

Waquoit Bay (WQB) National Estuarine Research Reserve Water Quality
Metadata
January 2002-December 2002
Latest Update: July 01, 2021

I. Data Set & Research Descriptors

1) Principal investigator & contact persons:

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2) Entry verification:

The data are uploaded in three file formats (each to separate files identified with the same file name but with unique extensions) from the YSI 6000 and 6600 data loggers to a PC with the YSI 6000 and 6600 EcoWatch software. Two of these (PC6000 and ASCII text formats) are kept on file in the WBNERR archive. The comma delimited format data file (.csv) is imported to the EXCEL spreadsheet program (version 5.0) where it is processed according to standard NERRS CDMO protocol using the CDMO Excel 5.0 macros. File size of one complete month of data each has been achieved by concatenating (and truncating if necessary) shorter files of interrupted data segments. File contents initially are examined for anomalies (e.g., sensor malfunction, battery failure, spurious values, etc.) by visualization of data with the Ecowatch Software provided by YSI. The data is also graphed using the Excel program for each two-week deployment of raw data. Data requiring editing are noted and copies of the graphs of raw data are saved at WBNERR. Data editing to CDMO protocol is conducted in Excel. Missing data (data logger malfunction or maintenance periods) are represented by periods ("."). Outliers (data values not within the

design range of the respective sensors except for turbidity and depth) are changed to periods. Data values recorded during deployment or retrieval (i.e., when the instrument was out of the water or in the laboratory) are deleted or replaced with periods. A record of changes is documented in the Data Anomalies section of the metadata file. The monthly files are sent electronically by FTP to CDMO.

The CDMO cdmomac3.xls will allow the user to automatically format column widths to the correct number of decimal places based on YSI sensor specifications. It also allows the user to QA/QC each data logger generated file for missing data points, fill all cells that do not contain data with periods, and find all data points that fall outside the range of what the data logger is designed to measure (i.e. outliers). The CDMO import.xls macro will allow PC users with 30-minute data to automatically create a monthly Excel file from a two-week deployment and insert periods for missing data. In addition, in November 1999 a graphing capability was added to this macro allowing users to produce single parameter and missing data point graphs on a monthly basis. Copies of all files are retained at the Reserve. During Deployment Year 2002, the Research Assistant, Kelly Chapman, performed all instrument calibration and maintenance and data management.

3) Research objectives:

For the NERR System-Wide Monitoring Program (SWMP), the YSI data loggers are programmed to record water quality parameters every 30 minutes. A total of four SWMP sites were located in the Waquoit Bay estuarine system during 2002. These four are: 1) Metoxit Point (MP), which is the oldest actively monitored site (since 1998), is located in the middle of Waquoit Bay's main basin; 2) Menauhant (MH), in operation since March 2001, is located adjacent to Eel Pond Inlet on Vineyard Sound - one of the two tidal inlets into the Waquoit Bay estuary; 3) Child's River (CR), in operation since May 2002, located near the head of the tidal section of Child's River- one of the two main surface fresh water sources to Waquoit Bay; and 4) Sage Lot (SL), in operation since May 2002,

located in Sage Lot Pond-a relatively pristine tidal pond surrounded by salt marsh and barrier beach, possessing one of the bay's few remaining eelgrass stands. The main purpose of water quality monitoring program is to aid Waquoit Bay NERR in one of its priority missions: to perform as a living laboratory and platform for coastal and estuarine research. The long term, continuous detailed monitoring of the estuary's basic hydrophysical parameters is an essential tool and context for any research activities located here. Besides this overarching mission, there are also several specific research interests. One primary issue for the Waquoit Bay ecosystem is the influence of anthropogenic induced alterations by nitrogen enrichment. Waquoit Bay receives nitrogen from several sources, such as septic systems (their leachate percolates into groundwater which then enters the bay), run off from roads, run off containing domestic and agricultural fertilizer and animal waste, and atmospheric sources. This elevated nitrogen loading to the bay has resulted in enhanced eutrophication that has contributed to the alteration of the bay's habitats. For example, thick mats of seaweeds (macroalgae) now cover the bottom where eelgrass meadows thrived in the 1970's. Unfortunately, there are few definitive records of the bay's water quality conditions during that period, which makes it difficult to evaluate the rates of change. To facilitate future evaluation, long-term records from SWMP can be used to track water column conditions. Of particular interest, in this regard are measurements of dissolved oxygen (DO), turbidity, dissolved nitrogen and chlorophyll concentration. Such records will facilitate evaluation of changes which may come about from a continuation of watershed alteration that result from current development patterns (i.e., non-sewered residential areas served by private septic systems typically consisting of septic tanks and leach fields) as well as non-industrial commercial development, such as golf courses, cranberry bogs, and retail shopping outlets. The records will be useful for

evaluating the efficacy of remediation efforts intended to reduce the nitrogen loading from these sources to Waquoit Bay.

Another focus of long-term research interest is the detection of climate change and the determination of its effects on the estuarine environment. Characterizing the variability of the various water column parameters, such as their scale, magnitude and frequency, is likely to be an important aspect of the estuarine ecosystem that may be sensitive to climate change. Related to this focus is an interest in the impact of storms (hurricanes and northeasters) and other extreme meteorological events on the estuary. For example, what temperature and wind field thresholds exist that might bring about or trigger certain conditions within the bay? The observations recorded by the SWMP will allow for these types of studies.

4) Research methods:

YSI 6000 and 6600 series sondes are deployed at each permanent water quality monitoring station at the Waquoit Bay Reserve. Since in-situ instrumentation can only record conditions at a specific location, permanent monitoring stations for SWMP are chosen to be in some way representative of the overall estuary. This is difficult in practice since estuaries by their very definition are coastal regions where large physical, chemical and biological variations tend to occur in space and time, so that often no particular location within the system is "typical" of the overall system. Establishing a number of stations can overcome this problem somewhat, and as of 2002 we have established four permanent stations in the Waquoit Bay estuaries. This represents a doubling over the previous year. Our current SWMP stations are situated so as to be as representative as much as possible of the estuary and its inputs/outputs. Additional details concerning the station characteristics are discussed in the next section.

The YSI sondes measure and record ambient water temperature, specific conductivity (and calculate salinity), dissolved oxygen (mg/L and % saturated), turbidity (NTU), water level (m), and pH at 30 minute intervals during deployment periods extending for approximately two weeks. Note that the pressure sensors we currently use are unvented and so variations in atmospheric pressure are recorded as changes in water depth (atmospheric data are available

from our SWMP meteorological station (as of 12/2001) and so it is possible to make this correction to the depth data, for increased accuracy. Also, at our Metoxit Point site, since 12/2000, we have been using a YSI chlorophyll 6025 sensor and these data are available by contacting us directly at the reserve (and included in the raw files for this year's SWMP data set for CDMO).

Sondes are deployed and retrieved approximately every two weeks. The "old" sonde is retrieved and a "new" replacement sonde is deployed immediately so that ideally no record gap occurs. The two week deployment duration is constrained by a combination of battery life (shorter life in colder waters) and fouling of the DO sensor (and other sensors to a lesser degree) during the warm summer months. Prior to deployment (within 24 hrs), each instrument is checked and its sensors re-calibrated using standard YSI (Operating Manual) protocols. Similarly, after a deployment, each sonde is brought back to the laboratory for a post-deployment check, data downloading, instrument and sensor cleaning. Salinity sensors are calibrated with reference seawater that had been previously analyzed with a Guildline salinometer at the Woods Hole Oceanographic Institution (David Wellwood is the technician for this instrument). pH sensors are calibrated with 7.0 and 10.0 pH standard solutions (2-point calibrations). The turbidity standard used was Hach 100 NTU, and distilled water (DI) for 0 NTU. Temperature sensors were not calibrated. Oxygen sensor membranes were inspected before and after each deployment. Oxygen sensor membranes were replaced 24 hours prior to each deployment when the sensor seemed to need reconditioning. Final DO calibration was not done until the membrane had been in place for at least 8 hours. As another check on instrument performance, in-situ measurements of air and water temperature, DO, salinity, water temperature, and pH are made using a hand-held YSI 650 at deployment/retrieval times. In 2002, SWMP data were collected at the Metoxit Point and Menauhant sites from January 1 through December 31, 2002. No significant ice-over conditions occurred during the winter/spring of 2002. The two new sites, Child's River and Sage Lot, went on line in May 2002 as part of a NERRS-wide SWMP expansion, and continued

operation into December. The Sage Lot site was shut-down in mid-December 2002 due to ice-over in Sage Lot Pond exceeding 4" in thickness. Two types of mooring silos are used to hold the sondes. The Metoxit Point and Sage Lot stations are located offshore and away from shore structures. The sonde moorings for these stations consist of a vertical PVC pipe tower (2" ID), about 1.5 meters in height) extending from a 120 lb cast concrete base resting on the bottom. Attached to this tower is a 0.7 m PVC pipe section (4" ID), referred to as the silo, that holds the sonde and is adjustable for setting the depth of the sensor package. The sondes are lowered and inserted into the 4" PVC silo from the surface at low water, when the top of the tower is only about 0.3 m below the surface. The lower part of the silo section is perforated with numerous 1.5" holes to allow the YSI sonde's sensors direct exposure to the flow of ambient waters. The Metoxit Point and Sage Lot silos are set so that the sensor package is 0.7 m and 0.5 m off the bottom, respectively. This ensures that the sensors are above the macro algal mats in the case of Metoxit Point, and sufficiently into the water column because of the thick eelgrass meadow in Sage Lot. The Menauhant and Child's River stations are shore-side locations and their moorings are a more typical type of silo - a single PVC section (4" ID) mounted vertically on a pier piling. The Menauhant site, located at a yacht club dock, is adjacent to a tidal inlet, and the Child's River site, located at a commercial marina and boat yard, is adjacent to the upper reaches of a tidal river. The base of these silos are also ventilated with large holes (1.5" diameter) and their sensor packages (bottom of the sonde) are both mounted about 0.4 m off the bottom. All mooring silos are painted with antifouling paint at the beginning of the spring season, and periodically checked and scrubbed during the summer season.

5) Site location and character:

General description of Waquoit Bay estuarine system:

The Waquoit Bay National Estuarine Research Reserve (WBNERR) is located in the northeastern United States on the southern coast of Cape Cod, Massachusetts. About 8,000 people maintain permanent residency in Waquoit Bay's drainage area, which covers parts of the towns of Falmouth, Mashpee, and Sandwich. During summer months, the population swells 2-3 times with the greatest housing concentrations immediate to the coastline (water views and frontage). In addition, the upper portions of the watershed include a military base, Otis Air Force Base and the Massachusetts Military Reservation, portions of which have been designated by the EPA as Superfund sites due to past practices of dumping jet fuel and other volatile groundwater contaminants.

WBNERR's estuaries are representative of shallow tidal lagoons that occur from Cape Cod to Sandy Hook, New Jersey. WBNERR is within the northern edge of the Virginian biogeographic province, on the transitional border (Cape Cod) with the Acadian biogeographic province to the north and east.

Like many embayments located on glacial outwash plains, Waquoit Bay is shallow (< 5 m), fronted by prominent barrier beaches (i.e., those of South Cape Beach State Park and Washburn Island), and is backed by salt marshes and upland coastal forests of scrub pine and oak. Two narrow, navigable inlets, reinforced with granite jetties, pass through two barrier beaches to connect Waquoit Bay with Vineyard Sound to the south. A third shallow and generally un-navigable inlet opened through the Washburn Island barrier beach during Hurricane Bob in August 1991, finally closed up in February 2002.

Bottom sediments in the bay are organic rich silts and medium sands. Sediment cores taken in summer of 2002 indicate that the depth of these estuarine sediments is up to 9 m thick in places. Thick (up to 0.3 m) macroalgae (seaweed) mats overlies much of the bottom of the bay, and largely consist of species *Cladophora vagabunda*, *Gracilaria tikvahiae*, and *Enteromorpha*. The dominant marsh vegetation in Waquoit Bay is *Spartina alterniflora* and *Spartina patens*. Dominant upland vegetation includes mixed forests of red oak, white oak, and pitch pine, and other shrubs and plants common to coastal New England. Land-use in the bay's watershed is about 60%

natural vegetation, but the remaining land is largely residential housing, with some commercial (retail malls), and minor amounts of agriculture (~3%) (cranberry bogs).

Dense housing developments cover the two peninsulas that form the western shore of the Waquoit Bay estuarine system. Although the developments themselves are outside of the Reserve boundaries, dissolved nitrogen in discharges from their septic systems (via groundwater) and in fertilizer run-off from their lawns has significant effects on the functioning of the Waquoit Bay ecosystem. These impacts have been a primary subject of study at the Reserve since its designation (1988). One outcome of this research has been the delineation of sub-watersheds within the overall drainage area for Waquoit Bay, of which WBNERR is a small part. This knowledge allows for the design of experiments based on the spatial variation of nutrient loading and other land-use related impacts.

At the northern end of the bay, an area comprising a separate sub-watershed, coastal bluffs of glacial till rise 30 feet above sea level. The northern basin of the bay, just below these bluffs, is its deepest area (approximately 3 m MLW), while much of the remainder of the bay is about 1.5 m. Bourne, Bog, and Caleb Ponds are freshwater kettle hole ponds on the northern-most shore of the bay. As components of the same sub-watershed, they have a common albeit minor freshwater outflow into the bay's northern basin via a narrow channel through a brackish marsh. To the east and south, other sub-watersheds surround several tidal and freshwater ponds, including Hamblin and Jehu Ponds, brackish salt ponds that are connected to the main bay by the tidal waters of Little and Great Rivers, respectively. The shorelines of the ponds are developed with residences that are occupied both seasonally and year round. Hamblin Pond and Little River are components of one sub-watershed, and Jehu Pond and Great River are elements of a separate sub-watershed. Further south lies Sage Lot Pond. It is in the least developed sub-watershed and also contains a barrier beach and salt marsh ecosystem of the reserve's South Cape Beach State

Park. To the east of Sage Lot Pond and within the same sub-watershed, lies the highly brackish Flat Pond. It receives minimal tidal flows of salt water from Sage Lot Pond through a narrow, excavated and culverted channel. The preponderance of the input to Flat Pond is groundwater and run off, both of which are likely affected (e.g., nutrients, pesticides, bacteria) by an adjacent golf course and near-by upper-scale residential development.

The largest source of surface freshwater to Waquoit Bay is the Quashnet / Moonakis River. Although named "river", this and Childs River are more appropriately described as "streams" because of their small channels and discharge ~1.0 CFS. A component of yet another sub-watershed, it originates in Johns Pond situated north of the bay and traverses forests, cranberry bogs, residential areas, and the Quashnet Valley Golf Course before entering the bay near the southern "boundary" of the northern basin. ("Quashnet" applies to that portion of the river within the town of Mashpee, and "Moonakis" refers to the brackish estuary at the river's mouth, lying in the town of Falmouth. Quashnet will be used hereafter to refer to the entire river.) The Quashnet River's tidal portion has sufficient numbers of coliform bacteria to cause it to be closed to shell fishing most of the time. The source(s) of this bacteria (human or avian) is unknown at this time.

The Childs River is the second largest input of surface freshwater to the bay. A component of another sub-watershed, it runs through densely developed residential areas. The Childs River sub-watershed receives the highest nitrogen loading and is the largest nitrogen contributor to the Waquoit Bay system of all the sub-watersheds. In the upper tidal portions of the river we have consistently recorded the highest chlorophyll levels and the lowest dissolved oxygen readings of any region in the bay and so this location represents an end-member for looking at anthropogenic inputs and impacts on the system. Another, albeit smaller, source of freshwater is the discharge of Red Brook through brackish marshlands into Hamblin Pond. Additional freshwater enters the bay

elsewhere through groundwater seepage (perhaps up to 50% of all freshwater input into the bay), precipitation and the flows of smaller brooks. There is relatively little surface water runoff entering directly into the bay due to the high percolation rates of Cape Cod's coarse, sandy soils.

Knowledge of the homo/heterogeneity of the water masses in Waquoit Bay was originally derived from measurements made by reserve staff and from data obtained by the reserve's volunteer water quality monitoring group, the Waquoit BayWatchers who have collected depth profiles of Waquoit Bay water quality since 1993. Subsequent research by reserve staff (including some numerical modeling by T. Isaji) has revealed that lateral mixing has considerable influence because tidal currents follow a general course through the bay. This results in an overall structure to horizontal patterns of water quality characteristics. The pattern it produces is a gyre in the central portion of the main bay whereby currents follow a generally counter-clockwise flow around a central area that exhibits reduced exchange with the remainder of the bay. The flushing rate within the gyre is diminished when compared with other more peripheral areas of the bay. The location of the gyre meanders slightly, apparently under the influence of tides and wind). Because of the shallow conditions, restricted tidal inlets, and low amplitude tidal forcing of Vineyard Sound here (tides are semi-diurnal with a range about 0.5 m) water levels in the bay are also strongly influenced by wind forcing. Southerly winds increase tidal heights and advance the phase of the flood and retard the phase of ebb (Northerly winds have the opposite effect).

The Metoxit Point station (MP) (41° 34.131' N 070° 31.294' W, 2.2 m deep) initiated in 1998, is located in the main basin of Waquoit Bay and was selected to be within or near the outer regions of the gyre (described above) and more or less represents "typical" water mass conditions and residence times for the bay. The location is at least a half mile from shore, well flushed by tides, and is in an area that is minimally disturbed by routine activities on the bay (e.g. boat traffic, shell fishing, etc.). Bottom sediments at the site

are organic rich muds overlain by thick algal mats. The salinity at this location typically ranges anywhere from 28-33 ppt. Turbidity throughout the year is typically low (<5 NTU), though base values are higher in the warmer months as phytoplankton levels increase. Also, because of this site's fairly open exposure to the south (greatest fetch over the bay), we have observed that when sustained southerly winds are greater than about 20 kts, the Metoxit Point site experiences increased turbidity ranging up to 25 NTU and beyond (sediment suspension event).

The Menauhant station (MH) (41° 33.156' N 070° 32.912' W, 1.2 m deep), initiated in March 2001, is located within the Eel Pond Inlet at the Menauhant Yacht Club dock. Eel Pond Inlet is the westernmost of the two main tidal inlets into the Waquoit Bay system. The site was chosen because it occupies one of the strategic locations for gauging the system's water mass characteristics. Entering waters represent the marine end-member while outflows represent the final product of estuarine water mass modification and export to shelf waters. The salinity typically ranges from 28 to 33 ppt. The site also has easy walk-in access to a secure private pier that extends into the throat of the inlet. Also, because of the turbulent tidal flow within the inlet, conditions are vertically well mixed, and the site can be maintained year round even through ice-over conditions in the rest of the bay. Bottom sediments at this site are clean sands and gravels with almost no attached bottom vegetation. Turbidity throughout the year is typically low (<5 NTU), though base values are higher in the warmer months as phytoplankton levels increase. Since inception, we have noted that strong south to southeast (onshore) winds tend to produce turbidity events, ranging up to 60 NTU, at this site from the wave induced suspension of fine sediments and organic material in the upstream near-shore zone. While we have found that these type of turbidity events are localized to windward near-shore areas in the bay, the transport of these sediments at inlet mouths during such times is perhaps a dominant sedimentation process within the estuarine system. In other words while the choice of our location may be producing a localized signal in

one of our measured parameters that signal may reflect key processes in the system at large.

The Child's River station (CR) (41° 34.793' N 070° 31.854' W, 1.2 m deep), was initiated this year in May, is located on a dock piling at Edwards Boat Yard, a commercial marina near the upper tidal reaches of Child's River - one of the two main surface fresh water sources to Waquoit Bay (see general description of Waquoit Bay watershed above). This location is very strongly stratified, characterized by a salt wedge with fresher river water overlying saline ocean water. Vertical salinity ranges can run from 0-10 ppm at the surface to more than 30 ppm just 1 m below. The sonde sensors are usually well within the salt wedge portion of the water column, nonetheless this location is also our freshest SWMP site, and is at the opposite end of Child's River from the seaward Menauhant station. Bottom sediments are fine organic rich muds. This location represents the most terrigenously and anthropogenically-impacted SWMP site. Monthly water quality, collected near this location for the past decade, shows very high chlorophyll concentrations during the warmer months and more recent dissolved nutrient records show very high nutrient-loads. Turbidity during the colder months is typically low (<5 NTU), while base values ramp up higher in the warmer months as phytoplankton levels increase to some of the highest concentrations recorded in the Waquoit Bay system. Boat traffic at the marina likely leads to increased turbidity (spiking up to 40 NTU and greater) during the boating season as well. As this site is dockside at a private marina, general security is high along with easy access. The station is also serviceable year-round and usually not subject to seasonal shutdown due to ice over.

The Sage Lot station (SL) (41° 33.254' N 070° 30.612' W, 1.2 m deep), also was initiated this year in May, and is located in deeper portion of Sage Lot Pond - a small sub-estuary of Waquoit Bay (20 ha) surrounded by salt marsh and barrier beach. Its small watershed is the least developed of all of Waquoit Bay's sub-watersheds and Sage Lot Pond is considered to be its least

impacted and most pristine sub-estuary. Bottom sediments are organic rich muds. Sage Lot Pond possesses one of the few remaining eelgrass beds in the Waquoit Bay system. Indeed the Child's River and Sage Lot Pond sites are considered to represent opposite end-members of nutrient-loading and human-induced influence. Researchers often locate their experiments in these two locations to take advantage of this difference. Turbidity throughout the year is typically low (<5 NTU), with higher end base values ranging up to 10 NTU. However, Sage Lot Pond is hydrologically connected to an upstream brackish source -- Flat Pond -- via a series of tidal creeks, drainage ditches and culverts. With this brackish input we see salinity readings from 20 to 32 ppt. Flat Pond borders a country club and golf course and some concern exists for its impact on the water quality of Sage Lot Pond.

6) Data collection period:
Data loggers were deployed at the Metoxit Point (MP) and Menauhant Yacht Club (MH) sites on January 1, 2002. Data loggers at the Child's River (CR) were first deployed on May 29, 2002 and at Sage Lot (S) on May 16, 2002. All stations, with the exception of Sage Lot, were in operation from these dates through the end of December. All monitoring is considered long-term. Deployment dates and times for 2002 are indicated below:

BEGAN	ENDED
Metoxit Point Site	
12/27/2001,15:30:00	01/15/2002, 04:00:00
01/16/2002,09:00:00	02/07/2002, 10:30:00
02/07/2002,11:00:00	02/19/2002, 11:30:00
02/19/2002,12:00:00	03/07/2002, 12:30:00
03/07/2002,13:00:00	03/20/2002, 11:30:00
03/20/2002,12:00:00	04/11/2002, 09:00:00
04/11/2002,09:30:00	04/29/2002, 09:30:00
04/29/2002,10:30:00	05/16/2002, 10:30:00
05/16/2002,10:30:00	05/29/2002, 08:00:00
05/29/2002,09:30:00	06/12/2002, 08:00:00
06/12/2002,07:30:00	06/26/2002, 07:00:00
06/26/2002,08:30:00	07/10/2002, 10:00:00
07/10/2002,10:00:00	07/26/2002, 09:00:00
07/26/2002,10:30:00	08/07/2002, 08:30:00
08/07/2002,08:00:00	08/21/2002, 10:30:00
08/21/2002,11:00:00	09/09/2002, 07:30:00
09/09/2002,08:00:00	09/19/2002, 09:30:00

09/19/2002, 10:00:00
10/03/2002, 12:00:00
10/15/2002, 16:00:00
10/31/2002, 12:00:00
11/12/2002, 13:00:00
12/04/2002, 12:30:00

10/03/2002, 11:30:00
10/15/2002, 12:30:00
10/31/2002, 11:30:00
11/12/2002, 12:30:00
12/04/2002, 12:00:00
01/01/2003, 23:00:00

Menauhant YC Site

12/27/2001, 08:30:00
01/16/2002, 09:30:00
02/07/2002, 12:00:00
02/19/2002, 09:30:00
03/07/2002, 12:00:00
03/20/2002, 12:30:00
04/09/2002, 08:00:00
04/29/2002, 11:00:00
05/16/2002, 07:30:00
05/29/2002, 09:00:00
06/12/2002, 08:30:00
06/26/2002, 08:00:00
07/10/2002, 07:30:00
07/25/2002, 07:00:00
08/07/2002, 08:30:00
08/21/2002, 14:30:00
09/06/2002, 09:30:00
09/19/2002, 09:00:00
10/03/2002, 07:30:00
10/15/2002, 12:30:00
10/31/2002, 09:00:00
11/12/2002, 10:00:00
12/04/2002, 09:30:00

01/16/2002, 09:00:00
02/07/2002, 11:30:00
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03/07/2002, 11:30:00
03/20/2002, 12:00:00
04/09/2002, 07:30:00
04/29/2002, 10:30:00
05/16/2002, 07:00:00
05/29/2002, 08:30:00
06/12/2002, 07:30:00
06/26/2002, 07:30:00
07/10/2002, 07:00:00
07/25/2002, 06:30:00
08/07/2002, 07:30:00
08/21/2002, 14:00:00
09/06/2002, 09:00:00
09/19/2002, 08:30:00
10/03/2002, 07:00:00
10/15/2002, 12:00:00
10/31/2002, 08:30:00
11/12/2002, 09:30:00
12/04/2002, 08:30:00
01/01/2003, 22:30:00

Child's River Site

05/29/2002, 09:30:00
06/12/2002, 09:00:00
06/26/2002, 08:30:00
07/10/2002, 12:00:00
07/26/2002, 10:00:00
08/07/2002, 09:30:00
08/21/2002, 14:00:00
09/06/2002, 10:00:00
09/19/2002, 09:30:00
10/03/2002, 08:00:00
10/15/2002, 10:30:00
10/31/2002, 09:30:00
11/12/2002, 10:30:00
12/04/2002, 09:30:00

06/12/2002, 08:30:00
06/26/2002, 08:00:00
07/10/2002, 11:30:00
07/26/2002, 09:30:00
08/07/2002, 09:00:00
08/21/2002, 13:30:00
09/06/2002, 09:30:00
09/19/2002, 09:00:00
10/03/2002, 07:30:00
10/15/2002, 10:00:00
10/31/2002, 09:00:00
11/12/2002, 10:00:00
12/04/2002, 09:00:00
01/08/2003, 12:00:00

Sage Lot Site

05/16/2002, 14:30:00
05/30/2002, 11:30:00
06/12/2002, 10:30:00
06/26/2002, 09:30:00

05/29/2002, 10:00:00
06/12/2002, 10:00:00
06/26/2002, 09:00:00
07/12/2002, 08:30:00

07/12/2002, 09:00:00	07/25/2002, 07:00:00
07/25/2002, 07:30:00	08/07/2002, 10:30:00
08/07/2002, 11:00:00	08/21/2002, 12:30:00
08/21/2002, 13:00:00	09/10/2002, 11:30:00
09/10/2002, 12:00:00	09/19/2002, 07:30:00
09/19/2002, 08:00:00	10/03/2002, 10:30:00
10/03/2002, 11:00:00	10/15/2002, 11:00:00
10/15/2002, 11:30:00	10/31/2002, 08:00:00
10/31/2002, 08:30:00	11/12/2002, 11:30:00
11/12/2002, 12:00:00	12/03/2002, 16:00:00
12/03/2002, 16:30:00	12/09/2002, 15:30:00
12/09/2002-12/31/2002	NO DATA COLLECTED DUE TO ICE!

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 referred 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 and 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 of 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 water quality 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 general information link on CDMO homepage) and online at the CDMO homepage <http://cdmo.baruch.sc.edu>. Data are available in text tab-delimited format, Microsoft Excel spreadsheet format and comma-delimited format.

8) Associated researchers and projects:

Our data is publicly available through our web site and we do not track its use.

II. Physical Structure Descriptors

9) Variable sequence, range measurements, units, resolution, and accuracy:

YSI 6000/6600 datalogger

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)			

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.

10) Coded variable indicator and variable code definitions:

All NERRS sites are required to use the following file naming convention.

File definitions: YSI deployment site/month/year or SS/MM/YY

Our sites names are designated:

- a) Metoxit Point= MP
- b) Menauhant Site= MH
- c) Child's River = CR
- d) Sage Lot= SL

Example: MPwq0502 (designates monthly water quality data from May 2002 at the Metoxit Point Site)

11) Data anomalies:

SMALL NEGATIVE TURBIDITY ANOMALIES: Slight negative turbidity values sometimes occur as a result of small calibration offsets. Often these turbidity minimum values are between 0 and -2 NTU. In May of this year we installed new model turbidity probes (YSI 6136) on our 6600 YSI data loggers. Due to the larger sampling depth of these new probes, larger calibration offsets occurred resulting in somewhat lower negative turbidity values (e.g., -2 to -14 NTU).

Improvement in our calibration methods corrected this larger offset problem later in the year. All of these small negative turbidity values (the minimum for a given deployment) should be considered to be within 2 NTU of the true datum for correction purposes. Consequently, we have not deleted any of these small negative turbidity data.

BIOLOGICAL-RELATED TURBIDITY ANOMALIES: This type anomaly includes turbidity readings that are either outside of the normal range or spikes way above background and unrelated to increased sediment suspension or decreased water column clarity. We believe these records are real (and not sensor malfunction), though not reflective of actual water column turbidity. These extreme values are likely due to biological factors (such as small fish, crabs, or other marine organisms). Our criteria for flagging these data are single spikes (above rather constant background) over 50NTU that are more than 10 times surrounding values. These readings were deleted.

SUSPENSION EVENT RELATED TURBIDITY ANOMALIES: This type of anomaly includes turbidity readings that were either outside the normal range, or spikes way

above background that are related to elevated turbidity levels indicative of wind wave related suspension events. We believe these are real (and not sensor malfunction), though not reflective of actual water column turbidity. These extreme values are likely due to large floating particles (i.e., seaweeds, detritus, etc.) suspended in the water column during storm events usually from strong southerly winds in the Waquoit Bay area. (see end of section 5 for more detail on these events at this site). Our criteria for flagging these data are values over 100NTU that are more than 5 times the magnitude of surrounding values, and linked to high winds. These readings were deleted.

January 2002
Metoxit Point:

a) The data logger stopped logging as of 01/15/2002 4:30 to 01/16/2002 8:30 due to battery failure.

Menauhant:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following data points were not collected by the data logger:

01/22/2002 09:00:00
01/22/2002 09:30:00

c) Depth is zero on 01/14/2002 at 04:00:00. This is likely due to a combination of extremely low tides and meteorological conditions causing the probe either to be out of the water and/or appearing so as to low atmospheric pressure. The depth data point was not deleted

February 2002
Metoxit Point:

a) There were no anomalous data found this month.

Menauhant:

a) The following data points were not collected by the data logger:

02/04/2002 08:30:00
02/26/2002 08:30:00
02/26/2002 09:00:00
02/28/2002 05:30:00

b) Oxygen probe electrode failure from 02/19/2002 09:30:00 to 02/28/2002 23:30:00. All DO data deleted for this period.

c) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

d) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

02/12/2002 12:30:00

e) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

02/26/2002 18:30:00

March 2002
Metoxit Point:

a) There were no anomalous data found this month.

Menauhant:

a) Oxygen probe electrode failure from 03/01/2002 00:00:00 to 03/07/2002 11:30:00. All DO data deleted for this period.

b) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

c) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

03/03/2002 01:00:00
03/03/2002 10:00:00
03/03/2002 14:30:00
03/20/2002 16:30:00

03/26/2002 18:00:00
03/30/2002 08:30:00, 09:30:00

d) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

03/09/2002 21:00:00
03/18/2002 10:00:00, 12:00:00

e) The following data points were not collected by the data logger:
03/27/2002 08:30:00 - 09:00:00

April 2002

Metoxit Point:

a) The temperature probe failed on the last day of month about one day after deployment. Temperature affects the calculation of a number of other parameters consequently the readings for temperature, specific conductivity, salinity, DO, depth and pH, were deleted due to the probe failure for the following time period:

04/30/2002 07:30:00 to 04/30/2002 23:30:00

b) Anomalous Specific Conductivity and salinity data were deleted for the following dates and times:
04/10/2002 13:00:00 - 19:00:00
04/10/2002 20:30:00
04/11/2002 01:30:00

Menauhant:

a) Channel dredging adjacent to this site started in the middle of the month. The exact dates are unknown. This may have caused some elevated turbidity levels, but no anomalous events appear to be directly related to this activity.

b) An anomalously low DO reading of unknown cause occurred at 04/01/2002 at 19:30:00. The DO data points for this time period were deleted.

c) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

d) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

04/25/2002 19:00:00-20:00:00, 21:00:00-21:30:00
04/28/2002 09:00:00

e) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

04/16/2002 09:00:00
04/24/2002 17:30:00

May 2002

Metoxit Point:

a) The temperature probe failed about one day after deployment. Temperature affects the calculation of a number of other parameters consequently the readings for temperature, specific conductivity, salinity, DO, depth and pH, were deleted due to the probe failure for the following time period:

05/01/2002 00:00:00 to 05/16/2002 10:30:00

b) The dissolved oxygen membrane was punctured with air bubbles when retrieved on 05/29/02. It looks as though it was punctured about an hour after it was deployed. The following dissolved oxygen % and mg/L readings were out of range due to a membrane puncture during deployment and were deleted:

05/16/2002 11:00:00 to 05/29/2002 08:00:00

Menauhant:

a) The following readings were not recorded by the data logger:

05/03/2002 08:30:00
05/03/2002 09:00:00
05/05/2002 05:30:00

b) There was battery failure after 05/12/2002 14:30:00. All records 05/12/2002 15:00:00 through 05/16/2002 07:00:00 were not recorded by the data logger.

c) Small negative turbidity values related to calibration offsets were

recorded this month. See note at the beginning of this section for further explanation.

d) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

05/06/2002 16:30:00, 17:30:00-18:00:00, 19:00:00
05/17/2002 12:00:00
05/22/2002 19:00:00

e) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

05/06/2002 12:00:00
05/11/2002 21:00:00
05/17/2002 08:30:00, 20:30:00
05/22/2002 12:00:00
05/29/2002 01:30:00

Child's River:

a) The initial deployment at this site began on 05/29/2002 at 09:30:00.

b) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

Sage Lot:

a) The data logger was deployed on 5/16/2002 at 14:30:00. The data logger ran out of memory on 5/29/2002, 10:00:00 due to loss of disk space. It was set at an interval of 1 minute for 14 days. Data were lost from 5/29/2002, 10:30:00 through 5/30/2002, 11:00:00.

b) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

June 2002

Metoxit Point:

a) Small negative turbidity values related to calibration offsets were

recorded this month. See note at the beginning of this section for further explanation.

Menauhant:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

06/06/2002 15:00:00
06/12/2002 19:30:00
06/29/2002 13:30:00

Child's River:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

Sage Lot:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

06/22/2002 16:30:00
06/24/2002 19:30:00

c) NOTE: There was an abundance of biota on the data logger, to a degree un-noticed at other sites.

July 2002

Metoxit Point:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

Menauhant:

a) The following dissolved oxygen mg/L data were negative due to fouling of the electrodes. These data were deleted.

07/17/2002 03:00:00 to 07/25/2002 06:30:00

b) The following DO data were deleted due to a punctured membrane.

07/25/2002 07:00:00 to 07/31/2002 23:30:00

c) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

d) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

07/04/2002 04:00:00

07/08/2002 14:30:00

07/21/2002 05:00:00, 16:00:00

e) Highly anomalous dissolved oxygen (mg/L and %) data were deleted for the

following dates/times due to fouling of sonde at retrieval:

07/09/2002 13:00:00 - 07/10/2002 07:00:00

Child's River:

a) The following dissolved oxygen % readings were slightly negative, but conditions were very anoxic. The data were not deleted.

07/02/2002 06:00:00 - 08:30:00

07/03/2002 11:30:00

07/04/2002 11:00:00 - 12:30:00

b) The following dissolved oxygen mg/L readings were slightly negative due,

but conditions were very anoxic. The data were not deleted

07/02/2002 06:00:00 - 09:00:00; 10:30:00 - 11:00:00

07/03/2002 11:00:00 - 12:00:00

07/04/2002 10:00:00 - 12:30:00

c) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further

explanation.

d) Anomalous high turbidity (872 NTU) for the following dates/times were deleted:
07/17/2002 15:00:00

Sage Lot:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) Specific conductivity and salinity data were deleted from 07/06/2002 00:00:00 to 07/12/2002 08:30:00 due to anomalous behavior of the conductivity probe. Salinity shows a very regular downward drift of about 8 ppm over this period. Cause is unknown, but a similar phenomenon was noted at Menauhant in August and a barnacle was found growing on the probe near the port. Though salinity affects the algorithms for depth, DO, and pH we have not deleted these data.

August 2002

Metoxit Point:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

08/21/2002 18:00:00
08/27/2002 09:30:00

Menauhant:

a) Specific conductivity and salinity data were deleted from 08/17/2002 00:00:00 to 08/21/2002 14:00:00 due to anomalous behavior of conductivity probe. Salinity shows a very regular downward drift of about 3 ppm over this period.

Cause is unknown, but a barnacle found growing on the probe near the port is the suspected cause. Though salinity affects the algorithms for depth, DO, and pH we have not deleted these data due to the rather small overall change in salinity.

b) The following DO data were deleted due to a punctured membrane.

08/01/2002 00:00:00 to 08/07/2002 07:30:00

c) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

d) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

08/19/2002 19:30:00

Child's River:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

08/05/2002 06:30:00
08/08/2002 05:30:00
08/09/2002 06:30:00
08/10/2002 05:30:00
08/11/2002 07:00:00
08/15/2002 01:30:00, 10:00:00
08/17/2002 02:30:00
08/20/2002 14:30:00, 18:00:00
08/23/2002 16:30:00
08/24/2002 06:30:00
08/25/2002 08:30:00
08/26/2002 06:30:00
08/28/2002 12:00:00
08/30/2002 06:00:00, 07:00:00, 16:30:00
08/31/2002 06:00:00

Sage Lot:

a) Small negative turbidity values related to calibration offsets were

recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation

08/17/2002 20:30:00

September 2002

Metoxit Point:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

09/11/2002 05:00:00
09/11/2002 09:00:00
09/13/2002 07:00:00
09/15/2002 00:00:00
09/16/2002 04:00:00
09/18/2002 12:00:00

Menauhant:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

09/08/2002 21:00:00
09/10/2002 12:00:00-12:30:00, 13:30:00

c) The following anomalous turbidity data are likely related to a biological

event and were deleted. See note at the beginning of this section for further explanation.

09/02/2002 23:30:00
09/07/2002 07:30:00
09/11/2002 12:30:00
09/29/2002 05:00:00

d) The following Spec. Cond and salinity data were deleted due to calibration error:
09/06/2002 09:30:00 - 09/19/2002 08:30:00

Child's River:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

09/03/2002 16:30:00

c) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

09/04/2002 18:00:00
09/08/2002 06:30:00
09/09/2002 16:30:00
09/11/2002 11:00:00, 12:00:00, 17:30:00
09/13/2002 11:30:00
09/16/2002 07:00:00, 11:30:00
09/17/2002 08:00:00
09/23/2002 19:30:00

Sage Lot:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further

explanation.

09/17/2002 22:00:00
09/25/2002 02:00:00
09/28/2002 17:30:00

October 2002

Metoxit Point:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) In the retrieval of instrument 01B1041 on 10/15/2002, the silo was found tipped over at the bottom of the bay and replaced on 10/15/2002 16:00:00. All data from the deployment 10/03/2002 12:00:00 to 10/15/2002 12:30:00 were deleted. In resetting the silo no data were collected from 10/15/2002 13:00:00 through 15:30:00.

c) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

10/17/2002 23:00:00
10/18/2002 00:30:00

d) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

10/21/2002 05:30:00
10/29/2002 19:00:00
10/29/2002 20:30:00

Menauhant:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a suspension

event and were deleted. See note at the beginning of this section for further explanation

10/04/2002 17:00:00-17:30:00, 18:30:00
10/07/2002 07:30:00-08:00:00
10/14/2002 20:30:00, 22:30:00-23:00:00
10/17/2002 01:30:00
10/25/2002 18:00:00, 19:00:00

c) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

10/10/2002 03:30:00, 22:00:00

Child's River:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

Sage Lot:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

10/21/2002 05:30:00
10/22/2002 23:30:00

c) Turbidity readings started acting funny from 10/30/2002 19:30:00 to 10/31/2002 08:00:00, oscillating from very high values to negative values (more negative than previous minima for deployment). Cause is unknown, but perhaps sensor malfunction. These data have been deleted.

November 2002

Metoxit Point:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

11/19/2002 19:00:00

Menauhant:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

11/02/2002 17:30:00

11/04/2002 02:30:00, 17:00:00, 19:30:00

11/05/2002 17:00:00

11/06/2002 00:00:00, 06:30:00-07:30:00, 17:00:00

11/07/2002 21:30:00

11/08/2002 19:30:00

11/10/2002 16:00:00, 17:00:00

11/11/2002 12:30:00, 17:30:00, 19:30:00

11/12/2002 03:30:00

c) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

11/12/2002 13:00:00

11/20/2002 10:00:00

11/25/2002 22:30:00

Child's River:

a) Zero turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

11/17/2002 21:00:00

c) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

11/22/2002 22:00:00
11/26/2002 05:00:00

Sage Lot:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) Turbidity readings again appear abnormal from 11/12/2002 12:00:00 to 11/18/2002 11:30:00, similar to behavior in earlier deployment with the same instrument in October. Again, cause is unknown, but suspect sensor malfunction. These data have been deleted.

December 2002

Metoxit Point:

a) There were no anomalous data this month.

Menauhant:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a suspension event and were deleted. See note at the beginning of this section for further explanation

12/12/2002 00:30:00-01:00:00
12/14/2002 03:00:00-03:30:00, 05:00:00-05:30:00
12/15/2002 08:30:00
12/20/2002 09:30:00
12/25/2002 10:00:00-12:30:00, 13:30:00, 16:30:00
12/31/2002 04:30:00-06:00:00, 08:00:00-08:30:00

c) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

12/11/2002 13:00:00

Child's River:

a) Zero turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

Sage Lot:

a) Small negative turbidity values related to calibration offsets were recorded this month. See note at the beginning of this section for further explanation.

b) The following anomalous turbidity data are likely related to a biological event and were deleted. See note at the beginning of this section for further explanation.

12/09/2002 15:30:00

c) The data logger was removed from the site on 12/09/2002 15:30:00 due to thick ice cover. From 12/09/2002 16:00:00 until 12/31/2002 23:30:00 the data logger was not deployed and no data was recorded.

12) Missing data:

Missing data are denoted by a period in the data set. Data are missing due to equipment failure where no probes deployed, maintenance/calibration of equipment, elimination of obvious outliers, or elimination of data due to calibration (both pre and post) problems. For more details on deleted data, see section 11, Data Anomalies. The Waquoit Bay NERR Research Coordinator can also be contacted about other issues concerning missing or anomalous data.

13) Post deployment information:

End of Deployment Post-calibration Readings in Standard Solutions:

Site	Date	Salinity (ppt) (std-31.93ppt)	DO% (std-air)	pH (std-7.0)	Turbidity (std-0 NTU)
MP	02/19/02	31.72	102.2	6.89	-0.1
	03/20/02	32.02	102.8	6.94	0.3
	04/11/02	33.44	104.4	6.77	1.4
	04/29/02	31.87	97.3	7.03	0.3
	05/15/02	31.25	48.6	6.95	0.6
	05/29/02	32.14	107.3	7.0	0.0

06/12/02	32.44	91.7	7.01	1.1
06/26/02	32.01	105.7	6.85	0.0
07/10/02	32.07	86.1	7.06	0.3
07/26/02	32.28	122.5	6.90	-4.6
08/07/02	32.39	134.4	7.03	4.0
08/21/02	31.49	100.3	6.92	-4.3
09/09/02	31.92	94.4	7.37	1.5
09/19/02	31.89	105.0	7.03	-7.0
10/03/02	NO POST CHECK DUE TO FAULTY CALIBRATION			
CONNECTOR...				
	(std-31.78ppt)			
10/15/02	13.54	108.2	7.09	-6.7
10/31/02	32.12	117.8	6.99	0.5
11/12/02	31.61	88.1	7.00	0.0
12/04/02	31.08	110.3	6.93	0.0
01/08/03	32.02	71.3	6.98	-0.2

Site	Date	Salinity (ppt) (std-31.93ppt)	DO% (std-air)	pH (std-7.0)	Turbidity (std-0
NTU)					
MH					
	02/19/02	32.19	103.4	6.97	-1.0
	03/20/02	31.74	98.6	6.97	0.3
	04/09/02	31.54	99.8	7.05	0.3
	04/29/02	31.93	73.7	6.95	0.1
	05/15/02	29.20	98.7	6.85	6.3
	05/29/02	32.95	106.2	6.90	3.5
	06/12/02	30.91	72.1	6.90	2.3
	06/26/02	31.74	106.5	6.98	0.0
	07/10/02	30.91	94.0	6.94	0.3
	07/25/02	32.06	86.3	6.94	2.3
	08/07/02	32.42	77.0	6.77	0.1
	08/21/02	31.24	40.4	6.92	-0.8
	09/06/02	31.74	87.0	6.89	-3.4
	09/19/02	34.09	107.0	7.05	-1.2
		(std-31.78ppt)			
	10/03/02	31.82	91.9	6.90	0.0
	10/15/02	31.77	85.1	7.01	-2.0
	10/31/02	32.30	88.3	6.81	0.0
	11/12/02	30.97	90.7	6.95	-0.2
	12/04/02	30.86	99.2	6.80	0.0
	01/08/03	31.78	117.1	6.90	0.0

Site	Date	Salinity (ppt) (std-31.93ppt)	DO% (std-air)	pH (std-7.0)	Turbidity (std-0
NTU)					
CR					
	06/12/02	31.52	93.4	6.95	17.3

	06/26/02	32.15	98.4	6.97	0.2
	07/10/02	32.05	67.2	6.96	6.6
	07/26/02	32.64	109.5	6.79	-5.7
	08/07/02	31.52	93.4	6.95	17.3
	08/21/02	32.70	99.9	7.08	-
13.8					
	09/06/02	31.87	100.9	7.01	-8.9
	09/19/02	32.31	107.1	7.03	-
12.0					
		(std-31.78ppt)			
	10/03/02	31.15	104.4	7.07	-1.7
	10/15/02	31.51	106.8	7.01	-
12.9					
	10/31/02	31.93	105.8	7.05	-0.1
	11/12/02	32.24	104.2	7.04	-0.1
	12/04/02	31.59	110.9	6.98	0.2
	01/08/02	31.36	85.9	6.94	-0.2

Site	Date	Salinity (ppt) (std-31.93ppt)	DO% (std-air)	pH (std-7.0)	Turbidity (std-0
NTU)					
SL					
	05/30/02	31.84	90.3	7.02	3.4
	06/12/02	31.76	87.1	6.91	3.6
	06/26/02	32.10	90.8	6.98	1.7
	07/12/02	26.71	39.0	6.96	-1.0
	07/25/02	31.95	90.4	6.87	0.3
	08/07/02	32.16	103.7	7.00	-1.2
	08/21/02	32.17	100.5	7.04	-2.9
	09/10/02	32.25	85.6	7.04	1.8
	09/19/02	32.17	100.5	7.04	-2.9
		(std-31.78ppt)			
	10/03/02	31.62	96.1	6.97	1.1
	10/15/02	31.99	119.8	6.99	0.2
	10/31/02	32.09	103.0	7.00	-1.5
	11/12/02	33.25	100.1	7.07	-0.1
	12/04/02	31.88	113.8	6.80	0.0
	12/10/02	32.2	101.5	6.95	-0.2

*NO DATA WAS COLLECTED AFTER 12/09/02

14) Other remarks/notes:

On 07/01/2021 this dataset was updated to include embedded QAQC flags for anomalous/suspect data.

System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2006, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document.

Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes. No other flags or codes were embedded in the dataset and users should still refer to the detailed explanations above for more information.