

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

17 Apr 2011; platform moved to lake center, 1-2pm 13 Nov 2011; platform moved to dock 12-1pm  
 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 falling (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 PSIS converted to depth using density of water at 40C (1.43321 psim)  
 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.)

Month	sum avg Tw	rain sum (in.) Aug-Sep2011		WS Max		Std pressure at sea level = 1 atm = 760 mm Hg = 29.92" Hg = 1013.2 mbar Std pressure at 428m elevation = 724 mm Hg, 29.61 in. Hg. (965.2 mbar)															Lake level - mm (40C)	cumul. rain-mm	Batt min-V	RH% CR10 enc	RH% MUX enc				
		Tair avg F	Tair max F	Tair min F	Rain-in	WS-max mph	WS-max m/s	WDIR-deg	Barom-mb	Sum Rad W/m2	Sum PAR μMol/m2/s	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	H310_z (m)	
Month	3.9	3.7	19.1	-7.5	69.3	24.4	1.7	12.6	246.3	965.9	153089529	305	3.8	3.7	4.0	3.7	3.9	3.9	4.1	3.9	4.0	4.0	3.9	1.5	37.8	24.4	12.4	16.7	27.9

Data

Location	% records	Date	Day of Yr	Tair avg-C	Tair Hi-C	Tair Min-C	RHair-%	Rain-mm	WS-n/s m/s	WS Max deg	WDIR-deg	Barom-mb	Sum Rad J/m2	Sum PAR μMol/m2/s	Tw 0.1m	Tw 0.5m	Tw 1m	Tw 2m	Tw 3m	Tw 4m	Tw 5m	Tw 6m	Tw 8m	Tw H310-C	Tw 12m	H310 depth-m (40C)	Lakelevel-cumul. rain-mm (40C)	Batt min-V	RH% CR10 enc	RH% MUX enc	
ND 100%		3/1/2012	61	0.2	0.6	-0.2	103.8	7.5	0.6	3.5	122	955.1	1653947	4	2.68	2.78	3.17	3.24	3.40	3.52	3.58	3.43	3.44	3.2	3.42	1.5	36.6	7.500	12.4	20.1	13.9
ND 100%		3/2/2012	62	0.6	2.1	-0.6	102.9	7.7	0.8	6.6	121	961.9	2428630	5	2.82	2.97	3.40	3.47	3.65	3.73	3.83	3.68	3.71	3.4	3.64	1.5	37.6	15.200	12.4	34.8	13.9
ND 100%		3/3/2012	63	5.2	10.5	2.1	72.3	2.4	2.3	12.6	226	949.3	13469311	27	3.35	3.21	3.56	3.37	3.54	3.63	3.72	3.62	3.67	3.6	3.65	1.6	40.6	17.600	12.4	26.8	35.9
ND 100%		3/4/2012	64	-0.5	2.1	-3.0	69.4	0.0	2.0	8.6	280	951.9	9870407	20	3.21	3.14	3.48	3.25	3.43	3.50	3.62	3.49	3.56	3.5	3.53	1.6	40.1	17.600	12.6	15.3	51.7
ND 100%		3/5/2012	65	-3.4	-0.3	-6.2	64.1	0.0	3.0	8.0	308	962.8	18430898	35	3.11	2.88	3.17	2.91	3.09	3.16	3.24	3.16	3.21	3.1	3.21	1.5	38.3	17.600	12.6	14.7	54.0
ND 100%		3/6/2012	66	-2.3	4.8	-7.5	61.2	0.0	1.5	5.3	285	978.8	16270627	32	2.63	2.69	3.06	2.92	3.07	3.18	3.28	3.18	3.19	3.1	3.23	1.5	35.9	17.600	12.6	14.1	40.0
ND 100%		3/7/2012	67	7.6	16.3	-1.0	54.1	0.0	1.2	6.2	249	986.1	18119480	36	3.67	3.66	3.99	3.64	3.83	3.88	4.11	3.94	4.05	4.0	4.02	1.5	35.1	17.600	12.6	13.9	17.6
ND 100%		3/8/2012	68	13.1	17.7	8.9	73.8	1.7	1.8	10.8	258	966.2	10980734	23	4.27	4.11	4.43	3.92	4.14	4.14	4.40	4.18	4.30	4.4	4.18	1.5	35.7	19.300	12.6	12.7	14.1
ND 100%		3/9/2012	69	1.2	6.1	-2.4	73.1	5.1	3.5	10.7	316	965.9	12050988	24	4.54	4.34	4.65	4.17	4.41	4.40	4.67	4.46	4.63	4.6	4.41	1.6	43.4	24.400	12.6	13.2	32.9
ND 100%		3/10/2012	70	-3.1	1.1	-6.2	61.6	0.0	2.7	11.3	289	976.4	17071509	33	4.25	4.05	4.31	3.87	4.10	4.12	4.36	4.18	4.34	4.2	4.16	1.6	39.9	24.400	12.5	14.2	41.7
ND 100%		3/11/2012	71	6.5	15.3	-2.5	42.3	0.0	1.4	7.5	254	975.8	19350301	39	4.51	4.32	4.62	4.23	4.45	4.48	4.73	4.53	4.64	4.6	4.54	1.5	37.4	24.400	12.5	13.6	18.7
ND 100%		3/12/2012	72	11.4	19.1	3.7	50.5	0.0	0.7	4.4	241	971.6	13377652	27	5.42	4.59	4.80	4.37	4.56	4.62	4.84	4.67	4.75	4.7	4.66	1.5	35.7	24.400	12.6	12.4	14.8
ND 25%		3/13/2012	73	11.9	13.0	9.5	71.5	0.0	0.7	4.2	251	965.6	5045	0	5.32	4.89	5.10	4.46	4.70	4.69	4.95	4.72	4.90	5.0	4.65	1.5	35.4	24.400	12.6	11.5	13.0

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	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw	Avg Tw
2.6176758	3.72	3.83	3.67	3.98	3.68	3.88	3.93	1.5	153089529	-8136	0.9	24.4	-0.4	-11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Nominal diffuse %R from water=7%	#N/A	#N/A	#N/A	5%
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Sum Terre vap=Air PD.mbar*WS.m/s	#N/A	#N/A	4	3.8	1.5
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Scale Adj (1.0=no adjustment) 4.184 (pule/calorie (= joule/degree for 1cm3))

7%	0.9	4.184	6000000	← CONVERT HEAT TO DEGREES cm3/m2 (for 0-4m integrated depth)					4.184	6000000	slope intercept t2
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 lost to other absorbed solar to match dTw LESS EVAP degC 0-6m)	RESID2: NON SOLAR FLUX to other absorbed solar to match dTw LESS EVAP (degC 0-6m)	evap loss (degC 0-6m)	
1538	-104	1434	6.8%	0.06	3.13	3.50	0.37	0.31	0.00	0.31	
2259	-107	2151	4.7%	0.09	3.50	3.40	(0.10)	(0.19)	0.00	(0.18)	
12526	-598	11928	4.8%	0.50	3.40	3.17	(0.24)	(0.73)	-0.02	(0.71)	
9179	-798	8381	8.7%	0.37	3.17	3.01	(0.16)	(0.53)	-0.03	(0.50)	
17141	-1453	15688	8.5%	0.68	3.01	2.69	(0.32)	(1.00)	-0.06	(0.95)	
15132	-748	14384	4.9%	0.60	2.69	3.44	0.75	0.15	-0.03	0.18	
16851	-330	16521	2.0%	0.67	3.44	3.78	0.34	(0.33)	-0.01	(0.32)	
10212	-482	10694	-4.7%	0.41	3.78	4.59	0.81	0.41	0.02	0.39	
11217	-1229	9988	11.0%	0.45	4.59	3.96	(0.63)	(1.08)	-0.05	(1.03)	
15877	-1567	14309	9.9%	0.63	3.96	4.28	0.32	(0.31)	-0.06	(0.25)	
17996	-708	17288	3.9%	0.72	4.28	4.62	0.34	(0.37)	-0.03	(0.35)	
12441	-195	12247	1.6%	0.50	4.62	4.60	(0.02)	(0.51)	-0.01	(0.51)	