Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh0@lehigh.edu, http://www.lehigh.edu/~brh0) 41⁰ 22.5'N 75⁰ 17.3'W elevation 428m
18 May 2013, 4:30-6:43pm EDT: platform moved to lake center 16Nov 2013: platform move to dock 11:45-13:00 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.

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

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)

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	Tw02.2m	Tw02.7m	H310_z (m)	Lakelevel-mm (4oC)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc
		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						
		27.6	55.1	-4.3		1.86	4.8	31					34.0	38.8	39.3	39.3	39.4	39.6	39.6	40.0	39.4	39.8	39.4						
	4.1	-2.4	12.8	-20.2	60.6	47.2	2.2	13.7	239.9	963.1	415487505	837	1.1	3.8	4.0	4.1	4.1	4.2	4.2	4.4	4.1	4.3	4.1	2.1	42.2	47.2	12.5	29.6	20.9

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%	3/1/2014	60	-7.9	1.0	-17.6	49.3	0.0	0.7	4.8	236	970.3	14362721	28.4	0.34	2.74	3.40	3.65	3.73	3.88	4.03	4.13	3.87	3.9	3.78	2.2	47.0	0.000	12.5	25.7	17.9
ND	100%	3/2/2014	61	-3.3	-0.5	-7.5	60.4	0.0	2.2	6.2	298	964.7	9291784	19.4	0.41	2.79	3.46	3.68	3.73	3.91	3.89	4.11	3.87	3.9	3.76	2.1	43.7	0.000	12.6	27.7	19.1
ND	100%	3/3/2014	62	-11.8	-7.6	-15.2	56.0	0.0	3.4	10.9	307	967.7	9422093	19.1	0.29	2.82	3.46	3.71	3.77	3.94	3.87	4.12	3.95	3.9	3.76	2.1	40.2	0.000	12.6	20.2	16.0
ND	100%	3/4/2014	63	-11.0	-3.1	-20.2	55.6	0.0	0.6	4.7	228	971.4	12276379	24.7	0.25	2.84	3.49	3.77	3.76	3.98	3.92	4.20	3.97	3.9	3.78	2.1	37.7	0.000	12.5	22.8	17.6
ND	100%	3/5/2014	64	-5.6	-2.8	-9.9	50.8	0.0	1.8	7.7	225	970.8	9888650	20.5	0.27	2.88	3.51	3.79	3.78	3.98	3.94	4.24	3.95	3.9	3.78	2.1	35.0	0.000	12.6	24.3	18.1
ND	100%	3/6/2014	65	-9.6	-2.2	-16.8	53.7	0.0	0.8	5.0	151	978.5	19086920	35.4	0.25	2.90	3.52	3.82	3.76	3.99	3.97	4.26	3.97	3.9	3.81	2.1	32.9	0.000	12.6	25.6	18.4
ND	100%	3/7/2014	66	-5.0	4.9	-13.3	65.6	0.0	0.6	4.6	113	969.3	16395996	32.9	0.26	2.99	3.59	3.85	3.78	4.03	4.01	4.31	3.96	4.0	3.89	2.1	30.7	0.000	12.6	28.1	21.4
ND	100%	3/8/2014	67	0.3	6.3	-7.1	69.4	0.0	1.9	8.5	278	959.5	11071773	23.1	0.28	3.09	3.64	3.87	3.82	4.07	4.06	4.36	3.99	4.0	3.93	2.1	29.0	0.000	12.6	29.3	23.3
ND	100%	3/9/2014	68	-1.4	0.7	-3.5	56.5	0.0	2.8	9.3	302	962.1	18252244	35.4	0.32	3.20	3.71	3.86	3.91	4.06	4.04	4.33	4.06	4.0	4.00	2.1	27.0	0.000	12.6	33.1	21.7
ND	100%	3/10/2014	69	2.9	9.0	-2.0	56.7	0.0	1.7	7.1	261	955.0	13642593	28.5	0.35	3.42	3.83	3.93	3.92	4.13	4.11	4.41	4.12	4.1	4.08	2.1	25.3	0.000	12.7	32.7	25.3
ND	100%	3/11/2014	70	7.3	12.8	1.6	58.0	0.0	1.5	7.1	252	952.1	18403793	37.6	0.38	3.63	3.93	3.88	3.93	4.16	4.09	4.38	4.15	4.1	4.16	2.1	25.2	0.000	12.7	38.4	27.1
ND	100%	3/12/2014	71	1.8	6.6	-8.8	81.5	3.6	1.7	11.8	172	943.5	3507206	8.2	0.41	3.82	3.97	3.89	3.96	4.15	4.05	4.34	4.10	4.2	4.09	2.1	29.5	3.600	12.6	33.6	24.6
ND	100%	3/13/2014	72	-10.8	-7.8	-13.3	55.9	0.0	5.8	12.8	322	952.1	19209272	36.8	0.68	3.94	4.06	3.99	4.03	4.09	4.07	4.23	4.05	4.3	4.04	2.1	35.8	3.600	12.5	24.0	18.4
ND	100%	3/14/2014	73	-2.9	5.2	-13.2	46.9	0.1	1.1	6.0	250	963.0	14092934	28.8	0.52	4.09	4.17	4.17	4.23	4.32	4.29	4.46	4.17	4.4	4.15	2.1	36.7	3.700	12.5	27.5	21.3
ND	100%	3/15/2014	74	4.8	8.1	-0.7	49.1	0.0	2.8	10.1	284	957.7	12920870	26.6	0.71	4.14	4.23	4.17	4.20	4.30	4.26	4.42	4.16	4.4	4.14	2.1	37.6	3.700	12.6	36.1	24.3
ND	100%	3/16/2014	75	-5.6	-1.2	-8.4	48.3	0.0	3.3	10.8	290	967.7	15769856	31.2	0.94	4.15	4.26	4.22	4.27	4.37	4.32	4.49	4.19	4.5	4.19	2.1	38.0	3.700	12.6	27.9	17.7
ND	100%	3/17/2014	76	-6.3	-0.3	-10.4	39.8	0.0	1.6	5.1	77	964.6	18499941	36.4	1.08	4.18	4.30	4.28	4.34	4.42	4.40	4.60	4.24	4.5	4.26	2.1	37.9	3.700	12.6	26.9	19.5
ND	100%	3/18/2014	77	-3.1	5.1	-10.9	41.3	0.0	0.8	4.9	135	969.0	18519940	37.3	1.25	4.22	4.36	4.34	4.41	4.49	4.46	4.68	4.33	4.6	4.34	2.1	37.6	3.700	12.6	28.2	20.7
ND	100%	3/19/2014	78	-0.9	0.9	-4.7	75.0	5.5	1.3	5.7	112	966.7	6359230	14.1	1.34	4.21	4.39	4.32	4.38	4.48	4.44	4.64	4.35	4.6	4.36	2.1	38.9	9.200	12.6	27.7	19.0
ND	100%	3/20/2014	79	2.3	5.9	0.0	74.1	0.2	2.3	9.5	262	956.6	10628534	22.0	1.60	4.14	4.28	4.20	4.27	4.39	4.34	4.52	4.23	4.5	4.30	2.1	43.6	9.400	12.6	34.2	24.0
ND	100%	3/21/2014	80	0.7	5.5	-2.9	54.5	0.0	2.7	9.2	287	962.3	17795446	35.8	1.62	4.20	4.33	4.28	4.34	4.43	4.38	4.55	4.26	4.5	4.26	2.1	42.9	9.400	12.6	33.8	22.6
ND	100%	3/22/2014	81	3.7	11.3	-3.2	55.7	0.0	1.9	9.2	241	959.6	15043082	30.6	1.93	4.24	4.35	4.26	4.31	4.43	4.38	4.57	4.26	4.6	4.26	2.1	42.3	9.400	12.6	33.3	23.0
ND	100%	3/23/2014	82	-2.8	-0.1	-8.8	54.7	0.0	3.3	9.2	322	964.5	12601294	25.5	1.89	4.28	4.38	4.29	4.35	4.45	4.40	4.57	4.30	4.6	4.28	2.1	42.0	9.400	12.6	29.4	18.9
ND	100%	3/24/2014	83	-8.5	-4.2	-11.6	54.9	0.0	2.7	8.5	301	967.6	16773322	32.8	2.07	4.31	4.38	4.26	4.31	4.42	4.37	4.56	4.26	4.6	4.27	2.1	40.8	9.400	12.6	23.6	17.5
ND	100%	3/25/2014	84	-5.0	-1.1	-11.5	60.9	0.0	0.7	4.9	183	962.5	12831755	26.0	2.10	4.32	4.40	4.26	4.33	4.43	4.37	4.58	4.23	4.6	4.22	2.1	40.7	9.400	12.6	25.6	18.0
ND	100%	3/26/2014	85	-6.3	-3.0	-9.0	59.3	0.0	5.0	13.7	327	961.7	20647200	39.7	2.23	4.31	4.41	4.30	4.34	4.40	4.36	4.50	4.21	4.6	4.16	2.1	39.7	9.400	12.6	27.3	17.6
ND	100%	3/27/2014	86	-3.4	4.4	-11.4	45.6	0.0	1.5	6.1	265	971.6	17890256	35.7	2.60	4.32	4.41	4.29	4.33	4.40	4.37	4.57	4.17	4.6	4.22	2.1	37.6	9.400	12.5	29.0	19.9
ND	100%	3/28/2014	87	4.1	8.1	0.7	82.7	3.2	1.0	6.6	242	964.5	3333496	7.6	2.37	4.22	4.33	4.24	4.30	4.31	4.34	4.56	4.22	4.6	4.20	2.2	38.1	12.600	12.6	33.6	24.6
ND	100%	3/29/2014	88	4.0	8.1	1.1	93.3	15.7	2.0	7.8	116	965.3	5874509	13.1	1.91	4.17	4.28	4.19	4.35	4.35	4.34	4.62	4.30	4.5	4.24	2.2	42.5	28.300	12.6	35.8	28.0
ND	100%	3/30/2014	89	2.1	4.7	-0.6	96.6	15.7	3.2	8.5	266	952.8	3266408	7.7	1.45	4.14	4.27	4.17	4.27	4.27	4.29	4.50	4.21	4.5	4.19	2.2	72.7	44.000	12.6	36.1	30.3
ND	100%	3/31/2014	90	1.4	7.1	-1.9	76.9	3.2	4.3	10.9	333	962.6	17828009	35.8	2.20	4.21	4.31	4.12	4.22	4.20	4.23	4.43	4.13	4.5	4.10	2.2	97.1	47.200	12.5	37.0	30.6
		4/1/2014	91	1.0	1.0	1.0	73.4	0.0	2.1	3.8	346	966.8	366	0.0	2.23	4.26	4.35	4.14	4.25	4.24	4.28	4.49	4.23	4.5	4.14	2.2	103.0	47.200	12.8	36.1	27.1

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)

Ratio of lake watershed to lake area: 2.6176758 Runoff & seepage as % of watershed area precip: 2%

	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	
Grand sum/avg	-2.46	1.11	3.77	4.05	4.07	4.11	4.23	1.9	415486159	-27964	54.4	47.2	71.2	-38.0	0.0	0.0

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

Data

DATE	DOY	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
3/1/2014	60	-8.32	0.34	2.74	3.40	3.65	3.72	3.88	0.4	14362307	-738	-2.734	0.0	-1.0	-1.0	0.0
3/2/2014	61	-3.18	0.41	2.79	3.46	3.68	3.73	3.91	2.0	9292075	-856	-3.878	0.0	-1.9	-1.2	0.0
3/3/2014	62	-11.53	0.30	2.82	3.46	3.71	3.77	3.93	3.2	9420544	-1877	-2.695	0.0	0.7	-2.5	0.0
3/4/2014	63	-11.26	0.25	2.83	3.49	3.77	3.76	3.98	0.5	12277996	-795	-2.564	0.0	-0.6	-1.1	0.0
3/5/2014	64	-5.54	0.27	2.88	3.51	3.79	3.78	3.99	1.6	9888169	-1032	-2.561	0.0	-0.3	-1.4	0.0
3/6/2014	65	-9.58	0.25	2.90	3.52	3.82	3.76	3.99	0.8	19086599	-869	-2.126	0.0	-0.1	-1.2	0.0
3/7/2014	66	-5.24	0.26	2.99	3.59	3.85	3.78	4.03	0.5	16396111	-489	-1.780	0.0	-0.3	-0.7	0.0
3/8/2014	67	0.18	0.28	3.09	3.64	3.87	3.82	4.07	1.7	11072887	-443	-2.135	0.0	-0.7	-0.6	0.0
3/9/2014	68	-1.33	0.32	3.20	3.71	3.86	3.90	4.06	2.6	18250809	-987	-1.791	0.0	0.4	-1.3	0.0
3/10/2014	69	2.73	0.35	3.41	3.82	3.93	3.92	4.13	1.4	13643839	-389	-1.303	0.0	0.1	-0.5	0.0
3/11/2014	70	7.33	0.38	3.62	3.93	3.88	3.92	4.16	1.3	18403746	-71	1.932	0.0	2.9	-0.1	0.0
3/12/2014	71	2.14	0.41	3.81	3.97	3.89	3.96	4.16	1.4	3507143	-154	7.843	3.6	5.3	-0.2	0.0
3/13/2014	72	-10.70	0.68	3.94	4.06	3.98	4.02	4.08	5.6	19207149	-3129	1.574	0.0	6.7	-4.2	0.0
3/14/2014	73	-3.32	0.52	4.08	4.17	4.17	4.23	4.31	0.9	14094266	-688	0.926	0.1	2.6	-0.9	0.0
3/15/2014	74	4.92	0.71	4.14	4.23	4.16	4.20	4.30	2.4	12920366	-659	0.588	0.0	2.3	-0.9	0.0
3/16/2014	75	-5.38	0.93	4.15	4.26	4.22	4.27	4.36	3.0	15770889	-1537	0.091	0.0	3.0	-2.1	0.0
3/17/2014	76	-6.37	1.07	4.18	4.30	4.28	4.34	4.42	1.5	18500480	-1153	0.216	0.0	2.6	-1.6	0.0
3/18/2014	77	-3.18	1.24	4.22	4.36	4.34	4.40	4.49	0.7	18519212	-733	-0.760	0.0	1.1	-1.0	0.0
3/19/2014	78	-1.03	1.35	4.22	4.39	4.33	4.38	4.49	1.1	6359449	-398	5.875	5.5	1.8	-0.5	0.0
3/20/2014	79	2.28	1.59	4.14	4.28	4.20	4.27	4.39	2.0	10627891	-502	0.661	0.2	2.0	-0.7	0.0
3/21/2014	80	0.82	1.61	4.20	4.33	4.28	4.34	4.43	2.5	17795686	-1077	-1.527	0.0	0.8	-1.5	0.0
3/22/2014	81	3.60	1.93	4.24	4.35	4.26	4.31	4.43	1.6	15042556	-594	0.487	0.0	2.1	-0.8	0.0
3/23/2014	82	-2.57	1.89	4.28	4.38	4.29	4.35	4.45	3.0	12601257	-1569	-2.288	0.0	0.7	-2.1	0.0
3/24/2014	83	-8.46	2.06	4.31	4.38	4.26	4.31	4.43	2.6	16773548	-1819	0.391	0.0	3.7	-2.5	0.0
3/25/2014	84	-5.27	2.10	4.32	4.40	4.26	4.33	4.42	0.4	12832317	-712	-0.681	0.0	1.1	-1.0	0.0
3/26/2014	85	-6.07	2.24	4.31	4.41	4.30	4.35	4.40	4.6	20646029	-2732	-1.592	0.0	3.0	-3.7	0.0
3/27/2014	86	-3.73	2.55	4.33	4.41	4.29	4.32	4.40	1.3	17891428	-1104	-2.053	0.0	0.3	-1.5	0.0
3/28/2014	87	3.97	2.42	4.23	4.34	4.24	4.30	4.31	0.7	3333705	-102	2.227	3.2	0.0	-0.1	0.0
3/29/2014	88	4.07	1.92	4.17	4.28	4.18	4.34	4.35	1.8	5874503	164	14.407	14.9	0.1	0.2	0.0
3/30/2014	89	2.28	1.46	4.14	4.27	4.18	4.27	4.28	2.9	3266447	25	32.044	16.5	16.4	0.0	0.0
3/31/2014	90	1.36	2.16	4.21	4.31	4.12	4.22	4.20	4.1	17826757	-946	17.618	3.2	16.5	-1.3	0.0

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

Nominal diffuse %R from water=7%	-24316.5	345506.7	6%		4	4.1	0.5		-1.0	-13.2
										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/m²)	solar heat absorbed - evap loss (kJ/m²)	% 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)
13357	-664	12693	5.0%	0.53	3.65	3.68	0.04	(0.50)	-0.03	(0.47)
8642	-771	7871	8.9%	0.34	3.68	3.69	0.01	(0.33)	-0.03	(0.30)
8761	-1690	7071	19.3%	0.35	3.69	3.71	0.01	(0.34)	-0.07	(0.27)
11419	-715	10703	6.3%	0.45	3.71	3.75	0.04	(0.41)	-0.03	(0.38)
9196	-929	8267	10.1%	0.37	3.75	3.75	(0.00)	(0.37)	-0.04	(0.33)
17751	-782	16969	4.4%	0.71	3.75	3.80	0.06	(0.65)	-0.03	(0.62)
15248	-440	14808	2.9%	0.61	3.80	3.85	0.04	(0.56)	-0.02	(0.55)
10298	-399	9899	3.9%	0.41	3.85	3.83	(0.02)	(0.43)	-0.02	(0.41)
16973	-888	16085	5.2%	0.68	3.83	3.93	0.10	(0.58)	-0.04	(0.54)
12689	-350	12339	2.8%	0.51	3.93	3.97	0.04	(0.46)	-0.01	(0.45)
17115	-64	17052	0.4%	0.68	3.97	3.96	(0.01)	(0.69)	0.00	(0.69)
3262	-139	3123	4.3%	0.13	3.96	3.92	(0.04)	(0.17)	-0.01	(0.17)
17863	-2816	15047	15.8%	0.71	3.92	4.17	0.25	(0.46)	-0.11	(0.35)
13108	-620	12488	4.7%	0.52	4.17	4.17	0.00	(0.52)	-0.02	(0.49)
12016	-593	11423	4.9%	0.48	4.17	4.19	0.02	(0.46)	-0.02	(0.44)
14667	-1383	13284	9.4%	0.58	4.19	4.26	0.07	(0.52)	-0.06	(0.46)
17205	-1037	16168	6.0%	0.69	4.26	4.34	0.07	(0.61)	-0.04	(0.57)
17223	-659	16563	3.8%	0.69	4.34	4.38	0.05	(0.64)	-0.03	(0.61)
5914	-358	5556	6.1%	0.24	4.38	4.32	(0.06)	(0.30)	-0.01	(0.29)
9884	-452	9432	4.6%	0.39	4.32	4.28	(0.04)	(0.43)	-0.02	(0.41)
16550	-970	15580	5.9%	0.66	4.28	4.36	0.08	(0.58)	-0.04	(0.54)
13990	-534	13455	3.8%	0.56	4.36	4.34	(0.02)	(0.58)	-0.02	(0.55)
11719	-1412	10307	12.0%	0.47	4.34	4.34	(0.00)	(0.47)	-0.06	(0.41)
15599	-1637	13962	10.5%	0.62	4.34	4.28	(0.06)	(0.68)	-0.07	(0.62)
11934	-640	11294	5.4%	0.48	4.28	4.35	0.07	(0.41)	-0.03	(0.38)
19201	-2458	16742	12.8%	0.76	4.35	4.33	(0.02)	(0.78)	-0.10	(0.68)
16639	-993	15646	6.0%	0.66	4.33	4.36	0.03	(0.63)	-0.04	(0.60)
3100	-92	3008	3.0%	0.12	4.36	4.25	(0.11)	(0.23)	0.00	(0.23)
5463	148	5611	-2.7%	0.22	4.25	4.27	0.02	(0.20)	0.01	(0.20)
3038	22	3060	-0.7%	0.12	4.27	4.18	(0.09)	(0.21)	0.00	(0.21)