Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh0@lehigh.edu, http://www.lehigh.edu/~brh0) 41°22.5'N 75°17.3'W elevation 428m

24 Marchl 2012: platform moved to lake center, 12-1:00pm 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

	5280 ft/mile
rain sum (in.) Aug-Sep2011=> 13.20	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)

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						
	27.3	58.1	-4.2		2.48	3.7	27					32.9	36.2	36.2	36.0	36.1	36.2	36.8	36.5	36.9	36.6	36.9						
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
2.5	-2.6	14.5	-20.1	84.8	63.0	1.7	12.0	251.5	965.2	47112735	91	0.5	2.3	2.4	2.2	2.3	2.3	2.7	2.5	2.7	2.6	2.7	2.3	60.6	63.0	12.5	13.9	15.6

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%	1/1/2013	1	-1.9	0.3	-7.5	82.3	0.0	2.8	9.4	304	959.4	816482	2	0.87	1.39	1.39	1.25	1.32	1.40	1.82	1.67	1.83	1.6	1.98	2.3	106.5	0.000	12.7	15.8	14.3
ND	100%	1/2/2013	2	-7.5	-4.5	-11.5	82.6	0.0	1.6	8.5	284	963.0	1206331	2	0.69	1.45	1.44	1.28	1.36	1.46	1.88	1.73	1.96	1.6	1.97	2.3	99.3	0.000	12.6	14.9	15.1
ND	100%	1/3/2013	3	-6.1	-3.1	-10.3	82.4	0.0	1.5	6.1	274	965.4	1972454	4	0.73	1.54	1.52	1.36	1.42	1.52	1.94	1.79	1.99	1.7	1.99	2.3	91.7	0.000	12.7	14.4	15.0
ND	100%	1/4/2013	4	-2.4	-0.7	-3.3	80.3	0.1	2.7	9.2	277	962.1	1562679	3	0.80	1.64	1.62	1.45	1.50	1.58	1.96	1.79	1.99	1.8	2.15	2.3	84.6	0.100	12.7	13.5	14.6
ND	100%	1/5/2013	5	-2.0	0.8	-5.1	78.7	0.0	2.7	11.5	296	967.7	1595788	3	0.78	1.73	1.72	1.55	1.61	1.66	2.01	1.84	2.04	1.9	2.14	2.3	79.0	0.100	12.7	13.5	14.6
ND	100%	1/6/2013	6	-0.2	4.0	-4.7	82.5	2.3	1.3	6.8	266	964.3	1912264	4	0.63	1.83	1.83	1.65	1.70	1.77	2.17	2.00	2.23	2.0	2.32	2.3	72.9	2.400	12.7	13.1	14.4
ND	100%	1/7/2013	7	-0.3	1.1	-3.5	85.2	0.5	2.0	7.3	292	970.7	1853164	4	0.72	1.96	1.95	1.77	1.82	1.90	2.28	2.12	2.32	2.1	2.41	2.3	67.0	2.900	12.7	13.1	14.1
ND	100%	1/8/2013	8	0.6	6.4	-3.8	77.9	4.6	1.0	6.5	255	973.5	2051053	4	0.60	2.08	2.05	1.88	1.94	2.00	2.38	2.22	2.45	2.2	2.52	2.3	61.3	7.500	12.6	13.3	14.6
ND	100%	1/9/2013	9	0.4	6.9	-5.6	91.0	3.1	1.0	8.7	263	971.1	636111	1	0.52	2.17	2.14	1.98	2.03	2.10	2.47	2.29	2.48	2.3	2.59	2.3	56.2	10.600	12.7	13.4	14.6
ND	100%	1/10/2013	10	1.9	3.9	-2.2	76.1	0.0	2.8	10.3	307	977.1	1855833	4	0.67	2.22	2.19	2.04	2.10	2.15	2.50	2.33	2.51	2.4	2.60	2.3	51.5	10.600	12.7	12.8	14.0
ND	100%	1/11/2013	11	0.2	2.6	-2.7	94.8	5.5	0.5	4.4	169	973.8	459612	1	0.45	2.29	2.27	2.10	2.16	2.22	2.61	2.43	2.61	2.5	2.73	2.2	48.2	16.100	12.8	13.0	14.2
ND	100%	1/12/2013	12	3.1	9.0	0.7	106.0	0.3	0.3	3.2	174	967.1	1583868	3	0.53	2.36	2.32	2.16	2.21	2.29	2.66	2.51	2.73	2.5	2.79	2.3	50.3	16.400	12.7	12.4	14.0
ND	100%	1/13/2013	13	3.0	6.7	0.9	107.3	0.2	0.2	2.8	179	965.2	751739	2	0.60	2.42	2.40	2.26	2.30	2.36	2.71	2.56	2.77	2.6	2.82	2.3	50.0	16.600	12.7	12.4	13.9
ND	100%	1/14/2013	14	5.5	9.6	0.2	93.2	1.5	1.9	8.5	248	966.6	1740168	3	0.69	2.50	2.48	2.34	2.37	2.42	2.79	2.64	2.86	2.7	2.91	2.3	55.0	18.100	12.7	12.1	14.0
ND	100%	1/15/2013	15	-1.4	-0.1	-3.2	81.5	0.0	1.6	5.9	153	971.8	1214907	2	0.78	2.64	2.60	2.44	2.52	2.56	2.93	2.78	2.98	2.8	2.96	2.3	60.9	18.100	12.8	13.2	14.4
ND	100%	1/16/2013	16	-2.2	-0.2	-3.9	103.3	0.0	1.0	5.1	175	962.4	297479	1	0.52	2.65	2.64	2.50	2.55	2.62	2.97	2.79	2.99	2.8	2.99	2.3	70.0	18.100	12.7	13.3	14.4
ND	100%	1/17/2013	17	-0.8	0.8	-2.7	92.0	3.1	1.8	6.5	274	962.9	1083015	2	0.46	2.64	2.63	2.48	2.53	2.59	2.97	2.79	2.99	2.8	2.95	2.3	70.2	21.200	12.6	13.1	14.2
ND	100%	1/18/2013	18	-6.9	-3.0	-9.8	75.2	0.0	2.1	8.3	238	971.1	2567709	5	0.48	2.65	2.64	2.49	2.53	2.59	2.96	2.77	3.02	2.8	2.88	2.3	67.0	21.200	12.7	15.1	15.5
ND	100%	1/19/2013	19	0.9	7.4	-6.5	61.3	4.4	1.5	6.9	250	966.8	2421528	5	0.50	2.65	2.64	2.50	2.55	2.60	2.94	2.75	2.98	2.8	2.89	2.3	63.0	25.600	12.7	13.1	14.7
ND	100%	1/20/2013	20	2.4	7.4	-5.5	61.4	0.1	2.8	11.9	266	956.4	2480746	5	0.64	2.66	2.65	2.49	2.56	2.61	2.89	2.69	2.91	2.8	2.89	2.3	60.3	25.700	12.8	12.7	14.3
ND	100%	1/21/2013	21	-6.2	-4.7	-7.2	76.3	0.0	1.3	7.3	275	960.7	775847	2	0.41	2.66	2.66	2.51	2.58	2.61	2.97	2.79	3.00	2.8	2.94	2.3	57.6	25.700	12.7	14.3	15.5
ND	100%	1/22/2013	22	-12.0	-8.3	-15.2	70.2	0.0	2.8	9.6	303	960.4	1846614	3	0.40	2.65	2.67	2.56	2.59	2.63	2.95	2.76	2.95	2.9	2.92	2.3	55.0	25.700	12.6	15.7	17.1
ND	100%	1/23/2013	23	-15.1	-12.1	-18.4	71.3	0.0	1.8	9.0	273	964.4	2077112	4	0.32	2.62	2.68	2.57	2.59	2.66	2.99	2.78	2.96	2.9	2.90	2.3	50.6	25.700	12.6	16.7	18.3
ND	100%	1/24/2013	24	-14.8	-10.0	-20.1	78.8	0.0	2.5	10.6	302	965.9	2229612	4	0.25	2.62	2.68	2.59	2.60	2.66	2.99	2.79	2.99	2.9	2.91	2.2	45.8	25.700	12.5	16.7	18.3
ND	100%	1/25/2013	25	-12.5	-7.8	-15.3	80.0	0.0	1.3	7.9	231	967.9	1356199	3	0.20	2.61	2.69	2.60	2.61	2.67	3.03	2.82	3.02	2.9	2.94	2.2	41.1	25.700	12.6	15.8	17.2
ND	100%	1/26/2013	26	-11.5	-7.6	-15.2	82.3	0.0	1.9	7.4	302	964.4	2112915	3	0.15	2.59	2.70	2.61	2.63	2.67	3.08	2.85	3.07	2.9	2.94	2.2	37.5	25.700	12.6	15.8	17.4
ND	100%	1/27/2013	27	-8.4	-3.7	-11.6	80.6	0.0	1.6	7.9	289	974.1	2805828	5	0.12	2.58	2.71	2.62	2.64	2.68	3.09	2.87	3.10	2.9	2.91	2.2	33.2	25.700	12.6	15.1	16.7
ND	100%	1/28/2013	28	-3.9	0.8	-10.5	98.4	0.1	0.4	4.7	188	967.6	367757	1	0.11	2.57	2.72	2.63	2.64	2.69	3.10	2.90	3.08	2.9	2.94	2.2	31.9	25.800	12.6	13.9	15.2
ND	100%	1/29/2013	29	4.4	7.5	1.6	105.4	16.0	0.6	5.4	239	963.1	1189472	2	0.12	2.56	2.72	2.65	2.68	2.72	3.11	2.92	3.11	3.0	3.04	2.2	35.3	41.800	12.6	12.2	27.2
ND	100%	1/30/2013	30	8.9	14.5	4.4	107.6	6.1	1.0	6.2	207	953.5	316805	1	0.14	2.60	2.75	2.66	2.68	2.72	3.10	2.92	3.11	3.0	3.08	2.2	44.8	47.900	12.7	12.1	31.8
ND	100%	1/31/2013	31	3.1	10.7	-5.2	82.2	15.1	3.3	12.0	245	941.6	1971643	4	0.33	2.60	2.81	2.71	2.73	2.75	3.08	2.91	3.10	3.0	3.11	2.3	80.2	63.000	12.7	13.1	19.1

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)

																											1.000	<=SCALE ADJ (1.0=no adjustment)
Ratio of lake watershed to lake area:	2.6176758			Runoff & seepage as % of watershed area precip:				#DIV/0!																			4.184	joule/calorie (= joule/degree for 1cm3)
Grand sum/avg	-2.63	0.49	2.33	2.35	2.22	2.26	2.32	1.4	47112735	-14569	-18.4	63.0	-46.2	-19.8	0.0	0.0											-0.5	-2.6
																SumTerrevap2=AirVPD,mbar*WS,m/s*s												slope
																	Nominal diffuse %R from water=7%	-13112.3	30702.6	24%		2	2.2	-1.4				
																										4.184	<=CONVERT HEAT TO DEGREES	intercept
																	7%	0.9								6000000	cm3/m2 (for 0-4m integrated depth)	r2

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	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)
1/1/2013	1	-1.90	0.87	1.39	1.39	1.25	1.32	1.40	2.6	816482	-650	-6.505	0.0	-3.5	-0.9	0.0	759	-585	174	77.1%	0.03	1.40	1.43	0.02	(0.01)	-0.02	0.01
1/2/2013	2	-7.48	0.69	1.45	1.44	1.28	1.36	1.46	1.4	1206331	-781	-7.559	0.0	-4.4	-1.1	0.0	1122	-703	419	62.7%	0.04	1.43	1.49	0.06	0.02	-0.03	0.04
1/3/2013	3	-6.05	0.73	1.54	1.52	1.36	1.42	1.52	1.3	1972454	-668	-7.631	0.0	-4.5	-0.9	0.0	1834	-601	1234	32.8%	0.07	1.49	1.56	0.07	0.00	-0.02	0.03
1/4/2013	4	-2.36	0.80	1.64	1.62	1.45	1.50	1.58	2.3	1562679	-716	-5.914	0.1	-2.4	-1.0	0.0	1453	-645	809	44.4%	0.06	1.56	1.64	0.08	0.02	-0.03	0.04
1/5/2013	5	-2.04	0.78	1.73	1.72	1.55	1.61	1.66	2.5	1595788	-759	-5.995	0.0	-3.4	-1.0	0.0	1484	-683	801	46.0%	0.06	1.64	1.75	0.11	0.05	-0.03	0.08
1/6/2013	6	-0.15	0.63	1.83	1.83	1.65	1.70	1.77	1.1	1912264	-213	-5.959	2.3	-7.8	-0.3	0.0	1778	-192	1586	10.8%	0.07	1.75	1.86	0.12	0.04	-0.01	0.05
1/7/2013	7	-0.27	0.72	1.96	1.95	1.77	1.82	1.90	1.9	1853164	-298	-5.978	0.5	-6.0	-0.4	0.0	1723	-268	1456	15.5%	0.07	1.86	1.97	0.11	0.04	-0.01	0.05
1/8/2013	8	0.61	0.60	2.08	2.05	1.88	1.94	2.00	0.8	2051053	-193	-5.207	4.6	-9.4	-0.3	0.0	1907	-173	1734	9.1%	0.08	1.97	2.08	0.11	0.03	-0.01	0.04
1/9/2013	9	0.40	0.52	2.17	2.14	1.98	2.03	2.10	0.8	636111	9	-4.705	3.1	-7.7	0.0	0.0	592	8	600	-1.4%	0.02	2.08	2.12	0.04	0.02	0.00	0.02
1/10/2013	10	1.91	0.67	2.22	2.19	2.04	2.10	2.15	2.6	1855833	-331	-5.060	0.0	-4.5	-0.4	0.0	1726	-298	1428	17.3%	0.07	2.12	2.20	0.09	0.02	-0.01	0.03
1/11/2013	11	0.17	0.45	2.29	2.27	2.10	2.16	2.22	0.2	459612	-48	2.027	5.5	-3.3	-0.1	0.0	427	-43	384	10.1%	0.02	2.20	2.24	0.03	0.02	0.00	0.02
1/12/2013	12	3.14	0.53	2.36	2.32	2.16	2.21	2.29	0.2	1583868	74	-1.297	0.3	-1.6	0.1	0.0	1473	67	1540	-4.5%	0.06	2.24	2.34	0.10	0.04	0.00	0.04
1/13/2013	13	2.97	0.60	2.42	2.40	2.26	2.30	2.36	0.1	751739	58	0.778	0.2	0.6	0.1	0.0	699	52	751	-7.4%	0.03	2.34	2.37	0.04	0.01	0.00	0.01
1/14/2013	14	5.52	0.69	2.50	2.48	2.34	2.37	2.42	1.7	1740168	355	8.632	1.5	6.8	0.5	0.0	1618	320	1938	-19.8%	0.06	2.37	2.50	0.13	0.06	0.01	0.05
1/15/2013	15	-1.36	0.78	2.64	2.60	2.44	2.52	2.56	1.4	1214907	-372	2.239	0.0	2.9	-0.5	0.0	1130	-335	795	29.6%	0.05	2.50	2.60	0.10	0.05	-0.01	0.07
1/16/2013	16	-2.20	0.52	2.65	2.64	2.50	2.55	2.62	0.9	297479	-141	10.029	0.0	10.3	-0.2	0.0	277	-127	149	46.0%	0.01	2.60	2.58	(0.02)	(0.03)	-0.01	(0.02)
1/17/2013	17	-0.80	0.46	2.64	2.63	2.48	2.53	2.59	1.6	1083015	-201	-2.852	3.1	-5.6	-0.3	0.0	1007	-181	826	18.0%	0.04	2.58	2.56	(0.02)	(0.06)	-0.01	(0.05)
1/18/2013	18	-6.90	0.48	2.65	2.64	2.49	2.53	2.59	1.8	2567709	-952	-3.625	0.0	-2.2	-1.3	0.0	2388	-857	1531	35.9%	0.10	2.56	2.59	0.03	(0.07)	-0.03	(0.03)
1/19/2013	19	0.85	0.50	2.65	2.64	2.50	2.55	2.60	1.2	2421528	-429	-4.014	4.4	-7.7	-0.6	0.0	2252	-386	1866	17.2%	0.09	2.59	2.59	(0.00)	(0.09)	-0.02	(0.07)
1/20/2013	20	2.42	0.64	2.66	2.65	2.49	2.56	2.61	2.3	2480746	-673	-1.637	0.1	-0.7	-0.9	0.0	2307	-606	1701	26.3%	0.09	2.59	2.60	0.01	(0.09)	-0.02	(0.06)
1/21/2013	21	-6.20	0.41	2.66	2.66	2.51	2.58	2.61	1.2	775847	-669	-2.845	0.0	-1.8	-0.9	0.0	722	-602	119	83.4%	0.03	2.60	2.61	0.01	(0.02)	-0.02	0.01
1/22/2013	22	-11.97	0.40	2.65	2.67	2.56	2.59	2.63	2.6	1846614	-1540	-3.557	0.0	-1.3	-2.1	0.0	1717	-1386	332	80.7%	0.07	2.61	2.62	0.01	(0.06)	-0.06	(0.01)
1/23/2013	23	-15.07	0.32	2.62	2.68	2.57	2.59	2.66	1.6	2077112	-1299	-4.756	0.0	-2.9	-1.8	0.0	1932	-1170	762	60.5%	0.08	2.62	2.65	0.03	(0.05)	-0.05	0.00
1/24/2013	24	-14.81	0.25	2.62	2.68	2.59	2.60	2.66	2.4	2229612	-1601	-4.932	0.0	-2.6	-2.2	0.0	2074	-1441	632	69.5%	0.08	2.65	2.62	(0.03)	(0.12)	-0.06	(0.06)
1/25/2013	25	-12.48	0.20	2.61	2.69	2.60	2.61	2.67	1.1	1356199	-964	-3.497	0.0	-2.1	-1.3	0.0	1261	-868	393	68.8%	0.05	2.62	2.67	0.05	0.00	-0.03	0.04
1/26/2013	26	-11.52	0.15	2.59	2.70	2.61	2.63	2.67	1.7	2112915	-1070	-4.542	0.0	-3.0	-1.5	0.0	1965	-963	1002	49.0%	0.08	2.67	2.66	(0.01)	(0.09)	-0.04	(0.05)
1/27/2013	27	-8.39	0.12	2.58	2.71	2.62	2.64	2.68	1.4	2805828	-813	-4.093	0.0	-2.9	-1.1	0.0	2609	-732	1878	28.0%	0.10	2.66	2.69	0.03	(0.08)	-0.03	(0.05)
1/28/2013	28	-3.88	0.11	2.57	2.72	2.63	2.64	2.69	0.3	367757	-199	3.289	0.1	3.6	-0.3	0.0	342	-179	163	52.4%	0.01	2.69	2.69	0.00	(0.01)	-0.01	(0.00)
1/29/2013	29	4.43	0.12	2.56	2.72	2.65	2.68	2.72	0.4	1189472	185	8.508	16.0	-7.6	0.3	0.0	1106	166	1272	-15.0%	0.04	2.69	2.70	0.00	(0.04)	0.01	(0.05)
1/30/2013	30	8.89	0.14	2.60	2.75	2.66	2.68	2.72	0.6	316805	674	10.136	6.1	3.2	0.9	0.0	295	607	901	-206.0%	0.01	2.70	2.73	0.03	0.02	0.02	(0.01)
1/31/2013	31	3.05	0.33	2.60	2.81	2.71	2.73	2.75	2.7	1971643	-342	38.148	15.1	25.2	-0.5	0.0	1834	-308	1526	16.8%	0.07	2.73	-	(2.73)	(2.80)	-0.01	(2.79)