

# Weather and water quality data summary (1995), University Field Station (Delta Marsh)

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The following is a summary of meteorological and water quality data collected at the Field Station during 1995. The complete data are available as *Microsoft Excel* spreadsheets on Macintosh or PC diskettes, and on the Station's page on the World Wide Web (Delta Marsh Home Page) at [http://www.umanitoba.ca/faculties/science/delta\\_marsh](http://www.umanitoba.ca/faculties/science/delta_marsh). Wind velocity and direction data, pyrhelimeter traces, barometer traces, and hygrothermograph traces are available on request.

Users are advised that the period represented by "daily" values differ between parameters: temperature, precipitation, and anemometer data are collected at 08:00 CST and represent the 24-hour period starting at 08:00 CST on the preceding day. This affects the interpretation of some parameters. For example, the maximum air temperature reported for 1 January ( $X^{\circ}\text{C}$ ) may be the value for 31 December of the previous year if the maximum actually occurred prior to 24:00 or it may be the value for 1 January if the maximum occurred between 00:00 and 08:00. Other daily data, including photosynthetically available radiation and hours of sunshine, are accurate for the reported calendar day, being cumulative between 00:00 and 24:00 CST. Monthly summary statistics (total, mean, median, minimum and maximum) are calculated for the period starting on the first day of the month, without

consideration for the above.

Data for daily photosynthetically available radiation (PAR) were found to underrepresent actual values due to drift in the calibration of the PAR sensor installed in December 1992. A method of correcting affected data is being developed.

Two Li-Cor Li-1200 Minimal Dataset Recorders were installed in August 1994, one at the existing meteorological station, and the other in Oxbow Woods by the Inkster Farm. Both recorders are maintained year-round and data for daily solar irradiance, precipitation, maximum, minimum and mean air temperature, and mean soil temperature (10 cm depth) are available. A third Li-1200, on loan from Manitoba Environment, is now installed at the meteorological station to check the consistency of data from the station's recorder.

Collection of weather data was made possible by instruments provided by the Atmospheric Environment Service of Environment Canada. Weather data were collected by Dick Convery, Shirley Dinwoodie, Doreen Greening, Gordon Goldsborough, Ken Sandilands, Curt Code, Russ Mead, and Gordon Robinson.

Lake water samples were collected by Russ Mead at monthly intervals as part of an ongoing water quality monitoring program of Manitoba Environment. Station WQ666 is approximately 1 km offshore from the UFS.

Table 1. Summary of tables and figures for meteorological and water quality data collected at the University Field Station (Delta Marsh) between January and December, 1995.

Uncorrected daily photosynthetically available radiation ( $\text{E}/\text{m}^2/\text{d}$ )	Fig. 1
Daily total sunshine	Fig. 2
Daily air temperature ( $^{\circ}\text{C}$ )	Fig. 3
Daily precipitation (mm)	Fig. 4
Water quality at station WQ666 (Lake Manitoba)	Table 2

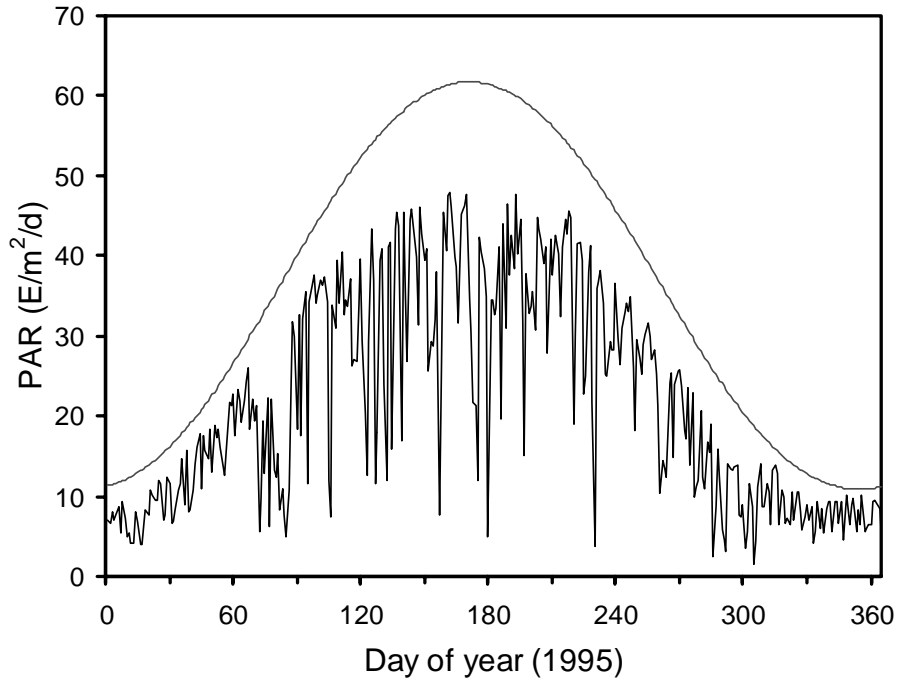


Figure 1. Uncorrected total daily photosynthetically available radiation (PAR - 400 to 700nm; E/m<sup>2</sup>/d) at the University Field Station (Delta Marsh) in 1995, as reported by miscalibrated PAR sensor Q11490. The smooth curve represents the maximum daily (cloudless) PAR at the station, as calculated using the SIMSOL computer program (Fee, E. J. 1990. Computer programs for calculating in situ phytoplankton photosynthesis. Can. Tech. Rep. Fish. Aquat. Sci. No. 1740, v + 27pp.).

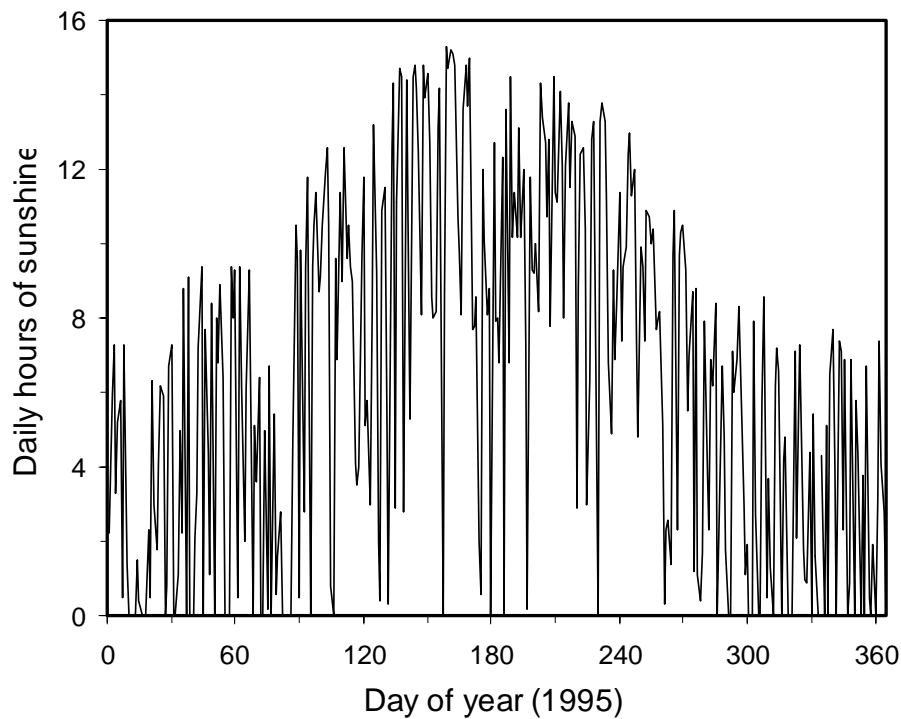


Figure 2. Daily hours of sunshine at the University Field Station (Delta Marsh) in 1995. The annual mean was 6.4 hours of sun per day. The range was 0 to 15.3 hours.

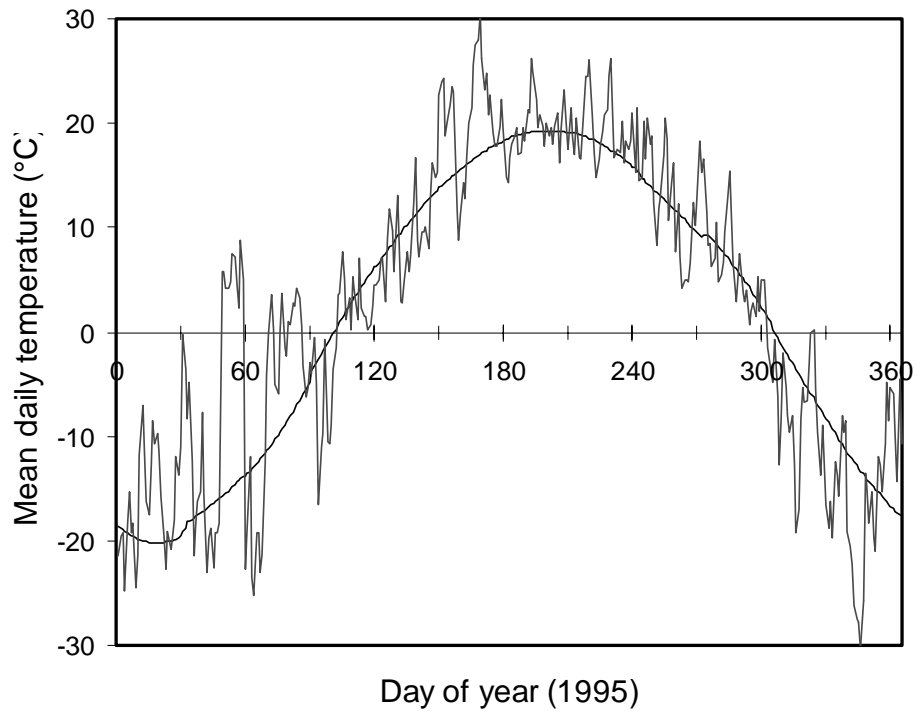


Figure 3. Daily mean air temperature (°C) at the University Field Station (Delta Marsh) in 1995. The smooth curve represents normal daily mean air temperature at the station, as calculated by R.McGinn (pers.comm. 1991). The annual mean daily temperature was 2.7°C. The minimum recorded temperature was -34.5°C and the maximum temperature was 37.0°C.

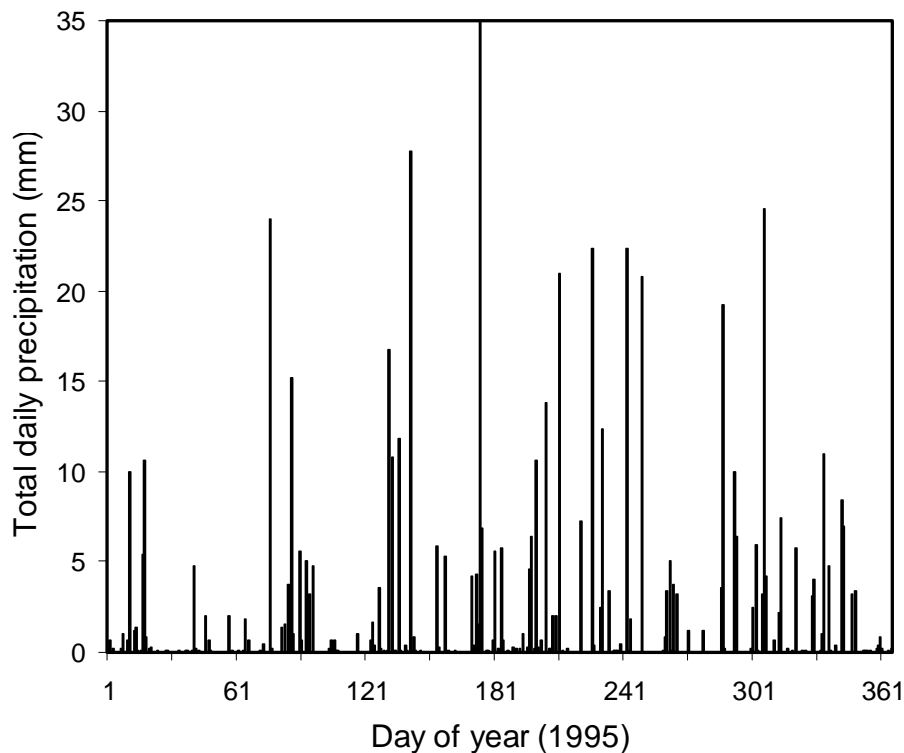


Figure 4. Daily total precipitation (water equivalents in mm) at the University Field Station (Delta Marsh) in 1995. The total annual precipitation was 591 mm, 70% of which fell as rain with the remainder as snow. The maximum amount of precipitation received in a single day was 35.0 mm (23 June).

Table 2. Water quality at sampling site WQ666 located 1 km offshore from the UFS in Lake Manitoba (1995). Analyses were performed by the Manitoba Department of Environment. Date format: day/month. ns = no sample.

Date	25-Jan	21-Feb	21-Mar	17-Apr	20-Apr	17-May	13-Jun	11-Jul	15-Aug	26-Sep	23-Oct	2-Nov	18-Dec
Water depth (m)	3.6	3.4	3.6	3.2	3		3.95	3.8	3.8	3.55	3.6		3.7
Secchi depth (m)	0.85	1.1	0.3	0.08	0.1		0.95	0.65	0.55	0.45	0.15		0.45
Coliform - fecal (CFU/100 mL)							4	<10	<10	<10	<10	<10	<10
Alkalinity - total (mg/L)	289	307	99.6	135	85.4	164	196	216	218	228	246	244	260
Alkalinity - bicarb (mg/L)	326	374	108	165	104	200	215	264	226	237	256	279	284
Alkalinity - carb (mg/L)	<18	<18.0	<18.0	<18.0	<18.0	<18.0	<18.0	<18.0	19.9	19.9	21.5	<18	<18
Alkalinity - hydrox (mg/L)	<10.2	<10.2	<10.2	<10.2	<10.2	<10.2	<10.2	<10.2	<10.2	<10.2	<10.2	<10.2	<10.2
pH	8.35	8.26	8.37	7.65	7.88	7.96	8.49	8.72	8.65	8.62	8.58	8.41	8.48
Conductivity (µS/cm)	2420	2530	729	483	278	624	1020	1510	1570	1750	1810	1920	2010
Color - true (units)	5	5	<5	>50	<35	20	15	10	10	10	15	15	<5
Oxygen - dissolved (mg/L)	10.8	14.5	15.2	11	11.6	8.9	8.9	5.9	8.8	9.8	8.7	12.3	10.8
Solids - dissolved (mg/L)	1400	1500	410	320	170	380	620	950	930	1000	1000	1100	1200
Solids - suspended (mg/L)	<5	<5	53	270	150	75	6	<5	32	18	91	19	67
Solids - total (mg/L)	1400	1500	470	590	310	450	630	950	960	1000	1100	1100	1200
Turbidity (NTU)	3.4	2.8	55	>200	120	97	5.5	9	26	16	80	21	16
Ammonia (mg/L)	0.052	0.072	0.892	0.362	0.131	0.082	<0.020	<0.020	<0.020	0.02	<0.020	<0.020	0.026
Boron - soluble (mg/L)	0.25				0.12			0.18					
Chloride - soluble (mg/L)	489				24			280	281		360		
Chlorophyll-a (µg/L)	4.5	<1.0	8.7	8.7	16	7	9	5.5	13	7	49	2.6	2.5
Nitrate+nitrite-N (mg/L)	0.02	0.04	0.59	0.44	0.34	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorus - total (mg/L)	0.024	0.025	0.079	0.284	0.294	0.17	0.047	0.035	0.06	0.04	0.116	0.033	0.042
Phosphorus - total diss (mg/L)												0.009	
Phosphorus - total part (mg/L)												0.024	
Sulphate - soluble (mg/L)	255				27			166	159		193		
Carbon - total (mg/L)	82.2	91.1	27.6	41.2	21.4	55.4	59.7	64.2	63.7	65	65.7	71.7	80.3
Carbon - inorganic (mg/L)		72.4	21.4	34.8	13.6	35.8	50	52.4	55.8	51.4	53.3	58	60.1
Carbon - organic (mg/L)		18.7	6.2	6.4	7.8	19.6	9.7	11.8	7.9	13.6	12.4	13.7	20.2
Nitrogen - TKN (mg/L)		1.08	2.08	1.69	1.28	1.1	0.9	0.94	0.88	1.16	1.41	1.01	1.07