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UNIVERSITY OF MARYLAND CENTER for ENVIRONMENTAL SCIENCE
CHESAPEAKE BIOLOGICAL LABORATORY

Monitoring of Sediment Oxygen and Nutrient Exchange Measurements in Eastern Bay, Tangier Sound and Tributaries in Support of TMDL Development 2009

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1. INTRODUCTION

1.1. Background

The Sediment, Oxygen and Nutrient Exchange (SONE) measurement program supported by MDE has, during the past decade, made these types of measurements in support of water quality modeling activities conducted by MDE and others. Measurements have now been made in all major (and some minor) tributaries of the Maryland portion of Chesapeake Bay. During the summer (Jun-Aug) of 2009 a final set of measurements were made in Tangier Sound and tributaries of the Sound (Honga River, Wicomico River, Nanticoke River and Fishing Bay) and in Eastern Bay and associated tributary rivers (Miles River and Wye River). All SONE data collected in the Bay region since the late 1970s have been compiled as a large and accessible data set (http://www.gonzo.cbl.umces.edu/). We will add the data collected during 2009 to this large data set in the near future.

Measurements of sediment processes (SONE measurements) are particularly important in these relatively shallow systems because the consumption of oxygen (DO) and release of nitrogen (N) and phosphorus (P) compounds at the sediment-water interface have a strong effect on water quality. In much deeper systems (>20 m) the influence of sediment processes is muted and most DO consumption and nutrient re-cycling occurs in the water column. Indeed, the very high primary production (mainly via phytoplankton) and secondary production (fish and shellfish) in the Chesapeake is supported, in part, by the efficient sediment re-cycling of essential nutrients (N and P) supporting primary producers. SONE measurements were made only during the summer period because, as clearly indicated by previous measurement programs, these processes are far more active during the warm, summer period than during other colder portions of the year. Hence, these measurements very likely represent peak rates for these variables.

During the past fifteen years Bay scientists have learned a great deal about the importance of exchanges of oxygen and nutrients across the sediment-water interface and the dynamics of these interactions. Sediment oxygen consumption can be an important sink for oxygen in estuarine environments and sediment nutrient releases can be a large internal source of both nitrogen and phosphorous to the water column (Boynton *et al.*, 1991). Both of the latter compounds are essential for phytoplankton growth, which can become excessive when nutrient supplies are large. Thus, sediment processes can play an important role in determining water quality conditions by lowering oxygen levels and promoting excessive algal growth.

Estuarine water quality and habitat conditions are directly affected by fluxes of nutrients from the sediments, especially in summer during hypoxic and anoxic events. The magnitudes of these fluxes appear to be directly influenced by nutrient and organic matter loading to the Bay. Both annual and interannual patterns demonstrate that when these external nutrient and organic matter loadings decrease, the cycle of organic matter deposition to the sediments, sediment oxygen demand, and the release of nutrients into

the water column also decrease and water quality and habitat conditions improve (Boynton e*t al.* 1995; Kemp *et al*. 2005). Evaluation of sediment nutrient releases as well as the loadings of pollutants from the land and atmosphere provides the information necessary to diagnose the health of an estuary.

The Clean Water Act Section 303(d)(1)C and federal regulation 40CFR 130.7C(1) directed each State to develop a Total Maximum Daily Load (TMDL) for all impaired waters on the Section 303 (d) list, taking into account seasonal variations and a margin of safety (MOS) to allow for uncertainty. A TMDL reflects the total pollutant loading of the impairing substance a body of water can receive and still meet water quality standards. The Maryland Department of the Environment (MDE) is in the process of developing TMDL assessments for the Maryland Eastern Bay, Tangier Sound and associated tributaries. This process involves water quality monitoring, as well as the development of watershed and estuarine models. Results from these models will be used to calculate the allocation of loads between point and non-point sources of the TMDLs.

1.2. Description of Project and Strategy for Station Locations.

Measurements of net sediment-water exchanges of nutrients (phosphorus and nitrogen) and oxygen, characterization of the nutrient content of surface sediments, water column respiration and measurement of water quality conditions in near-bottom water were made monthly during June, July and August of 2009 at twenty four stations in Maryland's Eastern Bay, Tangier Sound and associated tributaries.

There were two major areas of the Maryland Chesapeake Bay that had never been monitored for SONE processes, as indicated previously. The basic sampling strategy was to focus measurements during the summer period when rates were very likely to be at annual maxima. Stations were then allocated to include upper river sites, lower river sites and open water sites. Thus, in the case of Tangier Sound, several stations were located in the open waters of the Sound (TS 01-TS03) and then two to three sites were allocated to the tributary rivers entering the Sound.

All stations were selected to represent the most common water depth in the vicinity of the station. We avoided locating stations in either extremely deep or shallow sites. The goal was to develop a data set that represented as large a spatial area as possible.

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2. ACQUISITION AND ANALYSIS OF TMDL SEDIMENT-WATER OXYGEN AND NUTRIENT EXCHANGES DATA

2.1. Location of TMDL Stations

Twenty four stations were located in Maryland's Eastern Bay, Tangier Sound and associated tributaries (Figure 2-1, Table 2-1). At all twenty four of these stations, measurements of sediment-water oxygen and nutrient exchanges were made along with associated bottom water conditions, surficial sediment chlorophyll-*a*, particulate carbon, nitrogen and phosphorus concentrations and estimates of surface water column respiration.

2.2. Sampling Frequency

The sampling frequency was based on the seasonal patterns of sediment water exchanges observed in previous studies conducted in the Chesapeake Bay region (Kemp and Boynton, 1980, 1981; Boynton *et al*., 1982; Boynton and Kemp, 1985). Based on these results the monitoring design adopted for this TMDL study involved three monthly measurements: June, July and August 2009.

2.3. Field Methods for TMDL Study

2.3.1. Water Column Profiles

At each TMDL station, vertical water column profiles of temperature, salinity and dissolved oxygen were measured at 0.5 m intervals from the surface to the bottom using a Yellow Springs Instrument (YSI) 6600 DataSonde®. Turbidity of surface waters was measured using a Secchi disk.

2.3.2. Water Column Nutrients

Near-bottom water samples (0.5 – 1.0 m above the sediment surface) were collected using a high volume submersible pump system. Samples were filtered, where appropriate, using 0.7 µm GF/F filter pads, and immediately frozen. Samples were analyzed by Nutrient Analytical Services Laboratory (NASL) for the following dissolved nutrients: ammonium (NH_4^+), nitrite (NO_2^-), nitrite plus nitrate ($NO_2^- + NO_3^-$) and dissolved inorganic phosphorus corrected for salinity (DIP or PO_4^{-3}).

2.3.3. Sediment Profiles

At each TMDL station an intact sediment core (~ 7 cm diameter) was used to measure the oxidation reduction (redox) potential (Eh) of the sediment porewater. The redox potential of the overlying water was also measured (+1cm measurement). Sediment redox (mV)

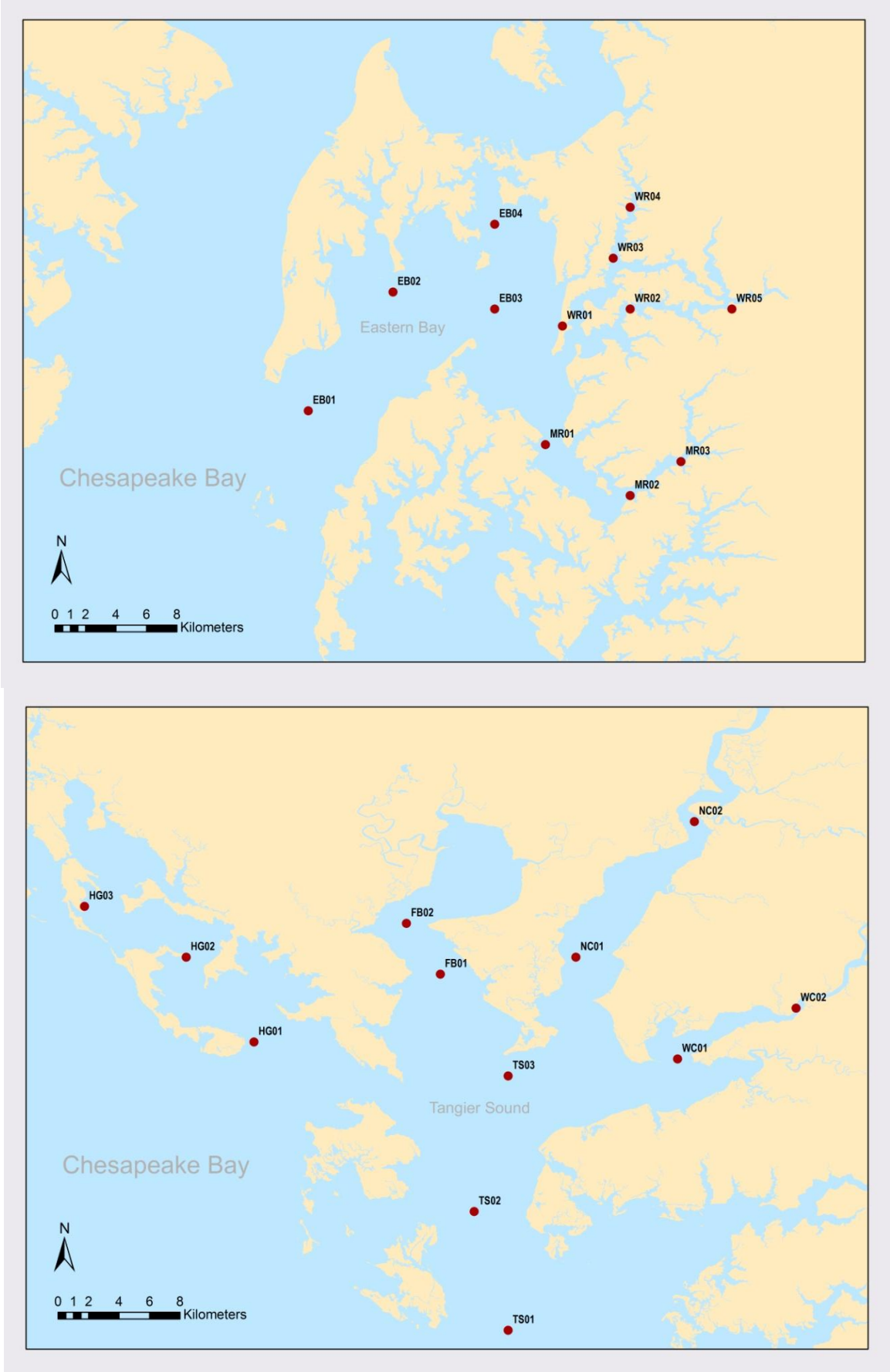


Figure 2-1. Location (decimal degrees, Datum NAD83) of twenty four TMDL stations sampled in Maryland's Eastern Bay, Tangier Sound and tributaries.

Table 2-1. TMDL Station Code, Grid Locations and Mean Depths (m)
Datum NAD 83 (*Latitude and longitude values expressed as decimal degrees*).

Station	Area / Tributary	Latitude	Longitude	Depth (m)
HG03	Honga River	38.3189	-76.2246	1.9
HG02	Honga River	38.2852	-76.1599	5.5
HG01	Honga River	38.2442	-76.1151	8.3
FB02	Fishing Bay	38.3104	-76.0279	5.0
FB01	Fishing Bay	38.2756	-76.0105	5.0
NC02	Nanticoke River	38.4529	-75.8626	5.0
NC01	Nanticoke River	38.2950	-75.9305	6.0
WC02	Wicomico River	38.2597	-75.8003	3.2
WC01	Wicomico River	38.2274	-75.8705	2.9
TS03	Tangier Sound	38.2169	-75.9720	4.5
TS02	Tangier Sound	38.1382	-75.9853	13.5
TS01	Tangier Sound	38.0691	-75.9672	13.5
WR01	Wye River	38.8652	-76.1962	4.0
WR03	Wye River	38.9903	-76.1693	4.0
WR04	Wye River	38.9440	-76.1582	2.5
WR05	Wye River	38.8846	-76.1027	4.5
WR02	Wye River	38.8800	-76.1636	8.8
MR01	Miles River	38.7951	-76.2054	8.9
MR02	Miles River	38.7705	-76.1626	4.2
MR03	Miles River	38.7906	-76.1329	3.3
EB04	Eastern Bay	38.9332	-76.2411	6.0
EB03	Eastern Bay	38.8781	-76.2378	9.7
EB02	Eastern Bay	38.8851	-76.2974	7.3
EB01	Eastern Bay	38.8203	-76.3471	11.8

was measured at the sediment surface and at 1 and 2 cm below the sediment surface. Additionally, surficial sediments were sampled for total and active sediment chlorophyll-a to a depth of 1 cm. Particulate carbon (PC), particulate nitrogen (PN) and particulate phosphorus (PP) were sampled to a depth of 1 cm.

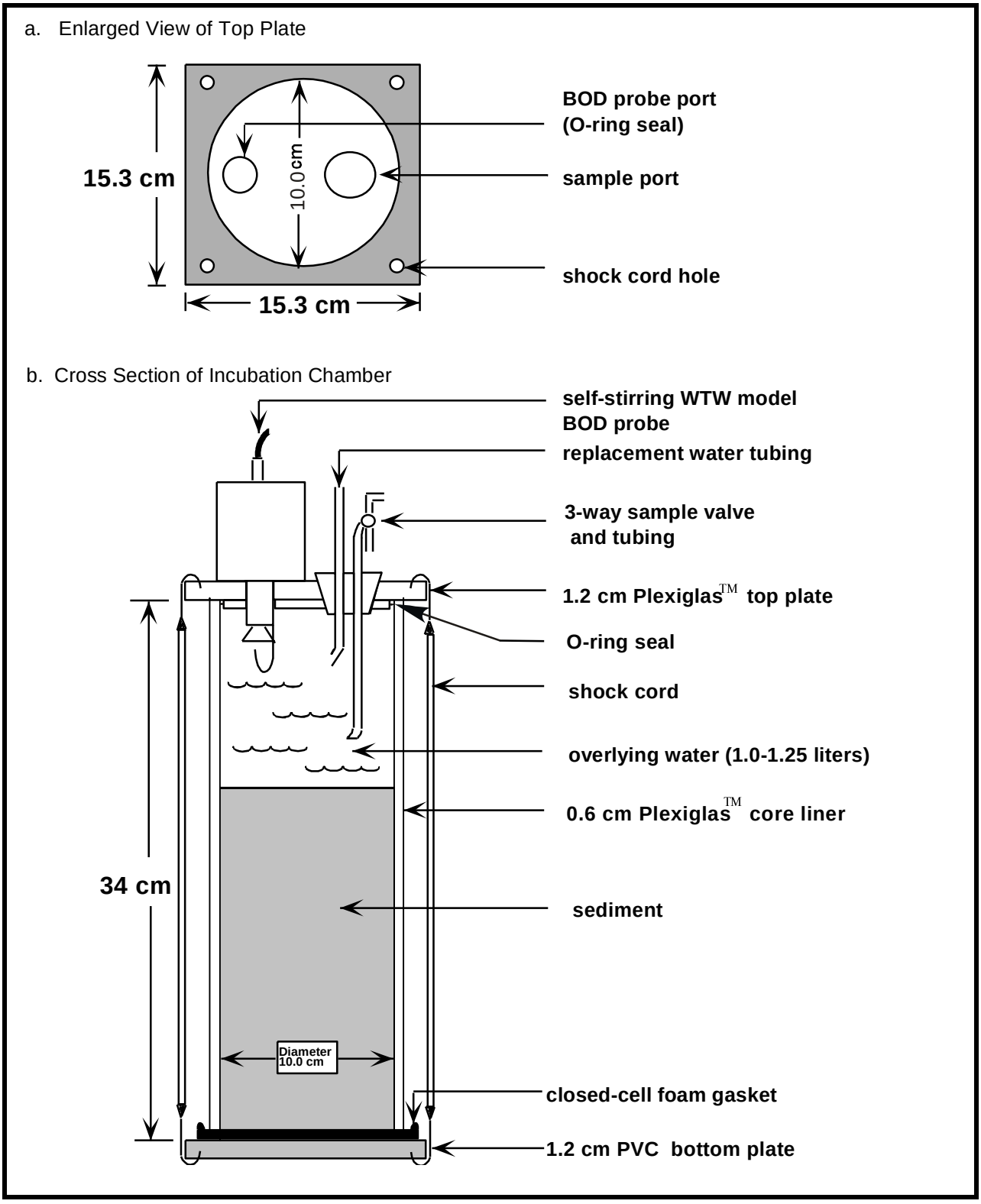
2.3.4. Sediment Flux Measurements

The protocols used in TMDL flux estimates included a single sediment core with no blank. An intact sediment core constituted a benthic microcosm where changes in oxygen, nutrient and other compound concentrations were determined during a fixed incubation time period (usually 3 hours).

A single intact sediment core was collected at each station using a modified Bouma box corer. These cores were then transferred to a Plexiglass cylinder (15 cm diameter x 30 cm length) and inspected for disturbances from large macrofauna or cracks in the sediment surface. If the sample was satisfactory, the core was fitted with an O-ring sealed top containing various sampling ports, and a gasket sealed bottom (Figure 2-2). The core was then placed in a darkened, temperature controlled holding tank where overlying water in the core was slowly replaced by fresh bottom water ensuring that water quality conditions in the core closely approximated *in situ* conditions.

During the period in which the flux measurements were taken, the cores were placed in a darkened temperature controlled bath to maintain ambient temperature conditions. The overlying water in a core was gently circulated with no induction of sediment resuspension via stirring devices attached to oxygen probes. Oxygen concentrations were recorded and overlying water samples (35 ml) were extracted from each core every 60 minutes during the incubation period. Cores were incubated for 3 hours with a total of 4 measurements taken. As a water sample was extracted from a core, an equal amount of ambient bottom water was added to replace the lost volume. Water samples were filtered and immediately frozen for later analysis for ammonium (NH_4^+), nitrite (NO_2^-), nitrite plus nitrate ($NO_2^- + NO_3^-$) and dissolved inorganic phosphorous (DIP or PO_4^{-3}). Oxygen and nutrient fluxes were estimated by calculating the rate of change in concentration over the incubation period and converting the volumetric rate to a flux using the volume to area ratio of each core.

Figure 2-2. Schematic Diagram of the Incubation Chamber
a. Enlarged View of Top Plate
b. Cross Section of Incubation Chamber



2.3.5. Water Column Respiration

Water column respiration measurements were made using a modified biological oxygen demand (BOD) protocol. Whole water samples were taken from the mixed layer at approximately 1 m below the surface using a high volume submersible pump system. Glass BOD bottles (300 ml) were gently filled with sample water and allowed to overfill, exchanging the volume at least two times. Duplicate samples were taken for initial and final measurements. Initial samples were fixed immediately with reagents for determination of dissolved oxygen (APHA, 1989). Final samples (in dark BOD bottles) were capped, incubated in a dark ambient flowing seawater incubator and fixed with reagents at the termination of the incubation period (24 hours). Fixed samples were stored at room temperature and returned to the lab for final analysis using a modification of the Winkler DO titration method.

2.4. Chemical Analyses used in TMDL Study

Methods for the determination of dissolved and particulate nutrients were: ammonium (NH_4^+), nitrite (NO_2^-), nitrite plus nitrate ($NO_2^- + NO_3^-$), and dissolved inorganic phosphorus (DIP or PO_4^-) were measured using the automated method of EPA (1979); particulate carbon (PC) and particulate nitrogen (PN) samples were analyzed using an Elemental Analyzer; particulate phosphorus (PP) concentration were obtained by acid digestion of muffled-dry samples (Aspila *et al.*, 1976); methods of Strickland and Parsons (1972) and Parsons *et al.* (1984) were followed for chlorophyll-*a* analysis.

2.5. Methods and Data Quality Indicators

Table 2-2. A summary of laboratory methods and performance criteria (from Rohland *et al.*, 2001; NASL, 2004).

Matrix	Parameter (Units)	Analytical Method	MDL***	Precision (% CV)*	Accuracy (percent spike recovery)
Water	Ammonium (NH_4^+; µM)	Berthelot Reaction	0.0030µM	< 5%	90-110%
Sediment	Active Chlorophyll-*a* (µg l^{-1})	Flourescence after acidification (EPA 445.0)	0.79 µg l^{-1}	-	-
Sediment	Total Chlorophyll-*a* (µg l^{-1})	Fluorescence before acidification (EPA 445.0)	0.65 µg l^{-1}	-	-
Water	Dissolved Inorganic Phosphorus (DIP; µM)	Antimony-phospho-molybdate complex	0.0007µM	< 5%	90-110%
Water	Nitrite (NO_2^-, µM)	Diazo compound	0.0003µM	< 5%	90-110%
Water	Nitrite + Nitrate (NO_2^- + NO_3^-; µM)	Copper-cadmium reduction	0.0007µM	< 5%	90-110%
Sediment	Sediment Particulate Carbon (%[wt])	Combustion in O_2	0.13%	< 5%**	-
Sediment	Sediment Particulate Nitrogen (%[wt])	Combustion in O_2	0.0084%	< 5%**	-
Sediment	Sediment Particulate Phosphorus (%[wt])	Antimony-phospho-molybdate complex	0.0087%	< 5%**	-

* Concentration dependent
** BCSS-1 Coastal marine sediment: Standard reference material
*** MDL Method Detection Limit
Note: In the laboratory seven replicates were used. No replicates were used in the field.

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3. DATA MANAGEMENT PROCEDURES

3.1. QA/QC Field Checks

Cruises and experiments were scheduled well ahead of time with Research Fleet Operations (RFO). A schedule of activities for each day of field work (cruise and experimental plan) was submitted to the PI and other members of the staff. Cruises and experiments that were canceled due to weather or mechanical problems were rescheduled.

3.1.1. Preparation of Collection Gear

Two to three weeks prior to initiating a research cruise an experimental run was conducted using all the necessary equipment involved in the collection of water and sediment samples, incubation of sediment cores and collection of physical water quality data and all these items were inventoried using specially prepared checklists. All equipment was cleaned, checked and calibrated to insure that it was fully operational. The equipment was packed into containers for easy transport and loaded aboard vehicles and the research vessel (R/V Rachel Carson). The checklist was re-examined to verify the presence of all necessary gear.

Standards and reagents involved in the calibration of instrumentation and for chemical analyses in the field were made according to a schedule of shelf life (i.e. daily, weekly or seasonally). All chemicals were handled, prepared and stored in accordance with standard laboratory practices. Material Safety Data Sheets (MSDS) for all chemicals and reagents used were available at all times.

3.1.2. Potential Contamination

During the course of a research cruise and experiments different steps were taken to insure that the chances for contamination were minimized. These practices involved almost constant washing of equipment over during a cruise. All containers used to collect bulk raw water were rinsed with copious amounts of sample (station) water before they were filled and were thoroughly cleaned with fresh water and dried at the end of the cruise. Containers from which samples were taken for chemical analysis were rinsed additionally with deionized water. The apparatus for taking the sediment samples, as well as the incubation equipment, was thoroughly washed with station water before it was used to collect samples. Upon completion of the cruise the apparatus was rinsed with fresh water. Single use/disposable plastic vials and centrifuge tubes that require no cleaning were used to collect water and sediment samples (after being fully processed) for chemical analysis. All syringes and other laboratory equipment used in processing these samples were washed with deionized water between each use. All glassware associated with the preparation of standards and reagents was cleaned with copious amounts deionized water and acid washed (10% HCL) when appropriate.

3.1.3. Calibration Procedures and Frequency

All instruments involved in the collection of water quality data (temperature, conductivity, salinity and dissolved oxygen) were calibrated daily. Dissolved oxygen calibration incorporates a standard air calibration based on air temperature and barometric pressure. Conductivity/salinity was calibrated with a 0.10 molar standard of potassium chloride. Temperature is calibrated by the manufacturer only when the instrument is returned for service. All instruments were maintained in accordance with manufacturer's specifications. If any apparent problems arose the instrument was removed from use until the malfunction was diagnosed and remedied.

3.1.4. Recording of Field Data

All field data were recorded on specially prepared field data sheets and the initials of the person recording the data were recorded on each data sheet. The raw data sheets were reviewed for possible missing data values due to sample collection problems. These sheets were filed in the laboratory. A cruise log book was also kept.

3.2. General Information Related to Data Sets

3.2.1. Naming Conventions

Data files were given unique names that were a combination of an alpha code reflecting the name of the data set, the type of data set and a numeric descriptor which indicated the number of the cruise.

3.2.2. Incorporation of Error Codes in Data Tables

In order to keep a record of problems experienced while collecting data a one or two letter code (Table 3-1) was entered in the data table, which describes the problems associated with questionable parameter values. Valid entries from the Sediment Data Management Plan (EPA, 1989) were used and where necessary.

Table 3-1. Analysis Problem Codes

(This table is also added at the beginning of the Appendices for reference).

ANALYSIS PROBLEM CODE	DESCRIPTION
A	Laboratory accident
B	Interference
C	Mechanical/materials failure
D	Insufficient sample
N	Sample Lost
P	Lost results
R	Sample contaminated
S	Sample container broken during analysis
V	Sample results rejected due to QA/QC criteria
W	Duplicate results for all parameters
X	Sample not preserved properly
AA	Sample thawed when received
BB	Torn filter paper
EE	Foil pouch very wet when received from field, therefore poor replication between pads, mean reported
FF	Poor replication between pads; mean reported
HD	Particulate and chlorophyll-a samples only taken at -1.0 cm of the Eh profile
HH	Sample not taken
JJ	Amount filtered not recorded (Calculation could not be done)
LL	Mislabeled
NI	Data for this variable are considered to be non-interpretable
NN	Particulates found in filtered sample
NR	No replicate analyzed for epiphyte strip chlorophyll-a concentration
PP	Assumed sample volume (pouch volume differs from data sheet volume; pouch volume used)
QQ	Although value exceeds a theoretically equivalent or greater value (*e.g.*, PO4F>TDP), the excess is within precision of analytical techniques and therefore not statistically significant.
SD	All sampling at station discontinued for one or more sampling periods
SS	Sample contaminated in field
TF	Dissolved oxygen probe failure
TL	Instrument failure in research laboratory
TS	Dissolved oxygen probe not stabilized
TT	Instrument failure on board research vessel
UU	Analysis discontinued
WW	Station was not sampled due to bad weather conditions, research vessel mechanical failure, or failure of state highway bridges to open or close
XX	Sampling for this variable was not included in the monitoring program at this time or was not monitored during a specific cruise
YB	No blank measured for MINI-SONE fluxes
YY	Data not recorded

3.3. Eastern Bay, Tangier Sound and Tributaries TMDL Data Sets

The data collected at each TMDL station were organized into five data sets, where xx = cruise number:

WATER COLUMN PROFILES (Filename: **TMDLEBPFxx,** Appendix A) reports temperature, salinity and dissolved oxygen data measured at half meter intervals in the water column.

WATER COLUMN NUTRIENTS (Filename: **TMDLEBNTxx**, Appendix B) reports bottom water dissolved nutrient concentrations.

SEDIMENT PROFILES (Filename: **TMDLEBSPxx**, Appendix C) includes redox potential and sediment measurements of total and active chlorophyll-*a*, particulate carbon, particulate nitrogen and particulate phosphorus concentrations.

CORE DATA (Filename: **TMDLEBCDxx**, Appendix D) lists dissolved oxygen and nutrient measurements in MINI-SONE sediment-water flux chambers.

SEDIMENT-WATER FLUX (Filename: **TMDLEBFLxx**, Appendix E) is a summary table providing oxygen and nutrient flux data.

WATER COLUMN RESPIRATION (Filename: **TMDLEBWKxx**, Appendix F) is a summary table providing surface water respiration rate data.

3.3.1 Data Tables QA/QC

Data recorded by instruments in the field were entered directly onto specially prepared data sheets. Data from samples analyzed by Nutrient Analytical Services Laboratory (NASL) were returned in written or electronic format. Data were keyed into the most recent version of Microsoft® Excel 2003. The standard EPC data file format was used. Hard copies of the files were manually checked for errors. Data files were corrected, a second printout was produced which was re-verified by a different staff member. The full data set was plotted and outlier values reevaluated. Values below detection limits are indicated in the data tables.

3.4. Analytical Methods QA/QC Control

The Nutrient Analytical Services Laboratory (NASL) at the Chesapeake Biological Laboratory provides nutrient analyses to University, State and Federal agencies. As part of the laboratory's QA/QC program, NASL participates in cross calibration exercises with other institutions and agencies whenever possible. Refer to http://nasl.cbl.umces.edu

and D'Elia *et al*. (1997) for specific details and updated references but some examples include:

- Particulate carbon and nitrogen cross calibration with Woods Hole Oceanographic Institution and Horn Point Environmental Laboratory.

- International Council for the Exploration of the Sea (ICES) inorganic nutrient round-robin communication. The fourth international inter-comparison report was published in 1991 (Kirkwood *et al*., 1991).

- Comparisons of dissolved nutrient analyses conducted at Horn Point Environmental Laboratory, Bigelow Laboratory, the University of Delaware and the University of New Hampshire.

- Quarterly cross calibration exercises with Virginia Institute of Marine Science (VIMS) and Old Dominion University (ODU).

- Environmental Protection Agency (EPA) unknown audits for various nutrients have been conducted.

- EPA audits of known nutrients were analyzed using samples in different salinity water while looking for possible matrix effects.

NASL has analyzed National Institute of Standards and Technology (NIST) and National Research Board of Canada reference materials, primarily estuarine sediment, as a check for their particulate and sediment carbon, nitrogen and phosphorus methods.

As part of the Chesapeake Bay Mainstem Monitoring Program, the laboratory routinely analyzes approximately ten percent of the total sample load for QA/QC checks. These samples include laboratory duplicates and spike analyses.

Specific procedures included inorganic nitrogen (ammonium [NH_4^+], nitrite [NO_2^-], nitrite plus nitrate [$NO_2^- + NO_3^-$] and dissolved inorganic phosphorus [DIP or PO_4^{-3}] for which a standard curve usually comprising five concentrations encompassing the expected range for that particular sample set, were analyzed at the beginning of each new run. A standard, which was treated as a sample, was analyzed at least every 20 samples. Baseline corrections were determined either manually or automatically, depending on the instrument providing the analysis. Data needed to calculate concentrations was recorded along with the sample concentration in laboratory notebooks, a carbon copy of which was provided to our group. This procedure was also carried out for other parameters performed by the laboratory in support of this effort. Details of precision and limits of detection for the variables are given at http://nasl.cbl.umces.edu.

3.4.1. Sample Custody

Upon arrival at NASL, samples were counted, observed for potential problems (melting, broken containers, *etc*.) and placed in a freezer until analysis. Sample information and date of arrival were recorded on a log sheet.

3.4.2. Instrument Maintenance

Analytical instruments are maintained on a regular basis and records are kept of hours of operation, scheduled maintenance, pump tube changes, *etc*. A critical spare parts inventory is maintained for each instrument. Instrument down-time is minimized by troubleshooting instrument problems telephonically with manufacturers and service representatives. Spare parts can be received within 24 hours via next-day air service.

3.5. Calculations

The format of the calculations given below follows that used in the Excel files:

3.5.1. Oxygen Saturation

Percent oxygen saturation was calculated using the dissolved oxygen concentration, temperature and salinity data of the sample (Weiss, 1970).

*DO SAT (%) = (100*DO)/(1.428 * @ EXP (-173.4292 + (249.6339 * (100/(TEMP + 273))) + (143.3483 * @LN((TEMP + 273)/100)) - (21.8492 * ((TEMP + 273)/100)) + SALIN * (-0.033096 + (0.014259 * ((TEMP + 273)/100)) - 0.0017 * ((TEMP + 273)/100)^2))))*

3.5.2. Eh

Corrected Eh represents Eh relative to the hydrogen electrode.

Eh CORR (mV) = Eh MEAS + 244

3.5.3. Flux Variables

3.5.3.1. Equations

Core Water Depth (m) represents height of water above the sediment surface in the TMDL chamber.

Core H_2O Depth = (CORE VOL^a/CORE SURFACE AREA^b)/100^c

Where

a is the measured volume of water in the sediment core (cm^3)
b is the surface area measurement of the core cylinder (cm^2)

c converts measurement units to m

General method for calculating net sediment-water fluxes:

*NET DO FLUX ($gO_2\ m^{-2}\ d^{-1}$) = [(DO SLOPE) * (CORE H20 DEPTH^a) x (1440^b]*

NET NUTRIENT FLUX (μmoles-N $m^{-2}\ h^{-1}$) = [(VARIABLE SLOPE^c) x (Core H2O DEPTH^a) x (60^d) x (1000^e)]

Where

a converts measurements from volumetric to areal basis
b converts time units from per minute to per day and from mg to g
c variables are NH_4^+, NO_2^-, $NO_2^- + NO_3^-$ and DIP
d converts time units from minutes to hours
e converts concentration to moles

Specific calculations:

a. Dissolved oxygen:

*DO FLUX ($gO_2\ m^{-2}\ d^{-1}$) = [(DO SLOPE) * 1440 * (CORE H20 DEPTH)]*

b. Ammonium:

*NH_4^+ FLUX (μmoles-N $m^{-2}\ h^{-1}$) = (NH_4^+ SLOPE * 60 * CORE H2O DEPTH) * 1000*

c. Nitrite:

*NO_2^- FLUX (μmoles-N $m^{-2}\ h^{-1}$) = (NO_2^- SLOPE * 60 * CORE H2O DEPTH) * 1000*

d. Nitrite plus nitrate

*$NO_2^- + NO_3^-$ FLUX (μmoles-N $m^{-2}\ h^{-1}$) = ($NO_2^- + NO_3^-$ SLOPE * 60 * CORE H2O DEPTH) * 1000*

e. Dissolved Inorganic Phosphorus

*DIP FLUX [μmoles-P $m^{-2}\ h^{-1}$) = (DIP SLOPE * 60 * CORE H2O DEPTH) * 1000*

3.5.3.2. Criteria for accepting, rejecting and modifying variable slopes used in calculating net sediment water fluxes

Nutrient concentrations were plotted against time of sampling and the slope of this curve is used to calculate net sediment-water exchanges. The following steps assume that all data have been previously verified following normal protocols.

1. If the slope of the nutrient concentrations vs. time plot was statistically significant, the slope was used in calculating fluxes without modification.

2. Occasionally, there are plots which indicated a clear increasing or decreasing trend in concentrations over time but had **one** data point which diverged strongly (either higher or lower concentration) from the trend. We consider these divergent data to represent contaminated samples (either by addition of the compound or addition of water having a much lower concentration of the compound) and they are not used. The slope was recalculated using lower degrees of freedom and a higher "r" value as a criteria for significance. If the slope is statistically significant, it was used in calculating fluxes.

3. If the concentration vs. time plots were erratic (*i.e.* no statistically significant increasing or decreasing trend in concentration over time) and if the difference in concentration among variables was **greater than** twice the detection limit for that variable, the data for that variable were considered to be non-interpretable. The slope was not calculated and the entry for that variable in the data file was recorded as "NI".

4. If the concentration vs. time plots were erratic (*i.e.* no statistically significant increasing or decreasing trend in concentration over time) and if the difference in concentration among variables was **less than** twice the detection limit for that variable, then the slope was taken to be zero and the net sediment-water flux was reported as zero. Occasionally, statistically significant slopes have been found for some variables (mostly nitrite and dissolved inorganic phosphorus) where concentration differences over the incubation period do not exceed twice the reported detection limit. These slopes were used to calculate net sediment-water exchanges.

References

D'Elia, C.F., E.E. Connor, N.L. Kaumeyer, C.W. Keefe, K. V. Wood and C.F. Zimmerman. 1997. Nutrient Analytical Services Laboratory Standard Operating Procedures. Technical Report Series No. 158-97. Chesapeake Biological Laboratory (CBL), Box 38, Solomons, MD 20688-0038.

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4. RESULTS AND DISCUSSION

4.1. Sediment Oxygen Demand (SOD) Measurements

A total of 72 SOD measurements were obtained during the 2009 sampling period. Rates ranged from about 0.4 to just over 4.0 g O_2 m^{-2} day^{-1} (Figure 4-1). Several patterns of SOD were clearly evident in this data set. First, with a few exceptions, rates were generally lower in the Tangier Sound area than in the Eastern Bay area. In the Tangier area rates were generally between 1 and 1.5 g O_2 m^{-2} day^{-1}. Rates of this magnitude are significant in terms of DO dynamics, but not overwhelming. The median rate of SOD (measured 1509 times in various areas of Chesapeake Bay) was 1.0 g O_2 m^{-2} day^{-1} (Boynton and Bailey 2008). Rates of this magnitude were expected in Tangier Sound and vicinity as there areas often have reasonably good water quality. However, SOD rates in the Eastern Bay area were much larger, ranging up to about 4 g O_2 m^{-2} day^{-1}on several occasions and were frequently in excess of 2 g O_2 m^{-2} day^{-1}. These are especially high rates and certainly play a role in depressing DO concentrations at these sites. Finally, there were several low SOD rates reported at Eastern Bay sites and these resulted

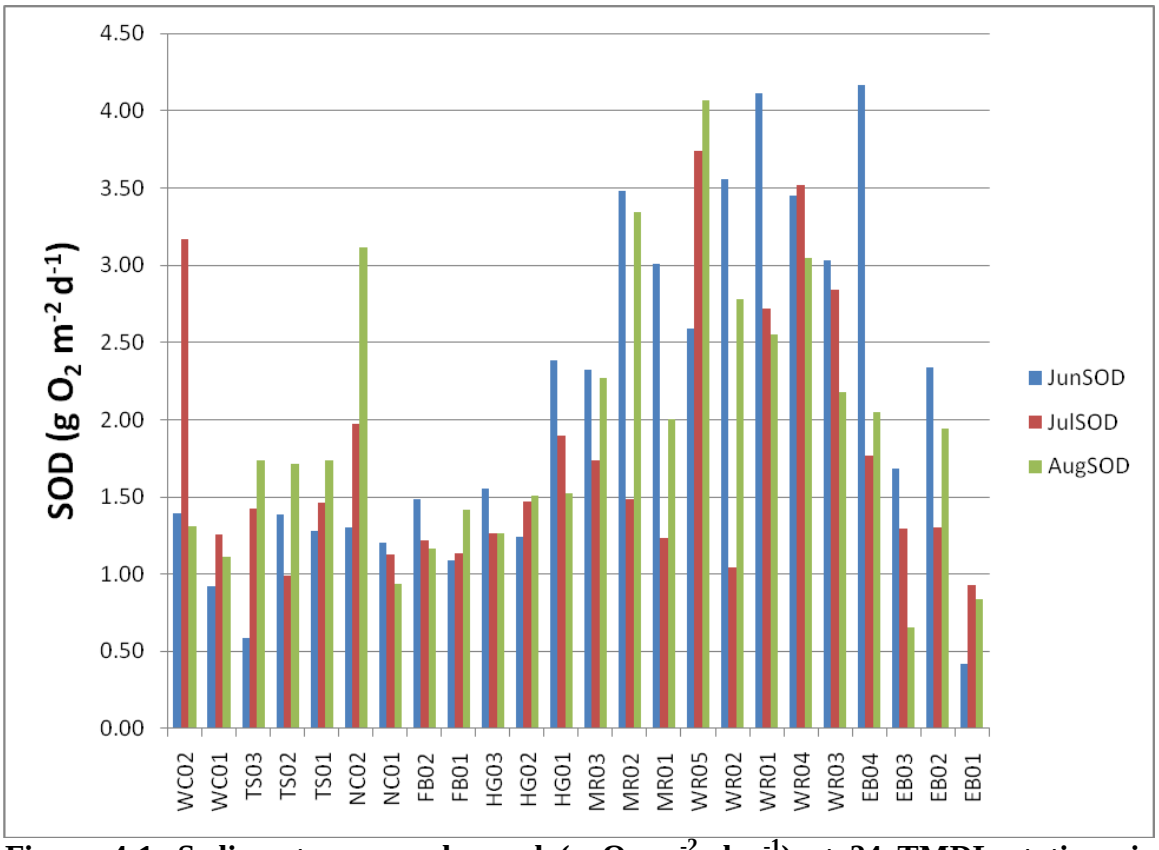

Figure 4-1. Sediment oxygen demand (g O_2 m^{-2} day^{-1}) at 24 TMDL stations in Maryland's Eastern Bay, Tangier Sound and tributaries in June, July and August 2009.

from the fact that DO conditions at the sediment-water interface were very depressed at the time of measurement. When this condition exists, SOD measurements are artificially

low and do not indicate low levels of sediment metabolism. It is very likely that organic carbon utilization rates were very high but based on anaerobic metabolic pathways involving sulphate reduction, a process we did not measure. In short, SOD rates in the Tangier Sound area were modest and similar to median rates for the Chesapeake Bay. Rates in the Eastern Bay area were alarmingly high, being 2 to 4 times higher than typical summer season rates.

4.2 Sediment Ammonium (NH_4) Flux Measurements

A total of 72 NH4 flux measurements were obtained during the 2009 sampling period. Rates ranged from about zero to just over 1000 µmoles m^{-2} hr^{-1} (Figure 4-2). Several patterns of ammonium flux were also evident in these data. Once again, as with SOD, ammonium fluxes were generally lower in the Tangier Sound area than in the Eastern Bay area.

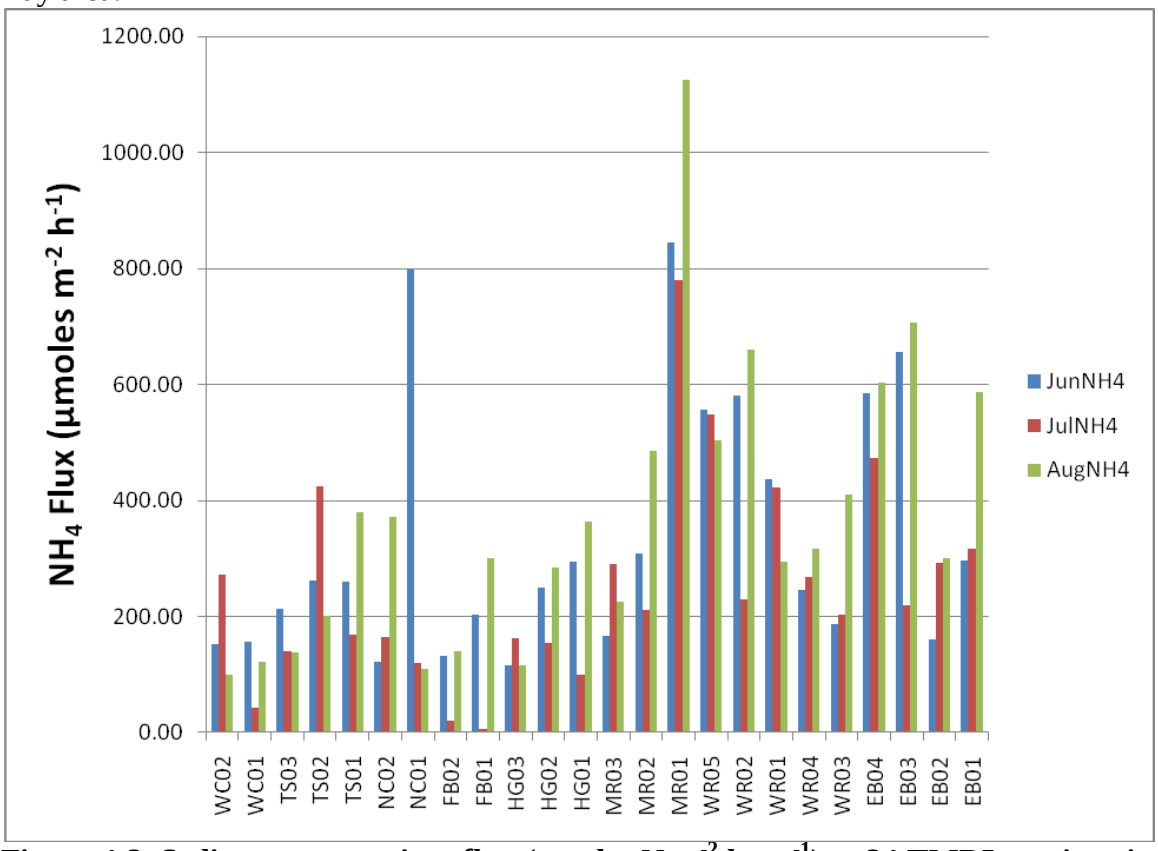

Figure 4-2. Sediment ammonium flux (µmoles N m^{-2} $hour^{-1}$) at 24 TMDL stations in Maryland's Eastern Bay, Tangier Sound and tributaries in June, July and August 2009.

Fluxes in Tangier were frequently between 100 and 300 µmoles m^{-2} hr^{-1} and there were only 2 measurements in excess of 400 µmoles m^{-2} hr^{-1}. The median sediment flux for ammonium, based on 1495 measurements made throughout Chesapeake Bay, was 193 µmoles m^{-2} hr^{-1} (Boynton and Bailey 2008). Thus, measurements from the Tangier Sound area are quite similar to those measured in other areas of the Bay system. In contrast, many measurements from the Eastern Bay area were larger (>400 µmoles m^{-2} hr^{-1}) and

several exceeded 600 µmoles m^{-2} hr^{-1}. These are extremely high rates and are indicative of sediments receiving excessive deposition of organic matter and chronically low bottom water DO conditions. Sediment ammonium releases of this magnitude are capable of supporting phytoplankton production rates greater than 1 g C m^{-2} day^{-1}, a substantial rate. In short, sediment ammonium fluxes in the Eastern Bay area are indicative of a seriously eutrophicated system.

4.3 Sediment Phosphorus (PO_4) Flux Measurements

A total of 72 PO_4 flux measurements were obtained during the 2009 sampling period. Rates ranged from about -45 (sediment uptake of P) to about 115 µmoles m^{-2} hr^{-1} (Figure 4-3). Again, there were strong differences between Tangier Sound and Eastern Bay sites. In general, Tangier Sound PO_4 fluxes were relatively small (<20 µmoles m^{-2} hr^{-1}) and many were very small, approaching or exceeding our level of detection.

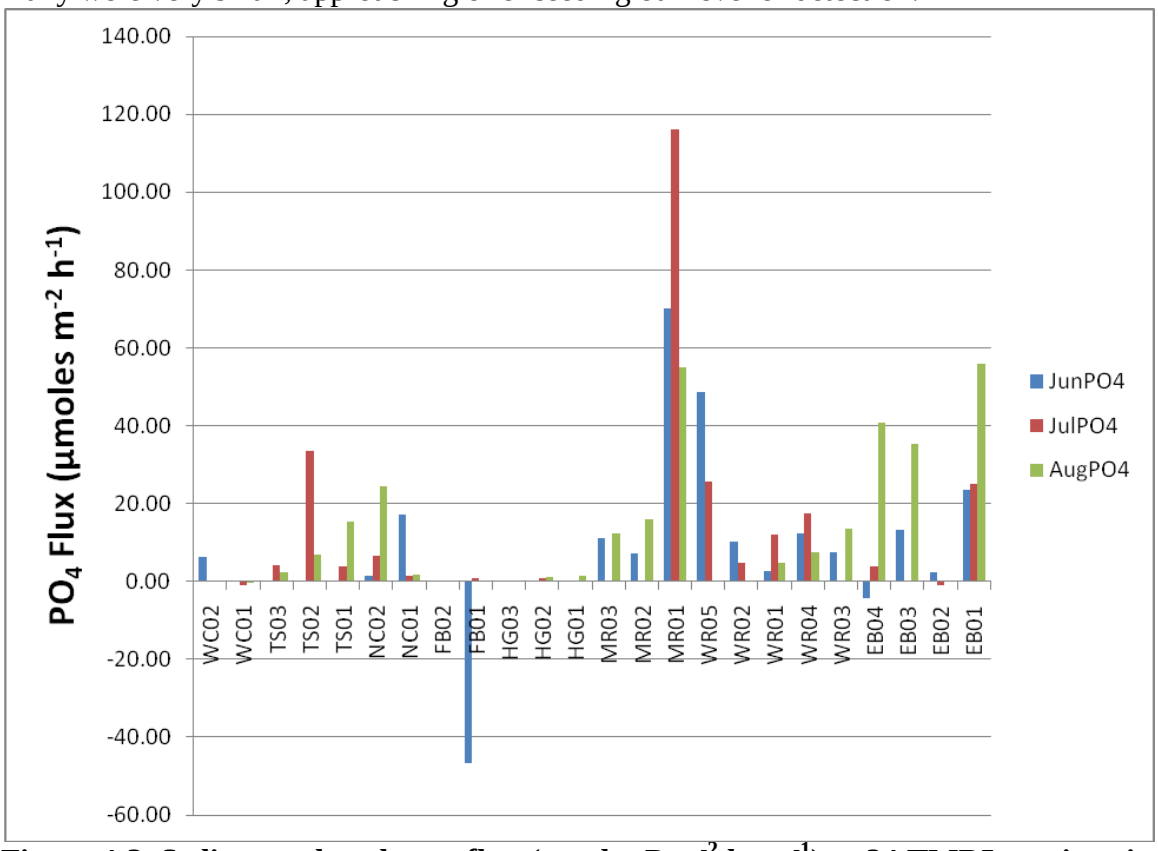

Figure 4-3. Sediment phosphorus flux (µmoles P m^{-2} $hour^{-1}$) at 24 TMDL stations in Maryland's Eastern Bay, Tangier Sound and tributaries in June, July and August 2009.

On one occasion the PO_4 flux was directed into sediments and this was likely caused by PO_4 adsorbing to some suspended sediments in the incubation chamber. Such fluxes occasionally occur but are not common. The Bay-wide median PO_4 flux is about 6 µmoles m^{-2} $hr^{-1}$and Tangier Sound fluxes are of a similar magnitude. As with other sediment processes, sediment PO_4 flux in the Eastern bay region was larger and, in several instances, very large. To put this into perspective, PO_4 fluxes in excess of 20

µmoles m^{-2} hr^{-1} can support phytoplankton production rates approaching 1 g C m^{-2} day^{-1}, a substantial rate. Elevated PO_4 fluxes are often associated with depressed bottom water DO conditions wherein P adsorbed to iron-rich sediments is liberated into the water column. This is likely happening at some Eastern Bay sites and is an indication of poor sediment and water quality.

4.4 Sediment Nitrite plus Nitrate (NO_{23}) Flux Measurements

A total of 72 NO_{23} flux measurements were obtained during the 2009 sampling period. Rates ranged from about -240 (sediment uptake of NO_{23}) to about 215 µmoles m^{-2} hr^{-1} (Figure 4-4). Sediment fluxes of NO_{23} are an indication of water quality at the sediment-water interface. NO_{23} is created as part of the organic matter decomposition

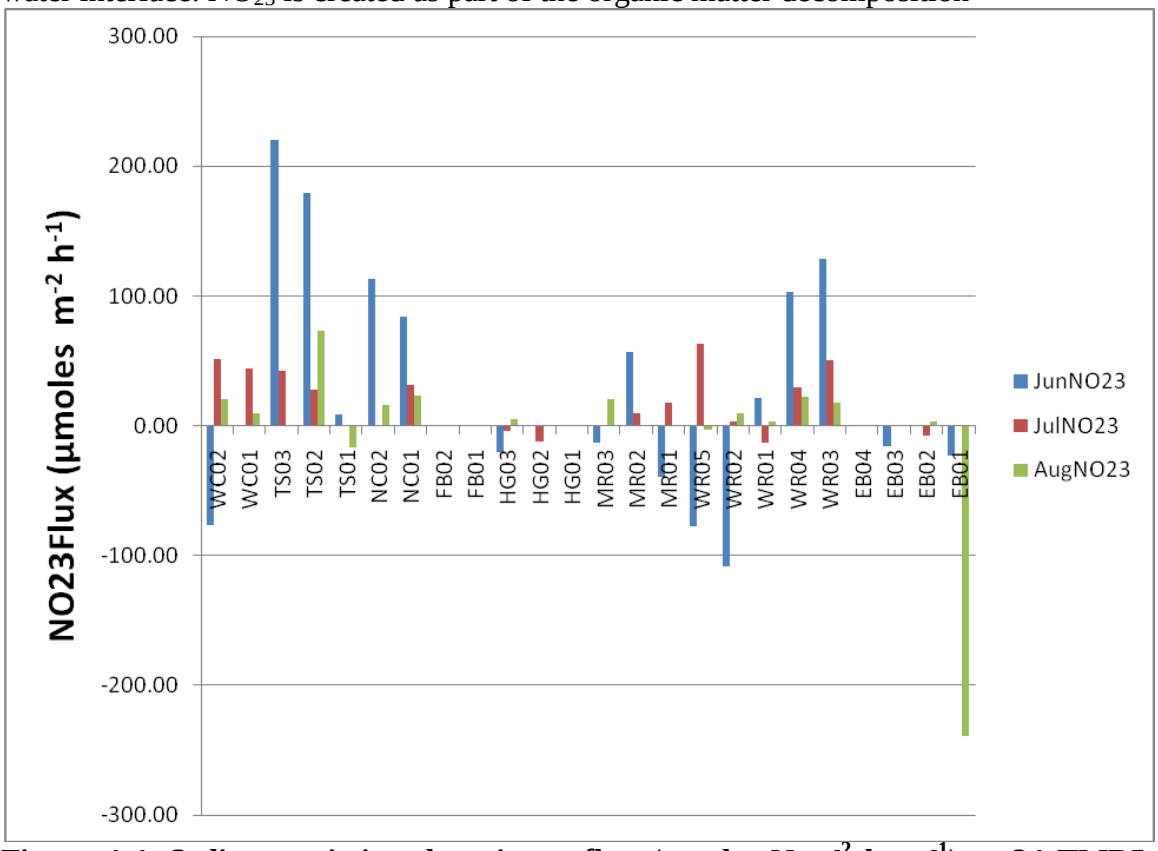

Figure 4-4. Sediment nitrite plus nitrate flux (µmoles N m^{-2} $hour^{-1}$) at 24 TMDL stations in Maryland's Eastern Bay, Tangier Sound and tributaries in June, July and August 2009.

sequence wherein ammonium is the first by-product of decomposition. If there is adequate DO in contact with sediments some portion of this NH_4 is oxidized to NO_2 or NO_3 and some portion of this can be released to overlying waters (NO_{23} can also be denitrified in anaerobic portions of the sediment column). Thus, at sites generally exhibiting NO_{23} release to the water, water quality at the sediment-water interface is generally good in terms of DO concentrations. In addition, sediments often exhibit NO_{23} uptake if there is a substantial amount of NO_{23} available in the water column. Boynton and Bailey (2008) found strong evidence of this when examining NO_{23} fluxes from many

areas of Chesapeake Bay. In the present case, we see substantial NO_{23} releases from sediments in the Tangier Sound area and far less of this in the Eastern Bay area. In addition, NO_{23} uptake by sediments (indicative of substantial NO_{23} in the water column) was more common in Eastern Bay than in the Tangier Sound area. These data again suggest better water and sediment quality in Tangier Sound and associated rivers than in Eastern Bay and associated rivers.

4.5 Water Column Respiration Measurements

A total of 72 water column respiration (oxygen consumption by plants, small animals and bacteria in the water column) measurements were obtained during the 2009 sampling period. Rates ranged from about 0.1 to 6.1 g O_2 m^{-3} day^{-1} (Figure 4-5). Here again there were clear differences between data collected in the Tangier Sound area and the Eastern Bay area. Rates in Tangier Sound and vicinity ranged from about 0.1 to a high of about 1.2 g O_2 m^{-3} day^{-1}. These are relatively low rates and are well below the median respiration rate developed based on many measurements at other Chesapeake Bay sites (Boynton and Bailey 2008).

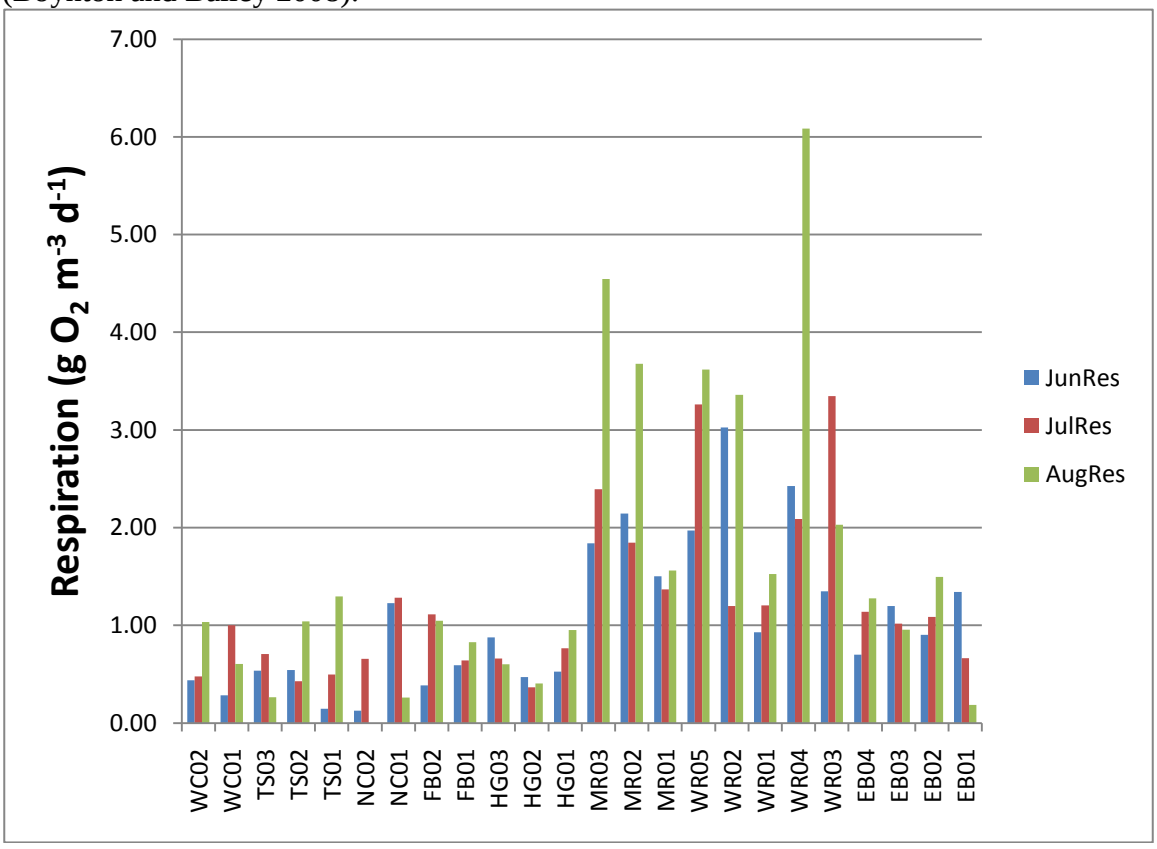

Figure 4-5. Water column respiration (g O_2 m^{-3} day^{-1}) at 24 TMDL stations in Maryland's Eastern Bay, Tangier Sound and tributaries in June, July and August 2009.

Relatively low rates of water column respiration are generally associated with good water quality. As with other measurements made in this monitoring program, rates of water column respiration in the Eastern Bay area were much higher, often exceeding 2.0 g O_2 m^{-3} day^{-1}. Rates of this magnitude, if sustained, can rapidly deplete the water column of DO and reach DO levels inadequate for good habitat conditions. For example, in a 4 m water column under summer conditions of temperature and salinity the water column could hold about 28 g O_2. With respiration rates of 2 g O_2 m^{-3} $day^{-1}$and a 4 m water column, water column DO could be depleted in about 3.5 days. In the two tributary rivers of eastern Bay, water column respiration was greater than 3 g O_2 m^{-3} day^{-1} about 33% of the time and exceeded 4 g O_2 m^{-3} day^{-1} on two occasions. If sediment SOD were included, DO depletion would be even faster. These high rates of water column respiration indicate a seriously eutrophicated condition.

References

Boynton, W.R. and E.M. Bailey. 2008. Sediment Oxygen and Nutrient Exchange Measurements from Chesapeake Bay, Tributary Rivers and Maryland Coastal Bays: Development of a Comprehensive Database and Analysis of Factors Controlling Patterns and Magnitude of Sediment-Water Exchanges. Final report to Maryland Department of the Environment, Science Services Administration, TMDL Technical Development Program, Baltimore, MD. Ref. No. [UMCES]CBL08-019. *[UMCES Technical Series No. TS-542-08]*.

APPENDICES A-F
Maryland's Eastern Bay, Tangier Sound and Tributaries, 2009

TMDL Data Sets

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S EASTERN BAY, TANGIER SOUND AND TRIBUTARIES TMDL DATA SET, 2009:

Page No.

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBPF01
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
HG03	20090608	9:39	2.0	0.5	0.5	24.38	0.00	14.31	8.32	108.1
					1.0	24.69	0.00	14.31	8.16	106.6
					1.5	24.86	0.00	14.31	8.12	106.4
HG02	20090608	10:52	5.0	0.7	0.5	23.25	24.41	14.83	8.07	103.0
					1.0	23.24	24.48	14.89	8.08	103.1
					1.5	23.24	24.48	14.88	8.08	103.1
					2.0	23.23	24.50	14.90	8.09	103.2
					2.5	23.20	24.51	14.90	8.09	103.2
					3.0	23.14	24.53	14.92	8.08	102.9
					3.5	23.07	24.54	14.93	8.08	102.8
					4.0	23.02	24.55	14.93	8.08	102.7
					4.5	23.07	24.54	14.91	8.09	102.9
HG01	20090608	12:05	7.5	0.9	0.5	22.59	24.35	14.08	7.48	93.9
					1.0	22.61	24.41	14.84	7.47	94.2
					1.5	22.61	24.41	14.84	7.47	94.2
					2.0	22.62	24.42	14.85	7.45	94.0
					2.5	22.62	24.44	14.86	7.44	93.8
					3.0	22.60	24.46	14.87	7.42	93.6
					3.5	22.54	24.47	14.88	7.33	92.3
					4.0	22.50	24.52	14.92	7.26	91.4
					4.5	22.49	24.52	14.91	7.23	91.0
					5.0	22.48	24.52	14.92	7.24	91.1
					5.5	22.48	24.51	14.91	7.23	91.0
					6.0	22.49	24.51	14.91	7.25	91.3
					6.5	22.47	24.51	14.91	7.24	91.1
					7.0	22.47	24.51	14.91	7.36	92.6
FB02	20090608	13:50	4.5	0.4	0.5	23.51	21.88	13.16	7.49	95.1
					1.0	23.28	21.88	13.17	7.38	93.3
					1.5	23.30	21.88	13.16	7.41	93.7
					2.0	23.23	21.87	13.16	7.39	93.4
					2.5	23.20	21.87	13.16	7.37	93.1
					3.0	23.22	21.86	13.15	7.38	93.2
					3.5	23.24	21.86	13.15	7.40	93.5
					4.0	23.25	21.85	13.14	7.42	93.8
FB01	20090608	14:29	4.5	0.6	0.5	23.66	22.46	13.54	7.63	97.4
					1.0	23.57	22.46	13.54	7.55	96.2

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBPF01
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					1.5	23.37	22.46	13.54	7.44	94.4
					2.0	23.27	22.45	13.54	7.35	93.1
					2.5	23.23	22.49	13.56	7.30	92.4
					3.0	23.15	22.59	13.62	7.22	91.3
					3.5	23.11	22.75	13.78	7.20	91.1
					4.0	23.10	22.78	13.78	7.18	90.8
NC02	20090608	15:48	4.5	0.3	0.5	23.96	8.93	4.98	6.13	72.8
					1.0	23.79	8.94	5.00	6.03	71.4
					1.5	23.76	8.99	4.99	6.03	71.3
					2.0	23.75	8.95	5.00	6.03	71.3
					2.5	23.76	9.02	5.04	6.06	71.7
					3.0	23.76	9.13	5.13	6.06	71.7
					3.5	23.73	9.22	5.17	6.04	71.4
					4.0	23.71	9.15	5.12	6.02	71.1
NC01	20090608	16:41	5.5	0.6	0.5	23.80	19.87	11.83	6.99	88.6
					1.0	23.33	19.98	11.92	6.77	85.1
					1.5	23.29	19.98	11.93	6.77	85.0
					2.0	23.28	19.98	11.93	6.76	84.9
					2.5	23.25	19.99	11.93	6.76	84.8
					3.0	23.25	19.99	11.93	6.76	84.8
					3.5	23.25	20.01	11.94	6.77	85.0
					4.0	23.23	20.02	11.95	6.78	85.1
					4.5	23.24	20.03	11.96	6.78	85.1
					5.0	23.29	20.03	11.96	6.78	85.2
WC02	20090609	8:20	2.5	0.5	0.5	24.41	12.58	7.21	4.94	61.6
					1.0	24.41	12.61	7.23	4.95	61.8
					2.0	24.41	12.61	7.23	4.95	61.8
WC01	20090609	9:55	2.5	0.4	0.5	24.33	18.39	10.88	6.76	86.0
					1.0	24.34	18.45	10.92	6.75	85.9
					2.0	24.33	18.48	10.93	6.76	86.0
TS03	20090609	10:44	3.5	1.8	0.5	23.88	24.09	14.61	7.27	93.7
					1.0	23.81	24.10	14.62	7.24	93.2
					2.0	23.78	24.10	14.62	7.23	93.0
					3.0	23.78	24.10	14.62	7.29	93.8

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBPF01
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
TS02	20090609	11:40	13.5	1.1	0.5	24.06	24.31	14.76	7.22	93.5
					1.0	24.06	24.30	14.75	7.20	93.2
					1.5	23.96	24.34	14.77	7.17	92.7
					2.0	23.83	24.44	14.82	7.14	92.1
					2.5	23.75	24.64	14.97	7.11	91.6
					3.0	23.86	24.43	14.85	7.10	91.6
					3.5	23.67	24.90	15.15	7.05	90.8
					4.0	23.67	24.94	15.18	7.06	91.0
					4.5	23.67	24.94	15.19	7.07	91.1
					5.0	23.68	24.95	15.19	7.07	91.1
					5.5	23.67	24.97	15.20	7.09	91.4
					6.0	23.66	24.98	15.21	7.09	91.4
					6.5	23.66	24.98	15.21	7.10	91.5
					7.0	23.65	25.01	15.23	7.10	91.5
					7.5	23.66	25.01	15.23	7.10	91.5
					8.0	23.70	25.07	15.26	7.11	91.7
					8.5	23.68	25.11	15.29	7.11	91.7
					9.0	23.67	25.11	15.29	7.12	91.8
					9.5	23.66	25.11	15.30	7.09	91.4
					10.0	23.67	25.19	15.35	7.09	91.4
					10.5	23.68	25.19	15.35	7.08	91.3
					11.0	23.63	25.17	15.33	7.07	91.1
					11.5	23.67	25.23	15.36	7.04	90.8
					12.0	23.65	25.29	15.41	7.02	90.5
					12.5	23.63	25.39	15.48	7.02	90.5
					13.0	23.64	25.30	15.49	7.06	91.1
TS01	20090609	12:38	13.5	1.2	0.5	23.95	26.59	16.27	7.51	97.9
					1.0	23.75	26.67	16.34	7.43	96.5
					1.5	23.66	26.69	16.35	7.41	96.1
					2.0	23.68	26.69	16.35	7.41	96.1
					2.5	23.65	26.69	16.35	7.39	95.8
					3.0	23.63	26.73	16.37	7.39	95.8
					3.5	23.63	26.73	16.38	7.40	95.9
					4.0	23.63	26.72	16.38	7.38	95.7
					4.5	23.64	26.74	16.39	7.37	95.6
					5.0	23.63	26.75	16.39	7.36	95.4
					5.5	23.63	26.77	16.40	7.33	95.0
					6.0	23.64	26.85	16.45	7.28	94.4
					6.5	23.65	26.85	16.46	7.28	94.5

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBPF01
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					7.0	23.64	26.90	16.49	7.22	93.7
					7.5	23.64	26.93	16.52	7.20	93.4
					8.0	23.65	26.92	16.51	7.20	93.4
					8.5	23.63	26.96	16.53	7.13	92.5
					9.0	23.61	27.04	16.59	7.04	91.3
					9.5	23.60	27.07	16.61	7.00	90.8
					10.0	23.57	27.10	16.63	6.95	90.1
					10.5	23.55	27.14	16.60	6.91	89.6
					11.0	23.57	27.19	16.70	6.91	89.7
					11.5	23.56	27.17	16.68	6.91	89.6
					12.0	23.58	27.23	16.72	6.90	89.5
					12.5	23.54	27.23	16.72	6.89	89.4
					13.0	23.55	27.19	16.68	6.96	90.3
WR01	20090610	9:41	4.0	1.1	0.5	23.91	19.61	11.67	6.09	77.2
					1.0	23.85	19.67	11.67	6.12	77.5
					1.5	23.83	19.59	11.66	6.21	78.6
					2.0	23.79	19.58	11.66	6.29	79.6
					2.5	23.77	19.59	11.66	6.30	79.7
					3.0	23.78	19.58	11.65	6.32	80.0
					3.5	23.75	19.57	11.65	6.37	80.5
WR03	20090610	10:21	3.0	0.9	0.5	24.93	18.46	10.90	5.06	65.1
					1.0	24.88	18.54	10.97	4.97	63.9
					1.5	24.86	18.56	10.99	4.90	63.0
					2.0	24.87	18.57	10.99	4.90	63.0
					2.5	24.88	18.56	10.99	4.90	63.0
WR04	20090610	11:08	1.5	0.5	0.5	25.71	16.17	9.44	5.19	67.2
					1.0	25.63	16.42	9.57	4.87	63.0
WR05	20090610	12:59	4.0	0.7	0.5	25.30	15.50	8.01	6.01	76.6
					1.0	24.91	15.66	9.13	3.58	45.6
					1.5	24.87	15.72	9.16	3.44	43.8
					2.0	24.90	15.80	9.20	3.40	43.3
					2.5	24.88	15.85	9.25	3.38	43.0
					3.0	24.87	15.91	9.30	3.36	42.8
					3.5	24.87	15.92	9.30	3.39	43.2
WR02	20090610	13:50	8.0	0.7	0.5	25.83	17.99	10.56	6.68	87.2

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBPF01
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					1.0	25.50	17.98	10.60	5.96	77.3
					1.5	24.80	15.53	10.94	4.80	61.6
					2.0	24.79	18.71	11.08	4.77	61.3
					2.5	24.74	18.74	11.10	4.67	59.9
					3.0	24.71	18.73	11.10	4.59	58.9
					3.5	24.69	18.74	11.10	4.53	58.1
					4.0	24.65	18.75	11.11	4.45	57.0
					4.5	24.60	18.85	11.16	4.40	56.3
					5.0	24.58	18.86	11.18	4.37	56.0
					5.5	24.58	18.86	11.18	4.34	55.6
					6.0	24.57	18.90	11.21	4.26	54.5
					6.5	24.56	18.92	11.22	4.16	53.3
					7.0	24.55	18.96	11.25	4.09	52.4
					7.5	24.52	19.01	11.28	3.75	48.0
MR01	20090610	14:50	8.5	1.0	0.5	23.99	19.67	11.71	6.70	85.1
					1.0	23.89	19.71	11.74	6.64	84.2
					1.5	23.65	19.80	11.80	6.75	85.3
					2.0	23.62	19.82	11.82	6.49	81.9
					2.5	23.61	19.83	11.82	6.41	80.9
					3.0	23.57	19.84	11.83	6.33	79.9
					3.5	23.52	19.84	11.83	6.19	78.0
					4.0	23.42	19.86	11.84	5.71	71.8
					4.5	23.39	19.87	11.85	5.51	69.3
					5.0	23.37	19.87	11.85	5.27	66.2
					5.5	23.33	19.89	11.86	4.78	60.0
					6.0	23.31	19.90	11.87	4.59	57.6
					6.5	23.30	19.90	11.87	4.43	55.6
					7.0	23.28	19.90	11.87	4.15	52.1
					7.5	23.26	19.91	11.88	4.04	50.7
					8.0	23.25	19.91	11.88	3.92	49.2
MR02	20090610	15:44	3.5	0.7	0.5	24.56	18.55	10.97	5.52	70.6
					1.0	24.53	18.63	11.02	5.46	69.8
					1.5	24.43	18.70	11.06	5.37	68.5
					2.0	23.99	19.14	11.35	5.20	65.9
					2.5	23.99	19.16	11.38	5.20	65.9
					3.0	23.98	19.16	11.38	5.18	65.7
MR03	20090610	16:29	2.5	0.4	0.5	25.10	16.30	9.50	4.63	59.3

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBPF01
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					1.0	25.09	16.62	9.74	4.53	58.1
					1.5	25.06	16.81	9.86	4.40	56.4
					2.0	25.08	16.81	9.87	4.47	57.3
EB04	20090611	6:52	5.5	1.0	0.5	23.87	18.63	11.04	6.55	82.7
					1.0	23.88	18.66	11.06	6.54	82.6
					1.5	23.88	18.65	11.06	6.54	82.6
					2.0	23.89	18.66	11.06	6.52	82.4
					2.5	23.88	18.66	11.06	6.55	82.7
					3.0	23.88	18.66	11.06	6.50	82.1
					3.5	23.88	18.66	11.06	6.44	81.3
					4.0	23.87	18.69	11.08	6.26	79.1
					4.5	23.87	18.70	11.09	6.32	79.8
					5.0	23.87	18.73	11.11	6.23	78.7
EB03	20090611	7:43	9.0	1.1	0.5	23.10	18.38	10.89	7.10	88.3
					1.0	23.11	18.40	10.90	6.96	86.6
					1.5	23.11	18.49	10.95	6.90	85.9
					2.0	23.09	18.40	10.91	6.75	84.0
					2.5	23.12	18.45	10.93	6.57	81.8
					3.0	23.16	18.55	11.00	6.33	78.9
					3.5	23.19	18.74	11.12	6.09	76.0
					4.0	23.16	18.81	11.16	5.69	71.0
					4.5	22.99	18.85	11.18	4.90	60.9
					5.0	22.66	19.31	11.49	4.11	50.9
					5.5	22.19	19.88	11.86	3.51	43.2
					6.0	22.17	19.91	11.88	3.48	42.8
					6.5	22.13	19.94	11.91	3.45	42.4
					7.0	22.07	20.04	11.97	3.42	42.0
					7.5	22.08	20.06	11.99	3.43	42.1
					8.0	22.08	20.06	11.99	3.45	42.4
					8.5	22.07	20.06	11.99	3.49	42.9
EB02	20090611	8:31	6.5	1.4	0.5	22.79	18.27	10.81	7.26	89.7
					1.0	22.77	18.23	10.81	7.64	94.4
					1.5	22.79	18.28	10.82	7.51	92.8
					2.0	22.81	18.35	10.88	7.33	90.7
					2.5	22.84	18.48	10.95	7.15	88.5
					3.0	22.87	18.70	11.10	6.92	85.8
					3.5	22.86	18.67	11.08	6.73	83.4

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBPF01
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					4.0	22.84	18.78	11.11	6.28	77.8
					4.5	22.80	18.89	11.20	5.70	70.6
					5.0	22.79	18.92	11.24	5.72	70.9
					5.5	22.80	18.92	11.24	5.82	72.1
					6.0	22.82	18.90	11.23	5.98	74.1
EB01	20090611	9:41	11.5	1.1	0.5	25.15	16.41	9.64	7.74	99.3
					1.0	22.19	16.50	9.69	7.64	92.8
					1.5	22.19	16.59	9.75	7.55	91.7
					2.0	22.20	16.65	9.74	7.51	91.2
					2.5	22.24	16.61	9.76	7.43	90.3
					3.0	22.34	16.86	9.83	7.18	87.5
					3.5	22.42	17.11	10.04	6.62	80.9
					4.0	22.04	17.67	10.40	5.86	71.2
					4.5	21.73	18.58	11.02	4.90	59.4
					5.0	21.65	18.79	11.14	4.67	56.6
					5.5	21.56	18.93	11.24	4.39	53.1
					6.0	21.41	19.30	11.49	3.99	48.2
					6.5	21.27	19.58	11.68	3.68	44.4
					7.0	21.08	19.75	11.80	3.44	41.4
					7.5	21.06	19.82	11.84	3.38	40.7
					8.0	21.07	19.86	11.86	3.33	40.1
					8.5	21.02	19.09	11.88	3.27	39.3
					9.0	20.98	19.89	11.89	3.08	37.0
					9.5	20.84	20.04	11.98	2.53	30.3
					10.0	19.38	24.08	14.07	0.44	5.2
					10.5	19.37	24.49	14.92	0.39	4.6
					11.0	19.38	24.48	14.92	0.43	5.1

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBPF02
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
HG03	20090713	8:52	3.0	1.0	0.5	25.76	23.51	14.20	7.29	97.0
					1.0	25.73	23.49	14.19	7.25	96.4
					1.5	25.76	23.51	14.20	7.22	96.1
					2.0	25.77	23.51	14.20	7.20	95.8
					2.5	25.75	23.51	14.20	7.21	95.9
HG02	20090713	9:45	9.5	1.1	0.5	25.71	24.22	14.68	7.33	97.7
					1.0	25.71	24.23	14.68	7.34	97.8
					2.0	25.71	24.22	14.68	7.36	98.1
					3.0	25.71	24.23	14.68	7.36	98.1
					4.0	25.71	24.23	14.68	7.36	98.1
					5.0	25.72	24.23	14.68	7.37	98.3
					6.0	25.72	24.24	14.69	7.38	98.4
					7.0	25.67	24.24	14.69	7.44	99.1
					8.0	25.74	24.24	14.69	7.51	100.2
					9.0	25.75	24.25	14.69	7.43	99.1
HG01	20090713	10:48	6.5	1.1	0.5	25.44	23.71	14.34	7.64	101.2
					1.0	25.45	23.71	14.34	7.63	101.0
					2.0	25.44	23.71	14.34	7.63	101.0
					3.0	25.44	23.71	14.34	7.65	101.3
					4.0	25.38	23.71	14.34	7.86	104.0
					5.0	25.44	23.71	14.33	7.65	101.3
					6.0	25.42	23.70	14.34	7.66	101.4
FB02	20090713	12:03	4.0	0.7	0.5	26.64	22.42	13.48	7.90	106.3
					1.5	26.61	22.43	13.48	7.80	104.9
					2.5	26.63	22.46	13.50	7.77	104.6
					3.5	26.61	22.46	13.50	7.81	105.1
FB01	20090713	12:51	4.0	0.7	0.5	26.24	23.26	14.03	7.82	104.8
					1.5	26.24	23.27	14.04	7.83	105.0
					2.5	26.23	23.27	14.04	7.83	105.0
					3.5	26.24	23.37	14.04	7.90	105.9
NC02	20090713	14:38	4.0	0.5	0.5	26.84	8.50	4.70	6.42	82.5
					1.5	26.78	8.55	4.74	6.20	79.6
					2.5	26.79	8.58	4.76	6.18	79.4
					3.5	26.77	8.58	4.76	6.18	79.4

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBPF02
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
NC01	20090713	15:35	5.5	0.6	0.5	26.73	17.76	10.43	8.55	113.3
					1.0	26.59	18.15	10.70	7.37	97.6
					2.0	26.35	18.31	10.76	7.01	92.4
					3.0	26.33	18.70	11.06	6.82	90.0
					4.0	26.35	18.72	11.07	6.94	91.7
					5.0	26.39	18.75	11.09	6.87	90.8
WC02	20090714	8:06	2.0	0.5	0.5	26.89	16.95	9.93	5.84	77.4
					1.0	26.88	17.33	10.17	5.85	77.6
					1.5	26.79	17.27	10.16	5.86	77.6
WC01	20090714	8:55	2.5	0.7	0.5	26.04	21.25	12.72	7.28	96.5
					1.0	26.03	21.31	12.75	7.29	96.7
					1.5	26.03	21.35	12.79	7.29	96.7
					2.0	26.01	21.37	12.79	7.30	96.8
TS03	20090713	13:27	3.5	0.9	0.5	26.20	24.23	14.68	8.08	108.6
					1.0	26.25	24.22	14.67	8.04	108.2
					1.5	26.27	24.23	14.68	8.05	108.4
					2.0	26.27	24.23	14.67	8.06	108.5
					2.5	26.27	24.23	14.68	8.07	108.6
					3.0	26.26	24.23	14.67	8.10	109.0
TS02	20090714	10:12	14.0	1.5	0.5	25.69	25.32	15.41	6.88	92.1
					1.5	25.69	25.32	15.41	6.87	91.9
					2.5	25.69	25.32	15.41	6.80	91.0
					3.5	25.69	25.32	15.41	6.81	91.1
					4.5	25.70	25.33	15.41	6.80	91.0
					5.5	25.69	25.33	15.42	6.80	91.0
					6.5	25.68	25.33	15.42	6.77	90.6
					7.5	25.70	25.34	15.42	6.76	90.5
					8.5	25.69	25.35	15.43	6.72	89.9
					9.5	25.69	25.37	15.43	6.67	89.3
					10.5	25.70	25.43	15.48	6.42	85.9
					11.5	25.70	25.47	15.50	6.07	81.3
					12.5	25.70	25.75	15.69	5.74	76.9
					13.5	25.70	25.79	15.73	5.74	77.0
TS01	20090714	10:50	14.0	1.4	0.5	25.93	26.15	15.96	7.28	98.1
					1.5	25.92	26.15	15.96	7.27	98.0

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBPF02
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					2.5	25.91	26.16	15.96	7.23	97.4
					3.5	25.90	26.16	15.97	7.17	96.6
					4.5	25.89	26.17	15.97	7.12	95.9
					5.5	25.87	26.17	15.97	7.10	95.6
					6.5	25.88	26.17	15.97	7.10	95.6
					7.5	25.88	26.18	15.98	7.08	95.4
					8.5	25.88	26.18	15.98	7.06	95.1
					9.5	25.88	26.21	16.00	6.99	94.2
					10.5	25.87	26.26	16.04	6.87	92.5
					11.5	25.86	26.35	16.08	6.71	90.4
					12.5	25.86	26.37	16.11	6.68	90.0
					13.5	25.85	26.38	16.11	6.70	90.3
WR01	20090715	9:31	5.0	1.9	0.5	26.18	21.39	12.81	6.48	86.2
					1.5	26.20	21.41	12.82	6.45	85.8
					2.5	26.20	21.42	12.83	6.35	84.5
					3.5	26.24	21.42	12.82	6.48	86.3
					4.5	26.19	21.41	12.82	6.54	87.0
WR03	20090715	10:19	3.5	0.7	0.5	27.26	20.32	12.09	8.02	108.3
					1.0	27.18	20.36	12.11	7.81	105.3
					1.5	27.13	20.36	12.12	7.69	103.6
					2.0	26.91	20.49	12.19	6.95	93.3
					2.5	26.92	20.52	12.23	6.90	92.7
					3.0	26.91	20.54	12.24	6.86	92.1
WR04	20090715	11:04	1.5	0.4	0.5	27.81	18.86	11.14	6.46	87.6
					1.0	27.73	18.90	11.17	5.90	79.9
WR05	20090715	12:52	3.0	0.5	0.5	28.08	17.80	10.45	8.05	109.2
					1.0	28.23	17.77	10.44	8.62	117.3
					1.5	28.22	17.73	10.41	8.79	119.5
					2.0	28.22	17.79	10.45	8.73	118.7
					2.5	28.22	17.70	10.41	9.08	123.5
WR02	20090715	13:44	7.5	0.7	0.5	26.78	20.81	12.39	5.70	76.4
					1.0	26.92	20.77	12.40	5.78	77.7
					2.0	26.89	20.80	12.40	5.56	74.7
					3.0	26.54	21.13	12.63	4.38	58.6
					4.0	26.56	21.22	12.69	4.27	57.1

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBPF02
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					5.0	26.50	21.33	12.70	4.02	53.7
					6.0	26.44	21.36	12.79	3.55	47.4
					7.0	26.41	21.44	12.83	3.41	45.5
MR01	20090715	14:36	8.5	0.9	0.5	27.90	21.42	12.82	8.58	117.6
					1.0	26.92	21.41	12.81	8.08	108.9
					2.0	26.16	21.56	12.90	5.25	69.8
					3.0	26.08	21.63	12.96	4.63	61.5
					4.0	26.05	21.71	13.01	4.22	56.1
					5.0	25.94	21.82	13.09	3.47	46.0
					6.0	25.89	21.88	13.13	3.19	42.3
					7.0	25.83	21.97	13.19	2.94	38.9
					8.0	25.84	21.96	13.19	2.97	39.3
MR02	20090715	15:20	3.5	0.5	0.5	27.66	20.39	12.14	7.20	97.9
					1.0	27.63	20.39	12.13	7.17	97.4
					1.5	27.55	20.40	12.14	7.03	95.4
					2.0	27.47	20.42	12.15	6.84	92.7
					2.5	27.52	20.41	12.15	6.95	94.3
					3.0	27.55	20.40	12.15	7.07	96.0
MR03	20090715	15:59	2.5	0.4	0.5	28.03	19.33	11.45	6.58	89.7
					1.0	27.86	19.40	11.48	6.06	82.4
					1.5	27.82	19.42	11.50	6.06	82.3
					2.0	28.00	19.41	11.47	6.59	89.8
EB04	20090716	6:48	5.0	0.5	0.5	25.57	19.41	11.53	6.60	86.2
					1.0	25.56	19.41	11.53	6.61	86.3
					2.5	25.48	19.48	11.57	6.62	86.3
					3.5	25.47	19.62	11.66	6.64	86.6
					4.5	25.48	19.70	11.71	6.62	86.4
EB03	20090716	7:36	9.0	0.7	0.5	25.79	20.70	12.35	7.46	98.3
					1.5	25.78	20.76	12.40	7.37	97.1
					2.5	25.73	20.81	12.42	7.24	95.3
					3.5	25.71	20.83	12.45	7.17	94.4
					4.5	25.68	20.84	12.45	6.92	91.0
					5.5	25.51	20.93	12.49	5.69	74.6
					6.5	25.46	21.13	12.64	5.01	65.7
					7.5	25.35	21.39	12.81	4.38	57.4

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBPF02
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					8.5	25.35	21.35	12.79	4.31	56.5
EB02	20090716	8:19	7.5	1.1	0.5	25.51	20.94	12.52	7.26	95.3
					1.0	25.56	20.94	12.52	7.42	97.4
					2.0	25.49	20.95	12.52	7.23	94.8
					3.0	25.48	20.95	12.53	7.24	94.9
					4.0	25.50	20.95	12.53	7.24	95.0
					5.0	25.48	20.95	12.53	7.22	94.7
					6.0	25.47	20.95	12.53	7.22	94.7
					7.0	25.46	20.94	12.53	7.24	94.9
EB01	20090716	9:05	11.0	1.2	0.5	25.09	21.06	12.61	6.69	87.2
					1.5	25.08	21.06	12.61	6.66	86.8
					2.5	25.09	21.06	12.60	6.71	87.4
					3.5	25.07	21.07	12.61	6.63	86.3
					4.5	25.04	21.06	12.61	6.52	84.9
					5.5	25.04	21.07	12.61	6.51	84.7
					6.5	25.04	21.07	12.61	6.46	84.1
					7.5	25.03	21.07	12.62	6.26	81.5
					8.5	24.96	21.13	12.64	5.31	69.0
					9.5	24.33	24.67	15.00	0.92	12.0
					10.5	24.34	24.07	14.51	0.69	9.0

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBPF03
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
HG03	20090810	8:39	2.5	0.6	0.5	28.14	23.51	14.17	7.28	101.0
					1.0	28.14	23.51	14.18	7.28	101.0
					1.5	28.14	23.54	14.18	7.29	101.1
					2.0	28.14	23.55	14.19	7.29	101.1
HG02	20090810	9:31	10.5	0.7	0.5	27.94	23.98	14.48	7.34	101.6
					1.0	27.93	23.99	14.49	7.33	101.5
					2.0	27.92	23.99	14.49	7.29	100.9
					3.0	27.89	24.00	14.50	7.25	100.3
					4.0	27.87	24.01	14.50	7.23	100.0
					5.0	27.87	24.01	14.51	7.23	100.0
					6.0	27.87	24.02	14.51	7.24	100.1
					7.0	27.85	24.02	14.51	7.23	100.0
					8.0	27.85	24.03	14.52	7.22	99.8
					9.0	27.86	24.03	14.52	7.23	100.0
					10.0	27.85	24.04	14.52	7.23	100.0
HG01	20090810	10:22	8.5	0.9	0.5	28.04	24.26	14.66	7.65	106.2
					1.0	28.03	24.26	14.67	7.64	106.0
					2.0	27.95	24.27	14.62	7.57	104.9
					3.0	27.81	24.34	14.71	7.33	101.4
					4.0	27.77	24.38	14.70	7.27	100.5
					5.0	27.77	24.46	14.80	7.23	100.0
					6.0	27.77	24.46	14.80	7.24	100.1
					7.0	27.77	24.47	14.81	7.25	100.3
					8.0	27.77	24.47	14.81	7.26	100.4
FB02	20090810	11:39	3.5	0.5	0.5	28.86	20.37	12.10	7.88	109.4
					1.0	28.81	20.44	12.13	7.81	108.3
					1.5	28.78	20.45	12.15	7.77	107.7
					2.0	28.76	20.51	12.19	7.74	107.3
					2.5	28.75	20.55	12.23	7.72	107.0
					3.0	28.75	20.56	12.23	7.74	107.3
FB01	20090810	12:41	4.5	0.7	0.5	28.42	21.60	12.90	7.97	110.3
					1.0	28.40	21.70	12.98	7.74	107.1
					2.0	28.39	21.69	12.97	7.73	106.9
					3.0	28.33	21.70	12.98	7.68	106.1
					4.0	28.27	21.79	13.04	7.62	105.2
NC02	20090810	15:01	4.5	0.4	0.5	28.85	10.39	5.82	6.41	85.9

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBPF03
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					1.0	28.94	10.68	5.99	6.36	85.4
					2.0	29.13	10.78	6.06	6.60	89.0
					3.0	29.16	10.91	6.14	6.66	89.9
					4.0	29.21	10.80	6.08	6.70	90.5
NC01	20090810	14:16	5.5	0.4	0.5	29.12	17.20	10.07	7.85	108.2
					1.0	28.67	17.56	10.18	7.40	101.3
					2.0	28.34	18.13	10.66	6.96	95.0
					3.0	28.25	18.73	11.04	6.68	91.2
					4.0	28.25	18.89	11.16	6.66	91.0
					5.0	28.29	18.80	11.10	6.68	91.3
WC02	20090811	8:20	3.0	0.5	0.5	29.10	15.05	8.71	6.64	90.8
					1.0	29.10	15.09	8.73	6.64	90.8
					1.5	29.10	15.09	8.73	6.63	90.7
					2.0	29.11	15.09	8.73	6.62	90.6
					2.5	29.10	15.12	8.75	6.61	90.4
WC01	20090811	9:16	2.5	0.7	0.5	29.07	20.52	12.17	7.33	102.1
					1.0	29.04	20.61	12.25	7.29	101.6
					1.5	29.04	20.65	12.28	7.30	101.7
					2.0	29.03	20.06	12.29	7.30	101.7
TS03	20090810	13:28	2.5	0.7	0.5	28.40	23.98	14.47	7.90	110.2
					1.0	28.38	23.96	14.46	7.87	109.8
					1.5	28.33	23.93	14.45	7.79	108.6
					2.0	28.34	23.93	14.44	7.83	109.1
TS02	20090811	10:08	13.5	1.1	0.5	28.24	24.24	14.64	8.09	112.7
					1.0	28.21	24.25	14.65	8.00	111.4
					2.0	28.04	24.26	14.67	7.81	108.4
					3.0	28.04	24.24	14.65	7.49	104.0
					4.0	27.96	24.30	14.68	7.21	100.0
					5.0	27.95	24.41	14.76	6.95	96.4
					6.0	27.97	24.45	14.80	6.98	96.9
					7.0	27.98	24.48	14.81	7.00	97.2
					8.0	27.96	24.54	14.85	6.93	96.2
					9.0	27.87	24.57	14.87	6.65	92.2
					10.0	27.77	24.62	14.90	6.48	89.7
					11.0	27.79	24.77	15.00	6.35	87.9
					12.0	27.78	25.03	15.18	6.28	87.0

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBPF03
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					13.0	27.78	25.02	15.17	6.29	87.2
TS01	20090811	10:55	13.5	1.1	0.5	28.55	25.30	15.34	7.82	109.9
					1.0	28.43	25.44	15.40	7.63	107.1
					2.0	28.36	25.52	15.48	7.46	104.6
					3.0	28.28	25.75	15.65	7.26	101.8
					4.0	28.28	25.77	15.66	7.21	101.1
					5.0	28.27	25.82	15.69	7.19	100.8
					6.0	28.27	25.85	15.72	7.14	100.1
					7.0	28.27	25.87	15.73	7.11	99.7
					8.0	28.76	25.89	15.74	7.10	100.4
					9.0	28.26	25.90	15.75	7.11	99.7
					10.0	28.24	25.90	15.75	7.11	99.6
					11.0	28.23	25.93	15.77	7.11	99.6
					12.0	28.24	25.95	15.78	7.12	99.8
					13.0	28.23	25.95	15.78	7.15	100.2
WR01	20090812	9:34	4.5	0.9	0.5	28.67	21.16	12.62	6.51	90.3
					1.0	28.61	21.52	12.66	6.42	89.0
					2.0	28.55	21.23	12.67	6.31	87.4
					3.0	28.52	21.23	12.67	6.20	85.8
					4.0	28.55	21.24	12.67	6.12	84.8
WR03	20090812	10:43	3.5	0.6	0.5	29.57	20.34	12.07	6.72	94.4
					1.0	29.56	20.40	12.11	6.68	93.8
					1.5	29.55	20.45	12.14	6.59	92.6
					2.0	29.52	20.49	12.17	6.47	90.8
					2.5	29.51	20.49	12.17	6.46	90.7
					3.0	29.50	20.49	12.17	6.45	90.5
WR04	20090812	11:33	1.5	0.4	0.5	30.41	19.34	11.41	7.74	109.9
					1.0	30.31	19.35	11.42	7.54	106.8
WR05	20090812	13:49	3.0	0.4	0.5	30.57	18.40	10.80	7.54	107.0
					1.0	30.55	18.41	10.82	7.49	106.2
					1.5	30.53	18.42	10.82	7.29	103.3
					2.0	30.50	18.44	10.84	7.24	102.6
					2.5	30.48	18.48	10.86	7.18	101.7
WR02	20090812	12:50	8.0	0.6	0.5	30.16	20.30	12.04	8.33	118.1
					1.5	29.73	20.47	12.15	6.94	97.8

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBPF03
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					2.5	29.59	20.52	12.17	6.32	88.8
					3.5	29.59	20.55	12.21	6.27	88.2
					4.5	29.58	20.56	12.21	6.24	87.7
					5.5	29.56	20.56	12.21	6.18	86.9
					6.5	29.55	20.60	12.24	6.15	86.4
					7.5	29.55	20.59	12.24	6.17	86.7
MR01	20090813	6:21	8.0	0.9	0.5	28.65	21.35	12.74	7.23	100.3
					1.5	28.65	21.35	12.74	7.23	100.3
					2.5	28.66	21.35	12.74	7.23	100.4
					3.5	28.65	21.35	12.74	7.19	99.8
					4.5	28.64	21.35	12.74	7.03	97.5
					5.5	28.64	21.35	12.74	6.99	97.0
					6.5	28.65	21.35	12.74	6.97	96.7
					7.5	28.64	21.35	12.74	6.97	96.7
MR02	20090812	15:20	3.5	0.5	0.5	29.82	20.47	12.14	6.48	91.4
					1.0	29.81	20.49	12.17	6.42	90.6
					1.5	29.81	20.52	12.18	6.41	90.5
					2.0	29.89	20.50	12.17	6.65	94.0
					2.5	29.89	20.50	12.17	6.64	93.8
					3.0	29.92	20.52	12.18	6.75	95.4
MR03	20090812	16:01	2.5	0.5	0.5	30.21	19.43	11.46	6.31	89.3
					1.0	30.09	19.63	11.60	6.09	86.1
					1.5	30.58	19.18	11.32	7.78	110.7
					2.0	30.00	19.75	11.69	5.45	76.9
EB04	20090813	7:36	5.0	0.6	0.5	28.32	20.17	11.94	4.86	66.8
					1.5	28.35	20.20	12.02	5.11	70.3
					2.5	28.33	20.33	12.04	4.80	66.0
					3.5	28.34	20.35	12.10	4.73	65.1
					4.5	28.32	20.35	12.10	4.70	64.6
EB03	20090813	8:18	8.5	1.4	0.5	28.09	21.07	12.57	7.17	98.5
					1.0	28.09	21.07	12.57	7.12	97.8
					2.0	28.06	21.11	12.59	6.55	89.9
					3.0	28.03	21.20	12.63	5.82	79.9
					4.0	27.95	21.36	12.75	4.93	67.6
					5.0	27.48	22.00	13.10	2.01	27.4
					6.0	27.16	22.38	13.31	0.86	11.7

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBPF03
REVISED: 20110203

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
					7.0	27.10	23.08	13.90	0.73	9.9
					8.0	27.15	22.97	13.84	0.88	12.0
EB02	20090813	9:00	7.0	1.0	0.5	28.24	21.16	12.63	7.03	96.8
					1.5	28.23	21.17	12.63	6.96	95.8
					2.5	28.23	21.16	12.63	6.99	96.3
					3.5	28.23	21.17	12.63	6.89	94.9
					4.5	28.24	21.18	12.64	6.81	93.8
					5.5	28.24	21.19	12.65	6.76	93.1
					6.5	28.23	21.19	12.64	6.87	94.6
EB01	20090813	9:50	10.5	1.6	0.5	27.67	20.63	12.28	6.40	87.1
					1.0	27.66	20.63	12.29	6.22	84.7
					2.0	27.64	20.66	12.31	6.13	83.4
					3.0	27.60	20.68	12.32	6.08	82.7
					4.0	27.57	20.70	12.34	5.07	68.9
					5.0	27.19	21.61	12.91	2.67	36.2
					6.0	26.79	22.82	13.54	0.92	12.4
					7.0	26.70	23.67	14.28	0.61	8.3
					8.0	26.62	24.76	15.03	0.47	6.4
					9.0	26.64	24.89	15.10	0.44	6.0
					10.0	26.64	24.89	15.10	0.45	6.1

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S EASTERN BAY, TANGIER SOUND AND TRIBUTARIES TMDL DATA SET, 2009:

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TABLE B-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE

WATER COLUMN NUTRIENTS: Dissolved nutrient concentrations in bottom waters.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBNT01
REVISED: 20100324

					DISSOLVED NUTRIENTS			
STATION	DATE	TOTAL DEPTH (m)	SAMPLE DEPTH (m)	SAMPLE #	NO_2^- (µM)	NH_4^+ (µM)	NO_2^-+NO3$^-$ (µM)	CORR DIP (µM)
HG03	20090608	2.0	1.5	1	0.05	-0.25	0.97	0.06
HG02	20090608	5.0	4.5	6	0.10	-0.97	4.11	0.04
HG01	20090608	7.5	7.0	11	0.05	-0.02	0.40	0.05
FB02	20090608	4.5	4.0	16	0.21	0.54	1.80	0.04
FB01	20090608	4.5	4.0	21	0.17	0.47	1.27	0.67
NC02	20090608	4.5	4.0	26	0.32	2.27	59.6	0.45
NC01	20090608	5.5	5.0	31	0.28	2.59	14.9	0.05
WC02	20090609	2.5	2.0	36	0.60	5.49	23.6	0.21
WC01	20090609	2.5	2.0	41	0.22	2.00	7.43	0.06
TS03	20090609	3.5	3.0	46	0.05	0.44	0.44	0.06
TS02	20090609	13.5	13.0	51	0.09	1.23	0.72	0.05
TS01	20090609	13.5	13.0	56	0.05	1.05	0.25	0.06
WR01	20090610	4.0	3.5	61	0.35	6.46	2.96	0.10
WR03	20090610	3.0	2.5	66	0.27	4.38	3.24	0.09
WR04	20090610	1.5	1.0	71	0.09	1.63	0.86	0.32
WR05	20090610	4.0	3.5	76	0.59	20.57	7.59	0.35
WR02	20090610	8.0	7.5	81	0.53	10.87	4.95	0.07
MR01	20090610	8.5	8.0	86	0.32	12.51	2.34	0.08
MR02	20090610	3.5	3.0	91	0.41	7.19	3.77	0.06
MR03	20090610	2.5	2.0	96	0.47	8.80	7.33	2.10
EB04	20090611	5.5	5.0	101	0.25	5.62	1.76	0.09
EB03	20090611	9.0	8.5	106	0.19	9.22	1.26	0.06
EB02	20090611	6.5	6.0	111	0.29	2.52	20.34	0.10
EB01	20090611	11.5	11.0	116	0.15	20.81	1.27	0.48

TABLE B-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE

WATER COLUMN NUTRIENTS: Dissolved nutrient concentrations in bottom waters.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBNT02
REVISED: 20100302

					DISSOLVED NUTRIENTS			
STATION	DATE	TOTAL DEPTH (m)	SAMPLE DEPTH (m)	SAMPLE #	NO_2^- (µM)	NH_4^+ (µM)	NO_2^-+NO3$^-$ (µM)	CORR DIP (µM)
HG03	20100713	3.0	2.5	201	0.04	0.86	1.13	0.04
HG02	20100713	9.5	9.0	206	0.01	0.21	0.19	0.06
HG01	20100713	6.5	6.0	211	0.01	0.00	0.11	0.02
FB02	20100713	4.0	3.5	216	0.01	0.07	0.18	0.03
FB01	20100713	4.0	3.5	221	0.01	0.07	0.23	0.05
NC02	20100713	4.0	3.5	231	0.26	2.00	19.67	0.15
NC01	20100713	5.5	5.0	236	0.02	0.50	0.26	0.05
WC02	20100714	2.0	1.5	241	0.00	0.57	0.17	0.07
WC01	20100714	2.5	2.0	246	0.01	0.50	0.52	0.05
TS03	20100713	3.5	3.0	226	0.01	0.29	0.59	0.06
TS02	20100714	14.0	13.5	251	0.06	2.79	1.37	0.10
TS01	20100714	14.0	13.5	256	0.02	0.64	2.49	0.05
WR01	20100715	5.0	4.5	261	0.01	0.64	0.46	0.06
WR03	20100715	3.5	3.0	266	0.01	0.57	0.26	0.07
WR04	20100715	1.5	1.0	271	0.02	0.71	0.33	0.26
WR05	20100715	3.0	2.5	276	0.01	0.50	0.14	0.32
WR02	20100715	7.5	7.0	281	0.06	6.43	0.24	0.13
MR01	20100715	8.5	8.0	286	0.04	2.79	0.21	0.09
MR02	20100715	3.5	3.0	291	0.06	0.64	0.11	0.07
MR03	20100715	2.5	2.0	296	0.04	2.21	0.18	0.24
EB04	20100716	5.0	4.5	301	0.07	1.00	0.71	0.11
EB03	20100716	9.0	8.5	306	0.02	1.50	0.27	0.06
EB02	20100716	7.5	7.0	311	0.01	0.36	0.48	0.06
EB01	20100716	11.0	10.5	316	0.01	9.57	1.23	0.35

TABLE B-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE

WATER COLUMN NUTRIENTS: Dissolved nutrient concentrations in bottom waters.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBNT03
REVISED: 20100305

					DISSOLVED NUTRIENTS			
STATION	DATE	TOTAL DEPTH (m)	SAMPLE DEPTH (m)	SAMPLE #	NO_2^- (µM)	NH_4^+ (µM)	NO_2^-+NO3$^-$ (µM)	CORR DIP (µM)
HG03	20090810	2.5	2.0	401	0.00	0.49	0.35	0.05
HG02	20090810	10.5	10.0	406	0.13	0.83	0.28	0.07
HG01	20090810	8.5	8.0	411	0.04	0.61	0.27	0.06
FB02	20090810	3.5	3.0	416	-0.02	0.73	0.22	0.07
FB01	20090810	4.5	4.0	421	0.03	1.08	0.18	0.07
NC02	20090810	4.5	4.0	436	0.14	0.95	0.07	0.28
NC01	2000810	5.5	5.0	431	0.00	0.84	0.28	0.12
WC02	20090811	3.0	2.5	441	-0.01	0.44	0.37	1.48
WC01	20090811	2.5	2.0	446	-0.01	0.63	0.29	0.07
TS03	20090810	2.5	2.0	426	0.00	1.29	0.52	0.07
TS02	20090811	13.5	13.0	451	0.19	3.35	0.59	0.47
TS01	20090811	13.5	13.0	456	0.02	1.24	0.26	0.07
WR01	20090812	4.5	4.0	461	0.02	0.99	0.32	0.14
WR03	20090812	3.5	3.0	466	0.02	1.01	0.15	0.34
WR04	20090812	1.5	1.0	471	0.02	1.03	0.29	1.79
WR05	20090812	3.0	2.5	481	0.01	2.55	0.16	2.17
WR02	20090812	8.0	7.5	476	0.01	1.38	0.31	0.47
MR01	20090813	8.0	7.5	496	0.01	0.67	0.24	0.10
MR02	20090812	3.5	3.0	486	0.01	0.75	0.15	0.62
MR03	20090812	2.5	2.0	491	0.01	1.23	0.15	1.08
EB04	20090813	5.0	4.5	501	0.04	2.54	0.48	0.15
EB03	20090813	8.5	8.0	506	0.54	6.72	0.65	0.45
EB02	20090813	7.0	6.5	511	0.03	0.69	0.87	0.06
EB01	20090813	10.5	10.0	516	9.78	1.70	0.13	1.17

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S EASTERN BAY, TANGIER SOUND AND TRIBUTARIES TMDL DATA SET, 2009:

Page No.

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBSP01
REVISED: 20100830

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
HG03	20090608	10:17	1.0	123.3	367						
			0.0	-142.6	101						
			-1.0	-213.9	30	1.20	0.16	0.0177	60.06	23.86	(1 cm)
			-2.0	-180.9	63						
HG02	20090608	11:31	1.0	108.1	352						
			0.0	-161.7	82						
			-1.0	-196.6	47	1.19	0.15	0.0180	57.75	22.43	(1 cm)
			-2.0	-168.3	76						
HG01	20090608	12:39	1.0	90.2	334						
			0.0	-207.3	37						
			-1.0	-199.2	45	1.09	0.13	0.0181	80.29	41.39	(1 cm)
			-2.0	-181.8	62						
FB02	20090608	14:12	1.0	120.5	365						
			0.0	-161.3	83						
			-1.0	-166.5	78	2.85	0.28	0.0294	30.10	6.72	(1 cm)
			-2.0	-161.1	83						
FB01	20090608	15:02	1.0	125.6	370						
			0.0	-108.8	135						
			-1.0	-204.7	39	2.15	0.23	0.0249	29.74	5.24	(1 cm)
			-2.0	-187.9	56						
NC02	20090608	16:48	1.0	115.9	360						
			0.0	-74.5	170						
			-1.0	-172.7	71	4.79	0.40	0.0568	32.51	3.46	(1 cm)
			-2.0	-173.5	71						
NC01	20090608	15:28	1.0	-23.9	220						
			0.0	-208.7	35						
			-1.0	-202.7	41	3.37	0.34	0.0404	47.24	11.23	(1 cm)
			-2.0	-197.4	47						
WC02	20090609	9:50	1.0	141.3	385						
			0.0	-67.3	177						
			-1.0	-139.6	104	4.29	0.38	0.0549	59.78	6.25	(1 cm)
			-2.0	177.6	422						
WC01	20090609	10:50	1.0	156.5	401						
			0.0	-167.8	76						
			-1.0	-212.8	31	2.85	0.29	0.0350	54.24	10.02	(1 cm)
			-2.0	-242.4	2						
TS03	20090609	12:02	1.0	127.7	372						
			0.0	-199.0	45						
			-1.0	-213.5	31	2.33	0.27	0.0372	61.39	17.91	(1 cm)
			-2.0	-194.8	49						

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBSP01
REVISED: 20100830

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
TS02	20090609	13:00	1.0	129.7	374						
			0.0	-222.9	21						
			-1.0	-190.9	53	1.90	0.24	0.0361	111.04	21.60	(1 cm)
			-2.0	-137.8	106						
TS01	20090609	13:38	1.0	82.5	327						
			0.0	-200.8	43						
			-1.0	-178.2	66	1.68	0.21	0.0370	109.50	29.92	(1 cm)
			-2.0	-150.2	94						
WR01	20090610	9:59	1.0	134.8	379						
			0.0	79.4	323						
			-1.0	126.7	371	1.24	0.15	0.0330	73.06	9.29	(1 cm)
			-2.0	146.3	390						
WR03	20090610	11:04	1.0	153.4	397						
			0.0	206.7	451						
			-1.0	175.0	419	2.87	0.35	0.0695	72.15	6.80	(1 cm)
			-2.0	225.7	470						
WR04	20090610	12:15	1.0	161.6	406						
			0.0	126.8	371						
			-1.0	206.7	451	2.93	0.35	0.0857	62.18	5.38	(1 cm)
			-2.0	185.5	430						
WR05	20090610	13:26	1.0	66.1	310						
			0.0	-131.1	113						
			-1.0	-112.8	131	2.94	0.35	0.0831	90.69	12.35	(1 cm)
			-2.0	-103.4	141						
WR02	20090610	14:22	1.0	106.2	350						
			0.0	176.6	421						
			-1.0	-21.3	223	2.76	0.35	0.0760	99.22	9.31	(1 cm)
			-2.0	-118.7	125						
MR01	20090610	16:01	1.0	102.5	347						
			0.0	-177.6	66						
			-1.0	-178.2	66	3.38	0.45	0.0645	79.15	14.57	(1 cm)
			-2.0	-212.5	32						
MR02	20090610	16:31	1.0	113.3	357						
			0.0	175.3	419						
			-1.0	135.1	379	2.21	0.28	0.0519	77.53	6.78	(1 cm)
			-2.0	58.7	303						
MR03	20090610	17:09	1.0	90.3	334						
			0.0	70.3	314						
			-1.0	148.8	393	2.44	0.33	0.0781	86.79	12.35	(1 cm)
			-2.0	-155.5	89						

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBSP01
REVISED: 20100830

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
EB04	20090611	7:14	1.0	137.3	381						
			0.0	79.9	324						
			-1.0	138.8	383	2.23	0.27	0.0460	69.15	9.31	(1 cm)
			-2.0	122.2	366						
EB03	20090611	8:26	1.0	108.1	352						
			0.0	-156.6	87						
			-1.0	-158.9	85	3.61	0.50	0.0556	107.51	28.99	(1 cm)
			-2.0	-220.7	23						
EB02	20090611	9:39	1.0	105.3	349						
			0.0	-163.9	80						
			-1.0	-182.3	62	1.22	0.17	0.0294	78.59	14.65	(1 cm)
			-2.0	-194.1	50						
EB01	20090611	12:13	1.0	13.3	257						
			0.0	-188.5	56						
			-1.0	-146.4	98	5.36	0.70	0.1023	255.12	120.80	(1 cm)
			-2.0	-163.4	81						

TABLE C-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBSP02
REVISED: 20110203

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
HG03	20090713	9:35	1.0	111.7	356						
			0.0	-138.9	105						
			-1.0	-152.5	92	1.30	0.16	0.0210	64.70	27.07	(1 cm)
			-2.0	-170.4	74						
HG02	20090713	10:31	1.0	108.8	353						
			0.0	-199.1	45						
			-1.0	-220.2	24	0.50	0.07	0.0116	74.25	45.11	(1 cm)
			-2.0	-195.9	48						
HG01	20090713	11:30	1.0	101.2	345						
			0.0	-200.8	43						
			-1.0	-160.9	83	1.16	0.15	0.0195	99.77	59.85	(1 cm)
			-2.0	-231.5	13						
FB02	20090713	12:55	1.0	102.3	346						
			0.0	-105.9	138						
			-1.0	-145.1	99	2.46	0.23	0.0222	36.75	10.00	(1 cm)
			-2.0	-144.9	99						
FB01	20090713	13:50	1.0	118.6	363						
			0.0	-197.4	47						
			-1.0	-161.9	82	2.22	0.25	0.0312	60.20	21.58	(1 cm)
			-2.0	-139.4	105						
NC02	20090713	15:46	1.0	142.0	386						
			0.0	62.2	306						
			-1.0	32.0	276	4.78	0.41	0.0611	65.11	10.48	(1 cm)
			-2.0	-128.1	116						
NC01	20090713	16:45	1.0	109.7	354						
			0.0	-92.7	151						
			-1.0	-192.3	52	2.65	0.27	0.0374	62.77	22.57	(1 cm)
			-2.0	-195.4	49						
WC02	20090714	10:34	1.0	132.4	376						
			0.0	-88.6	155						
			-1.0	-59.8	184	2.84	0.26	0.0430	62.15	11.17	(1 cm)
			-2.0	-53.7	190						
WC01	20090714	9:43	1.0	52.6	297						
			0.0	-126.1	118						
			-1.0	-217.2	27	2.74	0.28	0.0382	54.08	16.40	(1 cm)
			-2.0	-167.9	76						
TS03	20090713	14:36	1.0	121.6	366						
			0.0	-234.9	9						
			-1.0	-170.6	73	2.20	0.26	0.0359	78.66	28.26	(1 cm)
			-2.0	-206.6	37						

TABLE C-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBSP02
REVISED: 20110203

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
TS02	20090714	11:54	1.0	119.4	363						
			0.0	-189.9	54						
			-1.0	-209.8	34	1.57	0.20	0.0366	85.45	31.82	(1 cm)
			-2.0	-326.3	-82						
TS01	20090714	12:50	1.0	40.1	284						
			0.0	-205.7	38						
			-1.0	-191.1	53	1.15	0.14	0.0710	79.09	23.64	(1 cm)
			-2.0	-244.9	-1						
WR01	20090715	10:00	1.0	53.4	297						
			0.0	-1.3	243						
			-1.0	-189.3	55	0.98	0.13	0.0265	86.16	20.59	(1 cm)
			-2.0	-240.3	4						
WR03	20090715	10:51	1.0	125.0	369						
			0.0	142.1	386						
			-1.0	90.5	335	2.56	0.32	0.0713	62.90	7.81	(1 cm)
			-2.0	65.0	309						
WR04	20090715	11:30	1.0	93.7	338						
			0.0	92.3	336						
			-1.0	13.1	257	2.93	0.33	0.0883	66.38	7.10	(1 cm)
			-2.0	-27.9	216						
WR05	20090715	13:20	1.0	32.9	277						
			0.0	-12.0	232						
			-1.0	-88.0	156	2.84	0.32	0.0814	92.06	17.06	(1 cm)
			-2.0	-176.1	68						
WR02	20090715	15:09	1.0	32.6	277						
			0.0	-148.0	96						
			-1.0	-242.9	1	2.73	0.34	0.0714	89.28	21.07	(1 cm)
			-2.0	-188.7	55						
MR01	20090715	16:52	1.0	34.3	278						
			0.0	-408.6	-165						
			-1.0	-409.7	-166	3.41	0.47	0.0815	97.33	26.90	(1 cm)
			-2.0	-356.6	-113						
MR02	20090715	17:21	1.0	32.6	277						
			0.0	-180.9	63						
			-1.0	-208.1	36	2.02	0.25	0.0493	63.89	9.09	(1 cm)
			-2.0	-239.6	4						
MR03	20090715	18:16	1.0	56.9	301						
			0.0	40.0	284						
			-1.0	-20.7	223	2.81	0.35	0.0805	94.49	14.39	(1 cm)
			-2.0	-54.9	189						

TABLE C-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBSP02
REVISED: 20110203

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
EB04	20090716	7:17	1.0	48.5	293						
			0.0	-229.8	14						
			-1.0	-250.3	-6	2.38	0.29	0.0543	69.20	16.79	(1 cm)
			-2.0	-251.8	-8						
EB03	20090716	8:05	1.0	-24.9	219						
			0.0	-406.9	-163						
			-1.0	-420.2	-176	3.43	0.46	0.0517	108.66	26.45	(1 cm)
			-2.0	-418.0	-174						
EB02	20090716	8:51	1.0	45.4	289						
			0.0	-149.6	94						
			-1.0	-189.9	54	1.55	0.21	0.0357	185.35	83.98	(1 cm)
			-2.0	-230.6	13						
EB01	20090716	11:34	1.0	11.5	256						
			0.0	-395.3	-151						
			-1.0	-418.4	-174	1.64	0.22	0.0322	188.59	82.60	(1 cm)
			-2.0	-393.1	-149						

TABLE C-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBSP03
REVISED: 20100616

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
HG03	20090810	9:10	1.0	33.1	277						
			0.0	-179.3	65						
			-1.0	-175.3	69	1.01	0.12	0.0147	34.38	13.30	(1 cm)
			-2.0	-162.1	82						
HG02	20090810	10:18	1.0	27.4	271						
			0.0	-156.9	87						
			-1.0	-164.7	79	0.85	0.08	0.0136	41.00	20.22	(1 cm)
			-2.0	-248.8	-5						
HG01	20090810	11:02	1.0	34.3	278						
			0.0	-256.8	-13						
			-1.0	-334.8	-91	1.50	0.20	0.0225	69.14	31.07	(1 cm)
			-2.0	-336.1	-92						
FB02	20090810	12:00	1.0	35.6	280						
			0.0	-200.7	43						
			-1.0	-203.2	41	2.23	0.23	0.0250	46.02	15.38	(1 cm)
			-2.0	-200.8	43						
FB01	20090810	13:02	1.0	53.5	298						
			0.0	-230.6	13						
			-1.0	-228.6	15	2.59	0.29	0.0312	54.83	16.01	(1 cm)
			-2.0	-240.3	4						
NC02	20090810	15:32	1.0	29.4	273						
			0.0	-136.3	108						
			-1.0	-222.2	22	8.05	0.55	0.0558	41.92	10.91	(1 cm)
			-2.0	-214.3	30						
NC01	20090810	14:40	1.0	40.4	284						
			0.0	-7.9	236						
			-1.0	-211.7	32	2.96	0.31	0.0389	63.64	15.08	(1 cm)
			-2.0	-229.8	14						
WC02	20090811	8:52	1.0	45.2	289						
			0.0	-60.4	184						
			-1.0	-245.0	-1	4.00	0.37	0.0480	84.22	18.91	(1 cm)
			-2.0	-246.3	-2						
WC01	20090811	9:37	1.0	59.4	303						
			0.0	-240.0	4						
			-1.0	-255.8	-12	2.68	0.28	0.0337	60.83	20.18	(1 cm)
			-2.0	-224.1	20						
TS03	20090810	13:55	1.0	44.3	288						
			0.0	-233.1	11						
			-1.0	-215.5	29	2.20	0.27	0.0338	107.58	30.06	(1 cm)
			-2.0	-233.1	11						
TS02	20090811	10:33	1.0	61.0	305						

TABLE C-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBSP03
REVISED: 20100616

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
			0.0	-190.9	53						
			-1.0	-158.5	86	1.09	0.14	0.0237	103.48	28.77	(1 cm)
			-2.0	-154.7	89						
TS01	20090811	12:25	1.0	54.9	299						
			0.0	-215.3	29						
			-1.0	-190.3	54	1.54	0.20	0.0297	143.53	64.12	(1 cm)
			-2.0	-240.6	3						
WR01	20090812	10:18	1.0	68.5	313						
			0.0	-153.1	91						
			-1.0	-182.5	62	1.09	0.14	0.0235	60.35	11.52	(1 cm)
			-2.0	-205.1	39						
WR03	20090812	11:09	1.0	62.8	307						
			0.0	48.2	292						
			-1.0	-17.1	227	2.50	0.32	0.0616	64.61	7.70	(1 cm)
			-2.0	-220.8	23						
WR04	20090812	12:03	1.0	94.9	339						
			0.0	102.5	347						
			-1.0	-221.1	23	2.92	0.34	0.0856	62.11	6.17	(1 cm)
			-2.0	-236.6	7						
WR05	20090812	14:12	1.0	65.3	309						
			0.0	-75.8	168						
			-1.0	-204.5	40	2.55	0.30	0.0725	67.64	7.75	(1 cm)
			-2.0	-232.0	12						
WR02	20090812	13:22	1.0	83.4	327						
			0.0	67.5	312						
			-1.0	-222.7	21	2.85	0.38	0.0747	121.16	13.85	(1 cm)
			-2.0	-238.2	6						
MR01	20090813	7:05	1.0	76.7	321						
			0.0	-137.4	107						
			-1.0	-255.2	-11	3.68	0.51	0.0825	111.70	30.64	(1 cm)
			-2.0	-355.6	-112						
MR02	20090812	15:46	1.0	81.2	325						
			0.0	3.1	247						
			-1.0	-154.3	90	1.78	0.23	0.0441	64.91	8.16	(1 cm)
			-2.0	-190.6	53						
MR03	20090812	16:41	1.0	85.7	330						
			0.0	66.7	311						
			-1.0	-242.1	2	2.78	0.34	0.0818	84.76	8.91	(1 cm)
			-2.0	-209.2	35						
EB04	20090813	7:58	1.0	60.7	305						
			0.0	-80.0	164						

TABLE C-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE

SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBSP03
REVISED: 20100616

						SURFICIAL SEDIMENT PARTICULATES					
STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHL*a* TOTAL (mg m^{-2})	SED CHL*a* ACTIVE (mg m^{-2})	
			-1.0	-217.7	26	2.38	0.30	0.0601	95.81	13.89	(1 cm)
			-2.0	-240.9	3						
EB03	20090813	8:50	1.0	61.3	305						
			0.0	-254.1	-10						
			-1.0	-338.9	-95	3.63	0.49	0.0531	131.85	33.26	(1 cm)
			-2.0	-399.4	-155						
EB02	20090813	9:34	1.0	20.1	264						
			0.0	-262.4	-18						
			-1.0	-234.1	10	1.42	0.20	0.0296	74.80	14.87	(1 cm)
			-2.0	-274.7	-31						
EB01	20090813	12:08	1.0	-69.6	174						
			0.0	-319.1	-75						
			-1.0	-408.2	-164	4.09	0.57	0.0646	139.61	46.45	(1 cm)
			-2.0	-420.2	-176						

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S EASTERN BAY, TANGIER SOUND AND TRIBUTARIES TMDL DATA SET, 2009:

Page No.

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBCD01
REVISED: 20100621

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
HG03	20090608	1	11	10	0	0	7.72	2	0.04	-0.25	0.05	0.63
			12	17	67	67	7.25	3	0.05	0.26	0.04	0.21
			13	18	61	128	6.81	4	0.06	1.11	0.04	0.34
			14	19	61	189	6.43	5	0.07	2.05	0.05	0.24
HG02	20090608	1	12	27	0	0	7.60	7	0.05	-0.53	0.13	0.30
			13	27	60	60	7.32	8	0.06	0.79	0.04	0.31
			14	30	63	123	6.96	9	0.09	2.81	1.08	0.32
			15	30	60	183	6.66	10	0.10	3.94	0.05	0.27
HG01	20090608	1	13	43	0	0	8.61	12	0.05	0.10	0.09	0.17
			14	43	60	60	7.77	13	0.05	1.62	0.06	0.30
			15	43	60	120	7.36	14	0.07	2.89	0.06	0.17
			16	43	60	180	7.00	15	0.06	4.86	1.51	0.16
FB02	20090608	1	15	5	0	0	7.41	17	0.22	1.16	0.06	1.85
			16	5	60	60	6.93	18	0.24	1.95	2.88	2.48
			17	5	60	120	6.50	19	0.25	2.33	0.83	2.84
			18	5	60	180	6.19	20	0.28	3.94	0.05	2.02
FB01	20090608	1	15	46	0	0	6.19	22	0.19	2.38	0.98	1.28
			16	46	60	60	5.82	23	0.26	4.13	1.61	1.28
			17	48	62	122	5.55	24	0.30	5.59	0.16	1.46
			18	42	54	176	5.23	25	0.33	6.59	0.06	2.49
NC02	20090608	1	17	20	0	0	5.68	27	0.31	2.67	0.23	59.1
			18	20	60	60	5.26	28	0.31	4.03	0.23	59.6
			19	22	62	122	4.87	29	0.42	4.34	2.67	49.2
			20	33	71	193	4.51	30	0.29	3.77	0.26	61.5
NC01	20090608	1	18	0	0	0	6.73	32	0.29	2.89	0.08	14.4
			19	0	60	60	6.31	33	0.37	9.07	0.31	15.3
			20	0	60	120	5.90	34	0.32	16.65	0.70	15.2
			20	50	50	170	5.58	35	0.41	20.74	0.49	16.6
WC02	20090609	1	10	40	0	0	4.61	37	0.60	6.01	0.21	23.4
			11	41	61	61	4.16	38	0.61	7.36	0.24	19.6
			12	43	62	123	3.79	39	0.64	8.29	0.30	22.4
			13	45	62	185	3.54	40	0.60	8.83	0.32	22.1
WC01	20090609	1	11	22	0	0	6.67	42	0.26	2.10	0.06	7.36

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBCD01
REVISED: 20100621

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
			12	24	62	62	6.45	43	0.24	2.71	0.23	7.22
			13	25	61	123	6.15	44	0.28	3.73	0.21	8.12
			14	25	60	183	5.90	45	0.36	5.28	0.05	7.87
TS03	20090609	1	12	17	0	0	7.23	47	0.07	1.01	-0.01	0.21
			13	19	62	62	7.10	48	0.06	1.22	0.07	0.32
			14	21	62	124	7.01	49	0.11	4.55	0.05	3.51
			15	21	60	184	6.71	50	0.15	4.73	0.06	4.11
TS02	20090609	1	13	15	0	0	7.25	52	0.14	2.21	0.08	1.01
			14	19	64	64	6.80	53	0.22	4.08	0.14	1.10
			15	19	60	124	6.32	54	0.48	7.48	0.15	1.81
			16	25	66	190	5.93	55	0.30	7.79	0.05	1.53
TS01	20090609	1	14	10	0	0	6.95	57	0.06	2.12	0.12	0.31
			15	13	63	63	6.58	58	0.10	5.04	0.09	0.41
			16	23	70	133	6.06	59	0.15	6.82	0.11	0.45
			17	25	62	195	5.74	60	0.19	8.28	0.13	0.53
WR01	20090610	1	10	53	0	0	5.61	62	0.36	6.70	0.06	2.14
			11	55	62	62	3.97	63	0.49	9.89	0.09	2.36
			12	55	60	122	2.83	64	0.61	12.59	0.09	2.57
			13	55	60	182	2.02	65	0.66	15.93	0.12	2.56
WR03	20090610	1	11	50	0	0	4.84	67	0.31	4.64	0.09	3.15
			12	50	60	60	3.74	68	0.37	6.25	0.19	4.94
			13	47	57	117	2.82	69	0.41	7.46	0.22	5.23
			14	50	63	180	2.18	70	0.45	8.63	0.26	6.07
WR04	20090610	1	12	38	0	0	4.50	72	0.13	2.09	0.38	0.98
			13	40	62	62	2.90	73	0.20	4.44	0.73	2.75
			14	40	60	122	1.90	74	0.26	6.09	0.62	2.58
			15	40	60	182	1.30	75	0.29	7.57	0.64	3.26
WR05	20090610	1	14	35	0	0	3.25	77	0.47	22.27	0.29	7.05
			15	35	60	60	2.35	78	0.44	27.09	0.63	6.48
			16	30	55	115	1.58	79	0.45	30.60	1.05	5.13
			17	30	60	175	1.01	80	0.40	33.99	1.28	5.42
WR02	20090610	1	15	25	0	0	3.85	82	0.53	15.43	0.22	5.31
			16	25	60	60	2.60	83	0.53	18.39	0.31	4.02

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBCD01
REVISED: 20100621

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
			17	25	60	120	1.63	84	0.58	24.65	0.37	4.35
			18	25	60	180	0.96	85	0.51	25.93	0.42	3.08
MR01	20090610	1	16	20	0	0	3.55	87	0.30	18.27	0.42	1.55
			17	20	60	60	2.56	88	0.26	25.75	1.58	1.32
			18	20	60	120	1.59	89	0.21	32.89	1.79	1.02
			19	28	68	188	0.94	90	0.18	35.70	1.80	1.38
MR02	20090610	1	17	11	0	0	4.77	92	0.39	8.90	0.08	3.74
			18	15	64	64	3.54	93	0.46	9.70	0.12	4.02
			19	23	68	132	2.42	94	0.52	11.44	0.22	4.87
			20	23	60	192	1.85	95	0.52	15.41	0.21	4.73
MR03	20090610	1	18	10	0	0	3.47	97	0.46	9.99	0.11	7.54
			19	19	69	69	2.77	98	0.48	11.97	0.25	7.59
			20	15	56	125	1.98	99	0.47	12.62	0.29	7.52
			21	15	60	185	1.37	100	0.46	13.82	0.37	7.40
EB04	20090611	1	8	24	0	0	5.35	102	0.26	5.75	0.19	2.33
			9	24	60	60	3.90	103	0.35	8.92	0.15	4.78
			10	20	56	116	2.75	104	0.47	14.80	0.13	2.46
			11	20	60	176	1.98	105	0.52	16.46	0.14	3.56
EB03	20090611	1	9	25	0	0	3.53	107	0.20	10.11	0.14	1.19
			10	23	58	58	2.98	108	0.18	16.68	0.18	1.08
			11	28	65	123	2.33	109	0.17	22.42	0.36	4.01
			12	25	57	180	1.93	110	0.16	25.19	0.42	0.82
EB02	20090611	1	10	17	0	0	5.91	112	0.35	7.15	0.08	3.07
			11	25	68	68	5.21	113	0.38	8.30	0.08	6.08
			12	20	55	123	4.69	114	0.39	9.23	0.10	3.03
			13	22	62	185	4.30	115	0.43	9.79	0.08	5.11
EB01	20090611	1	11	55	0	0	0.85	117	0.16	21.45	0.60	1.08
			12	50	55	55	0.75	118	0.15	22.97	0.64	0.96
			13	58	68	123	0.60	119	0.12	23.72	0.87	0.79
			14	58	60	183	0.53	120	0.12	27.53	1.02	1.05

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBCD02
REVISED: 20100622

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
HG03	20090713	1	10	29	0	0	7.00	202	0.01	0.36	0.04	0.36
			11	30	61	61	6.66	203	0.04	1.43	0.07	0.34
			12	30	60	121	6.35	204	0.05	2.43	0.05	0.31
			13	30	60	181	6.00	205	0.06	3.43	0.03	0.42
HG02	20090713	1	11	40	0	0	7.39	207	0.06	0.57	0.04	0.44
			12	40	60	60	6.99	208	0.06	1.64	0.04	0.40
			13	40	60	120	6.61	209	0.09	2.86	0.04	0.30
			14	40	60	180	6.24	210	0.09	3.36	0.05	0.41
HG01	20090713	1	12	45	0	0	7.40	212	0.01	0.64	0.06	0.42
			13	45	60	60	6.90	213	0.02	1.14	0.06	0.31
			14	47	62	122	6.30	214	0.02	1.93	0.06	0.46
			15	45	58	180	5.90	215	0.02	1.79	0.05	0.28
FB02	20090713	1	14	0	0	0	7.31	217	0.46	0.14	0.27	0.51
			15	0	60	60	6.84	218	0.02	0.29	0.06	0.36
			16	0	60	120	6.53	219	0.02	0.43	0.05	2.28
			17	0	60	180	6.22	220	0.04	0.00	0.04	0.48
FB01	20090713	1	14	26	0	0	7.48	222	0.01	0.14	0.04	0.22
			15	30	64	64	7.12	223	0.02	0.36	0.05	0.25
			16	30	60	124	6.78	224	0.02	0.21	0.05	0.41
			17	30	60	184	6.52	225	0.03	0.29	0.04	0.16
NC02	20090713	1	17	10	0	0	5.40	232	0.19	1.71	0.17	19.08
			18	10	60	60	4.63	233	0.21	3.79	0.22	17.98
			19	10	60	120	4.00	234	0.26	7.50	0.26	18.62
			20	43	93	213	3.39	235	0.26	5.93	0.26	18.67
NC01	20090713	1	17	15	0	0	6.47	237	0.01	0.86	0.05	0.67
			18	13	58	58	6.05	238	0.04	1.57	0.07	0.29
			19	16	63	121	5.76	239	0.08	3.00	0.07	0.45
			20	45	89	210	5.27	240	0.12	3.71	0.08	0.85
WC02	20090714	1	10	10	0	0	5.59	242	0.01	0.79	0.09	0.30
			11	15	65	65	4.34	243	0.07	2.86	0.09	0.90
			12	15	60	125	3.26	244	0.11	5.29	0.15	1.67
			13	15	60	185	2.52	245	0.14	7.07	0.15	1.55
WC01	20090714	1	10	45	0	0	6.85	247	0.00	0.43	0.06	0.18

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBCD02
REVISED: 20100622

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
			11	46	61	61	6.40	248	0.01	0.36	0.05	0.19
			12	45	59	120	6.08	249	0.03	0.71	0.04	1.05
			13	55	70	190	5.80	250	0.03	0.93	0.07	1.01
TS03	20090713	1	15	25	0	0	7.61	227	0.01	0.21	0.07	0.18
			16	25	60	60	7.00	228	0.01	1.36	0.15	0.24
			17	25	60	120	6.52	229	0.01	2.50	0.15	0.57
			18	25	60	180	6.30	230	0.03	3.29	0.17	1.11
TS02	20090714	1	11	44	0	0	5.47	252	0.09	3.50	0.15	0.36
			12	44	60	60	5.21	253	0.21	7.00	0.67	0.62
			13	56	72	132	4.90	254	0.40	10.20	0.77	0.80
			14	59	63	195	4.60	255	0.46	12.50	0.91	0.96
TS01	20090714	1	12	35	0	0	6.14	257	0.03	1.29	0.07	0.33
			13	54	79	79	5.63	258	0.05	2.50	0.11	12.78
			14	59	65	144	5.36	259	0.06	3.14	0.11	0.35
			16	19	80	224	4.87	260	0.06	4.86	0.15	1.88
WR01	20090715	1	11	6	0	0	5.61	262	0.04	1.57	0.07	0.48
			12	6	60	60	4.91	263	0.06	3.71	0.15	0.38
			13	6	60	120	4.13	264	0.11	6.43	0.19	0.32
			14	6	60	180	3.54	265	0.16	9.36	0.30	0.47
WR03	20090715	1	12	0	0	0	7.47	267	0.01	0.50	0.09	0.14
			13	0	60	60	6.54	268	0.05	1.79	0.08	0.91
			14	0	60	120	5.82	269	0.07	3.21	0.94	0.50
			15	0	60	180	5.22	270	0.14	4.29	0.09	1.17
WR04	20090715	1	12	45	0	0	5.68	272	0.01	0.71	0.27	0.24
			13	45	60	60	4.39	273	0.05	2.64	0.48	0.45
			14	45	60	120	3.45	274	0.09	4.29	0.55	0.58
			15	45	60	180	2.80	275	0.11	6.00	0.63	0.85
WR05	20090715	1	14	43	0	0	6.53	277	0.01	1.07	0.41	0.16
			15	43	60	60	5.18	278	0.04	4.21	0.52	0.52
			16	43	60	120	4.12	279	0.07	7.86	0.76	1.03
			17	43	60	180	3.29	280	0.09	12.50	0.92	0.44
WR02	20090715	1	15	50	0	0	3.10	282	0.05	8.50	0.21	0.28
			16	50	60	60	2.75	283	0.06	10.00	0.24	0.49

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBCD02
REVISED: 20100622

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
			17	50	60	120	2.44	284	0.08	12.00	0.28	0.33
			18	50	60	180	2.20	285	0.06	13.10	0.30	0.35
MR01	20090715	1	16	30	0	0	3.13	287	0.03	6.21	0.57	0.20
			17	30	60	60	2.68	288	0.04	13.60	1.38	0.51
			18	34	64	124	2.27	289	0.05	19.70	2.18	0.26
			19	37	63	187	1.89	290	0.06	25.10	3.42	0.67
MR02	20090715	1	17	0	0	0	6.30	292	0.03	1.43	0.05	0.25
			18	0	60	60	5.83	293	0.08	4.00	0.05	0.34
			19	6	66	126	5.47	294	0.09	3.86	0.05	0.35
			20	38	92	218	5.03	295	0.11	5.71	0.05	0.47
MR03	20090715	1	17	25	0	0	5.90	297	0.02	1.64	0.09	0.33
			18	32	67	67	5.20	298	0.05	3.79	0.10	0.47
			19	36	64	131	4.80	299	0.06	5.71	0.16	0.29
			20	39	63	194	4.50	300	0.09	7.14	0.35	0.50
EB04	20090716	1	8	10	0	0	5.98	302	0.04	1.43	0.08	0.32
			9	10	60	60	5.59	303	0.07	3.57	0.07	0.32
			10	10	60	120	5.14	304	0.11	6.64	0.09	0.42
			11	11	61	181	4.71	305	0.13	9.50	0.12	0.89
EB03	20090716	1	9	5	0	0	4.40	307	0.04	2.21	0.09	0.42
			10	5	60	60	3.96	308	0.03	4.36	0.06	1.20
			11	5	60	120	3.63	309	0.03	5.43	0.06	0.14
			12	5	60	180	3.31	310	0.04	6.71	0.07	0.39
EB02	20090716	1	10	7	0	0	6.29	312	0.01	3.43	0.10	0.56
			11	7	60	60	5.85	313	0.04	5.64	0.06	0.51
			12	7	60	120	5.56	314	0.06	7.29	0.06	0.25
			13	18	71	191	5.22	315	0.09	9.14	0.05	0.40
EB01	20090716	1	11	42	0	0	0.86	317	0.01	16.30	0.99	0.23
			12	46	64	64	0.49	318	0.01	19.10	1.29	0.75
			13	47	61	125	0.27	319	0.01	21.20	1.42	0.17
			14	47	60	185	0.10	320	0.02	22.40	1.49	0.53

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBCD03
REVISED: 20100622

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
HG03	20090810	1	10	29	0	0	6.26	402	0.03	1.41	0.06	0.31
			11	30	61	61	5.91	403	0.04	1.94	0.10	0.28
			12	30	60	121	5.56	404	0.05	2.60	0.06	0.32
			13	32	62	183	5.21	405	0.10	3.77	0.06	0.35
HG02	20090810	1	11	8	0	0	6.41	407	0.06	2.29	0.11	0.37
			12	8	60	60	6.08	408	0.04	3.81	0.10	0.36
			13	8	60	120	5.72	409	0.06	5.60	0.12	0.68
			14	9	61	181	5.43	410	0.09	6.67	0.13	0.40
HG01	20090810	1	12	5	0	0	6.27	412	0.03	2.94	0.14	0.34
			13	5	60	60	5.80	413	0.05	5.90	0.20	1.21
			14	6	61	121	5.42	414	0.10	7.75	0.21	0.44
			15	6	60	181	5.04	415	0.05	10.13	0.22	0.39
FB02	20090810	1	13	0	0	0	6.73	417	0.01	2.12	0.08	0.92
			14	0	60	60	6.39	418	0.06	3.10	0.09	0.57
			15	0	60	120	6.06	419	0.17	4.14	0.07	1.76
			16	0	60	180	5.79	420	0.13	4.82	0.08	0.51
FB01	20090810	1	14	11	0	0	6.63	422	0.01	1.43	0.11	0.37
			15	12	61	61	6.09	423	0.03	2.95	0.09	0.36
			16	12	60	121	5.68	424	0.16	5.01	0.12	0.37
			17	12	60	181	5.32	425	0.10	8.09	0.28	0.37
NC02	20090810	1	16	40	0	0	5.67	437	0.15	1.86	0.30	4.73
			17	45	65	65	4.53	438	0.18	3.23	0.35	5.25
			18	45	60	125	3.60	439	0.21	5.67	0.47	5.10
			20	35	110	235	2.20	440	0.24	11.49	0.94	5.14
NC01	20090810	1	15	50	0	0	5.60	432	0.02	1.61	0.18	0.33
			16	52	62	62	5.28	433	0.08	3.03	0.18	0.49
			17	52	60	122	5.13	434	0.09	3.29	0.21	0.61
			18	52	60	182	4.86	435	0.12	3.72	0.21	0.76
WC02	20090811	1	9	50	0	0	5.50	442	0.00	0.79	0.11	0.43
			10	50	60	60	5.16	443	0.02	1.34	0.10	0.60
			11	50	60	120	4.84	444	0.05	2.32	0.14	0.67
			12	50	60	180	4.41	445	0.05	2.65	0.13	0.85
WC01	20090811	1	10	30	0	0	6.33	447	0.00	1.14	0.12	0.37

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBCD03
REVISED: 20100622

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
			12	30	120	120	5.66	448	0.06	2.41	0.12	0.54
			13	30	60	180	5.32	449	0.09	3.34	0.11	0.56
			14	30	60	240	5.23	450	0.11	4.18	0.10	0.62
TS03	20090810	1	14	55	0	0	7.09	427	0.11	2.38	0.15	1.06
			15	55	60	60	6.70	428	0.06	3.41	0.20	0.33
			16	55	60	120	6.18	429	0.08	4.26	0.19	0.28
			17	55	60	180	5.60	430	0.14	5.28	0.19	0.36
TS02	20090811	1	11	55	0	0	5.30	452	0.24	3.88	0.13	0.75
			12	55	60	60	4.60	453	0.44	5.30	0.17	1.10
			13	55	60	120	4.30	454	0.67	6.42	0.21	1.39
			14	55	60	180	3.90	455	0.83	7.73	0.26	2.20
TS01	20090811	1	12	35	0	0	6.12	457	0.04	3.38	0.24	0.64
			13	35	60	60	5.58	458	0.05	5.05	0.32	0.31
			14	35	60	120	5.14	459	0.07	7.73	0.44	0.34
			15	35	60	180	4.72	460	0.13	10.60	0.52	0.34
WR01	20090812	1	11	17	0	0	5.20	462	0.03	2.49	0.18	0.28
			12	25	68	68	4.43	463	0.09	4.53	0.22	0.33
			13	25	60	128	3.81	464	0.09	6.46	0.24	0.32
			14	25	60	188	3.20	465	0.14	7.96	0.27	0.35
WR03	20090812	1	12	10	0	0	5.26	467	0.03	2.39	0.42	0.30
			13	10	60	60	4.58	468	0.03	5.20	0.51	0.51
			14	12	62	122	4.01	469	0.09	8.41	0.63	0.50
			15	12	60	182	3.57	470	0.12	9.80	0.67	0.68
WR04	20090812	1	13	20	0	0	5.80	472	0.01	1.24	1.79	0.24
			14	20	60	60	4.79	473	0.06	3.08	1.76	0.39
			15	20	60	120	3.94	474	0.07	5.08	1.88	0.61
			16	20	60	180	3.31	475	0.12	7.52	1.94	0.65
WR05	20090812	1	15	15	0	0	6.24	482	0.02	2.27	2.19	0.27
			16	15	60	60	4.98	483	0.04	5.25	1.99	0.34
			17	25	70	130	3.80	484	0.06	9.44	2.31	0.22
			18	25	60	190	2.94	485	0.06	11.81	2.29	0.21
WR02	20090812	1	14	25	0	0	5.35	477	0.04	3.44	0.70	0.18
			15	25	60	60	4.62	478	0.07	6.80	0.64	0.22

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBCD03
REVISED: 20100622

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	(min)	TIME DELTA (min)	TIME SUM (min)	DO (mg l^{-1})	AA VIAL NO	NO_2^- (μM)	NH_4^+ (μM)	DIP (μM)	NO_2^-+NO_3^- (μM)
			16	25	60	120	3.96	479	0.09	11.08	0.66	0.33
			17	25	60	180	3.38	480	0.11	14.47	0.74	0.33
MR01	20090813	1	8	15	0	0	5.80	497	0.01	5.49	0.29	0.22
			9	18	63	63	5.20	498	0.04	15.43	0.61	0.21
			10	39	81	144	4.50	499	0.05	24.93	1.15	0.28
			11	39	60	204	ND	500	0.06	30.39	1.48	0.80
MR02	20090812	1	17	0	0	0	5.98	487	0.03	2.12	0.67	0.37
			18	0	60	60	4.90	488	0.08	4.89	0.81	0.28
			19	51	111	171	3.56	489	0.18	10.01	0.97	0.50
			20	52	61	232	2.74	490	0.19	13.22	1.04	0.49
MR03	20090812	1	17	30	0	0	5.23	492	0.02	1.68	1.14	0.22
			18	30	60	60	4.61	493	0.09	3.54	1.14	0.30
			19	52	82	142	3.78	494	0.09	4.47	1.29	0.44
			20	52	60	202	3.23	495	0.14	6.87	1.38	0.68
EB04	20090813	1	9	0	0	0	4.06	502	0.11	4.33	0.24	0.28
			10	3	63	63	3.43	503	0.07	6.84	0.45	0.61
			11	8	65	128	2.90	504	0.11	10.96	0.77	0.32
			12	8	60	188	2.41	505	0.11	15.88	1.01	0.33
EB03	20090813	1	9	45	0	0	1.37	507	0.51	7.15	0.41	0.69
			10	45	60	60	1.03	508	0.46	10.54	0.63	0.54
			11	55	70	130	0.89	509	0.44	17.12	0.91	0.54
			12	55	60	190	0.81	510	0.41	20.63	1.10	0.59
EB02	20090813	1	10	50	0	0	5.69	512	0.04	2.11	0.10	0.22
			11	55	65	65	5.22	513	0.05	4.17	0.10	0.27
			12	55	60	125	4.72	514	0.09	6.20	0.19	0.24
			13	55	60	185	4.21	515	0.08	7.52	0.13	0.28
EB01	20090813	1	12	38	0	0	0.95	518	9.06	1.58	1.08	8.68
			13	38	60	60	0.63	517	8.46	5.83	1.67	9.04
			14	38	60	120	0.43	519	5.82	10.26	1.78	5.96
			15	38	60	180	0.32	520	4.85	11.82	2.15	4.93

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S EASTERN BAY, TANGIER SOUND AND TRIBUTARIES TMDL DATA SET, 2009:

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TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates of dissolved oxygen ($gO_2\ m^{-2}\ d^{-1}$)and nutrients ($\mu moles\text{-}N\ m^{-2}\ hr^{-1}$ and $\mu moles\text{-}P\ m^{-2}\ hr^{-1}$).

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 1
FILENAME: TMDLEBFL01
REVISED: 20100621

		CORE													
			H_2O			DO	DO	NH_4^+	NH_4^+	NO_2^-	NO_2^-	$NO_2^- + NO_3^-$	$NO_2^- + NO_3^-$	DIP	DIP
STATION	DATE	NO	VOL (ml)	DEPTH (m)	SIZE (cm^2)	SLOPE ($mg\ l^{-1}\ min^{-1}$)	FLUX ($g\ O_2\ m^{-2}\ d^{-1}$)	SLOPE ($\mu moles\text{-}N\ l^{-1}\ min^{-1}$)	FLUX ($\mu moles\text{-}N\ m^{-2}\ h^{-1}$)	SLOPE ($\mu moles\text{-}N\ l^{-1}\ min^{-1}$)	FLUX ($\mu moles\text{-}N\ m^{-2}\ h^{-1}$)	SLOPE ($\mu moles\text{-}N\ l^{-1}\ min^{-1}$)	FLUX ($\mu moles\text{-}N\ m^{-2}\ h^{-1}$)	SLOPE ($\mu moles\text{-}P\ l^{-1}\ min^{-1}$)	FLUX ($\mu moles\text{-}P\ m^{-2}\ h^{-1}$)
HG03	20090608	1	1310	0.157	83.32	-0.006866	-1.55	0.012310	116.1	0.000139	1.31	-0.002116	-19.96	0.000000	0.00
HG02	20090608	1	1380	0.166	83.32	-0.005198	-1.24	0.025214	250.6	0.000270	2.68	0.000000	0.00	0.000000	0.00
HG01	20090608	1	1580	0.190	83.32	-0.008733	-2.38	0.025946	295.2	0.000095	1.08	0.000000	0.00	0.000000	0.00
FB02	20090608	1	1260	0.151	83.32	-0.006817	-1.48	0.014549	132.0	0.000343	3.11	0.000000	0.00	NI	NI
FB01	20090608	1	1180	0.142	83.32	-0.005335	-1.09	0.023899	203.1	0.000781	6.64	0.000000	0.00	-0.005476	-46.53
NC02	20090608	1	1240	0.149	83.32	-0.006067	-1.30	0.013670	122.1	0.000000	0.00	0.012705	113.45	0.000171	1.53
NC01	20090608	1	1030	0.124	83.32	-0.006777	-1.21	0.107543	797.7	0.000682	5.06	0.011323	83.98	0.002309	17.13
WC02	20090609	1	1390	0.167	83.32	-0.005800	-1.39	0.015196	152.1	0.000000	0.00	-0.007615	-76.22	0.000633	6.34
WC01	20090609	1	1250	0.150	83.32	-0.004278	-0.92	0.017313	155.8	0.000932	8.39	0.000000	0.00	0.000000	0.00
TS03	20090609	1	1260	0.151	83.32	-0.002681	-0.58	0.023591	214.1	0.000487	4.42	0.024260	220.12	0.000000	0.00
TS02	20090609	1	1140	0.137	83.32	-0.007041	-1.39	0.031797	261.0	0.000817	6.71	0.021841	179.30	0.000000	0.00
TS01	20090609	1	1170	0.140	83.32	-0.006345	-1.28	0.030899	260.3	0.000695	5.86	0.001047	8.82	0.000000	0.00
WR01	20090610	1	1210	0.145	83.32	-0.019676	-4.11	0.050160	437.1	0.001686	14.69	0.002431	21.18	0.000320	2.79
WR03	20090610	1	1180	0.142	83.32	-0.014881	-3.03	0.022038	187.3	0.000772	6.56	0.015164	128.85	0.000879	7.47
WR04	20090610	1	1140	0.137	83.32	-0.017519	-3.45	0.029856	245.1	0.000888	7.29	0.012610	103.52	0.001515	12.44
WR05	20090610	1	1160	0.139	83.32	-0.012908	-2.59	0.066729	557.4	-0.000361	-3.02	-0.009293	-77.63	0.005841	48.79
WR02	20090610	1	1280	0.154	83.32	-0.016067	-3.55	0.062924	580.0	0.000000	0.00	-0.011718	-108.01	0.001110	10.23
MR01	20090610	1	1240	0.149	83.32	-0.014048	-3.01	0.094562	844.4	-0.000641	-5.72	-0.004376	-39.08	0.007843	70.03
MR02	20090610	1	1310	0.157	83.32	-0.015378	-3.48	0.032815	309.6	0.000716	6.75	0.006019	56.78	0.000752	7.09
MR03	20090610	1	1160	0.139	83.32	-0.011581	-2.32	0.020040	167.4	-0.000111	-0.93	-0.001574	-13.15	0.001329	11.10
EB04	20090611	1	1250	0.150	83.32	-0.019275	-4.16	0.064937	584.5	0.001570	14.13	0.000000	0.00	-0.000469	-4.22
EB03	20090611	1	1080	0.130	83.32	-0.009019	-1.68	0.084364	656.1	-0.000218	-1.70	-0.002052	-15.96	0.001721	13.38
EB02	20090611	1	1540	0.185	83.32	-0.008784	-2.34	0.014547	161.3	0.000428	4.75	NI	NI	0.000215	2.38
EB01	20090611	1	1340	0.161	83.32	-0.001802	-0.42	0.030687	296.1	-0.000241	-2.33	-0.002416	-23.31	0.002449	23.63

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates of dissolved oxygen ($gO_2\ m^{-2}\ d^{-1}$)and nutrients (µmoles-N $m^{-2}\ hr^{-1}$ and µmoles-P $m^{-2}\ hr^{-1}$).

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 2
FILENAME: TMDLEBFL02
REVISED: 20100419

		CORE													
STATION	DATE	NO	H_2O VOL (ml)	DEPTH (m)	SIZE (cm^2)	DO SLOPE ($mg\ l^{-1}\ min^{-1}$)	DO FLUX ($g\ O_2\ m^{-2}\ d^{-1}$)	NH_4^+ SLOPE (µmoles-N $l^{-1}\ min^{-1}$)	NH_4^+ FLUX (µmoles-N $m^{-2}\ h^{-1}$)	NO_2^- SLOPE (µmoles-N $l^{-1}\ min^{-1}$)	NO_2^- FLUX (µmoles-N $m^{-2}\ h^{-1}$)	$NO_2^- + NO_3^-$ SLOPE (µmoles-N $l^{-1}\ min^{-1}$)	$NO_2^- + NO_3^-$ FLUX (µmoles-N $m^{-2}\ h^{-1}$)	DIP SLOPE (µmoles-P $l^{-1}\ min^{-1}$)	DIP FLUX (µmoles-P $m^{-2}\ h^{-1}$)
		1													
HG03	20100713	1	1330	0.160	83.32	-0.005489	-1.26	0.016933	162.2	0.000272	2.61	-0.000429	-4.11	0.000000	0.00
HG02	20100713	1	1335	0.160	83.32	-0.006383	-1.47	0.015983	153.7	0.000000	0.00	-0.001233	-11.85	0.000083	0.80
HG01	20100713	1	1295	0.155	83.32	-0.008478	-1.90	0.010586	98.7	0.000000	0.00	0.000000	0.00	0.000000	0.00
FB02	20100713	1	1180	0.142	83.32	-0.005967	-1.22	0.002417	20.5	0.000000	0.00	0.000000	0.00	0.000000	0.00
FB01	20100713	1	1250	0.150	83.32	-0.005265	-1.14	0.000778	7.0	0.000119	1.07	0.000000	0.00	0.000105	0.95
NC02	20100713	1	1220	0.146	83.32	-0.009357	-1.97	0.018667	164.0	0.000323	2.84	0.000000	0.00	0.000750	6.59
NC01	20100713	1	1170	0.140	83.32	-0.005589	-1.13	0.014183	119.5	0.000525	4.42	0.003738	31.49	0.000174	1.47
WC02	20100714	1	1095	0.131	83.32	-0.016757	-3.17	0.034577	272.6	0.000724	5.71	0.006570	51.81	0.000000	0.00
WC01	20100714	1	1320	0.158	83.32	-0.005492	-1.25	0.004379	41.6	0.000000	0.00	0.004674	44.43	-0.000108	-1.03
TS03	20100713	1	1120	0.134	83.32	-0.007350	-1.42	0.017300	139.5	0.000000	0.00	0.005218	42.08	0.000515	4.15
TS02	20100714	1	1285	0.154	83.32	-0.004444	-0.99	0.045902	424.8	0.001982	18.34	0.002993	27.70	0.003615	33.45
TS01	20100714	1	1520	0.182	83.32	-0.005552	-1.46	0.015469	169.3	0.000161	1.76	0.000000	0.00	0.000350	3.83
WR01	20100715	1	1350	0.162	83.32	-0.011650	-2.72	0.043483	422.7	0.000688	6.69	-0.001341	-13.04	0.001230	11.96
WR03	20100715	1	1320	0.158	83.32	-0.012450	-2.84	0.021317	202.6	0.000645	6.13	0.005328	50.65	0.000000	0.00
WR04	20100715	1	1275	0.153	83.32	-0.015967	-3.52	0.029200	268.1	0.000560	5.14	0.003228	29.64	0.001893	17.38
WR05	20100715	1	1205	0.145	83.32	-0.017967	-3.74	0.063233	548.7	0.000453	3.93	0.007312	63.45	0.002948	25.58
WR02	20100715	1	1205	0.145	83.32	-0.005017	-1.04	0.026333	228.5	0.000075	0.65	0.000408	3.54	0.000552	4.79
MR01	20100715	1	1080	0.130	83.32	-0.006604	-1.23	0.100330	780.3	0.000145	1.13	0.002331	18.13	0.014949	116.26
MR02	20100715	1	1500	0.180	83.32	-0.005729	-1.49	0.019612	211.8	0.000363	3.92	0.000907	9.80	0.000000	0.00
MR03	20100715	1	1410	0.169	83.32	-0.007139	-1.74	0.028541	289.8	0.000324	3.29	0.000000	0.00	0.000000	0.00
EB04	20100716	1	1450	0.174	83.32	-0.007065	-1.77	0.045246	472.4	0.000487	5.09	0.000000	0.00	0.000372	3.88
EB03	20100716	1	1250	0.150	83.32	-0.006000	-1.30	0.024283	218.6	0.000000	0.00	0.000000	0.00	0.000000	0.00
EB02	20100716	1	1370	0.164	83.32	-0.005511	-1.30	0.029586	291.9	0.000430	4.24	-0.000789	-7.78	-0.000100	-0.99
EB01	20100716	1	1325	0.159	83.32	-0.004069	-0.93	0.033193	316.7	0.000000	0.00	0.000000	0.00	0.002639	25.18

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
Eastern Bay, Tangier Sound and Tributaries: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates of dissolved oxygen ($gO_2\ m^{-2}\ d^{-1}$)and nutrients ($\mu moles\text{-}N\ m^{-2}\ hr^{-1}$ and $\mu moles\text{-}P\ m^{-2}\ hr^{-1}$).

EASTERN BAY, TANGIER SOUND & TRIBUTARIES CRUISE: 3
FILENAME: TMDLEBFL03
REVISED: 20100621

		CORE													
STATION	DATE	NO	H_2O VOL (ml)	DEPTH (m)	SIZE (cm^2)	DO SLOPE ($mg\ l^{-1}\ min^{-1}$)	DO FLUX ($g\ O_2\ m^{-2}\ d^{-1}$)	NH_4^+ SLOPE ($\mu moles\text{-}N\ l^{-1}\ min^{-1}$)	NH_4^+ FLUX ($\mu moles\text{-}N\ m^{-2}\ h^{-1}$)	NO_2^- SLOPE ($\mu moles\text{-}N\ l^{-1}\ min^{-1}$)	NO_2^- FLUX ($\mu moles\text{-}N\ m^{-2}\ h^{-1}$)	$NO_2^- + NO_3^-$ SLOPE ($\mu moles\text{-}N\ l^{-1}\ min^{-1}$)	$NO_2^- + NO_3^-$ FLUX ($\mu moles\text{-}N\ m^{-2}\ h^{-1}$)	DIP SLOPE ($\mu moles\text{-}P\ l^{-1}\ min^{-1}$)	DIP FLUX ($\mu moles\text{-}P\ m^{-2}\ h^{-1}$)
HG03	20090810	1	1270	0.152	83.32	-0.005747	-1.26	0.012753	116.6	0.000327	2.99	0.000578	5.29	0.000000	0.00
HG02	20090810	1	1595	0.191	83.32	-0.005472	-1.51	0.024750	284.3	0.000455	5.23	0.000000	0.00	0.000102	1.17
HG01	20090810	1	1305	0.157	83.32	-0.006738	-1.52	0.038762	364.3	0.000579	5.44	0.000000	0.00	0.000139	1.31
FB02	20090810	1	1280	0.154	83.32	-0.005250	-1.16	0.015227	140.4	0.000656	6.05	0.000000	0.00	0.000000	0.00
FB01	20090810	1	1140	0.137	83.32	-0.007200	-1.42	0.036522	299.8	0.000509	4.18	0.000000	0.00	0.000000	0.00
NC02	20090810	1	1230	0.148	83.32	-0.014658	-3.12	0.041914	371.2	0.000358	3.17	0.001790	15.85	0.002766	24.50
NC01	20090810	1	1390	0.167	83.32	-0.003914	-0.94	0.010887	109.0	0.000476	4.76	0.002320	23.22	0.000000	0.00
WC02	20090811	1	1270	0.152	83.32	-0.005983	-1.31	0.010955	100.2	0.000327	2.99	0.002217	20.28	0.000000	0.00
WC01	20090811	1	1340	0.161	83.32	-0.004790	-1.11	0.012687	122.4	0.000464	4.48	0.001017	9.81	-0.000052	-0.50
TS03	20090810	1	1210	0.145	83.32	-0.008317	-1.74	0.015899	138.5	0.000679	5.92	0.000000	0.00	0.000274	2.39
TS02	20090811	1	1320	0.158	83.32	-0.007500	-1.71	0.021125	200.8	0.003362	31.96	0.007735	73.53	0.000736	7.00
TS01	20090811	1	1300	0.156	83.32	-0.007733	-1.74	0.040590	380.0	0.000465	4.35	-0.001790	-16.76	0.001636	15.32
WR01	20090812	1	1390	0.167	83.32	-0.010618	-2.55	0.029437	294.7	0.000521	5.22	0.000334	3.34	0.000492	4.92
WR03	20090812	1	1360	0.163	83.32	-0.009276	-2.18	0.041856	409.9	0.000555	5.44	0.001826	17.88	0.001392	13.63
WR04	20090812	1	1270	0.152	83.32	-0.013867	-3.04	0.034725	317.6	0.000557	5.09	0.002447	22.38	0.000813	7.44
WR05	20090812	1	1360	0.163	83.32	-0.017307	-4.07	0.051342	502.8	0.000235	2.30	-0.000300	-2.94	0.000000	0.00
WR02	20090812	1	1470	0.176	83.32	-0.010950	-2.78	0.062286	659.3	0.000398	4.21	0.000914	9.68	0.000000	0.00
MR01	20090813	1	1285	0.154	83.32	-0.009010	-2.00	0.121569	1124.9	0.000214	1.98	0.000000	0.00	0.005946	55.02
MR02	20090812	1	1420	0.170	83.32	-0.013611	-3.34	0.047519	485.9	0.000756	7.73	0.000000	0.00	0.001563	15.98
MR03	20090812	1	1320	0.158	83.32	-0.009932	-2.27	0.023669	225.0	0.000525	4.99	0.002181	20.73	0.001303	12.39
EB04	20090813	1	1360	0.163	83.32	-0.008714	-2.05	0.061544	602.7	0.000000	0.00	0.000000	0.00	0.004174	40.88
EB03	20090813	1	1330	0.160	83.32	-0.002834	-0.65	0.073694	705.8	-0.000490	-4.69	0.000000	0.00	0.003682	35.26
EB02	20090813	1	1400	0.168	83.32	-0.008026	-1.94	0.029726	299.7	0.000000	0.00	0.000332	3.35	0.000000	0.00
EB01	20090813	1	1390	0.167	83.32	-0.003483	-0.84	0.058596	586.5	-0.025448	-254.72	-0.023893	-239.16	0.005573	55.78

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S EASTERN BAY, TANGIER SOUND AND TRIBUTARIES TMDL DATA SET, 2009:

Page No.

TABLE F-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
EASTERN BAY AND TANGIER SOUND: MINI-SONE
WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
($g\ O_2\ m^{-3}\ d^{-1}$)

EASTERN BAY AND TANGIER SOUND CRUISE: 1
FILENAME: TMDLEBTSWK01
REVISED: 20110203

T_I : TIME INITIAL
T_F : TIME FINAL

STATION	DATE	SAMPLE	DATE/TIME T_I	DATE/TIME T_F	DO ($mg\ l^{-1}$) T_I	DO ($mg\ l^{-1}$) T_F	Respiration Rate ($g\ O_2\ m^{-3}\ day^{-1}$)
HG03	20090608	A	6/8/09 10:15	6/9/09 10:20	7.75	6.90	0.88
		B			7.92	7.01	
HG02	20090608	A	6/8/09 11:21	6/9/09 11:22	7.75	7.30	0.47
		B			7.81	7.32	
HG01	20090608	A	6/8/09 12:31	6/9/09 12:25	7.82	7.25	0.53
		B			7.80	7.32	
FB02	20090608	A	6/8/09 14:03	6/9/09 13:58	7.22	6.79	0.39
		B			7.15	6.81	
FB01	20090608	A	6/8/09 14:47	6/9/09 14:44	7.60	7.05	0.59
		B			7.62	6.99	
NC02	20090608	A	6/8/09 16:03	6/9/09 16:00	6.08	5.74	0.13
		B			5.81	5.90	
NC01	20090609	A	6/9/09 17:01	6/10/09 16:57	8.75	7.40	1.23
		B			8.62	7.52	
WC02	20090609	A	6/9/09 8:45	6/10/09 8:36	4.52	4.05	0.44
		B			4.50	4.10	
WC01	20090609	A	6/9/09 10:12	6/10/09 10:10	6.30	6.00	0.29
		B			6.35	6.08	
TS03	20090609	A	6/9/09 11:12	6/10/09 10:59	7.85	7.31	0.53
		B			7.80	7.28	
TS02	20090609	A	6/9/09 12:10	6/10/09 12:04	7.50	7.05	0.54
		B			7.43	6.80	
TS01	20090609	A	6/9/09 12:56	6/10/09 12:53	7.65	7.68	0.15
		B			7.62	7.30	
WR01	20090610	A	6/10/09 9:54	6/11/09 9:41	6.00	5.09	0.93
		B			5.98	5.05	
WR03	20090610	A	6/10/09 10:35	6/11/09 10:26	5.32	4.00	1.35
		B			5.41	4.05	
WR04	20090610	A	6/10/09 11:19	6/11/09 11:06	5.09	2.79	2.43
		B			5.11	2.60	
WR05	20090610	A	6/10/09 13:15	6/11/09 13:10	6.12	3.95	1.97
		B			5.89	4.13	
WR02	20090610	A	6/10/09 14:00	6/11/09 13:57	7.18	4.30	3.03
		B			7.31	4.15	
MR01	20090610	A	6/10/09 15:06	6/11/09 14:59	7.13	5.59	1.50

TABLE F-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
EASTERN BAY AND TANGIER SOUND: MINI-SONE
WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
($g\ O_2\ m^{-3}\ d^{-1}$)

EASTERN BAY AND TANGIER SOUND CRUISE: 1
FILENAME: TMDLEBTSWK01
REVISED: 20110203

T_I : TIME INITIAL
T_F : TIME FINAL

STATION	DATE	SAMPLE	DATE/TIME T_I	DATE/TIME T_F	DO ($mg\ l^{-1}$) T_I	DO ($mg\ l^{-1}$) T_F	Respiration Rate ($g\ O_2\ m^{-3}\ day^{-1}$)
		B			7.15	5.70	
MR02	20090610	A	6/10/09 15:57	6/11/09 15:34	6.60	4.50	2.14
		B			6.52	4.40	
MR03	20090610	A	6/10/09 16:40	6/11/09 15:34	6.00	4.29	1.84
		B			6.18	4.38	
EB04	20090611	A	6/11/09 7:08	6/12/09 8:28	6.31	5.59	0.70
		B			6.27	5.51	
EB03	20090611	A	6/11/09 8:01	6/12/09 8:28	8.28	7.03	1.20
		B			8.19	7.00	
EB02	20090611	A	6/11/09 8:47	6/12/09 10:24	7.95	7.00	0.90
		B			8.00	7.02	
EB01	20090611	A	6/11/09 10:03	6/12/09 10:24	8.00	6.58	1.34
		B			7.90	6.60	

TABLE F-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
EASTERN BAY AND TANGIER SOUND: MINI-SONE
WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
($g\ O_2\ m^{-3}\ d^{-1}$)

EASTERN BAY AND TANGIER SOUND CRUISE: 2
FILENAME: TMDLEBTSWK02
REVISED: 20090803

T_I : TIME INITIAL
T_F : TIME FINAL

STATION	DATE	SAMPLE	DATE/TIME T_I	DATE/TIME T_F	DO ($mg\ l^{-1}$) T_I	DO ($mg\ l^{-1}$) T_F	Respiration Rate ($g\ O_2\ m^{-3}\ day^{-1}$)
HG03	20090713	A	7/13/09 9:12	7/14/09 8:52	6.93	6.18	0.66
		B			6.83	6.28	
HG02	20090713	A	7/13/09 9:58	7/14/09 9:51	6.84	6.32	0.37
		B			6.99	6.78	
HG01	20090713	A	7/13/09 11:03	7/14/09 10:51	7.20	6.41	0.77
		B			7.15	6.42	
FB02	20090713	A	7/13/09 12:16	7/14/09 12:11	7.03	5.92	1.11
		B			7.10	5.99	
FB01	20090713	A	7/13/09 13:02	7/14/09 12:56	7.28	6.67	0.64
		B			7.25	6.58	
NC02	20090713	A	7/13/09 14:58	7/14/09 14:54	6.08	5.45	0.66
		B			6.08	5.40	
NC01	20090713	A	7/13/09 15:53	7/14/09 16:19	8.38	6.98	1.28
		B			8.31	7.10	
WC02	20090714	A	7/14/09 8:24	7/15/09 8:20	5.58	5.09	0.48
		B			5.51	5.05	
WC01	20090714	A	7/14/09 9:05	7/15/09 8:56	7.07	6.18	1.00
		B			7.20	6.10	
TS03	20090713	A	7/13/09 13:47	7/14/09 13:51	7.40	6.68	0.71
		B			7.42	6.72	
TS02	20090714	A	7/14/09 10:30	7/15/09 10:21	6.61	6.29	0.43
		B			6.68	6.15	
TS01	20090714	A	7/14/09 11:20	7/15/09 11:31	7.15	6.55	0.50
		B			7.07	6.67	
WR01	20090715	A	7/15/09 9:45	7/16/09 9:33	6.28	5.11	1.21
		B			6.37	5.15	
WR03	20090715	A	7/15/09 10:34	7/16/09 10:22	8.35	4.95	3.35
		B			8.23	4.99	
WR04	20090715	A	7/15/09 11:17	7/16/09 11:14	6.72	4.61	2.09
		B			6.81	4.75	
WR05	20090715	A	7/15/09 13:06	7/16/09 13:01	8.62	5.36	3.26
		B			8.65	5.41	
WR02	20090715	A	7/15/09 13:54	7/16/09 13:55	6.46	5.31	1.20
		B			6.25	5.00	
MR01	20090715	A	7/15/09 14:50	7/16/09 14:52	8.45	7.32	1.37
		B			8.48	6.87	
MR02	20090715	A	7/15/09 15:32	7/16/09 15:34	7.06	5.29	1.85

TABLE F-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
EASTERN BAY AND TANGIER SOUND: MINI-SONE
WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
($g\ O_2\ m^{-3}\ d^{-1}$)

EASTERN BAY AND TANGIER SOUND CRUISE: 2
FILENAME: TMDLEBTSWK02
REVISED: 20090803

T_I : TIME INITIAL
T_F : TIME FINAL

STATION	DATE	SAMPLE	DATE/TIME T_I	DATE/TIME T_F	DO ($mg\ l^{-1}$) T_I	DO ($mg\ l^{-1}$) T_F	Respiration Rate ($g\ O_2\ m^{-3}\ day^{-1}$)
		B			7.62	5.69	
MR03	20090715	A	7/15/09 16:13	7/16/09 16:17	6.73	4.69	2.39
		B			7.38	4.62	
EB04	20090716	A	7/16/09 7:03	7/17/09 8:08	6.08	4.80	1.14
		B			6.00	4.90	
EB03	20090716	A	7/16/09 7:49	7/17/09 8:08	7.10	6.08	1.02
		B			7.05	6.01	
EB02	20090716	A	7/16/09 8:36	7/17/09 8:08	6.91	5.88	1.09
		B			7.00	5.90	
EB01	20090716	A	7/16/09 9:20	7/17/09 10:19	6.25	5.65	0.66
		B			6.32	5.54	

TABLE F-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
EASTERN BAY AND TANGIER SOUND: MINI-SONE
WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
($g\ O_2\ m^{-3}\ d^{-1}$)

EASTERN BAY AND TANGIER SOUND CRUISE: 3
FILENAME: TMDLEBTSWK03
REVISED: 20100623

T_I : TIME INITIAL
T_F : TIME FINAL

STATION	DATE	SAMPLE	DATE/TIME T_I	DATE/TIME T_F	DO ($mg\ l^{-1}$) T_I	DO ($mg\ l^{-1}$) T_F	Respiration Rate ($g\ O_2\ m^{-3}\ day^{-1}$)
HG03	20090810	A	8/10/09 8:56	8/11/09 8:50	7.18	6.61	0.60
		B			7.15	6.52	
HG02	20090810	A	8/10/09 9:50	8/11/09 9:50	6.48	5.97	0.41
		B			6.52	6.22	
HG01	20090810	A	8/10/09 10:42	8/11/09 10:41	7.51	6.50	0.95
		B			7.41	6.52	
FB02	20090810	A	8/10/09 23:51	8/11/09 23:46	7.07	6.16	1.05
		B			7.08	5.90	
FB01	20090810	A	8/10/09 12:52	8/11/09 12:56	7.50	6.68	0.83
		B			7.44	6.60	
NC02	20090810	A	8/10/09 15:15	8/11/09 15:05	5.89	5.89	0.00
		B			5.99	5.99	
NC01	20090810	A	8/10/09 14:27	8/11/09 14:24	7.01	6.80	0.26
		B			7.05	6.74	
WC02	20090811	A	8/11/09 8:35	8/12/09 8:15	6.28	5.01	1.03
		B			6.09	5.32	
WC01	20090811	A	8/11/09 9:28	8/12/09 9:15	6.31	5.93	0.61
		B			6.42	5.60	
TS03	20090810	A	8/10/09 13:41	8/11/09 13:48	7.38	7.10	0.26
		B			7.37	7.12	
TS02	20090811	A	8/11/09 10:28	8/12/09 10:25	7.20	6.14	1.04
		B			7.20	6.18	
TS01	20090811	A	8/11/09 11:12	8/12/09 11:05	7.43	5.83	1.30
		B			7.49	6.51	
WR01	20090812	A	8/12/09 9:50	8/13/09 9:44	6.18	4.39	1.53
		B			5.77	4.52	
WR03	20090812	A	8/12/09 10:57	8/13/09 10:54	6.20	4.40	2.03
		B			6.71	4.46	
WR04	20090812	A	8/12/09 11:52	8/13/09 11:50	7.20	1.32	6.08
		B			7.28	1.01	
WR05	20090812	A	8/12/09 14:01	8/13/09 13:54	7.90	4.29	3.62
		B			7.87	4.28	
WR02	20090812	A	8/12/09 13:02	8/13/09 13:00	8.12	5.01	3.36
		B			8.48	4.88	
MR01	20090813	A	8/13/09 6:37	8/14/09 9:13	6.50	5.02	1.56
		B			6.61	4.63	
MR02	20090812	A	8/12/09 15:31	8/13/09 15:24	8.54	4.95	3.68

TABLE F-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
EASTERN BAY AND TANGIER SOUND: MINI-SONE
WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
($g\ O_2\ m^{-3}\ d^{-1}$)

EASTERN BAY AND TANGIER SOUND CRUISE: 3
FILENAME: TMDLEBTSWK03
REVISED: 20100623

T_I : TIME INITIAL
T_F : TIME FINAL

STATION	DATE	SAMPLE	DATE/TIME T_I	DATE/TIME T_F	DO ($mg\ l^{-1}$) T_I	DO ($mg\ l^{-1}$) T_F	Respiration Rate ($g\ O_2\ m^{-3}\ day^{-1}$)
		B			8.62	4.89	
MR03	20090812	A	8/12/09 16:16	8/13/09 16:13	10.99	5.83	4.54
		B			10.53	6.62	
EB04	20090813	A	8/13/09 7:48	8/14/09 9:15	5.91	4.43	1.28
		B			5.73	4.50	
EB03	20090813	A	8/13/09 8:32	8/14/09 9:16	6.58	5.62	0.96
		B			6.49	5.48	
EB02	20090813	A	8/13/09 9:13	8/14/09 9:17	6.68	5.30	1.50
		B			6.67	5.05	
EB01	20090813	A	8/13/09 10:05	8/14/09 10:01	6.09	5.89	0.19
		B			6.35	6.18	