Lake Lacawac, Bruce R. Hargreaves, Lehigh University (brh0@lehigh.edu, http://www.lehigh.edu/~brh0)
13Apr09: Station moved from dock from 2:30-3:30pm (problems with ice-shift anchors result in wind direction error until corrected on 10Jun09)
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.
Adjusted Tw sensors 13Nov07 based on comparison of depths and vs PUV & YSI sonde profiles (note that Tw at 11.3m matches PUV Tw at 12.5, probably within sediment boundary layer)
Tw12 adjusted to match others on bottom after moved to dock

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

	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						
	23.8	30.2	17.5		2.59	4.7	36					33.2	36.6	36.9	37.3	37.2	38.1	37.7	38.1	37.9	37.7	37.4						
Month summary	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
	-4.5	**-1.0**	**-8.0**	**82.4**	**65.9**	**2.1**	**16.2**	**265.5**	**960.3**	**171722737**	**338**	**0.7**	**2.6**	**2.7**	**2.9**	**2.9**	**3.4**	**3.2**	**3.4**	**3.3**	**3.2**	**3.0**	**2.0**	**-19.2**	**65.9**	**12.4**	**49.1**	**15.0**

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%	1/1/2010	1	-1.2	1.2	-4.1	95.9	2.6	1.2	7.2	245	958.3	1576214	5	0	2	2.3	2.5	2.8	3.1	2.9	3.3	3.0	3.0	2.8	2.1	16.7	2.600	12.5	69.2	14.1
ND	100%	1/2/2010	2	-8.9	-4.2	-13.0	82.9	0.0	4.2	11.0	320	953.8	5433192	10	0	2	2.3	2.5	2.6	2.9	2.7	3.0	2.9	2.7	2.8	2.1	11.0	2.600	12.5	68.1	15.5
ND	100%	1/3/2010	3	-11.7	-10.7	-13.0	80.9	0.0	5.2	16.2	316	949.4	5026572	10	1	2	2.4	2.5	2.4	2.7	2.5	2.8	2.7	2.6	2.7	2.1	5.3	2.600	12.6	64.0	15.8
ND	100%	1/4/2010	4	-9.9	-7.0	-11.8	83.5	0.0	3.2	8.0	318	953.4	5263168	10	1	2	2.4	2.5	2.6	3.0	2.8	3.1	3.0	2.8	2.8	2.1	-1.0	2.600	12.5	63.6	15.5
ND	100%	1/5/2010	5	-8.1	-6.7	-9.8	84.6	0.0	3.2	8.1	318	953.5	5026854	10	1	2	2.4	2.5	2.6	3.0	2.8	3.1	2.9	2.8	2.7	2.0	-6.4	2.600	12.5	63.5	15.3
ND	100%	1/6/2010	6	-6.1	-4.8	-7.4	83.4	0.0	3.8	11.0	319	954.1	6449656	12	1	2	2.4	2.6	2.5	3.1	2.8	3.0	2.9	2.8	2.7	2.0	-11.3	2.600	12.5	64.0	15.2
ND	100%	1/7/2010	7	-3.8	-1.9	-5.3	87.3	0.0	2.6	8.4	309	958.3	3260094	7	1	2	2.4	2.6	2.5	3.1	2.9	3.1	3.0	2.8	2.7	2.0	-15.5	2.600	12.6	63.5	14.8
ND	100%	1/8/2010	8	-5.7	-3.1	-9.5	86.4	0.0	2.2	9.4	275	954.3	2912516	6	1	2	2.4	2.6	2.6	3.2	3.0	3.2	3.0	2.9	2.8	2.0	-17.6	2.600	12.4	61.6	14.8
ND	100%	1/9/2010	9	-10.4	-7.5	-14.8	74.5	0.0	3.6	9.3	326	964.3	8336153	15	1	2	2.4	2.6	2.6	3.1	2.9	3.1	3.0	2.8	2.8	2.0	-20.6	2.600	12.4	59.1	15.9
ND	100%	1/10/2010	10	-11.7	-7.6	-16.0	78.5	0.0	1.4	6.8	295	968.3	5704440	11	0	2	2.4	2.6	2.6	3.2	3.0	3.2	3.0	3.0	2.8	2.0	-23.8	2.600	12.6	55.2	16.9
ND	100%	1/11/2010	11	-7.8	-3.6	-12.0	71.1	0.1	1.4	5.1	278	964.3	6543547	13	0	2	2.5	2.6	2.7	3.2	3.1	3.2	3.0	3.0	2.8	2.0	-27.8	2.700	12.6	60.2	16.0
ND	100%	1/12/2010	12	-6.7	-4.7	-9.0	87.0	0.0	2.6	8.6	316	963.6	3554733	7	0	2	2.5	2.7	2.6	3.2	3.0	3.2	3.0	2.9	2.8	2.0	-31.8	2.700	12.6	59.9	15.2
ND	100%	1/13/2010	13	-5.1	-0.4	-9.2	77.0	0.0	2.3	7.8	298	965.8	8596067	17	0	2	2.5	2.7	2.6	3.2	3.0	3.2	3.0	2.9	2.8	2.0	-35.4	2.700	12.5	61.5	15.0
ND	100%	1/14/2010	14	-2.9	4.1	-9.1	80.5	0.1	0.8	4.9	251	967.3	8174368	16	0	2	2.5	2.7	2.7	3.2	2.9	3.3	3.1	3.0	2.8	2.0	-38.5	2.800	12.7	64.4	15.1
ND	100%	1/15/2010	15	1.5	4.6	-5.0	73.6	0.0	2.1	8.0	293	966.5	3491124	7	0	2	2.5	2.7	2.7	3.2	2.8	3.2	3.0	2.9	2.8	2.0	-41.6	2.800	12.7	61.9	14.4
ND	100%	1/16/2010	16	1.5	6.4	-2.2	80.8	0.0	1.7	6.8	278	967.5	8570895	17	1	2	2.6	2.8	2.8	3.3	2.8	3.3	3.2	3.0	2.9	2.0	-44.4	2.800	12.6	62.7	14.0
ND	100%	1/17/2010	17	-1.3	1.2	-4.8	98.6	11.4	1.2	4.5	120	960.4	1589615	4	1	2	2.6	2.8	2.9	3.4	3.0	3.3	3.2	3.1	2.9	2.0	-42.9	14.200	12.6	58.6	14.6
ND	100%	1/18/2010	18	1.9	5.7	0.2	97.1	4.5	1.4	6.8	216	955.0	5916897	12	1	2	2.7	2.9	2.9	3.4	3.1	3.3	3.2	3.1	3.0	2.0	-30.6	18.700	12.5	58.2	13.7
ND	100%	1/19/2010	19	0.9	2.5	-0.6	99.3	1.8	0.6	4.6	249	958.2	1806045	4	1	3	2.8	3.0	3.0	3.5	3.3	3.4	3.3	3.3	3.0	2.0	-30.6	20.500	12.5	49.3	13.8
ND	100%	1/20/2010	20	-1.4	-0.5	-3.1	87.8	0.0	2.0	6.0	323	960.4	2381088	5	1	3	2.8	3.0	3.0	3.5	3.3	3.4	3.3	3.3	3.1	2.0	-32.1	20.500	12.5	41.3	14.3
ND	100%	1/21/2010	21	-3.4	1.9	-7.9	87.0	0.1	0.6	3.2	184	966.7	8931310	17	1	3	2.8	3.1	3.1	3.6	3.4	3.5	3.5	3.5	3.1	2.0	-34.5	20.600	12.4	32.7	15.2
ND	100%	1/22/2010	22	-3.4	2.1	-7.1	86.3	0.0	0.4	4.9	193	961.7	5343484	12	1	3	2.9	3.3	3.2	3.7	3.5	3.6	3.6	3.5	3.2	2.0	-38.7	20.600	12.7	25.8	15.1
ND	100%	1/23/2010	23	-3.7	5.0	-10.2	76.8	0.0	0.3	3.4	148	968.4	10015470	19	1	3	3.0	3.4	3.3	3.8	3.6	3.7	3.7	3.7	3.3	2.0	-44.6	20.600	12.6	25.1	15.6
ND	100%	1/24/2010	24	0.5	7.2	-2.6	92.2	1.7	0.8	6.2	168	963.8	1989747	4	1	3	3.1	3.5	3.3	3.8	3.6	3.8	3.7	3.7	3.4	2.0	-49.8	22.300	12.6	24.4	14.1
ND	100%	1/25/2010	25	9.7	13.0	3.5	96.2	42.9	1.8	7.6	195	943.6	1968019	4	1	3	3.1	3.3	3.2	3.7	3.5	3.7	3.6	3.5	3.3	2.0	-5.0	65.200	12.5	41.0	13.3
ND	100%	1/26/2010	26	0.1	3.1	-2.7	70.4	0.0	2.2	9.5	284	949.5	5710456	11	1	3	3.2	3.2	3.2	3.7	3.5	3.7	3.6	3.5	3.3	2.1	28.9	65.200	12.5	42.9	14.1
ND	100%	1/27/2010	27	-2.8	-0.8	-3.9	72.4	0.0	1.9	7.0	284	961.7	6142697	12	1	3	3.3	3.3	3.3	3.8	3.6	3.7	3.7	3.6	3.4	2.1	16.1	65.200	12.6	30.1	14.8
ND	100%	1/28/2010	28	-4.2	0.5	-11.7	77.5	0.7	2.6	11.2	276	961.4	4303816	9	1	3	3.3	3.4	3.2	3.7	3.5	3.7	3.7	3.6	3.4	2.1	3.6	65.900	12.6	25.7	15.1
ND	100%	1/29/2010	29	-12.0	-9.0	-14.1	70.4	0.0	4.2	11.4	317	968.4	9707932	18	1	3	3.3	3.4	3.2	3.8	3.5	3.7	3.7	3.6	3.4	2.0	-7.4	65.900	12.4	23.6	16.9
ND	100%	1/30/2010	30	-13.5	-11.1	-16.1	70.9	0.0	2.6	8.1	234	966.3	6101252	12	1	3	3.4	3.5	3.4	3.9	3.8	3.9	3.8	3.8	3.5	2.0	-17.9	65.900	12.5	19.3	17.0
ND	100%	1/31/2010	31	-10.7	-5.6	-16.8	63.5	0.0	1.6	6.6	282	962.5	11895314	22	1	3	3.5	3.6	3.5	4.0	3.8	4.0	4.0	3.9	3.6	2.0	-26.9	65.900	12.5	21.2	16.7

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: **3.88**   Runoff & seepage as % of watershed area precip: **36.5%**

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	Sum Out flow (lake mm)
Grand sum/avg		**-4.53**	**0.67**	**2.58**	**2.74**	**2.92**	**2.89**	**3.39**	**1.9**	**171722737**	**-23712**	**-50.0**	**65.9**	**73.2**	**-34.3**	**0.0**	**-155.1**
																SumTerrevap2=AirVPD,mbar*WS,m/s*sc	
		Data															
1/1/2010	1	-1.19	0.45	2.25	2.35	2.47	2.76	3.08	1.1	1576214	-173	-5.660	2.6	-4.6	-0.2	0.0	-3.6
1/2/2010	2	-8.94	0.42	2.25	2.35	2.49	2.60	2.90	3.9	5433192	-1738	-5.062	0.0	0.6	-2.5	0.0	-3.1
1/3/2010	3	-11.72	0.60	2.24	2.37	2.53	2.43	2.73	4.9	5026572	-2487	-7.242	0.0	-0.8	-3.6	0.0	-2.8
1/4/2010	4	-9.92	0.56	2.25	2.37	2.53	2.64	2.96	2.9	5263168	-1427	-5.238	0.0	-0.6	-2.1	0.0	-2.6
1/5/2010	5	-8.14	0.60	2.19	2.38	2.53	2.56	2.98	3.0	5026854	-1306	-4.781	0.0	-0.5	-1.9	0.0	-2.4
1/6/2010	6	-6.09	0.56	2.24	2.41	2.58	2.47	3.13	3.6	6449656	-1318	-4.675	0.0	-0.5	-1.9	0.0	-2.3
1/7/2010	7	-3.75	0.60	2.23	2.43	2.59	2.52	3.12	2.4	3260094	-709	-4.078	0.0	-0.9	-1.0	0.0	-2.1
1/8/2010	8	-5.72	0.50	2.21	2.44	2.60	2.59	3.16	2.1	2912516	-864	-1.230	0.0	2.7	-1.2	0.0	-2.7
1/9/2010	9	-10.36	0.52	2.22	2.44	2.62	2.56	3.12	3.4	8336153	-1723	-3.375	0.0	3.6	-2.5	0.0	-4.5
1/10/2010	10	-11.66	0.44	2.21	2.45	2.63	2.65	3.21	1.3	5704440	-970	-3.797	0.0	1.7	-1.4	0.0	-4.1
1/11/2010	11	-7.77	0.42	2.21	2.47	2.64	2.67	3.22	1.3	6543547	-789	-3.937	0.1	0.7	-1.1	0.0	-3.6
1/12/2010	12	-6.75	0.38	2.20	2.48	2.67	2.64	3.20	2.5	3554733	-962	-4.043	0.0	0.6	-1.4	0.0	-3.3
1/13/2010	13	-5.13	0.42	2.21	2.49	2.70	2.64	3.19	2.2	8596067	-864	-3.199	0.0	1.1	-1.2	0.0	-3.0
1/14/2010	14	-2.86	0.47	2.23	2.50	2.72	2.73	3.25	0.7	8174368	-334	-2.953	0.1	0.3	-0.5	0.0	-2.9
1/15/2010	15	1.51	0.49	2.25	2.53	2.73	2.71	3.23	1.9	3491124	-228	-3.234	0.0	-0.2	-0.3	0.0	-2.7
1/16/2010	16	1.52	0.55	2.32	2.57	2.75	2.84	3.33	1.6	8570895	-183	-2.144	0.0	0.7	-0.3	0.0	-2.6
1/17/2010	17	-1.34	0.60	2.42	2.61	2.82	2.89	3.38	1.1	1589615	-125	12.163	11.4	3.6	-0.2	0.0	-2.7
1/18/2010	18	1.92	0.71	2.49	2.68	2.87	2.92	3.42	1.3	5916897	86	2.496	4.5	1.3	0.1	0.0	-3.4
1/19/2010	19	0.86	0.73	2.64	2.76	3.03	2.98	3.46	0.6	1806045	-10	-0.070	1.8	1.5	0.0	0.0	-3.4
1/20/2010	20	-1.36	0.69	2.68	2.79	3.04	3.00	3.48	1.9	2381088	-367	-2.390	0.0	1.4	-0.5	0.0	-3.3
1/21/2010	21	-3.40	0.95	2.76	2.83	3.14	3.08	3.56	0.5	8931310	-313	-2.707	0.1	0.7	-0.5	0.0	-3.1
1/22/2010	22	-3.44	1.11	2.88	2.93	3.29	3.16	3.67	0.4	5343484	-328	-5.765	0.0	-2.4	-0.5	0.0	-2.9
1/23/2010	23	-3.74	1.15	2.97	3.02	3.41	3.28	3.79	0.2	10015470	-383	-5.660	0.0	-2.5	-0.6	0.0	-2.6
1/24/2010	24	0.52	0.98	3.04	3.11	3.51	3.32	3.82	0.4	1989747	-69	-2.742	1.7	-1.9	-0.1	0.0	-2.4
1/25/2010	25	9.66	0.71	2.95	3.14	3.33	3.20	3.75	1.0	1968019	1047	81.909	42.9	50.6	1.5	0.0	-13.1
1/26/2010	26	0.13	0.62	2.98	3.17	3.20	3.19	3.74	2.0	5710456	-535	-8.894	0.0	17.8	-0.8	0.0	-25.9
1/27/2010	27	-2.84	0.85	3.18	3.25	3.28	3.26	3.79	1.7	6142697	-663	-14.097	0.0	3.9	-1.0	0.0	-17.1
1/28/2010	28	-4.24	0.88	3.21	3.28	3.37	3.23	3.73	2.3	4303816	-1007	-10.406	0.7	1.3	-1.5	0.0	-10.9
1/29/2010	29	-11.98	1.02	3.25	3.31	3.42	3.21	3.78	3.9	9707932	-2290	-11.460	0.0	-0.9	-3.3	0.0	-7.3
1/30/2010	30	-13.49	0.98	3.33	3.40	3.51	3.40	3.94	2.4	6101252	-1587	-9.843	0.0	-2.6	-2.3	0.0	-5.0
1/31/2010	31	-10.68	0.88	3.42	3.49	3.62	3.50	4.01	1.4	11895314	-1091	-7.910	0.0	-2.8	-1.6	0.0	-3.7

									1.000	<=SCALE ADJ (1.0=no adjustment)
									4.184	joule/calorie (= joule/degree for 1cm3)
Nominal diffuse %R from water=7%	**-21341.0**	**98864.9**	**17%**		**3**	**#N/A**	**#N/A**		**-0.9**	**#N/A**
										slope
				4.184	<=CONVERT HEAT TO DEGREES				4.184	intercept
30%	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)
1103	-155	948	14.1%	0.04	2.73	2.67	(0.05)	(0.10)	-0.01	(0.09)
3803	-1564	2239	41.1%	0.15	2.67	2.52	(0.15)	(0.31)	-0.06	(0.24)
3519	-2238	1281	63.6%	0.14	2.52	2.58	0.06	(0.08)	-0.09	0.01
3684	-1284	2400	34.9%	0.15	2.58	2.68	0.10	(0.04)	-0.05	0.01
3519	-1175	2343	33.4%	0.14	2.68	2.70	0.02	(0.12)	-0.05	(0.07)
4515	-1186	3329	26.3%	0.18	2.70	2.68	(0.02)	(0.20)	-0.05	(0.16)
2282	-638	1644	28.0%	0.09	2.68	2.79	0.11	0.02	-0.03	0.04
2039	-777	1261	38.1%	0.08	2.79	2.73	(0.06)	(0.14)	-0.03	(0.11)
5835	-1551	4284	26.6%	0.23	2.73	2.78	0.05	(0.18)	-0.06	(0.12)
3993	-873	3120	21.9%	0.16	2.78	2.81	0.03	(0.13)	-0.03	(0.10)
4580	-710	3870	15.5%	0.18	2.81	2.81	0.01	(0.18)	-0.03	(0.15)
2488	-866	1622	34.8%	0.10	2.81	2.76	(0.06)	(0.15)	-0.03	(0.12)
6017	-777	5240	12.9%	0.24	2.76	2.86	0.10	(0.14)	-0.03	(0.11)
5722	-301	5421	5.3%	0.23	2.86	2.85	(0.00)	(0.23)	-0.01	(0.22)
2444	-206	2238	8.4%	0.10	2.85	2.82	(0.03)	(0.13)	-0.01	(0.12)
6000	-165	5835	2.7%	0.24	2.82	2.94	0.12	(0.12)	-0.01	(0.12)
1113	-113	1000	10.1%	0.04	2.94	2.96	0.02	(0.02)	0.00	(0.02)
4142	77	4219	-1.9%	0.16	2.96	3.08	0.12	(0.04)	0.00	(0.04)
1264	-9	1255	0.7%	0.05	3.08	3.13	0.04	(0.01)	0.00	(0.01)
1667	-331	1336	19.8%	0.07	3.13	3.15	0.02	(0.05)	-0.01	(0.03)
6252	-282	5970	4.5%	0.25	3.15	3.29	0.14	(0.11)	-0.01	(0.09)
3740	-296	3445	7.9%	0.15	3.29	3.38	0.09	(0.06)	-0.01	(0.05)
7011	-345	6666	4.9%	0.28	3.38	3.50	0.13	(0.15)	-0.01	(0.14)
1393	-62	1331	4.5%	0.06	3.50	3.48	(0.02)	(0.07)	0.00	(0.07)
1378	942	2320	-68.4%	0.05	3.48	3.32	(0.16)	(0.22)	0.04	(0.26)
3997	-481	3516	12.0%	0.16	3.32	3.36	0.04	(0.12)	-0.02	(0.10)
4300	-597	3703	13.9%	0.17	3.36	3.41	0.04	(0.13)	-0.02	(0.10)
3013	-906	2106	30.1%	0.12	3.41	3.43	0.02	(0.10)	-0.04	(0.06)
6796	-2061	4734	30.3%	0.27	3.43	3.46	0.04	(0.23)	-0.08	(0.15)
4271	-1429	2842	33.5%	0.17	3.46	3.66	0.19	0.02	-0.06	0.08
8327	-982	7345	11.8%	0.33	3.66	#N/A	#N/A	#N/A	-0.04	#N/A