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

18 Apr 2014, 10:40-11:40am EDT: platform moved to lake center 10Nov 2014: platform move to dock 11:05-11:55 EDT

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.

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)

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						
	28.8	57.6	-1.2		2.13	4.8	33					31.8	37.5	38.3	38.6	38.9	38.7	38.4	39.0	39.2	38.7	39.0						
Month summary 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	Tw02.1m	Tw02.6m	H310_z (m)	Lakelevel-mm (4oC)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
3.7	-1.8	14.2	-18.4	69.0	54.1	2.1	14.6	259.7	966.1	372743956	747	-0.1	3.1	3.5	3.7	3.8	3.7	3.6	3.9	4.0	3.7	3.9	2.1	24.5	54.1	12.4	13.9	14.5

month (All)

PAR & PYR Integration period=15min instead of 60min after 11am on 9/11/2013

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%	3/1/2015	60	-9.8	-4.7	-17.5	83.5	0.0	0.3	3.4	171	977.4	3965557	6.3	-0.17	2.10	2.95	3.36	3.53	3.43	3.26	3.66	3.76	3.3	3.53	2.1	-4.1	0.000	12.4	15.2	15.9
ND	100%	3/2/2015	61	-4.0	-1.6	-7.6	69.4	3.9	3.6	12.5	313	967.8	11662216	26.8	-0.15	2.09	2.94	3.35	3.53	3.43	3.24	3.55	3.67	3.3	3.54	2.1	-0.6	3.900	12.4	13.9	14.7
ND	100%	3/3/2015	62	-8.6	-1.9	-16.3	77.4	0.0	1.0	6.6	207	969.5	5401320	11.8	-0.17	2.06	2.91	3.35	3.53	3.49	3.24	3.57	3.70	3.3	3.51	2.1	0.5	3.900	12.5	15.1	15.8
ND	100%	3/4/2015	63	1.2	3.3	-1.7	91.2	13.8	1.4	5.0	276	957.6	3534352	8.3	-0.17	2.03	2.92	3.33	3.52	3.46	3.22	3.57	3.72	3.3	3.52	2.1	8.6	17.700	12.5	13.0	14.3
ND	100%	3/5/2015	64	-7.4	0.7	-13.1	73.5	0.1	3.1	9.6	316	966.4	3610113	8.1	-0.13	2.02	2.91	3.33	3.52	3.45	3.23	3.58	3.71	3.3	3.55	2.1	10.1	17.800	12.4	14.6	14.6
ND	100%	3/6/2015	65	-11.5	-5.2	-18.4	58.0	1.4	1.4	5.8	294	975.6	20126452	36.5	-0.13	1.99	2.91	3.32	3.54	3.45	3.23	3.61	3.76	3.3	3.53	2.1	8.2	19.200	12.4	15.8	15.9
ND	100%	3/7/2015	66	-5.4	0.8	-15.9	61.7	0.0	1.4	8.1	264	967.3	11424969	22.7	-0.19	1.97	2.89	3.32	3.53	3.44	3.23	3.62	3.76	3.3	3.55	2.1	6.1	19.200	12.5	14.5	15.6
ND	100%	3/8/2015	67	0.8	4.3	-4.4	68.9	0.3	1.9	10.1	258	965.0	13125422	26.3	-0.16	1.96	2.88	3.34	3.54	3.44	3.23	3.59	3.73	3.3	3.56	2.1	3.9	19.500	12.5	13.6	14.3
ND	100%	3/9/2015	68	1.4	7.7	-5.6	65.2	0.0	1.3	8.5	237	968.4	18677756	36.7	-0.15	1.95	2.89	3.36	3.56	3.47	3.25	3.62	3.75	3.3	3.60	2.1	2.2	19.500	12.5	14.0	14.5
ND	100%	3/10/2015	69	1.3	9.8	-6.1	84.4	6.8	0.3	4.6	129	969.5	8310980	18.2	-0.13	1.95	2.89	3.36	3.55	3.45	3.25	3.66	3.77	3.3	3.62	2.1	2.1	26.300	12.6	13.4	14.3
ND	100%	3/11/2015	70	5.9	10.4	1.3	73.9	0.4	2.5	9.5	275	964.2	14612836	29.5	-0.13	2.03	2.92	3.38	3.58	3.46	3.28	3.63	3.77	3.3	3.67	2.1	9.2	26.700	12.5	13.6	13.6
ND	100%	3/12/2015	71	0.8	4.0	-2.7	37.3	0.0	4.4	11.7	328	976.6	20635998	40.3	-0.10	2.29	3.01	3.46	3.65	3.55	3.34	3.60	3.74	3.4	3.79	2.1	10.3	26.700	12.6	13.5	13.9
ND	100%	3/13/2015	72	-0.4	6.0	-7.9	39.7	0.0	0.9	5.9	204	979.4	18959401	37.7	-0.11	2.65	3.17	3.51	3.73	3.64	3.42	3.77	3.91	3.4	3.87	2.1	10.3	26.700	12.6	13.4	14.0
ND	100%	3/14/2015	73	3.0	4.9	0.9	94.1	9.6	0.8	6.7	222	962.4	3435882	8.1	-0.13	2.88	3.29	3.60	3.77	3.62	3.50	3.80	3.94	3.5	3.85	2.1	17.2	36.300	12.5	12.5	13.4
ND	100%	3/15/2015	74	0.7	4.0	-0.8	77.9	0.1	4.5	13.7	317	958.4	2290720	5.4	-0.09	2.96	3.33	3.57	3.74	3.62	3.46	3.70	3.82	3.5	3.79	2.1	25.4	36.400	12.5	13.2	14.0
ND	100%	3/16/2015	75	2.5	8.1	-1.9	70.5	0.0	1.7	9.7	286	961.2	12901957	27.0	-0.10	3.10	3.43	3.69	3.82	3.73	3.58	3.84	4.00	3.6	3.93	2.1	27.5	36.400	12.5	14.2	13.6
ND	100%	3/17/2015	76	2.4	6.7	-3.4	74.6	3.2	3.4	14.6	284	954.8	7954698	16.4	-0.07	3.36	3.55	3.67	3.81	3.69	3.55	3.81	3.93	3.7	3.90	2.1	33.8	39.600	12.6	13.8	13.8
ND	100%	3/18/2015	77	-4.3	-1.9	-6.4	54.3	0.0	4.4	11.9	303	964.2	17289793	33.6	-0.04	3.58	3.67	3.71	3.84	3.72	3.58	3.80	3.93	3.8	3.96	2.1	39.4	39.600	12.5	14.4	14.9
ND	100%	3/19/2015	78	-4.0	0.8	-7.7	51.7	0.0	2.2	8.9	290	971.5	22135130	42.0	-0.06	3.78	3.80	3.68	3.84	3.75	3.56	3.88	3.97	3.9	4.06	2.1	40.3	39.600	12.6	14.3	14.9
ND	100%	3/20/2015	79	-4.0	-2.7	-5.2	78.0	0.0	1.1	4.6	107	970.2	4742652	11.1	-0.16	3.90	3.92	3.83	3.96	3.83	3.70	3.98	4.08	4.0	4.07	2.1	43.2	39.600	12.5	13.8	14.8
ND	100%	3/21/2015	80	0.0	4.8	-4.1	94.5	7.1	1.3	9.1	241	962.6	7287615	15.6	-0.13	3.88	3.91	3.83	3.99	3.87	3.73	4.04	4.12	4.0	4.05	2.1	46.6	46.700	12.5	13.4	14.1
ND	100%	3/22/2015	81	-3.6	1.0	-7.9	55.5	0.1	4.2	11.0	301	964.4	22387950	43.0	-0.05	3.91	3.93	3.84	3.99	3.88	3.75	4.02	4.11	4.0	4.10	2.1	44.2	46.800	12.5	14.3	14.7
ND	100%	3/23/2015	82	-6.6	-3.1	-9.4	52.6	0.0	3.4	9.4	313	969.3	22852949	43.3	-0.10	3.96	3.99	3.91	4.05	3.91	3.80	4.06	4.15	4.1	4.17	2.1	40.8	46.800	12.6	14.5	15.3
ND	100%	3/24/2015	83	-4.2	2.8	-11.6	49.2	0.0	1.1	4.9	217	972.7	20901865	40.7	-0.16	4.03	4.05	3.96	4.11	3.95	3.85	4.12	4.23	4.2	4.21	2.1	37.8	46.800	12.6	14.2	14.8
ND	100%	3/25/2015	84	-1.6	5.2	-9.5	73.7	0.2	0.7	6.0	227	972.4	9198216	18.3	-0.13	4.05	4.07	4.01	4.17	4.00	3.92	4.18	4.29	4.2	4.26	2.1	35.9	47.000	12.6	13.6	14.7
ND	100%	3/26/2015	85	5.8	14.2	0.9	95.2	4.9	1.2	8.6	253	958.4	6503256	14.5	-0.08	4.06	4.08	4.02	4.18	4.02	3.93	4.20	4.29	4.2	4.29	2.1	36.4	51.900	12.5	13.2	13.0
ND	100%	3/27/2015	86	1.1	2.5	-1.2	76.9	0.0	2.6	6.9	317	956.0	6390216	13.9	-0.03	4.07	4.12	4.07	4.22	4.06	3.97	4.24	4.35	4.2	4.33	2.1	44.4	51.900	12.5	13.3	13.7
ND	100%	3/28/2015	87	-5.0	-1.4	-8.3	62.1	0.0	4.1	9.7	281	960.5	13683562	27.1	0.00	4.13	4.17	4.11	4.24	4.09	3.99	4.23	4.34	4.3	4.30	2.1	45.4	51.900	12.5	14.2	14.8
ND	100%	3/29/2015	88	-3.6	4.3	-10.1	48.2	0.0	2.0	6.7	298	968.8	24557693	46.9	0.03	4.22	4.23	4.17	4.34	4.19	4.07	4.32	4.43	4.3	4.32	2.1	44.4	51.900	12.6	14.3	14.7
ND	100%	3/30/2015	89	2.2	6.3	-1.8	64.9	0.6	2.3	9.8	278	958.4	7388390	15.7	0.07	4.20	4.22	4.13	4.27	4.13	4.02	4.32	4.38	4.3	4.25	2.1	43.7	52.500	12.6	13.0	13.6
ND	100%	3/31/2015	90	-0.1	2.1	-2.8	81.2	1.6	1.7	7.3	243	957.4	6794040	15.1	0.10	4.13	4.16	4.06	4.23	4.11	3.96	4.29	4.34	4.3	4.17	2.1	45.9	54.100	12.5	13.4	14.0

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: 2.6176758 Runoff & seepage as % of watershed area precip: 122%

Grand sum/avg	**-1.79**	**-0.10**	**3.07**	**3.49**	**3.67**	**3.83**	**3.72**	**1.9**	**372742895**	**-19608**	**55.4**	**54.1**	**133.2**	**-26.6**	**0.0**	**0.0**

SumTerrevap2=AirVPD,mbar*WS,m/s*s

Data

DATE	DOY	AvgTair C	AvgTw 0.1m	\\	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
3/1/2015	60	-10.18	-0.17	2.10	2.95	3.36	3.53	3.43	0.2	3964910	-529	5.990	0.0	7.4	-0.7	0.0
3/2/2015	61	-3.87	-0.15	2.09	2.94	3.35	3.53	3.43	3.3	11661626	-1266	-2.141	3.9	-2.6	-1.7	0.0
3/3/2015	62	-8.79	-0.17	2.06	2.92	3.35	3.54	3.49	0.8	5401647	-675	10.715	0.0	12.9	-0.9	0.0
3/4/2015	63	1.12	-0.17	2.03	2.92	3.33	3.52	3.46	1.2	3535275	-3	-0.791	13.4	-11.3	0.0	0.0
3/5/2015	64	-7.00	-0.13	2.02	2.91	3.33	3.52	3.45	2.8	3609242	-1138	1.069	0.5	4.9	-1.5	0.0
3/6/2015	65	-11.58	-0.13	1.99	2.91	3.32	3.54	3.45	1.3	20126608	-1011	-2.003	1.4	0.9	-1.4	0.0
3/7/2015	66	-5.68	-0.18	1.97	2.89	3.32	3.53	3.44	1.2	11425000	-677	-2.234	0.0	1.8	-0.9	0.0
3/8/2015	67	0.91	-0.16	1.96	2.88	3.34	3.54	3.44	1.7	13125616	-411	-1.846	0.3	1.7	-0.6	0.0
3/9/2015	68	1.40	-0.15	1.95	2.89	3.36	3.56	3.47	1.2	18677183	-302	-1.617	0.0	2.2	-0.4	0.0
3/10/2015	69	1.13	-0.13	1.95	2.89	3.36	3.55	3.45	0.1	8311742	-86	6.071	6.6	3.1	-0.1	0.0
3/11/2015	70	5.86	-0.13	2.03	2.92	3.38	3.58	3.46	2.2	14611580	102	3.192	0.6	5.3	0.1	0.0
3/12/2015	71	1.04	-0.10	2.28	3.01	3.46	3.65	3.55	4.2	20635170	-1682	-0.632	0.0	4.5	-2.3	0.0
3/13/2015	72	-0.52	-0.11	2.64	3.16	3.51	3.73	3.64	0.6	18960976	-496	0.287	0.0	3.8	-0.7	0.0
3/14/2015	73	2.94	-0.13	2.88	3.29	3.59	3.77	3.63	0.6	3436184	66	12.933	9.6	5.9	0.1	0.0
3/15/2015	74	0.82	-0.09	2.96	3.33	3.57	3.74	3.62	4.2	2290746	-492	3.266	0.1	6.5	-0.7	0.0
3/16/2015	75	2.33	-0.10	3.09	3.42	3.69	3.82	3.73	1.7	12901541	-178	2.064	0.0	5.1	-0.2	0.0
3/17/2015	76	2.59	-0.07	3.35	3.55	3.67	3.81	3.69	3.0	7954187	-488	9.081	3.2	9.8	-0.7	0.0
3/18/2015	77	-4.23	-0.04	3.57	3.66	3.71	3.84	3.71	4.2	17290743	-1829	2.482	0.0	8.8	-2.5	0.0
3/19/2015	78	-4.06	-0.06	3.78	3.80	3.68	3.83	3.75	2.1	22135301	-1079	0.036	0.0	5.5	-1.5	0.0
3/20/2015	79	-3.96	-0.15	3.90	3.92	3.83	3.96	3.82	1.0	4742634	-381	7.163	0.0	12.1	-0.5	0.0
3/21/2015	80	-0.18	-0.14	3.88	3.91	3.83	3.99	3.87	1.1	7286321	0	-1.396	7.1	-3.5	0.0	0.0
3/22/2015	81	-3.35	-0.05	3.90	3.92	3.84	3.99	3.88	4.0	22387332	-1561	-3.389	0.1	3.2	-2.1	0.0
3/23/2015	82	-6.60	-0.10	3.96	3.99	3.90	4.05	3.91	3.2	22854146	-1587	-3.317	0.0	2.9	-2.2	0.0
3/24/2015	83	-4.31	-0.16	4.03	4.04	3.95	4.10	3.95	1.0	20902020	-671	-2.454	0.0	2.1	-0.9	0.0
3/25/2015	84	-1.82	-0.13	4.05	4.07	4.01	4.17	4.00	0.3	9198551	-267	-1.901	0.2	1.7	-0.4	0.0
3/26/2015	85	5.79	-0.08	4.05	4.08	4.02	4.18	4.02	1.0	6503314	423	7.739	4.9	5.8	0.6	0.0
3/27/2015	86	1.23	-0.03	4.07	4.11	4.07	4.22	4.06	2.4	6390405	-272	2.502	0.0	7.5	-0.4	0.0
3/28/2015	87	-4.81	0.00	4.13	4.16	4.11	4.24	4.09	3.8	13682284	-1537	-0.140	0.0	6.7	-2.1	0.0
3/29/2015	88	-3.84	0.03	4.22	4.23	4.17	4.34	4.19	1.9	24558322	-974	-1.220	0.0	4.7	-1.3	0.0
3/30/2015	89	2.12	0.07	4.21	4.23	4.14	4.27	4.13	2.0	7388593	-353	0.231	0.6	4.6	-0.5	0.0
3/31/2015	90	0.02	0.10	4.13	4.16	4.06	4.23	4.11	1.6	6793696	-253	5.623	1.6	9.2	-0.3	0.0

1.000 <=SCALE ADJ (1.0=no adjustment)

4.184 joule/calorie (= joule/degree for 1cm3)

Nominal diffuse %R from water=7%	**-17419.7**	**322913.1**	**6%**		**4**	**3.6**	**0.8**		**-0.7**	**-12.1**
										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)	SOLAR FLUX to offset absorbed solar to match dTw LESS EVAP (degC 0-6m)
3687	-476	3211	12.9%	0.15	3.27	3.24	(0.03)	(0.17)	-0.02	(0.15)
10845	-1139	9706	10.5%	0.43	3.24	3.23	(0.01)	(0.44)	-0.05	(0.40)
5024	-607	4416	12.1%	0.20	3.23	3.19	(0.04)	(0.24)	-0.02	(0.22)
3288	-3	3285	0.1%	0.13	3.19	3.22	0.03	(0.10)	0.00	(0.10)
3357	-1025	2332	30.5%	0.13	3.22	3.21	(0.00)	(0.14)	-0.04	(0.10)
18718	-910	17808	4.9%	0.75	3.21	3.23	0.01	(0.73)	-0.04	(0.70)
10625	-609	10016	5.7%	0.42	3.23	3.23	(0.00)	(0.42)	-0.02	(0.40)
12207	-370	11837	3.0%	0.49	3.23	3.23	0.00	(0.48)	-0.01	(0.47)
17370	-271	17098	1.6%	0.69	3.23	3.25	0.02	(0.67)	-0.01	(0.66)
7730	-77	7653	1.0%	0.31	3.25	3.24	(0.01)	(0.32)	0.00	(0.31)
13589	91	13680	-0.7%	0.54	3.24	3.31	0.07	(0.48)	0.00	(0.48)
19191	-1513	17677	7.9%	0.76	3.31	3.39	0.08	(0.68)	-0.06	(0.62)
17634	-447	17187	2.5%	0.70	3.39	3.40	0.01	(0.69)	-0.02	(0.67)
3196	59	3255	-1.8%	0.13	3.40	3.47	0.06	(0.06)	0.00	(0.07)
2130	-443	1688	20.8%	0.08	3.47	3.53	0.07	(0.02)	-0.02	(0.00)
11998	-160	11838	1.3%	0.48	3.53	3.61	0.08	(0.40)	-0.01	(0.39)
7397	-439	6958	5.9%	0.29	3.61	3.60	(0.02)	(0.31)	-0.02	(0.29)
16080	-1646	14434	10.2%	0.64	3.60	3.67	0.07	(0.57)	-0.07	(0.50)
20586	-971	19614	4.7%	0.82	3.67	3.77	0.10	(0.72)	-0.04	(0.68)
4411	-342	4068	7.8%	0.18	3.77	3.81	0.04	(0.13)	-0.01	(0.12)
6776	0	6776	0.0%	0.27	3.81	3.83	0.03	(0.24)	0.00	(0.24)
20820	-1405	19416	6.7%	0.83	3.83	3.84	0.01	(0.82)	-0.06	(0.76)
21254	-1429	19826	6.7%	0.85	3.84	3.89	0.05	(0.80)	-0.06	(0.74)
19439	-604	18835	3.1%	0.77	3.89	3.95	0.06	(0.71)	-0.02	(0.69)
8555	-240	8314	2.8%	0.34	3.95	3.97	0.02	(0.32)	-0.01	(0.31)
6048	380	6428	-6.3%	0.24	3.97	4.00	0.02	(0.22)	0.02	(0.23)
5943	-245	5698	4.1%	0.24	4.00	4.04	0.04	(0.19)	-0.01	(0.18)
12725	-1383	11341	10.9%	0.51	4.04	4.10	0.06	(0.45)	-0.06	(0.39)
22839	-877	21963	3.8%	0.91	4.10	4.19	0.09	(0.82)	-0.03	(0.78)
6871	-318	6554	4.6%	0.27	4.19	4.05	(0.14)	(0.42)	-0.01	(0.40)