Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh0@lehigh.edu, http://www.lehigh.edu/~brh0) 41^0 22.5'N 75^0 17.3'W elevation 428m
18 May 2013, 4:30-6:43pm EDT: platform moved to lake center 3Nov 2012: platform move to dock by 12N
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.
Dec11: Tw12 appears to be failing (drifting upward); need to check or replace when possible

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).

rain sum (in.) Aug-Sep2011=> 13.71

5280	ft/mile
1609.3	m/mile

Std pressure at sea level =1 atm=760 mm Hg=29.92" Hg=1013.2 mbars
Std pressure at 428m elevation =724 mm Hg, 29.61 in. Hg, (965.2 mbars)

		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						
		57.9	86.1	32.5		2.99	4.0	33					64.6	64.0	63.1	61.2	59.8	57.6	54.1	52.3	51.1	52.5	51.0						
Month summai	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
	13.7	**14.4**	**30.1**	**0.3**	**82.0**	**76.0**	**1.8**	**14.9**	**222.1**	**966.9**	**158450019**	**325**	**18.1**	**17.8**	**17.3**	**16.2**	**15.4**	**14.2**	**12.3**	**11.3**	**10.6**	**11.4**	**10.6**	**5.3**	**25.5**	**76.0**	**12.6**	**13.7**	**19.9**

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%	5/1/2013	121	12.3	20.5	3.1	53.6	0.0	1.2	6.9	174	977.5	7165976	14	15.28	14.87	14.65	13.92	13.71	13.56	13.12	13.00	12.88	13.7	13.00	2.3	32.4	0.000	12.7	11.1	14.9
ND	100%	5/2/2013	122	13.7	22.3	4.1	68.0	0.0	1.0	7.4	187	977.7	7120863	14	16.59	15.82	15.38	14.43	14.07	13.82	13.38	13.24	13.10	14.2	13.25	2.3	27.9	0.000	12.7	10.9	14.6
ND	100%	5/3/2013	123	14.0	18.9	10.0	55.6	0.0	1.9	7.6	136	976.5	7134897	14	17.12	16.91	16.57	14.83	14.44	14.11	13.50	13.35	13.16	14.6	13.31	2.2	23.0	0.000	12.7	10.6	13.6
ND	100%	5/4/2013	124	13.0	20.6	3.7	65.5	0.0	1.4	7.4	165	973.4	7234123	15	17.58	17.29	17.17	15.36	14.70	14.38	13.81	13.65	13.53	15.1	13.64	2.2	17.7	0.000	12.7	10.9	14.0
ND	100%	5/5/2013	125	12.3	19.8	4.1	65.7	0.0	1.5	8.5	145	971.6	7455991	15	18.01	17.81	17.68	16.04	15.30	14.78	14.08	13.92	13.81	15.8	13.92	2.2	12.8	0.000	12.7	10.9	13.8
ND	100%	5/6/2013	126	12.3	21.1	3.9	82.5	0.0	1.0	5.9	163	970.5	6963348	14	18.51	17.84	17.67	16.42	15.64	15.11	14.37	14.19	14.08	16.2	14.19	2.2	7.9	0.000	12.7	11.0	14.1
ND	100%	5/7/2013	127	15.4	21.2	9.1	83.9	0.0	1.2	7.8	116	968.7	5178743	11	19.26	18.92	18.61	16.60	16.05	15.51	14.63	14.40	14.24	16.4	14.34	2.2	3.9	0.000	12.7	11.1	13.6
ND	100%	5/8/2013	128	14.7	17.2	11.8	102.3	31.6	1.7	6.1	111	965.8	1651540	4	18.79	18.79	18.71	16.77	16.08	15.57	14.66	14.46	14.19	16.5	14.32	2.2	8.5	31.600	12.6	12.1	20.4
ND	100%	5/9/2013	129	13.5	18.0	11.1	100.4	2.9	0.8	3.6	165	962.9	2880090	6	18.47	18.17	18.06	17.29	16.51	15.88	14.82	14.62	14.31	16.9	14.48	2.3	38.0	34.500	12.6	13.5	42.3
ND	100%	5/10/2013	130	16.0	23.1	12.1	95.8	2.6	0.9	6.4	245	963.9	4366436	9	19.27	18.46	18.16	17.25	16.50	15.97	15.06	14.79	14.59	16.9	14.73	2.3	40.6	37.100	12.6	13.2	25.7
ND	100%	5/11/2013	131	15.8	17.3	13.7	103.3	6.3	0.9	4.8	260	957.6	2051189	4	18.98	18.65	18.41	17.44	16.72	16.17	15.16	14.94	14.67	17.1	14.78	2.3	46.0	43.400	12.6	14.3	25.7
ND	100%	5/12/2013	132	10.8	12.8	6.7	71.8	0.0	2.6	9.7	286	956.9	5847197	12	18.31	18.24	18.16	17.78	17.26	16.73	15.69	15.44	15.16	17.5	15.41	2.3	46.9	43.400	12.6	12.6	18.8
ND	100%	5/13/2013	133	4.2	6.4	1.8	76.8	1.3	2.1	7.8	296	964.6	3991356	8	16.48	16.49	16.45	16.31	16.25	16.32	15.93	15.73	15.62	16.1	15.84	2.3	41.0	44.700	12.7	12.2	14.3
ND	100%	5/14/2013	134	5.8	12.6	0.3	69.1	0.1	1.9	8.2	287	967.3	7059847	14	15.89	15.79	15.68	15.39	15.29	15.30	15.22	14.97	14.90	15.2	14.94	2.3	37.7	44.800	12.6	12.3	15.2
ND	100%	5/15/2013	135	13.0	22.2	4.8	77.1	0.0	1.1	7.2	237	960.4	4716145	10	15.94	15.60	15.49	15.24	15.12	15.15	14.93	14.72	14.64	15.0	14.76	2.3	34.2	44.800	12.6	12.1	16.1
ND	100%	5/16/2013	136	18.4	24.2	10.5	61.9	0.0	2.0	9.3	297	958.5	6811484	14	17.38	16.99	16.73	16.00	15.66	15.56	15.20	15.00	14.92	15.7	15.04	2.3	31.5	44.800	12.7	12.2	16.4
ND	100%	5/17/2013	137	13.8	18.3	9.4	64.6	0.0	2.3	8.6	261	967.6	6373356	13	17.52	17.35	17.26	16.83	16.56	16.43	15.75	15.57	15.41	16.6	15.60	2.2	26.8	44.800	12.7	11.2	14.3
ND	100%	5/18/2013	138	12.0	17.6	7.4	88.2	0.2	0.9	6.1	213	973.3	2408473	5	17.30	17.18	17.12	16.69	16.16	15.47	14.44	13.93	13.51	14.4	13.54	4.0	23.2	45.000	12.7	15.3	14.9
ND	100%	5/19/2013	139	12.9	14.1	12.3	102.7	0.0	1.9	7.4	161	972.5	1337270	3	16.78	16.78	16.76	16.59	14.91	11.39	8.43	6.66	5.43	5.3	5.22	11.2	20.9	45.000	12.6	15.0	16.1
ND	100%	5/20/2013	140	18.1	24.3	12.5	96.8	0.0	1.2	6.7	200	967.3	4345280	9	17.81	17.12	16.80	16.47	14.97	11.48	8.44	6.68	5.43	5.3	5.25	11.2	20.9	45.000	12.6	16.1	19.5
ND	100%	5/21/2013	141	23.0	29.4	17.0	88.2	0.0	1.9	7.3	250	962.9	6686026	14	20.34	19.24	17.65	16.67	15.09	11.47	8.54	6.66	5.50	5.3	5.26	11.2	21.2	45.000	12.7	16.0	19.3
ND	100%	5/22/2013	142	23.7	29.3	19.3	90.4	0.4	2.2	14.9	200	960.7	5263686	11	22.42	21.56	18.73	16.92	15.10	11.55	8.56	6.73	5.50	5.3	5.26	11.2	19.5	45.400	12.7	19.3	20.1
ND	100%	5/23/2013	143	19.4	22.8	16.4	97.6	4.0	1.8	6.5	220	959.5	3464103	7	22.29	22.10	20.25	17.15	15.09	11.43	8.68	6.87	5.55	5.3	5.26	11.2	17.7	49.400	12.7	18.2	22.6
ND	100%	5/24/2013	144	8.8	15.6	4.5	103.5	7.4	3.2	9.7	299	960.3	1371216	3	20.11	20.12	19.94	17.51	15.14	11.56	8.71	6.91	5.62	5.3	5.28	11.2	23.4	56.800	12.7	14.8	38.7
ND	100%	5/25/2013	145	7.0	9.9	4.3	87.7	2.4	5.0	13.5	320	964.2	3752781	8	16.63	16.64	16.64	16.51	15.56	11.77	8.77	6.95	5.57	5.4	5.30	11.2	24.5	59.200	12.6	16.1	29.8
ND	100%	5/26/2013	146	9.8	14.5	5.3	70.5	0.0	4.2	12.3	311	966.6	7556760	15	15.44	15.43	15.41	15.26	15.20	13.20	8.92	6.98	5.57	5.4	5.29	11.2	19.8	59.200	12.6	14.1	20.3
ND	100%	5/27/2013	147	12.1	19.7	4.4	66.8	0.0	1.9	8.1	281	971.0	7558338	15	16.02	15.97	15.84	15.23	14.96	14.15	9.18	6.98	5.59	5.4	5.30	11.2	16.0	59.200	12.7	12.5	17.6
ND	100%	5/28/2013	148	11.1	13.5	8.1	101.6	16.5	0.8	4.9	203	970.1	1151995	3	16.43	16.41	16.35	15.57	14.97	14.16	9.30	7.00	5.61	5.4	5.31	11.2	20.9	75.700	12.6	12.6	24.1
ND	100%	5/29/2013	149	20.0	26.3	12.7	92.2	0.3	1.6	7.6	195	967.0	6094217	13	17.52	17.18	16.50	15.75	15.05	14.05	9.49	7.03	5.61	5.4	5.34	11.2	30.4	76.000	12.6	18.3	27.0
ND	100%	5/30/2013	150	23.6	29.0	17.4	79.0	0.0	1.4	5.9	270	969.4	6614457	14	20.64	20.05	18.00	16.04	15.17	14.06	9.51	7.09	5.63	5.4	5.35	11.2	28.9	76.000	12.7	18.0	22.7
ND	100%	5/31/2013	151	24.6	30.1	17.5	77.6	0.0	1.5	7.5	232	968.7	6842836	14	23.19	22.14	19.09	16.38	15.29	13.97	9.66	7.11	5.63	5.4	5.36	11.2	26.2	76.000	12.7	17.7	21.4

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: **2.6176758** Runoff & seepage as % of watershed area precip: **-3.7%**

Grand sum/avg	**14.37**	**18.14**	**17.80**	**17.29**	**16.21**	**15.44**	**14.20**	**1.5**	**158450019**	**-54924**	**-10.7**	**76.0**	**-7.3**	**-75.7**	**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
5/1/2013	121	12.32	15.28	14.87	14.65	13.92	13.71	13.56	0.9	7165976	-1861	-4.662	0.0	-2.1	-2.6	0.0
5/2/2013	122	13.75	16.59	15.82	15.38	14.43	14.07	13.82	0.7	7120863	-1470	-4.278	0.0	-2.1	-2.0	0.0
5/3/2013	123	14.04	17.12	16.91	16.57	14.83	14.44	14.11	1.7	7134897	-2599	-5.475	0.0	-1.8	-3.6	0.0
5/4/2013	124	12.97	17.58	17.29	17.17	15.36	14.70	14.38	1.2	7234123	-2190	-4.818	0.0	-1.7	-3.0	0.0
5/5/2013	125	12.32	18.01	17.81	17.68	16.04	15.30	14.78	1.3	7455991	-2817	-5.295	0.0	-1.3	-3.9	0.0
5/6/2013	126	12.29	18.51	17.84	17.67	16.42	15.64	15.11	0.6	6963348	-1646	-4.424	0.0	-2.0	-2.3	0.0
5/7/2013	127	15.40	19.26	18.92	18.61	16.60	16.05	15.51	1.0	5178743	-1466	-3.530	0.0	-1.4	-2.0	0.0
5/8/2013	128	14.69	18.79	18.79	18.71	16.77	16.08	15.57	1.5	1651540	-959	30.906	31.6	0.7	-1.3	0.0
5/9/2013	129	13.50	18.47	18.17	18.06	17.29	16.51	15.88	0.7	2880090	-836	7.172	2.9	5.5	-1.2	0.0
5/10/2013	130	16.04	19.27	18.46	18.16	17.25	16.50	15.97	0.6	4366436	-724	2.311	2.6	0.8	-1.0	0.0
5/11/2013	131	15.83	18.98	18.65	18.41	17.44	16.72	16.17	0.7	2051189	-472	6.531	6.3	1.0	-0.7	0.0
5/12/2013	132	10.79	18.31	18.24	18.16	17.78	17.26	16.73	2.3	5847197	-3863	-5.394	0.0	0.1	-5.3	0.0
5/13/2013	133	4.23	16.48	16.49	16.45	16.31	16.25	16.32	1.9	3991356	-3521	-3.978	1.3	-0.3	-4.8	0.0
5/14/2013	134	5.82	15.89	15.79	15.68	15.39	15.29	15.30	1.6	7059847	-3167	-4.413	0.1	0.0	-4.4	0.0
5/15/2013	135	12.98	15.94	15.60	15.49	15.24	15.12	15.15	0.7	4716145	-989	-2.321	0.0	-0.8	-1.4	0.0
5/16/2013	136	18.41	17.38	16.99	16.73	16.00	15.66	15.56	1.8	6811484	-2205	-4.226	0.0	-1.1	-3.0	0.0
5/17/2013	137	13.77	17.52	17.35	17.26	16.83	16.56	16.43	2.0	6373356	-2729	-4.575	0.0	-0.7	-3.8	0.0
5/18/2013	138	12.05	17.30	17.18	17.12	16.69	16.16	15.47	0.5	2408473	-805	-2.044	0.2	-1.0	-1.1	0.0
5/19/2013	139	12.90	16.78	16.78	16.76	16.59	14.91	11.39	1.7	1337270	-872	-1.849	0.0	-0.5	-1.2	0.0
5/20/2013	140	18.14	17.81	17.12	16.80	16.47	14.97	11.48	1.0	4345280	10	0.999	0.0	1.1	0.0	0.0
5/21/2013	141	23.00	20.34	19.24	17.65	16.67	15.09	11.47	1.7	6686026	15	-1.165	0.0	-1.1	0.0	0.0
5/22/2013	142	23.67	22.42	21.56	18.73	16.92	15.10	11.55	2.0	5263686	-343	-1.846	0.4	-1.7	-0.5	0.0
5/23/2013	143	19.44	22.29	22.10	20.25	17.15	15.09	11.43	1.6	3464103	-1033	1.461	4.0	-1.0	-1.4	0.0
5/24/2013	144	8.77	20.11	20.12	19.94	17.51	15.14	11.56	3.0	1371216	-4565	4.905	7.4	3.9	-6.3	0.0
5/25/2013	145	7.04	16.63	16.64	16.64	16.51	15.56	11.77	4.7	3752781	-5587	-2.707	2.4	2.7	-7.7	0.0
5/26/2013	146	9.77	15.44	15.43	15.41	15.26	15.20	13.20	3.9	7556760	-4410	-4.574	0.0	1.6	-6.1	0.0
5/27/2013	147	12.15	16.02	15.97	15.84	15.23	14.96	14.15	1.7	7558338	-2196	-2.794	0.0	0.3	-3.0	0.0
5/28/2013	148	11.14	16.43	16.41	16.35	15.57	14.97	14.16	0.7	1151995	-769	15.939	16.5	0.6	-1.1	0.0
5/29/2013	149	20.04	17.52	17.18	16.50	15.75	15.05	14.05	1.4	6094217	430	-0.622	0.3	-1.4	0.6	0.0
5/30/2013	150	23.58	20.64	20.05	18.00	16.04	15.17	14.06	1.2	6614457	-308	-2.407	0.0	-1.9	-0.4	0.0
5/31/2013	151	24.59	23.19	22.14	19.09	16.38	15.29	13.97	1.4	6842836	-980	-3.498	0.0	-2.0	-1.4	0.0

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

Nominal diffuse %R from water=7%	**-49431.2**	**97927.3**	**44%**		**15**	**#N/A**	**#N/A**		**-2.0**	**#N/A**

slope

				4.184	<=CONVERT HEAT TO DEGREES				4.184	intercept
7%	0.9			6000000	cm3/m2 (for 0-4m integrated depth)				6000000	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)
6664	-1675	4990	25.1%	0.27	13.64	14.01	0.37	0.11	-0.07	0.17
6622	-1323	5300	20.0%	0.26	14.01	14.21	0.20	(0.07)	-0.05	(0.01)
6635	-2339	4296	35.3%	0.26	14.21	14.84	0.64	0.37	-0.09	0.46
6728	-1971	4757	29.3%	0.27	14.84	15.48	0.64	0.37	-0.08	0.45
6934	-2535	4399	36.6%	0.28	15.48	15.69	0.21	(0.07)	-0.10	0.03
6476	-1482	4994	22.9%	0.26	15.69	15.85	0.16	(0.09)	-0.06	(0.04)
4816	-1320	3497	27.4%	0.19	15.85	16.20	0.35	0.16	-0.05	0.21
1536	-863	672	56.2%	0.06	16.20	16.16	(0.05)	(0.11)	-0.03	(0.07)
2678	-753	1926	28.1%	0.11	16.16	16.48	0.32	0.22	-0.03	0.25
4061	-651	3409	16.0%	0.16	16.48	16.65	0.17	0.01	-0.03	0.04
1908	-425	1483	22.3%	0.08	16.65	16.91	0.26	0.19	-0.02	0.20
5438	-3477	1961	63.9%	0.22	16.91	16.87	(0.04)	(0.26)	-0.14	(0.12)
3712	-3169	543	85.4%	0.15	16.87	15.62	(1.25)	(1.40)	-0.13	(1.28)
6566	-2850	3715	43.4%	0.26	15.62	15.14	(0.48)	(0.74)	-0.11	(0.62)
4386	-890	3496	20.3%	0.17	15.14	15.65	0.51	0.34	-0.04	0.37
6335	-1984	4351	31.3%	0.25	15.65	16.07	0.41	0.16	-0.08	0.24
5927	-2456	3471	41.4%	0.24	16.07	16.25	0.19	(0.05)	-0.10	0.05
2240	-724	1516	32.3%	0.09	16.25	13.28	(2.97)	(3.06)	-0.03	(3.03)
1244	-784	459	63.1%	0.05	13.28	13.25	(0.03)	(0.08)	-0.03	(0.05)
4041	9	4050	-0.2%	0.16	13.25	13.39	0.14	(0.02)	0.00	(0.02)
6218	14	6232	-0.2%	0.25	13.39	13.80	0.41	0.16	0.00	0.16
4895	-309	4586	6.3%	0.19	13.80	14.28	0.48	0.29	-0.01	0.30
3222	-929	2292	28.8%	0.13	14.28	14.43	0.15	0.02	-0.04	0.06
1275	-4108	-2833	322.1%	0.05	14.43	13.87	(0.56)	(0.61)	-0.16	(0.45)
3490	-5028	-1538	144.1%	0.14	13.87	13.18	(0.69)	(0.83)	-0.20	(0.63)
7028	-3969	3058	56.5%	0.28	13.18	13.40	0.22	(0.06)	-0.16	0.10
7029	-1976	5053	28.1%	0.28	13.40	13.75	0.35	0.07	-0.08	0.15
1071	-692	379	64.6%	0.04	13.75	13.61	(0.14)	(0.18)	-0.03	(0.15)
5668	387	6055	-6.8%	0.23	13.61	14.18	0.57	0.35	0.02	0.33
6151	-277	5874	4.5%	0.25	14.18	14.55	0.37	0.13	-0.01	0.14
6364	-882	5482	13.9%	0.25	14.55	#N/A	#N/A	#N/A	-0.04	#N/A