

Padilla Bay (PDB) NERR Meteorological Metadata

January – December 2002

Latest Update: **February 21, 2023**

I. Data Set & Research Descriptors

1) Principal investigator & contact persons:

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2) Entry verification

a) Data Input Procedures:

The 15-minute, 1-hour average, and 24-hour data were downloaded from each instrument on the weather station to a Campbell Scientific CR10X datalogger. The CDMO Data Logger Program (PADBA_01.csi) was loaded into the CR10X and controls the sensors and data collection schedule (see 2b of the Entry Verification section for the data collection schedule). The data is downloaded once a month in the field to a Toshiba laptop computer connected to the storage module using PC208W software or a Palm m515 using PConnect software, both are Campbell Scientific software.

Once an entire month of data was available, the CDMO Weather Data Management Program (WDMP) was used to convert the files to an Access database. This program was developed in Visual Basic to interface with the NERRS data collection schedule (see 2b of the Entry Verification section for the data collection schedule). The WDMP will automatically input and convert the monthly raw data file into an Access Database. There are three main steps the WDMP performs. First, it converts the comma delimited monthly raw data file into an Access Database. Secondly, it checks the data against a predetermined set of error criteria (see Part C of this section). Finally, it produces error and summary reports. All anomalous data were investigated and are noted below in the "Data anomalies/ Data corrections" section, along with any corrections that were performed. The raw data and Access tables are stored on the laptop, on the desktop SWMP computer in the lab and archived on compact discs.

Common errors noted in the monthly error reports are "Air temp difference (over a 15 minute time period) is greater than 3.0 degrees C" and "Rel hum difference (over a 15 minute time period) is greater than 25%". All errors were double checked with other data that could support such "anomalous" weather changes and noted in Section 11. Robin Cottrell performed all data management.

The Centralized Data Management Office converted all SWMP weather data collected with CR10X program versions prior to version 4.0 which was distributed in October 2003. This was necessary in order to merge the old data format (12 array output) with the new data format found in version 4.0 (3 array output). The new format produces averages, maximums and minimums every fifteen minutes (array 15), every hour (array 60) and every day (array 144) for any sensors hooked up to the CR10X. Specifically, the 150 and 151 fifteen minute data were converted to the new 15 array; the hourly 101, 102, 105 and 106 data were converted to the new 60 array; and the daily 241, 242, 243, 244, 245 and 246 data were converted to the new 144 array. With the new format, the use of 55555's to code for deleted data and 11111's to code for missing data has been abandoned. Hence, all 55555's or 11111's contained in the SWMP weather data collected prior to Version 4.0 of the CR10X program were removed and left blank.

b) Data Collection Schedule

i) Data is collected in the following formats:

- 1) 15 minute data are instantaneous readings except for PAR and precipitation data that are totalized from 5 second samples sorted by date and time.
(Arrays 150 and 151)
- 2) Hourly averages (Arrays 101 and 102) are calculated from 5 second samples sorted by date and time except for PAR and precipitation data that are hourly totals calculated from 15 minute totals (Arrays 105 and 106).
- 3) Daily average (arrays 241 and 242), maximum with time, and minimum with time (arrays 243 and 244) are calculated from 5 second samples sorted by date and time except for PAR and precipitation data which are 24 hour totals calculated from hourly totals (arrays 245 and 246).

ii) 15 minute sample point parameters: Date, Time, Air Temperature (°C), Relative Humidity (%), LiCor (PAR), Barometric Pressure (mb), Wind Speed (m/s), Wind Direction (Array 150); Rainfall (mm) (Array 151)

iii) Hourly average parameters: Date, Time, Air Temperature (°C), Relative Humidity (%), Barometric Pressure (mb) (Array 101); Wind Speed (m/s), Wind Direction, Wind Speed Maximum (Array 102)

iv) Hourly total parameters: LiCor (PAR) (Array 105); Rainfall (mm) (Array 106)

v) Daily Average parameters: Date, Time, Air Temperature (°C), Relative Humidity (%), Barometric Pressure (mb) (Array 241); Wind Speed (m/s), Wind Direction, Wind Direction Standard Deviation (using Yamartino's Algorithm) (Array 242)

vi) Daily Total parameter: LiCor (PAR) (Array 245); Rainfall (mm) (Array 246)

vii) Daily Maximum parameters: Date, Time, Air Temperature (°C), Time, Relative Humidity (%), Time, LiCor (PAR), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery Voltage, Time (Array 243)

viii) Daily Minimum parameters: Date, Time, Air Temperature (°C), Time, Relative Humidity (%), Time, LiCor (PAR), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery Voltage, Time (Array 244)

c) Error/Anomalous Data Criteria

Air Temp:

- 15 min sample greater than max for the day
- 15 min sample less than the min for the day
- 15 min sample greater than 3.0 °C from the previous 15 minutes
- Max and Min values not recorded for the day
- 1-hour average greater than 10% above the greatest 15 min sample recorded in the hour

Relative Humidity:

- Changed by more than 25% from the previous 15 minutes
- Max and Min values not recorded for the day
- 1-hour average greater than 10% above the greatest 15 min sample recorded in the hour

Rainfall:

- Precipitation greater than 5 mm in 15 minutes
- No precipitation for the month

Wind Speed:

- Wind speed greater than 30 m/s
- Wind speed less than 0.5 m/s

Wind Direction:

- Wind direction greater than 360 degrees
- Wind direction less than 0 degrees

Pressure:

- Pressure greater than 1040 mb or less than 980 mb
- Pressure changes greater than 5 mb per hour
- Max and Min values not recorded for the day
- 1-hour average greater than 10% above the greatest 15 min sample recorded in the hour

Time:

- 15-minute interval not recorded

For all data:

- Duplicate interval data

3) Research objectives:

The principal objective is to record meteorological data at Padilla Bay for use in studies

investigating correlations between meteorological data and water quality data, biological data, or other phenomenon in Padilla Bay and its watershed.

4) Research methods:

Data is downloaded once a month from the weather station because the storage module can only hold 49 days of data before the datalogger begins to overwrite data and the Weather Data Management Program cannot organize and sort raw data files that span more than two months. The sensors are visually inspected at this time for debris or damage except for the PAR sensor that cannot be seen from the ground so is inspected less often. Due to the location of the weather station in the middle of flat farm fields the sensors require very little cleaning. The most common problem occurs seasonally from air borne seeds partially blocking the rain gauge funnel. To mitigate this problem weeds near the site are cut before they set seed.

Sensors are sent in to Campbell Scientific to be calibrated according to their maintenance schedule recommendations. On occasion very high or very low barometric pressures were checked against weather data collected in Oak Harbor on Whidbey Island.

5) Site location and character:

Padilla Bay (48° 30' N; 122° 30' W) is a shallow embayment in northern Puget Sound located in the greater Puget Sound-Georgia Basin estuary. It is an "orphaned" estuary in that the Skagit River, which formed the delta mud flats of Padilla Bay, no longer enters the bay directly. The tide flats are dominated by the eelgrass *Zostera marina*, which covers approximately 3,000 ha. *Zostera japonica*, a recent invader to the region, now covers about 350 ha of the bay. Tides are mixed semi-diurnal with a mean range of 1.55m. Salinity varies from about 15 to 30 PSU. Most of the land in the 9300 ha Padilla Bay watershed is agricultural, and is drained by four sloughs which empty into the bay. Some freshwater from the Skagit now enters Padilla Bay from the south through the Swinomish Channel which connects Padilla Bay to Skagit Bay. Other major freshwater flows into this area of the Puget Sound-Georgia Basin estuary from the Fraser and Nooksack Rivers to the north. Padilla Bay is bordered on the east and south by flat, diked farmland; farther to the east are foothills of the Cascade Range. March Point, on the western edge of the reserve, is the site of two large oil refineries. To the north and west are the San Juan Islands of northern Puget Sound.

The weather station is located near the southeast corner (122° 28' 4.81" W; 48° 27' 50.58" N) of Padilla Bay on a 40 hectare demonstration farm that is owned by the Reserve. Flat fields that are farmed for seasonal crops surround the site. Access is off of Bayview-Edison road about 150 m down a gravel driveway.

The sensors are mounted on a 3 m tower that is secured to a concrete pad as specified by the manufacturer, Campbell Scientific. The relative humidity/temperature sensor is mounted 2 m high and the wind and PAR sensors are at the top of the tower 3 m above ground level. The tipping-bucket rain gauge is bolted to a slab of wood that is attached to the top of a 55 gallon

metal drum filled with water for stability, the top of the rain gauge is 1.2 m above ground level. Surrounding the site is a six foot high chain link fence for security. The weather station is about 300 m from the diked edge of the bay and approximately 4 km SE of the Bayview Channel YSI deployment site and about 4 km south of the Padilla Bay Research Reserve laboratory.

6) Data collection period:

January 1 at 00:00 to December 31 at 24:00 2002.

7) Distribution

According to the Ocean and Coastal Resource Management Data Dissemination Policy for the NERRS System-wide Monitoring Program,

NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from the NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration. The data set enclosed within this package/transmission is only as good as the quality assurance/quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR weather data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see Section 1 Principal investigators and contact persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general information link on the CDMO home page) and online at the CDMO home page <http://cdmo.baruch.sc.edu/>. Data are available in text format.

8) Associated researchers and projects:

None

II. Physical Structure Descriptors

9) Sensor specifications, operating range, accuracy, date of last calibration:

LiCor Quantum Sensor

Model # LI190SB

Stability: $<\pm 2\%$ change over 1 yr

Operating Temperature: -40°C to 65°C

Sensitivity: typically $5\ \mu\text{A}$ per $1000\ \mu\text{moles s}^{-1}\text{ m}^{-2}$

Light spectrum wavelength: 400 to 700 nm

Date of last calibration: December 2000

Wind Sentry

Model # 03001

Wind Speed Range: 0-50 m/s; Threshold: 0.5 m/s

Wind Direction Range: 360° mechanical, 355° electrical (5° open)

Date of last calibration: December 2000

Temperature and Relative Humidity

Model #: HMP35C

Operating Temperature: -40°C to $+60^{\circ}\text{C}$

Temperature Measurement Range: -40°C to $+60^{\circ}\text{C}$

Temperature Accuracy: $\pm 0.2^{\circ}\text{C}$ @ 20°C

Relative Humidity Measurement Range: 0-100% non-condensing

RH Accuracy: $\pm 2\%$ RH (0-90%) and $\pm 3\%$ (90-100%)

Uncertainty of calibration: $\pm 1.2\%$ RH

Date of Last calibration: December 2000

Vaisala Barometric Sensor

Model # CS-105

Operating Range:

Pressure: 600-1060 mb

Temperature: -40°C to $+60^{\circ}\text{C}$

Humidity: non-condensing

Accuracy: ± 0.5 to 6.0 mb ($+20^{\circ}\text{C}$ to $+60^{\circ}\text{C}$)

Stability: $\pm 0.1\text{ mb}$ per year

Date of Last calibration: December 2000

Fluid Isolation Technology Tipping Bucket Rain Gauge

Model #: RG-2000-C

Range: 0.01 inch per tip

Accuracy: $\pm 1.0\%$ (at 14" per hour)

Date of Last calibration: June 2001

10) Coded variable indicator and variable code definitions:

PF=Padilla Farm

11) Data anomalies/Data corrections:

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

Note: CDay=Calendar Day; JDay=Julian Day

January 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
150	1	1	315	Air temp difference from 1 (1) 315 (6.7564) to 1 (1) 330 (3.2671) is greater than 3.0 degrees C
150	1	1	330	Air temp difference from 1 (1) 330 (3.2671) to 1 (1) 345 (7.2199) is greater than 3.0 degrees C
150	1	1	430	Air temp difference from 1 (1) 430 (7.1516) to 1 (1) 445 (3.4958) is greater than 3.0 degrees C
150	26	26	600	Rel hum difference from 26 (26) 600 (90.985) to 26 (26) 615 (65.094) is greater than 25%

February 2002

The following data appear to be correct, high pressure readings were also recorded at a nearby regional airport. The pressure readings ranged from 1040.1 to 1041.8 on February 11 and 1040.1 to 1041.8 on February 25.

Array	CDay	JDay	Time	Error message
150	11	42	615	Pressure is greater than 1040 or less than 980 on 11 (42) 615 (1040.1) through:
150	11	42	2230	Pressure is greater than 1040 or less than 980 on 11 (42) 2230 (1040.2)
150	25	56	245	Pressure is greater than 1040 or less than 980 on 25 (56) 245 (1040.2) through:
150	25	56	1330	Pressure is greater than 1040 or less than 980 on 25 (56) 1330 (1040.1)

March 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
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102 3 62 2100 Wind speed is less than 0.5 m/s from 3 (62) 2100
to 4 (63) 1100

April 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
150	13	103	2345	Air temp difference from 13 (103) 2345 (13.059) to 13 (103) 2400 (9.8102) is greater than 3.0 degrees C

On the night of April 13-14 a low pressure system passed through the area. The minimum barometric pressure and maximum wind speeds for the month were recorded during this event (994 mb and 21.5 m/s). It was also accompanied by an abrupt drop in temperature which included a decrease of 3.3 degrees C in 15 minutes around midnight.

May 2002

None

June 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
150	25	176	1815	Air temp difference from 25 (176) 1815 (22.942) to 25 (176) 1830 (19.689) is greater than 3.0 degrees C

July 2002

A new program was uploaded to the CR10X on July 31 at 14:20 causing it to lose the 5 second data up to that point so the hourly data and the 24 hour totals were deleted as follows:

Array	CDay	JDay	Time	Error message
101	31	212	1500	Technician changed 101 Array data from 31 (212) 1500
102	31	212	1500	Technician changed 102 Array from 31 (212) 1500
241	31	212	2400	Technician changed 241 Array data at 31 (212) 2400
242	31	212	2400	Technician changed 242 Array data at 31 (212) 2400
243	31	212	2400	Technician changed 243 Array data at 31 (212) 2400
244	31	212	2400	Technician changed 244 Array data at 31 (212) 2400

August 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
150	14	226	115	Air temp difference from 14 (226) 115 (16.581) to 14 (226) 130 (19.595) is greater than 3.0 degrees C
150	16	228	215	Air temp difference from 16 (228) 215 (9.3616) to 16 (228) 230 (14.063) is greater than 3.0 degrees C

September 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
150	25	268	330	Air temp difference from 25 (268) 330 (11.25) to 25 (268) 345 (7.0764) is greater than 3.0 degrees C
150	25	268	445	Air temp difference from 25 (268) 445 (10.892) to 25 (268) 500 (6.9334) is greater than 3.0 degrees C

October 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
150	17	290	530	Air temp difference from 17 (290) 530 (6.4366) to 17 (290) 545 (3.1256) is greater than 3.0 degrees C

November 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
102	1	305	2200	Wind speed is less than 0.5 m/s from 1 (305) 2200 to 2 (306) 1100
102	2	306	1800	Wind speed is less than 0.5 m/s from 2 (306) 1800 to 3 (307) 1000
102	26	330	2000	Wind speed is less than 0.5 m/s from 26 (330) 2000 to 27 (331) 1200
102	28	332	1900	Wind speed is less than 0.5 m/s from 28 (332) 1900 to 29 (333) 1300

The following errors are the result of a program glitch that occurs when dealing with negative temperature values; the data appear to be correct:

Array	CDay	JDay	Time	Error message
101	3	307	2400	Air temp average in 1 hour data (-1.5965) is less than 15 minute minimum (-1.4278) by at least 10%
101	27	331	2400	Air temp average in 1 hour data (.67923) is less than 15 minute minimum (.76117) by at least 10%

December 2002

The following data appear to be correct:

Array	CDay	JDay	Time	Error message
150	5	339	330	Air temp difference from 5 (339) 330 (2.2657) to 5 (339) 345 (5.7913) is greater than 3.0 degrees C
150	5	339	530	Air temp difference from 5 (339) 530 (5.8976) to 5 (339) 545 (2.0856) is greater than 3.0 degrees C
150	5	339	845	Air temp difference from 5 (339) 845 (1.0521) to 5 (339) 900 (4.4797) is greater than 3.0 degrees C
150	23	357	2045	Air temp difference from 23 (357) 2045 (.11619) to 23 (357) 2100 (3.4058) is greater than 3.0 degrees C

102	1	335	1700	Wind speed is less than 0.5 m/s from 1 (335)
				1700 to 2 (336) 1100
102	3	337	1600	Wind speed is less than 0.5 m/s from 3 (337)
				1600 to 4 (338) 400
102	6	340	1900	Wind speed is less than 0.5 m/s from 6 (340)
				1900 to 7 (341) 1500
102	7	341	1700	Wind speed is less than 0.5 m/s from 7 (341)
				1700 to 8 (342) 1200
102	8	342	1500	Wind speed is less than 0.5 m/s from 8 (342)
				1500 to 9 (343) 800
102	21	355	1500	Wind speed is less than 0.5 m/s from 21 (355)
				1500 to 22 (356) 300

12) Missing data:

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

January 2002

None

February 2002

None

March 2002

None

April 2002

None

May 2002

None

June 2002
None

July 2002
None

August 2002
None

September 2002
None

October 2002
None

November 2002
None

December 2002
None

13) Other Remarks/notes

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

Precipitation:

During the initial years of NERRS SWMP weather data collection the CR10X programming was inconsistent in how precipitation values were recorded. For most reserves, zeros were not recorded when rainfall had not occurred between 2001-2003, instead no rainfall was represented by a blank cell. The CDMO verified which datasets were impacted by this issue for the 2001-2006 datasets and inserted zeros when the metadata indicated that no precipitation occurred and data were not missing for other reasons. In some cases, zero values for precipitation data were evaluated and removed where the metadata confirmed that no rainfall should have been in the dataset. The pre-2007 data did not go

through a thorough QAQC process again at that time (in addition to previous QAQC); however, if discrepancies were noticed between what was documented in the metadata and what was in the dataset, additional updates may have been made. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout early 2023.

Occasionally throughout the year wind direction values were recorded as small negative numbers (<-0.99). According to a Campbell Scientific technician newer programs correct this to zero so these values have been changed in the Access Database master table to zero.

In 2001 an incorrect multiplier was entered for the LiCor PAR sensor so all of the PAR data from January 1st through July 31st at 14:15, 2002 (when a new program was loaded) were corrected by multiplying all 15 minute data by a correction factor of .604 (the ratio of the correct/incorrect multiplier) then the data was recompiled using the Weather Data Management Program.

The Centralized Data Management Office converted all SWMP weather data collected with CR10X program versions prior to version 4.0 which was distributed in October 2003. This was necessary in order to merge the old data format (12 array output) with the new data format found in version 4.0 (3 array output). The new format produces averages, maximums and minimums every fifteen minutes (array 15), every hour (array 60) and every day (array 144) for any sensors hooked up to the CR10X. Specifically, the 150 and 151 fifteen minute data were converted to the new 15 array; the hourly 101, 102, 105 and 106 data were converted to the new 60 array; and the daily 241, 242, 243, 244, 245 and 246 data were converted to the new 144 array. With the new format, the use of 55555's to code for deleted data and 11111's to code for missing data has been abandoned. Hence, all 55555's or 11111's contained in the SWMP weather data collected prior to Version 4.0 of the CR10X program were removed and left blank.

Rain Events:

January

Date	RainAmount (mm)
1	2.794
2	.254
6	.254
7	1.016
8	3.556
10	1.778
11	.508
12	6.604
15	.254
16	1.524
17	.254
18	10.922
19	4.572
20	1.016
21	3.302
22	8.128
23	2.286

24	9.398
25	9.906
26	1.270
27	3.556
28	1.016
30	13.716
31	1.270

"Monthly Total"89.2

February

Date	RainAmount (mm)
3	3.048
5	1.778
6	1.016
7	2.540
8	2.794
10	2.794
14	.254
16	.254
17	5.080
18	2.032
19	2.032
20	1.524
21	13.462
22	22.098
23	4.318
27	.254

"Monthly Total"65.3

March

Date	RainAmount (mm)
5	.762
7	1.524
9	.508
10	.254
11	8.382
13	2.032
14	4.572
15	10.160
16	.254
18	1.778
19	16.764
20	3.302
21	7.112

26	1.270
27	9.652
28	2.286
29	.254
31	1.270

"Monthly Total"72.1

April

Date	RainAmount (mm)
6	5.588
9	10.414
10	1.778
11	.254
12	3.810
13	7.112
14	3.302
15	5.588
16	2.032
22	1.778
23	.254
26	5.334
28	.254

"Monthly Total"47.5

May

Date	RainAmount (mm)
2	2.540
3	.254
4	3.048
5	2.794
6	3.302
13	7.112
14	1.778
16	7.366
17	1.778
18	.254
19	1.016
20	6.604
22	1.524
25	1.270
26	.762
27	1.270
28	.508
29	2.794

30 .508

"Monthly Total"46.5

June

Date	RainAmount (mm)
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5	1.778
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17	5.080
----	-------

18	13.208
----	--------

27	4.318
----	-------

28	13.208
----	--------

29	1.778
----	-------

30	1.524
----	-------

"Monthly Total"40.9

July

Date	RainAmount (mm)
------	-----------------

3	4.572
---	-------

7	10.414
---	--------

8	10.668
---	--------

9	.254
---	------

26	.254
----	------

"Monthly Total"26.2

August

Date	Rainamount (mm)
------	-----------------

4	1.524
---	-------

6	6.604
---	-------

"Monthly Total"8.1

September

Date	RainAmount (mm)
------	-----------------

2	2.794
---	-------

8	.508
---	------

16	7.874
----	-------

17	.254
----	------

19	1.270
----	-------

28	1.778
----	-------

29	10.668
----	--------

30	4.318
----	-------

"Monthly Total"29.5

October

Date	Rainamount (mm)
1	.254
2	.762
3	9.398
5	1.016
6	1.016
8	3.048
10	.254
14	.254
19	2.032
23	.254
24	.254
27	2.286
28	.508

"Monthly Total"21.3

November

Date	Rainamount (mm)
3	.254
5	.508
6	.508
7	1.270
8	2.540
9	1.270
10	.508
11	3.048
12	1.270
13	3.810
15	2.032
16	6.096
18	2.032
19	7.620
25	.254
28	.254
30	.254

"Monthly Total"33.5

December

Date	RainAmount (mm)
1	.254

4	5.588
7	.254
8	.254
9	.254
10	.762
11	8.382
12	.508
13	.508
14	5.080
15	6.858
16	14.732
17	1.778
18	.254
24	3.302
25	2.286
27	3.556
28	.762
29	.508

"Monthly Total"55.9