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

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						
	26.8	60.4	-1.3		2.21	4.6	36					32.0	37.5	38.6	38.7	39.5	38.9	39.1	39.0	39.2	38.5	39.4						
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
3.8	-2.9	15.8	-18.5	74.1	56.2	2.0	16.3	234.8	961.6	259668378	513	0.0	3.0	3.6	3.7	4.1	3.8	4.0	3.9	4.0	3.6	4.1	2.3	-1.7	56.2	12.4	20.5	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
ND	100%	2/1/2011	32	-8.0	-6.3	-10.1	95.4	0.0	1.5	4.8	71	969.3	1863476	4	-0.12	2.70	3.49	3.65	4.21	3.86	3.88	3.83	4.05	3.8	4.11	2.3	-7.8	0.000	12.5	15.9	14.8
ND	100%	2/2/2011	33	-2.9	1.9	-6.3	94.9	0.0	2.4	9.8	155	956.5	3624362	8	-0.11	2.68	3.48	3.65	4.15	3.83	3.85	3.81	3.99	3.7	4.04	2.3	6.0	0.000	12.4	17.9	14.5
ND	100%	2/3/2011	34	-7.3	-3.0	-12.8	72.4	0.0	2.9	10.6	295	969.3	12610390	23	-0.07	2.73	3.48	3.68	4.14	3.82	3.85	3.77	3.87	3.7	3.96	2.3	3.6	0.000	12.4	20.6	14.3
ND	100%	2/4/2011	35	-6.4	-0.2	-12.4	71.5	0.0	1.3	9.1	256	967.7	12939515	24	-0.09	2.75	3.47	3.73	4.17	3.82	3.89	3.83	4.01	3.7	4.08	2.3	-0.6	0.000	12.6	19.6	14.8
ND	100%	2/5/2011	36	-1.7	2.0	-5.9	91.9	0.0	1.0	9.7	156	954.1	2638998	5	-0.09	2.74	3.47	3.67	4.17	3.82	3.91	3.86	4.03	3.7	4.09	2.3	-2.2	0.000	12.6	18.0	14.6
ND	100%	2/6/2011	37	-0.1	3.2	-2.7	83.3	0.9	2.8	13.9	278	956.8	9293585	18	-0.05	2.74	3.47	3.66	4.14	3.85	3.91	3.84	3.94	3.6	4.03	2.3	-2.7	0.900	12.6	23.8	14.0
ND	100%	2/7/2011	38	-0.5	3.2	-4.2	88.4	2.6	0.4	3.1	200	959.1	4481170	10	-0.09	2.73	3.45	3.69	4.23	3.87	3.94	3.86	4.02	3.7	4.10	2.3	-5.8	3.500	12.6	19.7	14.0
ND	100%	2/8/2011	39	-5.3	0.2	-12.3	87.8	0.0	3.1	11.3	255	954.1	3668544	8	-0.05	2.73	3.47	3.62	4.10	3.79	3.85	3.81	3.96	3.6	4.03	2.3	-5.3	3.500	12.5	19.6	14.0
ND	100%	2/9/2011	40	-9.5	-3.2	-15.5	63.8	0.0	1.7	7.8	259	965.2	10233155	19	-0.08	2.73	3.47	3.68	4.12	3.78	3.88	3.83	3.93	3.6	4.03	2.3	-8.0	3.500	12.4	17.6	14.4
ND	100%	2/10/2011	41	-9.7	-6.2	-13.8	59.5	0.0	2.0	7.3	289	962.1	14456583	26	-0.08	2.71	3.49	3.69	4.16	3.83	3.90	3.82	4.00	3.6	4.09	2.3	-10.9	3.500	12.6	18.7	14.3
ND	100%	2/11/2011	42	-8.9	-1.5	-16.7	64.2	0.1	1.0	7.9	253	963.9	12184345	23	-0.08	2.71	3.48	3.67	4.15	3.82	3.89	3.81	4.00	3.6	4.09	2.3	-13.5	3.600	12.6	18.2	14.6
ND	100%	2/12/2011	43	-4.2	-0.8	-9.0	66.1	0.0	2.1	8.9	268	959.2	5918722	12	-0.07	2.68	3.48	3.64	4.11	3.79	3.83	3.76	3.96	3.6	4.00	2.3	-15.8	3.600	12.6	16.8	14.3
ND	100%	2/13/2011	44	-1.3	5.3	-11.8	69.2	2.6	1.2	8.2	240	959.8	7469654	15	-0.08	2.64	3.46	3.69	4.12	3.76	3.87	3.76	3.87	3.6	3.96	2.2	-17.6	6.200	12.6	18.7	14.2
ND	100%	2/14/2011	45	5.6	11.0	-2.2	60.6	0.0	3.3	12.2	264	949.0	8402158	17	0.00	2.66	3.49	3.63	4.05	3.76	3.87	3.74	3.88	3.6	3.94	2.2	-19.8	6.200	12.6	24.1	14.0
ND	100%	2/15/2011	46	-6.2	-2.4	-9.5	58.9	0.0	3.9	12.5	304	970.4	15674270	29	0.01	2.67	3.48	3.66	4.08	3.84	4.00	3.91	3.95	3.5	4.04	2.2	-21.4	6.200	12.6	20.7	14.1
ND	100%	2/16/2011	47	-0.7	7.0	-9.7	56.0	0.0	0.8	6.2	224	970.3	13549493	26	-0.03	2.78	3.54	3.74	4.23	3.94	4.08	4.01	4.10	3.6	4.16	2.2	-22.9	6.200	12.6	21.5	14.2
ND	100%	2/17/2011	48	6.8	15.5	0.8	71.1	0.0	0.7	6.9	230	966.1	10986789	23	-0.01	2.89	3.55	3.73	4.25	3.94	4.11	4.04	4.10	3.6	4.17	2.2	-23.7	6.200	12.6	24.9	13.9
ND	99%	2/18/2011	49	11.3	15.8	5.6	63.7	0.0	2.2	14.3	252	956.3	10778840	22	0.05	2.99	3.63	3.74	4.23	3.89	4.05	4.00	4.12	3.6	4.19	2.2	-19.4	6.200	12.7	28.4	13.4
ND	100%	2/19/2011	50	-1.8	7.1	-8.8	59.4	0.0	5.9	16.3	309	956.3	7268077	15	0.32	3.11	3.72	3.75	4.07	3.81	3.99	3.94	4.00	3.6	4.07	2.3	-11.6	6.200	12.6	21.0	14.4
ND	100%	2/20/2011	51	-5.4	0.2	-9.7	66.9	0.0	3.2	12.5	293	966.7	15497550	29	0.25	3.27	3.77	3.89	4.25	3.97	4.17	4.12	4.17	3.7	4.25	2.3	-8.4	6.200	12.5	20.1	14.9
ND	100%	2/21/2011	52	-5.0	-2.2	-10.1	81.9	0.0	2.3	8.1	135	957.0	5209672	14	0.13	3.29	3.70	3.68	4.14	3.81	4.04	3.94	3.91	3.6	4.04	2.3	6.7	6.200	12.5	17.8	14.2
ND	100%	2/22/2011	53	-9.4	-2.4	-15.2	64.5	0.1	1.9	5.9	284	964.7	17141411	32	0.08	3.42	3.80	3.59	4.02	3.74	3.98	3.91	3.91	3.5	4.03	2.3	7.8	6.300	12.5	19.1	14.4
ND	100%	2/23/2011	54	-8.2	4.4	-18.5	68.1	8.2	0.7	4.8	204	971.2	17091710	33	0.06	3.60	4.00	3.76	4.12	3.83	4.00	3.95	4.03	3.6	4.13	2.3	5.8	14.500	12.4	22.5	14.7
ND	100%	2/24/2011	55	-4.2	6.6	-15.3	81.6	0.4	0.5	5.1	198	966.5	8434218	18	0.04	3.61	4.01	3.88	4.23	3.91	4.04	3.96	4.06	3.7	4.13	2.3	4.4	14.900	12.4	18.7	14.9
ND	100%	2/25/2011	56	-0.4	1.3	-3.0	97.2	31.7	2.7	13.3	198	951.2	1512005	4	0.07	3.57	4.06	3.90	4.25	3.96	4.09	4.00	4.13	3.7	4.23	2.3	28.2	46.600	12.5	19.8	15.5
ND	100%	2/26/2011	57	-2.7	0.7	-6.4	70.2	0.1	1.7	6.9	256	965.4	12631657	25	0.04	3.67	4.02	3.69	4.13	3.81	4.02	3.97	3.99	3.6	4.12	2.3	38.5	46.700	12.5	21.4	22.9
ND	100%	2/27/2011	58	1.0	5.3	-1.1	77.4	0.0	1.2	7.7	227	961.5	10843108	22	0.08	4.03	4.02	3.55	4.06	3.75	3.97	3.95	4.06	3.5	4.17	2.3	32.9	46.700	12.7	23.4	22.9
ND	100%	2/28/2011	59	4.2	10.4	-1.6	88.8	9.5	2.6	10.3	222	955.1	3264922	8	0.17	4.05	4.10	3.62	4.03	3.73	3.95	3.92	4.13	3.5	4.29	2.3	35.7	56.200	12.6	25.3	28.0
	0%																														
	0%																														
	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: **35.1%**

Grand sum/avg			-2.88	0.01	3.03	3.65	3.70	4.15	3.83	1.8	259668378	-17323	52.8	56.2	125.9	-25.0	0.0	0.0	SumTerrevap2=AirVPD,mbar*WS,m/s*s												

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
2/1/2011	32	-7.96	-0.12	2.70	3.49	3.65	4.21	3.86	1.5	1863476	-613	7.945	0.0	12.0	-0.9	0.0
2/2/2011	33	-2.90	-0.11	2.68	3.48	3.65	4.15	3.83	2.2	3624362	-412	11.812	0.0	17.1	-0.6	0.0
2/3/2011	34	-7.29	-0.07	2.73	3.48	3.68	4.14	3.82	2.7	12610390	-1223	-4.957	0.0	1.4	-1.8	0.0
2/4/2011	35	-6.44	-0.09	2.75	3.47	3.73	4.17	3.82	1.1	12939515	-674	-3.902	0.0	1.2	-1.0	0.0
2/5/2011	36	-1.73	-0.09	2.74	3.47	3.67	4.17	3.82	0.8	2638998	-95	2.355	0.0	6.5	-0.1	0.0
2/6/2011	37	-0.14	-0.05	2.74	3.47	3.66	4.14	3.85	2.5	9293585	-306	-4.113	0.9	-0.6	-0.4	0.0
2/7/2011	38	-0.49	-0.09	2.73	3.45	3.69	4.23	3.87	0.3	4481170	-77	-2.390	2.6	-1.3	-0.1	0.0
2/8/2011	39	-5.26	-0.05	2.73	3.47	3.62	4.10	3.79	2.8	3668544	-1027	0.352	0.0	5.5	-1.5	0.0
2/9/2011	40	-9.53	-0.08	2.73	3.47	3.68	4.12	3.78	1.5	10233155	-1008	-3.269	0.0	1.5	-1.5	0.0
2/10/2011	41	-9.69	-0.08	2.71	3.49	3.69	4.16	3.83	1.8	14456583	-1166	-2.461	0.0	2.1	-1.7	0.0
2/11/2011	42	-8.87	-0.08	2.71	3.48	3.67	4.15	3.82	0.8	12184345	-787	-2.742	0.1	0.8	-1.1	0.0
2/12/2011	43	-4.17	-0.07	2.68	3.48	3.64	4.11	3.79	1.9	5918722	-768	-1.898	0.0	1.3	-1.1	0.0
2/13/2011	44	-1.26	-0.08	2.64	3.46	3.69	4.12	3.76	0.9	7469654	-361	-2.215	2.6	-2.5	-0.5	0.0
2/14/2011	45	5.62	0.00	2.66	3.49	3.63	4.05	3.76	2.8	8402158	-258	-1.687	0.0	0.0	-0.4	0.0
2/15/2011	46	-6.20	0.01	2.67	3.48	3.66	4.08	3.84	3.6	15674270	-1628	-1.230	0.0	2.1	-2.4	0.0
2/16/2011	47	-0.67	-0.03	2.78	3.54	3.74	4.23	3.94	0.6	13549493	-404	-1.723	0.0	-0.6	-0.6	0.0
2/17/2011	48	6.83	-0.01	2.89	3.55	3.73	4.25	3.94	0.6	10986789	148	0.984	0.0	1.1	0.2	0.0
2/18/2011	49	11.26	0.05	2.99	3.63	3.74	4.23	3.89	1.8	10778840	378	8.613	0.0	9.4	0.5	0.0
2/19/2011	50	-1.83	0.32	3.11	3.72	3.75	4.07	3.81	5.4	7268077	-2053	4.043	0.0	9.8	-3.0	0.0
2/20/2011	51	-5.38	0.25	3.27	3.77	3.89	4.25	3.97	2.9	15497550	-1327	2.953	0.0	8.1	-1.9	0.0
2/21/2011	52	-5.03	0.13	3.29	3.70	3.68	4.14	3.81	2.2	5209672	-809	15.854	0.0	21.8	-1.2	0.0
2/22/2011	53	-9.37	0.08	3.42	3.80	3.59	4.02	3.74	1.8	17141411	-1094	-2.039	0.1	4.3	-1.6	0.0
2/23/2011	54	-8.15	0.06	3.60	4.00	3.76	4.12	3.83	0.6	17091710	-676	-2.039	8.2	-4.5	-1.0	0.0
2/24/2011	55	-4.18	0.04	3.61	4.01	3.88	4.23	3.91	0.3	8434218	-328	1.617	0.4	6.3	-0.5	0.0
2/25/2011	56	-0.45	0.07	3.57	4.06	3.90	4.25	3.96	2.5	1512005	-288	33.994	31.7	9.8	-0.4	0.0
2/26/2011	57	-2.67	0.04	3.67	4.02	3.69	4.13	3.81	1.5	12631657	-541	-4.289	0.1	4.7	-0.8	0.0
2/27/2011	58	1.03	0.08	4.03	4.02	3.55	4.06	3.75	1.0	10843108	-176	-6.082	0.0	1.5	-0.3	0.0
2/28/2011	59	4.18	0.17	4.05	4.10	3.62	4.03	3.73	2.0	3264922	249	9.281	9.5	6.8	0.4	0.0
#N/A																
#N/A																
#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	#N/A		4	#N/A	#N/A		#N/A	#N/A	
				4.184	<=CONVERT HEAT TO DEGREES				4.184	slope	
50%	0.9			6000000	cm3/m2 (for 0-4m integrated depth)				6000000	intercept	
										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)	
932	-551	380	59.2%	0.04	3.69	3.68	(0.01)	(0.04)	-0.02	(0.02)	
1812	-371	1441	20.5%	0.07	3.68	3.58	(0.10)	(0.17)	-0.01	(0.16)	
6305	-1100	5205	17.5%	0.25	3.58	3.70	0.12	(0.13)	-0.04	(0.08)	
6470	-607	5863	9.4%	0.26	3.70	3.68	(0.02)	(0.27)	-0.02	(0.25)	
1319	-86	1234	6.5%	0.05	3.68	3.60	(0.08)	(0.14)	0.00	(0.13)	
4647	-275	4372	5.9%	0.19	3.60	3.68	0.07	(0.11)	-0.01	(0.10)	
2241	-69	2172	3.1%	0.09	3.68	3.68	0.00	(0.08)	0.00	(0.08)	
1834	-924	910	50.4%	0.07	3.68	3.64	(0.04)	(0.11)	-0.04	(0.08)	
5117	-907	4209	17.7%	0.20	3.64	3.69	0.05	(0.16)	-0.04	(0.12)	
7228	-1049	6179	14.5%	0.29	3.69	3.67	(0.02)	(0.31)	-0.04	(0.26)	
6092	-708	5384	11.6%	0.24	3.67	3.66	(0.01)	(0.25)	-0.03	(0.22)	
2959	-691	2268	23.3%	0.12	3.66	3.67	0.00	(0.11)	-0.03	(0.09)	
3735	-325	3410	8.7%	0.15	3.67	3.66	(0.00)	(0.15)	-0.01	(0.14)	
4201	-232	3969	5.5%	0.17	3.66	3.59	(0.07)	(0.24)	-0.01	(0.23)	
7837	-1465	6372	18.7%	0.31	3.59	3.77	0.18	(0.13)	-0.06	(0.07)	
6775	-364	6411	5.4%	0.27	3.77	3.79	0.01	(0.26)	-0.01	(0.24)	
5493	134	5627	-2.4%	0.22	3.79	3.81	0.02	(0.20)	0.01	(0.20)	
5389	#N/A	#N/A	#N/A	#N/A				#N/A	#N/A		
3634	-1848	1786	50.9%	0.14	3.72	3.81	0.09	(0.06)	-0.07	0.02	
7749	-1194	6555	15.4%	0.31	3.81	3.90	0.09	(0.22)	-0.05	(0.17)	
2605	-728	1877	27.9%	0.10	3.90	3.65	(0.25)	(0.35)	-0.03	(0.32)	
8571	-985	7586	11.5%	0.34	3.65	3.77	0.11	(0.23)	-0.04	(0.19)	
8546	-609	7937	7.1%	0.34	3.77	3.82	0.05	(0.29)	-0.02	(0.26)	
4217	-296	3922	7.0%	0.17	3.82	3.91	0.09	(0.08)	-0.01	(0.06)	
756	-259	497	34.3%	0.03	3.91	3.87	(0.05)	(0.08)	-0.01	(0.07)	
6316	-487	5829	7.7%	0.25	3.87	3.75	(0.11)	(0.37)	-0.02	(0.35)	
5422	-159	5263	2.9%	0.22	3.75	3.75	(0.00)	(0.22)	-0.01	(0.21)	
1632	224	1856	-13.7%	0.07	3.75	#N/A	#N/A	#N/A	0.01	#N/A	
	#N/A	#N/A		#N/A				#N/A	#N/A		
	#N/A	#N/A		#N/A				#N/A	#N/A		
	#N/A	#N/A		#N/A				#N/A	#N/A		