F		Tair max	Tair min F	Tair min C	RHair-%	Rain-mm	WS-mpH	WS max mpr	WS m/s	WS max m/s	WDIR-deg	Barom-mb	Sum Rad W/m2	Sum PAR μMm2/s	Tw 0.1m	Tw 0.5m	Tw 1m	Tw 2m	Tw 3m	Tw 4m	Tw 5m	Tw 6m	Tw 8m	Tw 10m	Tw 12m	H310_z (m)	Lakelevel-enc (40C)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
	68.9	76.7	81.8	4.00	3.4	21	4.00	3.4	21	258	966.4	578610897	1217	25.1	25.1	25.1	24.6	23.3	18.8	13.8	10.7	7.9	7.3	45.2	45.2	10.2	-13.5	101.5	12.6	13.2	26.8	

Data

Location	% records	Date	Day of Yr	Tair avg-C	Tair Hi-C	Tair Min-	RHair-%	Rain-mm	WS-m/s	WS Max-WDIR-	Barom-mb	Sum Rad J/m2	Mol/m2	Tw 0.1m	Tw 0.5m	Tw 1m	Tw 2m	Tw 3m	Tw 4m	Tw 5m	Tw 6m	Tw 8m	Tw 10m	Tw 12m	H310 depth-m (40C)	Lakelevel-enc (40C)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc	
LC	100%	8/1/2009	213	20.7	25.4	15.0	83.8	0.2	1.5	5.9	204	967.5	24575043	52	25	24	24.2	23.9	22.6	17.7	12.9	10.2	7.7	7.3	7.3	10.2	4.0	0.200	12.6	10.2	22.7
LC	100%	8/2/2009	214	20.3	22.0	19.1	97.3	18.4	1.3	6.1	181	962.8	7499144	16	24	24	24.4	24.0	22.6	17.8	13.0	10.2	7.7	7.3	7.3	10.2	9.3	18.600	12.6	10.0	25.1
LC	100%	8/3/2009	215	20.0	24.6	16.3	80.1	0.0	1.2	5.1	231	965.6	26488594	55	25	25	24.2	23.9	22.7	17.9	13.1	10.3	7.7	7.3	7.3	10.2	12.1	18.600	12.6	10.2	23.0
LC	100%	8/4/2009	216	21.1	24.3	18.4	84.4	0.1	1.7	6.2	282	964.5	23492007	49	25	25	24.7	24.1	22.7	17.9	13.1	10.3	7.7	7.3	7.3	10.2	4.5	18.700	12.6	10.4	21.2
LC	100%	8/5/2009	217	21.3	24.7	16.4	84.1	0.0	1.8	7.6	282	963.1	18468279	39	25	25	25.1	24.4	22.7	17.9	13.1	10.3	7.8	7.3	7.3	10.2	-1.1	18.700	12.6	10.3	22.2
LC	100%	8/6/2009	218	17.5	22.5	11.6	77.9	0.0	1.8	6.9	289	965.3	25784019	54	25	25	24.7	24.4	22.8	18.0	13.2	10.3	7.8	7.3	7.3	10.2	-7.4	18.700	12.6	10.3	19.2
LC	100%	8/7/2009	219	17.3	22.3	12.2	76.0	0.0	2.4	9.2	291	968.3	25173289	52	24	24	24.3	24.2	23.0	18.0	13.2	10.4	7.8	7.3	7.3	10.2	-14.5	18.700	12.6	10.3	19.0
LC	100%	8/8/2009	220	17.0	21.9	9.5	75.5	0.0	1.0	3.9	221	972.5	21439519	44	24	24	23.8	23.6	23.2	18.1	13.2	10.4	7.8	7.3	7.3	10.2	-21.1	18.700	12.6	10.3	18.4
LC	100%	8/9/2009	221	19.9	23.8	17.1	95.2	6.4	1.5	5.3	209	967.8	6718441	15	24	24	23.7	23.6	22.9	18.2	13.3	10.4	7.8	7.3	7.3	10.2	-21.7	25.100	12.6	10.4	22.9
LC	100%	8/10/2009	222	23.4	29.2	19.9	82.9	2.0	1.3	5.0	258	963.5	21584374	46	24	24	24.0	23.5	23.2	18.3	13.3	10.5	7.8	7.3	7.3	10.2	-13.3	27.100	12.6	11.6	24.8
LC	100%	8/11/2009	223	22.6	26.5	20.0	86.4	0.1	1.8	7.6	286	962.1	20556598	44	25	25	25.0	23.9	23.0	18.4	13.4	10.5	7.8	7.3	7.3	10.2	-22.6	27.200	12.6	11.5	25.2
LC	100%	8/12/2009	224	21.6	26.4	18.4	85.2	12.0	1.1	6.2	170	965.1	19717551	42	25	25	25.3	24.3	23.0	18.5	13.4	10.5	7.8	7.3	7.3	10.2	-25.1	27.200	12.6	11.8	26.2
LC	100%	8/13/2009	225	20.1	24.1	18.6	94.4	16.0	1.6	5.4	118	969.0	14769066	32	25	25	25.3	24.6	23.1	18.7	13.5	10.6	7.8	7.3	7.3	10.2	-5.1	55.200	12.6	11.8	39.3
LC	100%	8/14/2009	226	21.6	27.7	17.8	88.0	0.0	0.9	3.0	211	971.2	21179260	45	26	25	25.2	24.8	23.1	18.8	13.6	10.6	7.8	7.3	7.3	10.2	-3.9	55.200	12.6	12.9	29.9
LC	100%	8/15/2009	227	22.6	28.4	17.2	84.8	0.1	1.2	4.8	244	971.7	24261458	51	26	26	25.7	25.0	23.2	18.9	13.7	10.7	7.9	7.3	7.3	10.2	-8.4	55.300	12.6	12.8	27.2
LC	100%	8/16/2009	228	23.4	29.2	19.9	82.9	2.0	1.3	5.0	258	963.5	21584374	46	24	24	24.0	23.5	23.2	18.3	13.3	10.5	7.8	7.3	7.3	10.2	-13.3	27.100	12.6	13.2	26.5
LC	100%	8/17/2009	229	24.6	30.7	19.0	79.7	0.0	1.2	5.0	253	971.3	20409680	50	27	27	26.6	25.6	23.3	19.0	13.8	10.7	7.9	7.3	7.3	10.2	-18.3	55.300	12.6	13.7	26.8
LC	100%	8/18/2009	230	24.3	29.3	19.5	80.7	0.0	1.6	6.2	241	967.7	23438443	47	27	27	27.0	25.9	23.4	19.0	13.9	10.7	7.9	7.3	7.3	10.2	-23.6	55.300	12.6	13.5	26.4
LC	100%	8/19/2009	231	22.3	26.7	19.3	91.1	1.1	1.5	5.9	265	965.2	16030111	34	27	27	27.1	26.2	23.5	19.1	14.0	10.8	7.9	7.3	7.4	10.2	-28.1	56.400	12.6	13.2	27.8
LC	100%	8/20/2009	232	22.8	27.3	17.5	91.3	0.0	1.5	6.7	200	964.2	19541395	42	27	27	26.9	26.4	23.6	19.1	14.0	10.8	7.9	7.3	7.4	10.2	-31.3	56.400	12.6	14.3	28.5
LC	100%	8/21/2009	233	22.7	26.0	19.9	95.8	28.1	1.6	7.1	209	962.1	6757074	15	26	26	26.6	26.4	23.7	19.2	14.1	10.9	7.9	7.3	7.4	10.2	-20.8	84.500	12.6	14.4	31.4
LC	100%	8/22/2009	234	21.8	25.6	18.7	95.5	2.1	1.1	4.4	156	961.2	12523028	27	26	26	25.9	25.7	23.8	19.3	14.2	10.9	7.9	7.4	7.4	10.2	-2.4	86.600	12.6	15.4	32.3
LC	100%	8/23/2009	235	21.0	22.7	18.1	93.3	0.0	1.7	5.9	284	961.6	14910557	32	26	26	26.0	25.5	24.0	19.3	14.3	11.0	7.9	7.3	7.4	10.2	-4.9	86.600	12.6	15.4	31.4
LC	100%	8/24/2009	236	19.3	23.3	16.3	88.0	0.0	1.6	7.0	290	967.8	17307121	37	25	25	25.5	25.4	24.1	19.4	14.3	11.0	7.9	7.4	7.4	10.2	-9.4	86.600	12.6	14.7	30.1
LC	100%	8/25/2009	237	20.0	25.7	14.6	85.1	0.0	1.1	5.5	252	969.6	23641841	50	26	25	25.3	25.0	24.3	19.4	14.4	11.0	7.9	7.3	7.4	10.2	-14.4	86.600	12.6	15.3	28.9
LC	100%	8/26/2009	238	20.6	25.3	16.7	87.5	0.2	2.0	7.3	269	966.2	18161126	38	25	25	25.3	25.1	24.3	19.4	14.4	11.1	7.9	7.3	7.4	10.2	-19.4	86.800	12.6	15.0	29.5
LC	100%	8/27/2009	239	18.7	22.3	15.5	75.0	0.1	1.6	6.9	247	968.6	23408072	49	25	25	25.1	24.9	24.4	19.5	14.5	11.1	7.9	7.4	7.4	10.2	-24.1	86.900	12.6	15.0	29.4
LC	100%	8/28/2009	240	15.6	17.4	13.9	95.2	11.2	1.6	4.6	83	968.4	2276218	5	24	24	24.4	24.3	24.1	19.5	14.5	11.1	7.9	7.4	7.4	10.2	-25.7	88.100	12.6	20.1	29.4
LC	100%	8/29/2009	241	19.0	22.3	16.7	91.1	3.2	1.4	5.1	151	969.0	6963299	15	23	23	23.6	23.4	23.0	19.6	14.6	11.1	7.9	7.4	7.4	10.2	-19.7	101.300	12.6	19.3	31.4
LC	100%	8/30/2009	242	18.1	21.6	15.3	83.5	0.2	1.9	7.1	255	962.2	22457143	47	23	23	23.4	23.3	23.0	19.9	14.6	11.2	8.0	7.3	7.4	10.2	-18.9	101.500	12.6	18.2	32.1
LC	100%	8/31/2009	243	14.3	18.1	11.1	79.1	0.0	2.2	8.6	267	969.5	21567358	44	23	23	22.9	22.8	22.7	20.3	14.6	11.2	8.0	7.4	7.4	10.2	-24.5	101.500	12.6	15.2	30.1

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

Ratio of lake watershed to lake area		Runoff & seepage as % of watershed area precip		WS Max-WDIR-		Sum PAR		Sum Rad J/m2		Sum H310 depth-m (40C)		Lakelevel-enc (40C)		cumul. rain-mm		Batt min-V		RH% CR10 enc		RH% MUX enc		
3.88		17.2%		1.4		578610897		-71671		-34.8		101.5		67.5		-106.0		-16.3		-81.8		
DATE	DayOfYr	AvgTair-C	AvgTw 0.1m	AvgTw 0.5m	Avg Tw1m	Avg Tw2m	Avg Tw3m	Avg Tw4m	AvgWS m/s	SumRad J/m2	SumH310 depth-m (40C)	SumH310 depth-m (40C)	SumLake level-enc (40C)	SumTerrepap2=AirV PD.mbar*WS.m/s*sc	SumRunoff & seepage	SumLake evap (mm)	Sum Terrepap2	Sum Outflow (lake mm)	RESID1: NON-SOLAR FLUX (Heat flux to offset absorbed solar to reach 0°C)	RESID2: NON-SOLAR FLUX to offset absorbed solar to reach 0°C LESS EVAP (degC*2mm)	evap loss (degC*0.8mm)	offset (degC*0.8mm)
8/1/2009	213	20.68	24.55	24.38	24.20	23.87	22.59	17.70	1.4	24575043	-2130	-8.714	0.2	-0.6	-3.2	-0.6	-2.6	0.11	(0.80)	-0.08	(0.73)	
8/2/2009	214	20.30	24.16	24.31	24.37	23.98	22.64	17.83	1.2	7499144	-1241	-15.187	18.4	1.3	-1.8	-0.1	-2.6	0.15	(0.33)	-0.04	(0.29)	
8/3/2009	215	20.04	24.65	24.56	24.22	23.88	22.66	17.87	1.0	26488594	-2282	-7.628	0.0	-1.1	-3.4	-0.6	-2.6	0.06	(0.82)	-0.08	(0.74)	
8/4/2009	216	21.14	24.68	24.74	24.67	24.07	22.70	17.92	1.6	23438375	-2154	-6.750	0.1	-0.2	-3.2	-0.9	-2.6	0.05	(0.82)	-0.08	(0.74)	
8/5/2009	217	21.32	24.93	25.04	25.11	24.36	22.70	17.92	1.6	18468279	-2299	-5.800	0.0	0.9	-3.4	-0.7	-2.6	0.21	(0.47)	-0.08	(0.39)	
8/6/2009	218	17.50	24.57	24.68	24.74	24.42	22.78	17.98	1.6	25784019	-3817	-6.539	0.0									