

Old Woman Creek (OWC) NERR Site Water Quality Metadata  
April through October, 1996  
Latest Update: October 1, 2001

1. Principal Investigator & contact persons:

Dr. David Klarer, Research Coordinator  
Mr. Gene Wright, Manager

Old Woman Creek SNP and NERR  
2514 Cleveland Road East  
Huron, Ohio 44839  
phone: (419) 433-4601

2. Entry verification:

The data were directly downloaded from the YSI data loggers into the YSI PC6000 program in the PC. The data were graphed and visually checked for any obvious outliers. The data were then transferred to an Excel spreadsheet. The data files were edited to remove headers, footers, and spaces. CDMO Excel macros were used to format the data, to check for outliers and determine missing dates and times, which were then added to the data file. Missing data were inserted into the spreadsheet and denoted by periods. The data files were then checked for readings that were outside the instrument range. These data were removed and replaced with a period. An explanation for the missing and the deleted data is included in this meta data sheet. The files were then transferred along with the associated metadata sheet by disk to the CDMO. The files are archived at OWC. Dr. David Klarer is responsible for both data logger deployment and data management.

3. Research Objectives:

Measurements are taken every 15 minutes over approximately two week periods at two sites within the Old Woman Creek estuary- one in the upper reaches at State Route 2 and the other near the mouth, just south of State Route 6. The purpose of this monitoring program is to document the role of Great Lakes estuaries in mitigating storm flow that passes through them.

4. Research methods:

The YSI monitoring program began on 25 April, 1996 at both sites. Prior to deployment of the data loggers, a 4 inch diameter PVC pipe was bolted to a metal sign post that had been driven into the sediment. Each pipe had 4 rows of holes drilled into it spanning the area of the probe guard on the data logger so that the probes would have direct contact with the surrounding waters. The data logger at site SU is .18 meters above the bottom, while the YSI at site WM is 0.05 meters above the bottom. Dissolved oxygen, pH, temperature, turbidity, and specific conductance readings are taken when the instrument is pulled at each site. On alternate weeks, the data loggers are pulled. The data is retrieved from each data logger and each data logger is recalibrated (according to the directions in the YSI Operations Manual) before being returned to the field. Dissolved oxygen, pH, temperature, and specific conductance readings are taken when the instrument is pulled at each site. On alternate weeks, the data loggers are pulled. The data is retrieved from each data logger and each data logger is recalibrated (according to the directions in the YSI Operations Manual) before being returned to the field. Conductivity, pH (2 point calibration), and turbidity (2 point calibration) were calibrated using commercial standards.

##### 5. Site location and character:

Old Woman Creek National Estuarine Research Reserve is located on the southern shore of Lake Erie, slightly east of the city of Huron, Ohio (Latitude 41 22' N; longitude 82 31' W).

The data logger at the State Route 2 (SU) 41 22' 57" N, 82 30' 52" W site is very near the southern boundary of the reserve. The data logger is sited near a concrete piling of the eastbound Ohio State Route 2 bridge. At this site the creek is relatively deep and narrow. Although water direction and flow is influenced at this site by changes in Lake Erie water levels, this site doesn't have direct contact with Lake Erie waters.

The data logger at State Route 6 (WM) 41 22' 56" N, 82 30' 26" W is very

close to the mouth of Old Woman Creek. In this portion of the Reserve, the creek is very shallow but extends over a large surface area. This site frequently experiences influx of Lake Erie waters.

#### 6. Data collection periods:

Sampling at WM began on April 25, 1996 at 09:15:00. Sampling for 1995 ceased at WM site on October 31, 1996 at 23:45:00. Sampling at SU began on April 25, 1996 at 15:30:00. Sampling ceased at SU site on October 31, 1996 at 23:45:00.

#### 7. Associated projects:

There were no projects directly associated with the datalogger project.

## II. Physical Structure and Descriptors:

#### 8. Variable sequence, column format, range of measurements, units, Resolution, Accuracy:

| Variable                                   | Range of Measurements         | Resolution        |         |
|--------------------------------------------|-------------------------------|-------------------|---------|
| Accuracy                                   |                               |                   |         |
| Date                                       | 1-12, 1-31, 00-99 (Mo,Day,Yr) | 1 mo, 1 day, 1 yr | NA      |
| Time                                       | 0-24, 0-60, 0-60 (Hr,Min,Sec) | 1 hr, 1 min, 1 s  | NA      |
| Temp                                       | -5 to 45 (c)                  | 0.01 C            | +/-     |
| 0.15C                                      |                               |                   |         |
| Sp COND                                    | 0-100 (mS/cm)                 | 0.01mS/cm         | +/-0.5% |
| Of                                         |                               |                   |         |
| reading + 0.001mS/Cm                       |                               |                   |         |
| Salinity                                   | 0-70 Parts per thousand (ppt) | 0.01 ppt          | +/- 1%  |
| of                                         |                               |                   |         |
| Reading or 0.1 ppt, (whichever is greater) |                               |                   |         |
| DO                                         | 0-200 (% air saturation)      | 0.1% @air sat     | +/-2%   |
| @air                                       |                               |                   |         |
| Saturation                                 |                               |                   |         |
| DO                                         | 200-500 (% air saturation     | 0.1% @ air sat    | +/- 6%  |
| @                                          |                               |                   |         |
| Saturation                                 |                               |                   |         |
| DO                                         | 0-20 (mg/l)                   | 0.01 mg/l         | +/-     |
| 0.2mg/l                                    |                               |                   |         |
| DO                                         | 20-50 (mg/l)                  | 0.01 mg/l         | +/-     |
| 0.6mg/l                                    |                               |                   |         |
| Depth (shallow)                            | 0-9.1 (m)                     | 0.001m            | +/-     |
| 0.018m                                     |                               |                   |         |
| PH                                         | 2-14 units                    | 0.01 units        | +/-     |
| 0.2units                                   |                               |                   |         |
| Turb                                       | 0-1000 NTU *                  | 0.1 NTU           | +/- 5%  |
| of                                         |                               |                   |         |

Reading or 2 NTU (whichever is greater)

\*(Note: negative Turb values signify turbidity values greater than 1000)

Data columns are separated by tabs. Each file contains a two line column header at the top of the page which identifies measurements and units for each column.

9. Coded variable indicator and variable code definitions:

SU- State Route 2            WM-State Route 6

10. Data anomalies:

April 1996:

WM: Turbidity on 04/25/96 (09:15:00)-data deleted due to sediment resuspension caused when installing data logger

May 1996:

WM: Turbidity 05/08/96 (08:15:00) through 05/20/96 (08:45:00)- probe malfunction

DO levels from 05/24/96 (13:45:00) to 05/31/96 (23:45:00) deleted because of oxygen probe failure; DO values from 5/20/96 (09:00:00) through 5/24/96 (13:30:00)

questionable due to high variability in values.

WM: Turbidity from 05/22/96 (12:15:00) through 05/31/96 (23:45:00) very erratic perhaps due to problems of the wiper parking over the optics during some of the

readings negative turbidity values: 05/22/96 (12:15:00, 13:15:00, 14:15:00-14:45:00, 15:15:00-17:30:00, 18:00:00-18:15:00, 18:45:00, 19:15:00-19:30:00, 20:00:00, 20:45:00, 21:15:00-21:30:00, 22:15:00-22:45:00, 23:15:00-23:30:00); 05/23/96 (00:15:00,00:45:00-01:00:00, 01:30:00, 02:30:00, 03:15:00-04:15:00, 04:45:00, 05:30:00-05:45:00, 06:30:00, 07:15:00-07:30:00, 08:00:00, 08:30:00, 09:00:00, 09:30:00-09:45:00, 11:45:00, 12:15:00-13:00:00, 13:30:00, 14:00:00-14:15:00, 14:45:00, 15:30:00-16:00:00, 16:30:00, 17:00:00, 17:30:00, 18:00:00-18:15:00, 18:45:00-19:15:00, 19:45, 20:15:00-20:45:00, 21:30:00, 22:00:00,22:45:00-23:00:00, 23:30:00); 05/24/96 (00:00, 00:30, 01:15, 01:45, 02:15, 02:45-03:00, 03:30-04:00, 05:15-05:45, 06:30, 07:15, 07:45-08:00, 08:30-08:45, 10:15, 10:45-11:00, 11:45, 12:30, 13:00, 13:30-14:00, 14:30, 15:30-16:15, 16:45, 17:15, 18:15, 19:00, 19:30, 20:00-20:30, 21:15, 21:45, 23:45); 05/25/96 (00:00:00, 00:45:00, 01:30:00-02:00:00, 02:45:00-03:00:00, 03:30:00, 04:00:00, 04:30:00-04:45:00, 05:30:00, 06:00:00,

06:30:00-06:45:00, 07:45:00-08:00:00, 08:45:00-09:00:00, 09:30:00-09:45:00, 10:15:00-11:00:00, 11:30:00,12:00:00, 12:30:00-13:00:00,13:30:00,14:15:00,14:45:00,15:45:00-16:15:00, 16:45:00, 17:00:00, 17:30:00-17:45:00,18:15:00, 19:00:00,19:30:00, 20:00:00-20:30:00, 22:00:00, 23:00:00-23:15:00, 23:45:00) 05/26/96 (00:15:00, 00:45:00, 01:30:00-01:45:00, 02:15:00-03:15:00, 03:45:00-05:15:00, 06:00:00-07:30:00, 08:00:00-08:30:00, 09:00:00-:09:30:00, 10:00:00-11:00:00, 11:30:00-12:00:00, 12:45:00, 13:30:00-14:30:00, 15:00:00,15:30:00-16:45:00, 18:00:00-18:15:00, 19:15:00-20:00:00, 20:30:00, 21:00:00-22:00:00, 22:30:00-22:45:00, 23:30:00) 05/27/96 (00:00:00-00:45:00, 01:15:00, 01:45:00, 02:15:00-02:30:00,03:00:00, 03:30:00-04:30:00, 05:00:00, 05:45:00, 06:30:00, 07:30:00-08:00:00, 08:45:00-09:15:00, 09:45:00-10:45:00, 11:15:00-11:30:00,12:15:00, 12:45:00-13:00:00, 14:00:00, 14:30:00, 15:00:00, 15:30:00, 16:00:00, 16:30:00-16:45:00, 17:15:00-17:30:00, 18:00:00-20:45:00, 21:15:00-21:30:00, 22:00:00-22:15:00, 22:45:00-23:15:00) 05/28/96 (00:00:00, 00:30:00, 01:00:00, 01:30:00, 02:00:00-02:45:00, 03:45:00, 04:30:00, 05:00:00-05:15:00, 05:45:00-06:30:00, 07:00:00-10:15:00, 10:45:00-11:00:00, 11:30:00, 12:00:00-12:45:00, 13:15:00-13:45:00, 14:15:00, 14:45:00, 15:45:00-16:15:00, 16:45:00-17:00:00, 17:30:00, 18:00:00-18:15:00, 18:45:00, 19:15:00, 19:45:00-20:30:00, 21:00:00, 21:30:00, 22:00:00, 22:45:00, 23:30:00) 05/29/96 (00:00:00, 00:30:00, 01:00:00, 01:30:00, 03:30:00, 04:00:00-05:00:00, 06:00:00,06:30:00-07:15:00, 07:45:00, 08:15:00-08:45:00, 09:45:00, 10:15:00-10:30:00, 11:00:00, 11:30:00, 13:00:00-13:30:00, 14:00:00, 14:45:00, 15:15:00,15:45:00, 16:15:00-16:45:00, 17:30:00, 18:00:00, 18:30:00-19:30:00, 20:15:00, 21:00:00-21:30:00, 22:00:00, 23:30:00-23:45:00) 05/30/96 (00:00:00, 00:45:00-01:15:00, 01:45:00, 02:15:00-03:15:00, 03:45:00, 04:15:00-04:30:00, 05:00:00-05:30:00, 06:00:00, 06:45:00, 07:30:00, 08:00:00, 09:00:00, 09:30:00-10:15:00, 10:45:00, 11:30:00, 12:00:00, 12:30:00, 13:00:00-13:15:00, 13:45:00-14:30:00, 15:15:00, 15:45:00, 16:15:00, 16:45:00, 18:15:00-18:30:00, 19:00:00, 19:30:00-19:45:00, 20:45:00-21:15:00, 22:00:00-22:15:00, 22:45:00-23:15:00) 05/31/96 (00:30:00, 01:15:00-01:30:00, 02:15:00, 02:45:00-03:00:00, 03:30:00, 04:00:00, 04:45:00, 05:15:00, 06:00:00, 06:45:00, 07:15:00, 07:45:00,

08:15:00, 09:00:00-09:45:00, 10:15:00, 10:45:00-12:00:00, 12:30:00-12:45:00, 13:30:00-13:45:00, 14:15:00, 14:45:00-15:15:00, 16:15:00, 17:15:00, 18:15:00, 19:45:00-20:00:00, 20:45:00-21:00:00, 22:00:00, 22:30:00, 23:00:00, 23:30:00)

Turbidity values over 1000 NTU 05/22/96 (18:30:00, 19:00:00, 20:15:00, 23:00:00) 05/24/96 (08:45:00, 16:00:00) 05/26/96 (10:00:00) 05/27/96 (07:45:00, 18:45:00) 05/29/96 (05:15:00, 14:15:00, 17:00:00-17:15:00, 19:45:00) 05/30/96 (12:45:00, 17:00:00, 20:15:00, 21:30:00-21:45:00, 22:30:00) 05/31/96 (13:15:00, 22:45:00)

An anomalous spike in specific conductivity/salinity occurred on 5/20/96 (09:15:00). Unknown what caused spike, therefore, data was retained.

June 1996:

WM: Dissolved oxygen data deleted from 06/01/96 (00:00:00) through 06/11/96 (08:15:00) due to probe malfunction

Turbidity from 06/01/96 (00:00:00) through 06/11/96 (08:15:00) very erratic perhaps due to problems of the wiper parking over the optics during some of the readings

negative turbidity values: 06/01/96 (00:15:00-00:30:00, 02:00:00, 02:30:00-02:45:00, 03:15:00-03:45:00, 04:15:00-04:30:00, 05:00:00-06:00:00, 06:30:00, 07:45:00, 08:15:00-08:45:00, 09:15:00-09:30:00, 10:00:00-10:30:00, 11:15:00, 11:45:00, 12:15:00-12:30:00, 13:15:00, 13:45:00, 14:30:00-15:45:00, 16:45:00, 17:15:00, 17:45:00, 18:15:00-19:15:00, 20:30:00-21:00:00, 21:30:00, 22:00:00-22:15:00, 23:00:00, 23:45:00) 06/02/96

(00:15:00, 00:45:00, 01:15:00, 02:15:00-02:45:00, 03:15:00, 03:45:00, 04:15:00-05:15:00, 05:45:00-06:15:00, 06:45:00-07:00:00, 07:45:00-08:00:00, 08:45:00, 09:15:00-09:30:00, 10:00:00-10:30:00, 11:00:00, 11:45:00, 12:15:00-12:30:00, 13:45:00, 14:15:00-14:30:00, 15:00:00, 15:30:00-15:45:00, 16:15:00-16:30:00, 17:15:00, 17:45:00-18:30:00, 19:00:00, 19:30:00, 20:30:00-20:45:00, 21:15:00, 22:00:00-22:45:00, 23:30:00) 06/03/96 (00:00:00, 00:45:00-01:30:00, 02:00:00, 02:30:00, 03:00:00-04:00:00, 05:00:00, 05:30:00, 06:30:00, 07:00:00-07:15:00, 08:00:00, 08:30:00-08:45:00, 09:15:00-09:30:00, 10:15:00, 10:45:00, 11:15:00, 11:45:00, 12:45:00-13:00:00, 13:30:00, 14:00:00, 14:30:00-

14:45:00, 15:30:00, 16:00:00-16:15:00, 16:45:00-17:15:00,  
18:00:00,18:30:00-  
18:45:00, 19:15:00-19:30:00, 20:15:00,20:45:00, 21:15:00, 21:45:00-  
22:30:00,  
23:15:00-23:45:00) 06/04/96 (00:00:00, 00:30:00,01:15:00, 02:00:00,  
02:30:00-  
03:15:00, 03:45:00-04:15:00, 05:00:00, 05:30:00, 06:00:00-06:15:00,  
07:15:00-  
07:30:00, 08:00:00, 08:30:00, 09:00:00, 09:45:00-10:15:00,  
11:00:00-11:15:00,  
12:15:00, 13:00:00-13:30:00, 14:15:00, 14:45:00-16:00:00, 17:00:00,  
17:45:00-  
18:45:00, 19:15:00, 19:45:00-20:00:00, 20:30:00-21:00:00, 21:30:00,  
22:00:00, 22:30:00-  
22:45:00, 23:45:00) 06/05/96 (00:00:00, 00:45:00-01:45:00,  
02:15:00-04:00:00,  
04:30:00, 05:00:00-05:30:00, 06:15:00-06:30:00, 07:30:00-07:45:00,  
08:45:00-  
09:00:00, 09:30:00-10:00:00, 10:30:00, 11:15:00, 12:15:00,  
12:45:00, 13:15:00-  
13:30:00, 14:00:00-14:30:00, 15:00:00, 15:45:00-16:00:00, 16:45:00,  
17:15:00-  
17:30:00, 18:00:00-18:15:00, 18:45:00-19:00:00, 19:45:00-20:15:00,  
20:45:00,  
21:15:00-21:30:00, 22:15:00, 23:30:00) 06/06/96 (00:15:00-00:30:00,  
01:00:00,  
01:45:00-02:00:00, 02:30:00-03:15:00, 03:45:00-04:30:00, 05:00:00,  
07:30:00,  
08:00:00, 08:30:00-09:15:00, 09:45:00, 10:30:00-11:30:00, 12:30:00-  
13:15:00,  
13:45, 14:15:00-15:30:00, 16:00:00-16:15:00, 16:45:00-17:00:00,  
17:45:00-18:00:00,  
18:30:00, 19:00:00-19:15:00, 19:45:00, 20:30:00, 21:15:00-21:30:00,  
22:00:00,  
22:45:00-23:15:00) 06/07/96 (00:00:00-00:30:00, 01:00:00-01:15:00,  
01:45:00-  
02:00:00, 02:30:00-03:00:00, 05:00:00-05:15:00, 05:45:00, 06:30:00-  
06:45:00,  
09:15:00-09:30:00, 10:00:00-11:00:00, 11:30:00-12:15:00, 12:45:00,  
15:00:00-  
15:45:00, 16:15:00-16:45:00, 17:15:00, 17:45:00, 18:45:00,  
19:15:00, 20:15:00-  
20:30:00, 21:00:00-21:30:00, 22:15:00-22:45:00, 23:45:00) 06/08/96  
(00:00:00,  
00:45:00-01:00:00, 02:00:00, 03:00:00, 03:30:00-04:15:00, 05:30:00-  
05:45:00,  
06:15:00, 06:45:00, 07:15:00, 08:45:00, 09:15:00, 09:45:00-  
10:00:00,10:30:00-  
10:45:00, 11:15:00, 12:15:00, 12:45:00, 14:00:00-14:15:00,  
15:00:00-15:30:00,  
16:45:00-17:00:00, 17:30:00, 18:00:00, 18:30:00-19:00:00, 19:30:00,  
20:00:00,  
20:30:00-20:45:00, 21:15:00-21:30:00, 22:15:00, 22:45:00, 23:15:00,  
23:45:00)

06/09/96 (00:00:00-00:15:00, 01:15:00-01:30:00, 02:00:00, 02:45:00,  
03:45:00-  
04:00:00, 04:45:00-05:15:00, 07:00:00-07:15:00, 07:45:00-08:00:00,  
08:30:00-  
08:45:00, 09:15:00-09:30:00, 10:00:00-10:30:00, 11:00:00-11:45:00,  
12:15:00-  
12:30:00, 13:15:00, 13:45:00, 15:00:00-15:45:00, 16:30:00,  
17:00:00-18:00:00,  
18:30:00-19:00:00, 19:30:00, 20:00:00-20:15:00, 21:15:00-21:30:00,  
22:30:00,  
23:15:00, 23:45:00) 06/10/96 (00:00:00-00:30:00, 01:00:00,  
01:30:00-01:45:00,  
03:00:00, 03:30:00-03:45:00, 04:15:00-04:30:00, 05:00:00-05:15:00,  
05:45:00-  
06:00:00, 06:45:00, 07:15:00-07:45:00, 08:30:00, 09:00:00,  
09:45:00-10:00:00,  
10:30:00-11:00:00, 11:30:00, 12:00:00, 12:30:00, 13:15:00, 14:00:00-  
15:00:00,  
15:45:00, 16:15:00, 16:45:00-17:00:00, 17:30:00, 18:45:00-19:00:00,  
20:45:00-  
21:00:00, 21:45:00-22:00:00, 22:45:00, 23:15:00-23:30:00) 06/11/96  
(00:00:00,  
01:00:00, 01:30, 02:15:00, 02:45:00, 03:45:00-04:15:00, 04:45:00-  
05:00:00, 05:30,  
06:15:00, 06:45:00, 07:15:00-07:45:00, 08:15:00) ; 06/27/96 (12:45,  
17:45)

Turbidity values over 1000 NTU 06/02/96 (01:30:00, 10:45:00, 13:15:00,  
17:00:00)  
06/03/96 (06:15:00, 11:00:00, 16:30:00) 06/04/96 (05:45:00)  
06/05/96 (11:45:00, 13:45:00, 17:45:00) 06/06/96 (00:00:00, 07:15:00,  
22:15:00)  
06/07/96 (03:15:00) 06/08/96 (01:15:00, 02:45:00, 11:45:00) 06/09/96  
(05:45:00) 06/10/96 (09:15:00, 20:15:00) 06/27/96 (01:15:00-01:30:00)  
06/28/96 (13:00:00) 06/29/96 (05:00:00, 11:30:00)

Dissolved oxygen gradually declined from 06/15/96 through 06/24/96  
(10:30:00)  
due to colonization of oxygen probe by periphyton

PH gradually declined from 06/15/96 through 06/24/96 (10:30:00) due to  
colonization  
of oxygen probe by periphyton

Turbidity deleted 06/13/96 (23:15:00), 06/20/96 (02:00:00, 04:30:00,  
06:45:00,  
17:45:00-18:00:00, 19:00:00, 21:15:00), 06/21/96 (17:00:00. 21:45:00),  
06/22/96  
(10:00:00, 19:15:00), 06/29/96 (19:30:00-20:30:00)- probe malfunction  
(all values were negative)

Depth values were deleted from 06/25/96 (10:45:00) through 06/29/96  
(20:30:00); depth was  
questionable averaging 0.2 when it should be 0.9.

SU: Turbidity deleted 06/07/96 (08:00:00) because high value was due to data logger recovery activities

Negative turbidity values 06/19/96 (22:30:00 to 22:45:00), 06/19/96 (23:15:00) to 06/20/96 (08:30:00), 06/20/96 (09:30:00), and 06/24 (17:30) and turbidity values over 1000 06/19/96 (23:00:00), 06/20/96 (08:45:00-09:00:00), and 06/24/96 (17:45:00- 18:45:00) are legitimate values as turbidity at this time was over 1000 NTU

July 1996:

WM: Dissolved oxygen gradually declined from 07/25/96 to 07/29/96 (08:30:00) due to colonization of oxygen probe by periphyton

Negative turbidity values 07/28/96 at 10:45:00 and at 15:15:00 probably due to biological activity

SU: Dissolved oxygen data deleted 07/31/96 (08:30:00) through 07/31/96 (12:30:00)- probe malfunction

August 1996:

WM: Dissolved oxygen gradually declined from 08/01/96 to 08/03/96 (23:45:00) due to colonization of oxygen probe by periphyton  
Dissolved oxygen declined from 08/28/96 through 09/02/96 (09:15:00) due to colonization of oxygen probe by periphyton  
Negative turbidity values on 08/19/96 (07:15:00), 08/28/96 (04:30:00), and 08/31/96 (18:45:00) probably due to biological activity

SU: Dissolved oxygen data deleted 08/05/96 (11:00:00) probe malfunction  
Dissolved oxygen data deleted from 08/06/96 (07:15:00) through 08/14/96 (14:30:00) probe malfunction  
Dissolved oxygen questionable from 08/14/96 (14:45:00) to 08/26/96 (08:45:00)  
pH from period 08/26/96 (09:15:00) to 08/31/96 (23:45:00) due to a cracked bulb on the probe.  
Dissolved oxygen data deleted from 08/27/96 (19:30:00) through 08/31/96 (23:45:00) probe malfunction  
Negative turbidity levels on 08/03/96 (22:15:00), 08/09/96 (15:30:00), 08/11/96 (07:30:00), 08/14/96 (04:15:00), 08/25/96 (01:00:00) and 08/26/96 (04:45:00) probably due to biological activity.

September 1996

WM: Negative turbidity values on 09/01/96 (15:00:00-15:15:00), 09/04/96 (07:45:00), 09/05/96 (09:45:00), and 09/15/96 (20:45:00) probably due to biological activity

Dissolved oxygen data deleted from 09/02/96 (09:30:00) through 09/06/96 (07:30:00) probe malfunction

SU: Dissolved oxygen deleted from 09/01/96 (00:00:00) through 09/09/96 (08:30:00) probe malfunction

pH from period 09/01/96 (00:00:00) to 09/09/96 (08:30:00) due to a cracked bulb on the probe

Dissolved oxygen deleted from 09/09/96 (11:00:00) through 09/16/96 (05:30:00) probe malfunction

Negative turbidity values on 09/11/96 03:00-04:00, 05:15, 06:30-12:30; 09/12/96 16:45, 17:15-18:00; and 09/14/96 05:15 are legitimate values as turbidity at this time was often over 1000 NTU

Turbidity data deleted from 09/20/96 (09:45:00) through 09/30/96 (23:45:00) probe malfunction

October 1996

WM: Negative turbidity values on 10/03/96 (14:45:00-15:00:00) probably due to biological activity

Dissolved oxygen data deleted from 10/07/96 (13:00:00) through 10/21/96 (09:30:00) probe malfunction

Negative turbidity on 10/29/96 17:45

SU: Turbidity data deleted from 10/01/96 (00:00:00) through 10/07/96 (09:15:00) probe malfunction

#### 11. Missing data:

April 1996:

WM: Sampling began on 25 April, 1996 at 09:15:00

Turbidity on 04/25/96 (09:15:00)-data deleted due to sediment resuspension caused when installing data logger

SU: Sampling began on 25 April, 1996 at 15:30:00

May 1996:

WM: Turbidity 05/08/96 (08:15:00) through 05/20/96 (08:45:00)- probe malfunction

Oxygen levels from 05/24/96 (13:45:00) to 05/31/96 (23:45:00) deleted because of oxygen probe failure

SU: Salinity 05/07/96 (08:45:00) through 05/10/96 (23:45:00)-parameter not measured

Turbidity 05/10/96 (17:30:00-23:45:00) parameter not measured

All parameters missing 05/11/96 (00:00:00) through 05/21/96 (07:45:00)- power failure

All parameters missing 05/27/96 (11:45:00) through 05/30/96 (08:45:00)- power failure

Salinity missing 05/30/96 (09:00:00) through 05/31/96 (23:45:00)- parameter not measured

June 1996:

WM: Dissolved oxygen from 06/01/96 (00:00:00) through 06/11/96 (08:15:00)- probe malfunction  
All parameters 06/11/96 (08:30:00)- service  
Turbidity deleted 06/13/96 (23:15:00), 06/20/96 (02:00:00, 04:30:00, 06:45:00, 17:45:00-18:00:00, 19:00:00, 21:15:00), 06/21/96 (17:00:00, 21:45:00), 06/22/96 (10:00:00, 19:15:00),  
06/29/96 (19:30:00-20:30:00)- probe malfunction (all values were negative)  
All parameters from 06/29/96 (20:45:00) through 06/30/96 (23:45:00)- power failure  
Depth values were deleted from 06/25/96 (10:45:00) through 06/29/96 (20:30:00); depth was questionable averaging 0.2 when it should be 0.9.

SU: Turbidity deleted 06/07/96 (08:00:00) because high value was due to data logger recovery activities  
All parameters from 06/07/96 (08:15:00) through 06/13/96 (08:30:00)- power failure  
All parameters 06/25/96 (10:00:00)- service

#### July 1996:

WM: All parameters from 07/01/96 (00:00:00) through 07/21/96 (09:45:00)- power failure  
All parameters 07/29/96 (08:45:00)- service  
SU: All parameters from 07/10/96 (01:30:00) through 07/21/96 (11:15:00)- power failure  
Dissolved oxygen 07/31/96 (08:30:00) through 07/31/96 (12:30:00)- probe malfunction

#### August 1996:

WM: All parameters 08/04/96 (00:00:00) through 08/14/96 (09:15:00)- power failure  
SU: Dissolved oxygen 08/05/96 (11:00:00)- probe malfunction  
Dissolved oxygen 08/06/96 (07:15:00) through 08/14/96 (14:30:00)- probe malfunction  
All parameters 08/26/96 (09:00:00)- service  
Dissolved oxygen 08/27/96 (19:30:00) through 09/09/96 (08:30:00)- probe malfunction

#### September 1996:

WM: Dissolved oxygen 09/02/96 (09:30:00) through 09/06/96 (07:30:00)- probe malfunction  
All parameters 09/06/96 (07:45:00) through 09/06/96 (11:00:00)- service  
All parameters 09/20/96 (09:15:00) through 09/20/96 (13:30:00)- service  
SU: Dissolved oxygen deleted from 09/01/96 (00:00:00) through 09/09/96 (08:30:00) probe malfunction  
All parameters 09/09/96 (08:45:00) through 09/09/96 (10:45:00)-service  
Dissolved oxygen 09/09/96 (11:00:00) through 09/16/96 (05:30:00)-probe malfunction  
All parameters 09/16/96 (05:45:00) through 09/20/96 (09:30:00)- power failure

Turbidity 09/20/96 (09:45:00) through 10/07/96 (09:15:00)- probe malfunction

October 1996:

WM: All parameters 10/07/96 (10:00:00) through 10/07/96 (12:45:00)- service.

Dissolved oxygen 10/07/96 (13:00:00) through 10/21/96 (09:30:00)-probe malfunction.

All parameters 10/21/96 (09:45:00) through 10/21/96 (13:45:00)- service

SU: Turbidity data deleted from 10/01/96 (00:00:00) through 10/07/96 (09:15:00) probe malfunction.

All parameters 10/20/96 (09:00:00) through 10/21/96 (09:00:00)-service