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MONITORING OF SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S COASTAL BAYS IN SUPPORT OF TMDL DEVELOPMENT

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Monitoring of Sediment Oxygen and Nutrient Exchanges in Maryland's Coastal Bays in Support of TMDL Development

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INTRODUCTION

1.1. Background

During the past fifteen years the Ecosystems Processes Component (EPC) of the Chesapeake Bay Water Quality Monitoring Program has 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). Evaluation of these nutrient loadings (via exchanges between sediment and the water column) as well as the loadings of other pollutants provides the information necessary to diagnose the apparent 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 1996 303(d) list submitted to EPA by the Maryland Department of the Environment lists several Chesapeake Bay eastern shore rivers as being impaired by nutrients, sediments, fecal coliform bacteria and low dissolved oxygen.

The Maryland Department of the Environment (MDE) is in the process of developing numerous TMDL assessments for the Maryland Coastal Bays. This process involves extensive 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

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 2003 at twenty one stations in Maryland's Coastal Bays. These measurements were made in conjunction with other efforts in the development of TMDLs for these estuaries.

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

2.1. Location of TMDL Stations

Twenty one stations were located in Maryland's Coastal Bays (Figure 2-1, Table 2-1). Fourteen of these stations were located in the northern bays including Assawoman Bay, Grey's Creek, St. Martin River, Isle of Wight Bay, Manklin Creek, Turville Creek and Herring Creek. Seven stations were located in the southern bays including Newport Bay, Sinepuxent Bay, Marshal Creek and Trappe Creek. At all twenty one 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. Estimates of water column respiration were made at ten of the twenty one stations.

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 2003.

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) 600R or 6920 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 one TMDL stations sampled in Maryland's Coastal Bays.

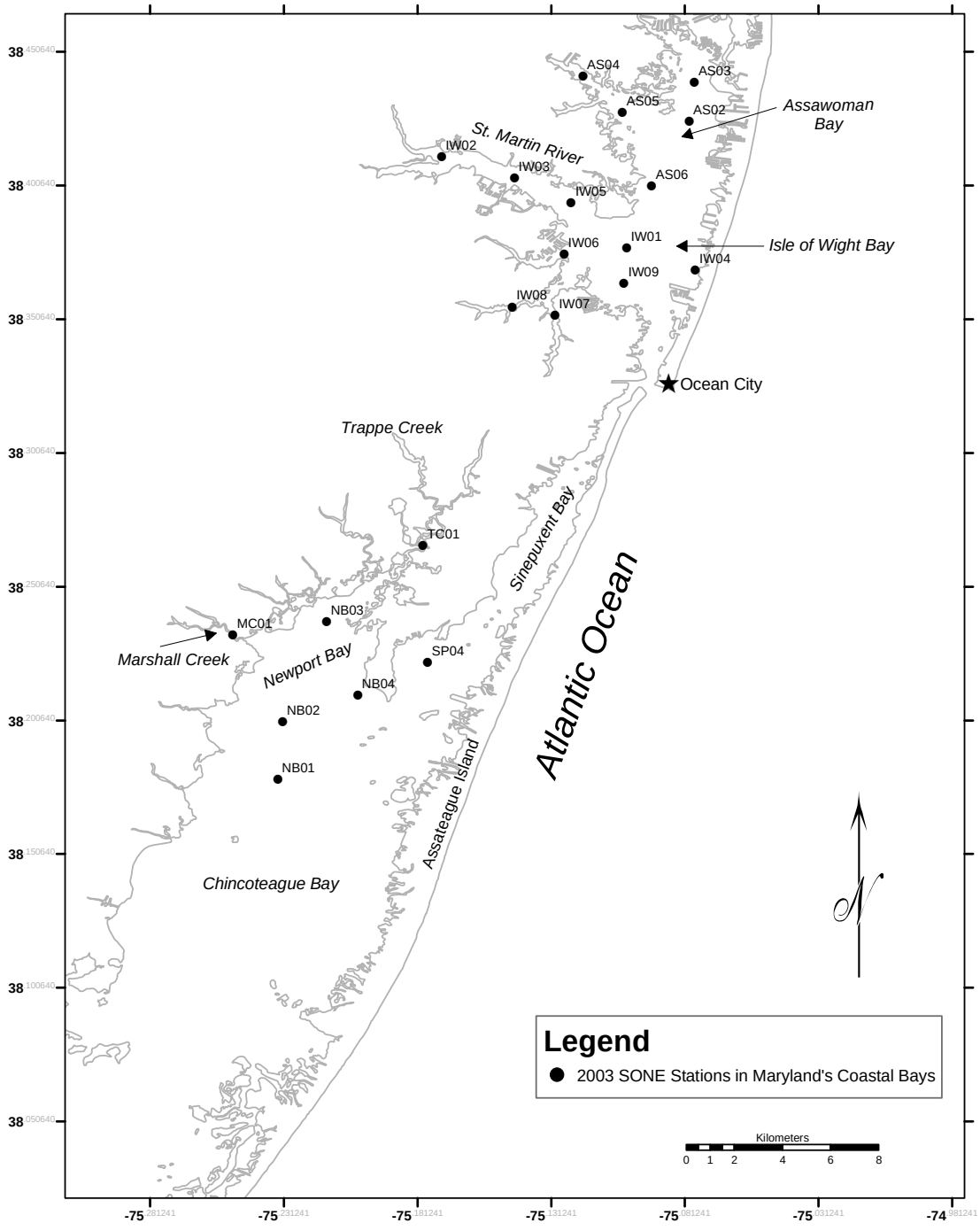


Table 2-1. TMDL Station Code, Grid Locations and Mean Depths (m).
Datum NAD 83
* Water column respiration stations.
Latitude and longitude values are expressed as decimal degrees.

Station	Tributary	Latitude Decimal Degrees	Longitude Decimal Degrees	Mean Depth (m)
AS02	Assawoman Bay	38.4245°N	75.0797°W	1.5
AS03*	Assawoman Bay	38.4393°N	75.0777°W	1.9
AS06*	Assawoman Bay	38.4004°N	75.0937°W	1.9
AS04*	Grey's Creek	38.4415°N	75.1194°W	0.9
AS05	Grey's Creek	38.4280°N	75.1046°W	1.4
IW02*	St. Martin River	38.4113°N	75.1723°W	1.1
IW03	St. Martin River	38.4035°N	75.1449°W	1.7
IW05*	St. Martin River	38.3943°N	75.1238°W	1.9
IW01	Isle of Wight Bay	38.3774°N	75.1030°W	2.1
IW04	Isle of Wight Bay	38.3690°N	75.0774°W	0.8
IW09*	Isle of Wight Bay	38.3639°N	75.1041°W	0.7
IW06	Manklin Creek	38.3750°N	75.1264°W	2.0
IW07	Herring Creek	38.3521°N	75.1299°W	1.3
IW08*	Turville Creek	38.3552°N	75.1458°W	1.0
MC01	Marshall Creek	38.2327°N	75.2503°W	0.8
NB01*	Newport Bay	38.1786°N	75.2335°W	2.0
NB02	Newport Bay	38.2001°N	75.2317°W	2.0
NB03*	Newport Bay	38.2376°N	75.2152°W	1.9
NB04	Newport Bay	38.2099°N	75.2036°W	1.5
SP04	Sinepuxent Bay	38.2223°N	75.1775°W	2.0
TC01*	Trappe Creek	38.2659°N	75.1792°W	1.5

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

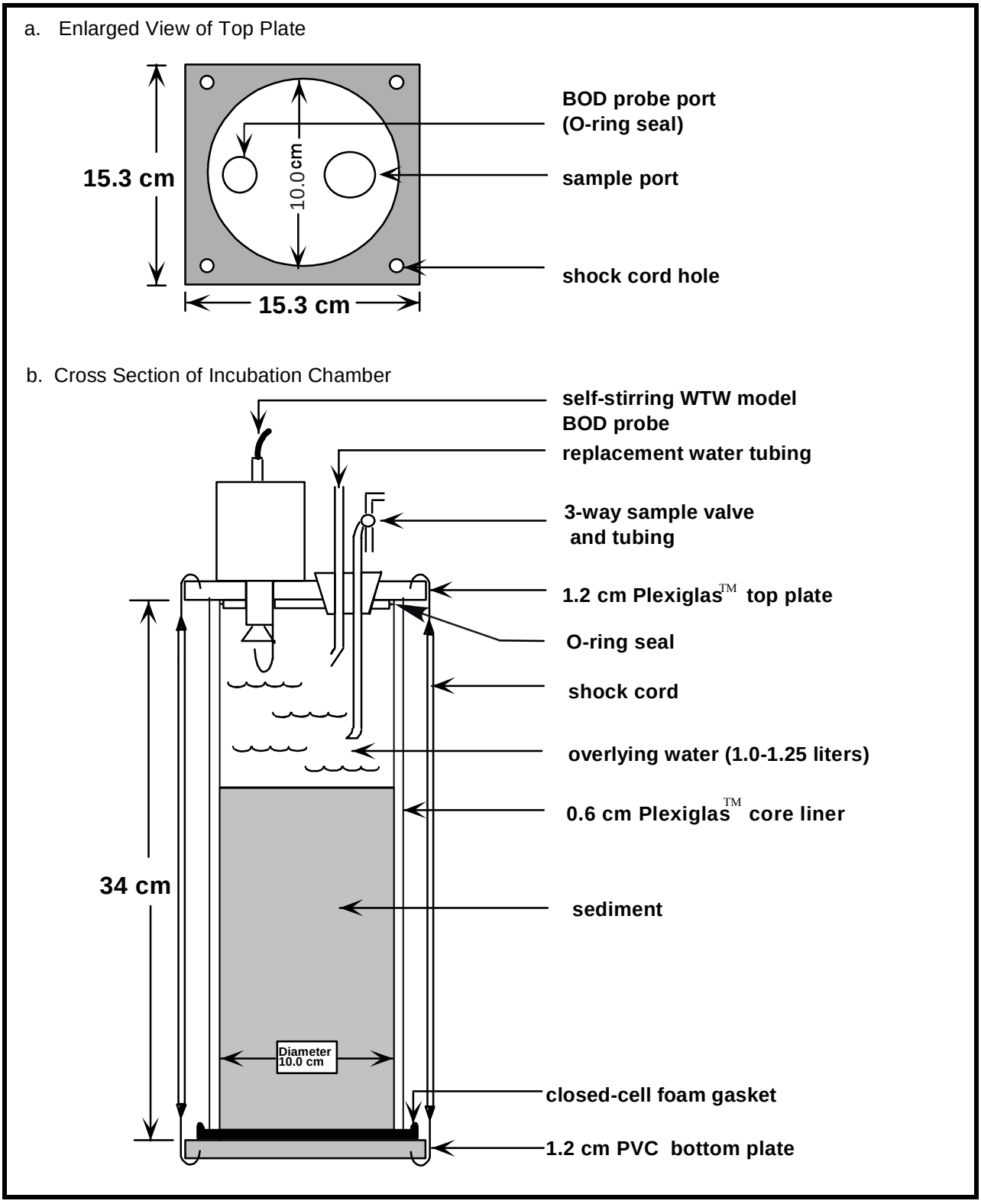
The protocols used in TMDL flux estimates included a single sediment core with no blank. An intact sediment core constituted a benthic microcosm where changes in oxygen, nutrient and other compound concentrations were determined over a fixed incubation time.

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 titration analysis.

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) and the National Park Service (NPS). 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 and experimental run all the necessary equipment involved in the collection of water and sediment samples, incubation of sediment cores and collection of physical water quality data 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 Aries). 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 the course of 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 physical 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. Coastal Bays TMDL Data Sets

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

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

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

SEDIMENT PROFILES (Filename: **TMDLCBSPxx**, 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: **TMDLCBCDxx**, Appendix D) lists dissolved oxygen and nutrient measurements in MINI-SONE sediment-water flux chambers.

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

WATER COLUMN RESPIRATION (Filename: **TMDLCBWKxx**, 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 2000. 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 D'Elia *et al*. (1997) for specific details 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). The most recent inter-comparison (November 1995) confirmed all parameters routinely analyzed by these laboratories as part of the Chesapeake Bay Monitoring Program. Samples from various salinities and nutrient regimes were analyzed under this exercise.

- 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 EPC 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 the EPC group. This procedure was also carried out for other parameters

performed by the laboratory in support of the EPC effort. Details of precision and limits of detection for the variables are given in D'Elia *et al.* (1997).

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 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 (ml)
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".

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

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APPENDICES A-F
Maryland's Coastal Bays, 2003

TMDL Data Sets

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

This table is added here for reference.

Station	Tributary	Latitude Decimal Degrees	Longitude Decimal Degrees	Mean Depth (m)
AS02	Assawoman Bay	38.4245°N	75.0797°W	1.5
AS03*	Assawoman Bay	38.4393°N	75.0777°W	1.9
AS06*	Assawoman Bay	38.4004°N	75.0937°W	1.9
AS04*	Grey's Creek	38.4415°N	75.1194°W	0.9
AS05	Grey's Creek	38.4280°N	75.1046°W	1.4
IW02*	St. Martin River	38.4113°N	75.1723°W	1.1
IW03	St. Martin River	38.4035°N	75.1449°W	1.7
IW05*	St. Martin River	38.3943°N	75.1238°W	1.9
IW01	Isle of Wight Bay	38.3774°N	75.1030°W	2.1
IW04	Isle of Wight Bay	38.3690°N	75.0774°W	0.8
IW09*	Isle of Wight Bay	38.3639°N	75.1041°W	0.7
IW06	Manklin Creek	38.3750°N	75.1264°W	2.0
IW07	Herring Creek	38.3521°N	75.1299°W	1.3
IW08*	Turville Creek	38.3552°N	75.1458°W	1.0
MC01	Marshall Creek	38.2327°N	75.2503°W	0.8
NB01*	Newport Bay	38.1786°N	75.2335°W	2.0
NB02	Newport Bay	38.2001°N	75.2317°W	2.0
NB03*	Newport Bay	38.2376°N	75.2152°W	1.9
NB04	Newport Bay	38.2099°N	75.2036°W	1.5
SP04	Sinepuxent Bay	38.2223°N	75.1775°W	2.0
TC01*	Trappe Creek	38.2659°N	75.1792°W	1.5

Table 3-1. Analysis Problem Codes

This table is added here 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

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S COASTAL BAYS TMDL DATA SET, 2003:

Page No.

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBPF01
REVISED: 20040506

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	GEAR CODE	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
AS02	20030709	YY	1.5	0.3		0.5	28.9	38.9	22.8	6.18	90.9
						1.0	28.8	38.9	22.8	5.92	47.2
AS03	20030709	8:40	2.0	0.3		0.5	28.9	37.7	22.0	5.68	83.3
						1.0	28.8	37.7	22.0	5.64	82.7
						1.5	28.7	37.9	22.2	5.32	77.9
AS04	20030709	11:25	0.9	0.3		0.5	30.1	35.2	19.9	7.43	109.8
AS05	20030709	12:25	1.4	0.3		0.5	30.1	38.1	21.7	8.03	119.9
						1.0	28.9	39.0	22.8	7.10	104.7
AS06	20030709	13:13	1.9	0.3		0.5	30.1	40.4	23.2	8.49	127.8
						1.0	30.1	40.5	23.2	8.49	127.9
						1.5	29.0	41.1	24.2	7.35	109.3
IW01	20030710	10:10	2.3	0.3		0.5	26.2	43.2	27.1	5.55	87.6
						1.0	25.9	43.4	27.4	5.25	82.6
						1.5	25.5	43.7	27.9	5.09	79.6
						2.0	25.0	43.8	28.2	5.39	83.8
IW02	20030709	15:10	1.2	0.2		0.5	30.8	37.3	20.9	10.31	155.1
IW03	20030709	16:10	1.8	0.2		0.5	29.5	41.6	24.2	8.14	122.2
						1.0	29.5	41.6	24.2	8.14	122.1
						1.5	29.4	41.6	24.3	8.09	121.2
IW04	20030710	9:07	1.0	0.3		0.5	25.2	43.8	28.1	5.65	88.1
IW05	20030709	17:06	2.0	0.3		0.5	27.9	43.3	26.3	7.33	108.2
						1.0	27.9	43.4	26.2	7.51	110.9
						1.5	27.9	43.4	26.3	7.55	111.5
IW06	20030710	11:06	2.1	0.4		0.5	27.0	43.5	26.9	5.53	88.7
						1.0	27.0	43.5	26.9	5.48	87.9
						1.5	26.2	43.8	27.6	3.67	58.2
IW07	20030709	19:58	1.5	0.3		0.5	28.8	44.7	26.6	8.25	137.0
						1.0	28.7	44.7	26.7	8.09	134.2

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBPF01
REVISED: 20040506

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	GEAR CODE	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
IW08	20030709	19:01	1.1	0.2		0.5	30.7	43.1	24.6	9.36	158.7
IW09	20030710	11:55	0.8	0.4		0.5	25.8	43.4	27.4	6.50	93.3
MC01	20030708	16:57	0.8	0.2		0.5	31.1	38.4	21.1	10.08	152.6
NB01	20030708	9:31	2.0	0.4		0.5	28.7	43.4	25.8	6.71	100.2
						1.0	28.7	43.4	25.8	6.74	100.6
						1.5	28.6	43.4	25.8	6.76	100.8
NB02	20030708	10:42	2.0	0.3		0.5	28.9	42.7	25.3	6.47	96.6
						1.0	28.9	42.7	25.3	6.45	96.3
						1.5	28.9	42.7	25.3	6.48	96.7
NB03	20030708	12:16	1.8	0.4		0.5	29.6	41.2	23.9	7.30	109.4
						1.0	29.6	41.2	23.9	7.38	110.7
						1.5	29.5	41.3	24.0	7.30	109.3
NB04	20030708	15:44	1.5	0.2		0.5	30.0	45.4	26.4	7.67	117.5
						1.0	30.0	45.4	26.4	7.77	119.0
SP04	20030708	18:37	2.1	0.3		0.5	30.1	46.1	26.8	7.93	121.9
						1.0	30.1	46.1	26.8	8.02	123.2
						1.5	30.1	46.1	26.8	8.16	125.4
TC01	20030708	13:26	1.7	0.3		0.5	29.9	26.2	14.5	6.88	98.4
						1.0	30.0	26.8	14.7	7.35	105.5
						1.5	30.0	27.1	14.9	7.50	107.9

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBPF02
REVISED: 20040506

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	GEAR CODE	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
AS02	20030723	9:00	1.5	0.3		0.5	26.2	40.9	25.6	6.11	87.1
						1.0	26.0	42.1	26.5	5.92	48.4
AS03	20030723	8:12	1.9	0.2		0.5	26.5	38.5	23.7	5.72	81.3
						1.0	26.5	38.5	23.7	5.69	80.9
						1.5	26.5	38.5	23.7	5.63	80.0
AS04	20030723	10:24	0.9	0.2		0.5	27.1	35.3	21.2	5.74	81.4
AS05	20030723	9:42	1.4	0.2		0.5	26.6	39.7	24.5	5.92	84.7
						1.0	26.6	39.9	24.6	5.70	81.6
AS06	20030723	12:22	1.9	0.3		0.5	26.6	41.5	25.6	5.65	81.4
						1.0	26.6	41.4	25.7	5.61	80.8
						1.5	26.6	41.4	25.7	5.61	80.8
IW01	20030724	9:11	2.0	0.2		0.5	25.4	41.4	26.3	5.79	81.9
						1.0	25.4	41.4	26.3	5.76	81.5
						1.5	25.4	41.4	26.3	5.73	81.1
IW02	20030723	13:28	1.0	0.2		0.5	28.1	26.3	15.0	6.52	90.8
IW03	20030723	14:18	1.6	0.2		0.5	27.6	33.8	20.1	7.56	107.4
						1.0	27.4	37.1	22.3	6.12	87.7
IW04	20030723	8:25	0.7	0.3		0.5	22.7	41.7	28.1	6.52	88.9
IW05	20030723	15:54	1.9	0.2		0.5	27.0	41.6	25.5	6.87	99.6
						1.0	27.0	41.6	25.5	6.85	99.3
						1.5	27.0	41.6	25.5	6.83	99.0
IW06	20030724	9:56	2.0	0.3		0.5	26.1	41.9	26.2	5.13	73.5
						1.0	26.1	41.9	26.2	5.13	73.5
						1.5	26.1	41.9	26.2	5.03	72.0
IW07	20030723	17:54	1.3	0.2		0.5	27.0	41.8	25.6	7.99	115.9
IW08	20030723	17:02	0.9	0.2		0.5	27.6	37.2	22.2	9.27	133.3
IW09	20030724	10:36	0.7	0.3		0.5	24.5	41.7	27.0	6.70	93.8

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBPF02
REVISED: 20040506

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	GEAR CODE	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
MC01	20030722	14:30	1.0	0.2		0.5	30.2	31.2	17.3	8.39	122.6
NB01	20030722	9:04	2.1	0.1		0.5	27.0	42.7	26.3	6.14	89.3
						1.0	27.0	42.7	26.3	6.23	90.6
						1.5	27.0	42.7	26.3	6.28	91.4
NB02	20030722	10:27	2.1	0.1		0.5	27.1	41.6	25.5	6.11	88.6
						1.0	27.1	41.6	25.5	6.15	89.2
						1.5	27.1	41.6	25.5	6.16	89.3
NB03	20030722	11:24	1.9	0.1		0.5	27.2	41.3	25.2	5.90	85.6
						1.0	27.2	41.3	25.2	5.90	85.6
						1.5	27.2	41.3	25.3	5.97	86.6
NB04	20030724	13:32	1.5	0.2		0.5	25.7	41.0	25.8	7.86	111.6
						1.0	25.7	41.0	25.8	7.81	110.9
SP04	20030724	12:37	1.9	0.2		0.5	25.1	41.0	26.2	6.89	97.0
						1.0	25.1	41.0	26.2	6.87	96.7
						1.5	25.1	41.0	26.2	6.89	97.0
TC01	20030722	13:18	1.1	0.2		0.5	28.8	36.9	21.5	8.41	122.8

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBPF03
REVISED: 20040506

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	GEAR CODE	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
AS02	20030820	9:23	1.4	0.4		0.5	27.1	41.4	25.3	8.53	123.2
						1.0	26.9	41.7	25.7	7.84	63.8
AS03	20030820	8:35	1.8	0.3		0.5	26.9	40.1	24.6	7.54	108.5
						1.0	27.0	40.6	24.8	6.97	100.6
						1.5	27.1	40.9	25.0	6.33	91.6
AS04	20030820	10:13	0.8	0.2		0.5	28.9	38.5	22.5	7.89	116.1
AS05	20030820	11:03	1.4	0.3		0.5	28.2	41.0	24.4	9.42	138.5
						1.0	27.7	43.0	26.1	6.47	95.1
AS06	20030820	12:55	1.9	0.3		0.5	27.8	43.8	26.7	9.11	134.6
						1.0	27.7	43.9	26.7	8.94	132.0
						1.5	27.6	43.8	26.7	8.85	130.5
IW01	20030821	9:15	2.0	0.3		0.5	26.3	44.3	27.8	6.91	100.2
						1.0	26.2	44.3	27.8	6.89	99.8
						1.5	26.2	44.5	27.9	6.30	91.3
IW02	20030820	13:53	1.2	0.2		0.5	30.5	33.0	18.4	11.59	171.1
						1.0	29.9	35.1	19.9	6.83	100.7
IW03	20030820	14:42	1.7	0.3		0.5	29.0	41.4	24.3	9.79	145.8
						1.0	29.0	41.3	24.3	9.67	143.8
						1.5	28.9	41.4	24.4	9.49	141.1
IW04	20030821	8:24	0.6	0.5		0.5	25.0	46.4	30.1	6.57	94.5
IW05	20030820	15:29	1.9	0.3		0.5	28.1	44.8	27.2	9.16	136.4
						1.0	28.1	44.8	27.1	9.00	134.0
						1.5	28.0	44.8	27.2	8.72	129.6
IW06	20030821	9:58	1.9	0.3		0.5	27.2	44.9	27.7	7.32	107.6
						1.0	26.9	44.7	27.7	6.72	98.5
						1.5	26.7	44.7	27.8	5.37	78.4
IW07	20030820	17:53	1.2	0.3		0.5	29.1	47.0	27.9	10.79	164.2
IW08	20030820	17:07	0.9	0.2		0.5	30.9	44.1	25.1	12.13	187.0

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBPF03
REVISED: 20040506

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	GEAR CODE	SAMPLE DEPTH (m)	TEMP (^{o}C)	COND (mS cm^{-1})	SALIN	DO (mg l^{-1})	DO SAT (%)
IW09	20030821	10:43	0.5	0.3		0.5	27.0	46.1	28.6	7.70	113.5
MC01	20030819	14:22	0.5	0.1		0.5	30.0	27.7	15.3	11.72	168.9
NB01	20030819	8:43	2.0	0.4		0.5	26.4	43.4	27.1	7.98	115.5
						1.0	26.4	43.4	27.2	7.94	114.9
						1.5	26.4	43.4	27.2	7.90	114.3
NB02	20030819	9:58	2.0	0.3		0.5	26.8	42.5	26.3	8.76	127.0
						1.0	26.7	42.4	26.3	8.64	125.1
						1.5	26.6	42.4	26.3	8.21	118.7
NB03	20030819	11:44	1.9	0.3		0.5	27.5	42.0	25.5	8.63	126.0
						1.0	27.5	41.9	25.5	8.65	126.3
						1.5	27.3	41.8	25.5	7.29	106.1
NB04	20030819	10:39	1.4	0.3		0.5	27.1	42.1	25.8	7.92	115.1
						1.0	27.0	42.0	25.8	7.85	114.0
SP04	20030819	15:20	2.0	0.3		0.5	27.9	46.3	28.2	9.28	138.6
						1.0	27.8	46.2	28.2	9.26	138.1
						1.5	27.7	46.2	28.2	9.16	136.4
TC01	20030819	13:19	1.6	0.2		0.5	28.1	32.9	19.2	10.00	142.6
						1.0	27.8	33.0	19.4	9.00	127.8

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S COASTAL BAYS TMDL DATA SET, 2003:

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TABLE B-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN NUTRIENTS: Dissolved nutrient concentrations in bottom waters.

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBNT01
REVISED: 20040506

					DISSOLVED NUTRIENTS			
STATION	DATE	TOTAL DEPTH (m)	SAMPLE DEPTH (m)	SAMPLE #	NH_4^+ (µM)	NO_2^- (µM)	NO_2^-+NO_3^- (µM)	CORR DIP (µM)
AS02	20030709	1.5	1.0	AS02	0.71	0.07	0.13	0.10
AS03	20030709	2.0	1.5	AS03	0.79	0.05	0.49	0.12
AS04	20030709	0.9	0.5	AS04	1.29	0.13	0.13	0.11
AS05	20030709	1.4	1.0	AS05	0.43	0.08	0.97	0.14
AS06	20030709	1.9	1.5	AS06	3.36	0.11	0.22	0.32
IW01	20030710	2.3	2.0	IW01	7.79	0.13	0.53	0.75
IW02	20030709	1.2	0.5	IW02	1.00	0.16	0.19	0.31
IW03	20030709	1.8	1.5	IW03	1.21	0.06	0.74	0.34
IW04	20030710	1.0	0.5	IW04	0.43	0.06	0.11	0.14
IW05	20030709	2.0	1.5	IW05	0.57	0.06	0.10	0.26
IW06	20030710	2.1	1.5	IW06	9.79	0.07	0.24	1.13
IW07	20030709	1.5	1.0	IW07	0.43	0.04	0.29	0.28
IW08	20030709	1.1	0.5	IW08	0.86	0.08	0.35	0.25
IW09	20030710	0.8	0.5	IW09	0.64	0.06	0.20	0.29
MC01	20030708	0.8	0.5	MC01	0.79	0.08	0.17	0.14
NB01	20030708	2.0	1.5	NB01	1.43	0.11	0.13	0.14
NB02	20030708	2.0	1.5	NB02	0.86	0.04	0.43	0.12
NB03	20030708	1.8	1.5	NB03	0.79	0.07	0.36	0.09
NB04	20030708	1.5	1.0	NB04	0.93	0.11	0.39	0.15
SP04	20030708	2.1	1.5	SP04	0.71	0.08	0.18	0.24
TC01	20030708	1.7	1.5	TC01	1.07	0.11	0.09	0.13

TABLE B-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN NUTRIENTS: Dissolved nutrient concentrations in bottom waters.

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBNT02
REVISED: 20040506

					DISSOLVED NUTRIENTS			
STATION	DATE	TOTAL DEPTH (m)	SAMPLE DEPTH (m)	SAMPLE #	NH_4^+ (µM)	NO_2^- (µM)	NO_2^-+NO_3^- (µM)	CORR DIP (µM)
AS02	20030723	1.5	1.0	AS02	0.50	0.02	0.15	0.09
AS03	20030723	1.9	1.5	AS03	0.64	0.02	0.12	0.05
AS04	20030723	0.9	0.5	AS04	0.57	0.02	0.13	0.14
AS05	20030723	1.4	1.0	AS05	0.43	0.01	0.12	0.06
AS06	20030723	1.9	1.5	AS06	1.00	0.09	1.85	0.17
IW01	20030724	2.0	1.5	IW01	5.00	0.05	0.33	0.76
IW02	20030723	1.0	0.5	IW02	1.21	0.08	0.15	0.42
IW03	20030723	1.6	1.0	IW03	0.93	0.09	0.22	0.42
IW04	20030723	0.7	0.5	IW04	0.57	0.05	0.23	0.51
IW05	20030723	1.9	1.5	IW05	0.64	0.03	0.15	0.51
IW06	20030724	2.0	1.5	IW06	0.64	0.00	0.14	0.90
IW07	20030723	1.3	0.5	IW07	0.86	0.03	0.18	0.55
IW08	20030723	0.9	0.5	IW08	0.71	0.05	0.15	0.24
IW09	20030724	0.7	0.5	IW09	0.43	0.01	0.14	0.75
MC01	20030722	1.0	0.5	MC01	1.07	0.10	0.16	0.20
NB01	20030722	2.1	1.5	NB01	2.00	0.20	0.15	0.22
NB02	20030722	2.1	1.5	NB02	1.50	0.16	0.39	0.49
NB03	20030722	1.9	1.5	NB03	6.50	1.06	0.29	0.25
NB04	20030724	1.5	1.0	NB04	0.93	0.08	0.16	0.41
SP04	20030724	1.9	1.5	SP04	0.57	0.01	0.54	0.37
TC01	20030722	1.1	0.5	TC01	0.43	0.09	0.15	0.14

TABLE B-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
WATER COLUMN NUTRIENTS: Dissolved nutrient concentrations in bottom waters.

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBNT03
REVISED: 20040506

					DISSOLVED NUTRIENTS			
STATION	DATE	TOTAL DEPTH (m)	SAMPLE DEPTH (m)	SAMPLE #	NH_4^+ (µM)	NO_2^- (µM)	NO_2^-+NO_3^- (µM)	CORR DIP (µM)
AS02	20030820	1.4	1.0	AS02	3.10	0.02	0.14	0.14
AS03	20030820	1.8	1.5	AS03	3.10	0.07	0.40	0.16
AS04	20030820	0.8	0.5	AS04	3.40	0.06	0.16	0.16
AS05	20030820	1.4	1.0	AS05	2.20	0.06	0.15	0.10
AS06	20030820	1.9	1.5	AS06	1.40	0.08	0.11	0.12
IW01	20030821	2.0	1.5	IW01	2.10	0.11	0.16	0.21
IW02	20030820	1.2	1.0	IW02	3.90	0.08	0.15	0.28
IW03	20030820	1.7	1.5	IW03	2.90	0.04	0.44	0.11
IW04	20030821	0.6	0.5	IW04	1.40	0.04	0.07	0.24
IW05	20030820	1.9	1.5	IW05	0.60	0.06	0.10	0.16
IW06	20030821	1.9	1.5	IW06	2.10	0.04	0.13	0.48
IW07	20030820	1.2	0.5	IW07	1.90	0.05	0.34	0.34
IW08	20030820	0.9	0.5	IW08	3.10	0.14	0.20	0.11
IW09	20030821	0.5	0.5	IW09	0.70	0.04	0.05	0.32
MC01	20030819	0.5	0.5	MC01	5.60	0.14	0.19	0.12
NB01	20030819	2.0	1.5	NB01	2.90	0.03	0.29	0.09
NB02	20030819	2.0	1.5	NB02	2.90	0.04	0.14	0.14
NB03	20030819	1.9	1.5	NB03	3.40	0.06	0.33	0.15
NB04	20030819	1.4	1.0	NB04	3.30	0.04	0.11	0.14
SP04	20030819	2.0	1.5	SP04	1.70	0.06	0.11	0.44
TC01	20030819	1.6	1.0	TC01	4.20	0.11	0.11	0.19

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S COASTAL BAYS TMDL DATA SET, 2003:

Page No.

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBSP01
REVISED: 20040506

						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})	
AS02	20030709	11:07	1.0	120	364						
			0.0	-76	168						
			-1.0	43	287	0.42	0.040	0.008	44.1	33.5	(1 cm)
			-2.0	-86	158						
AS03	20030709	11:07	1.0	172	416						
			0.0	121	365						
			-1.0	125	369	2.11	0.190	0.042	25.2	17.7	(1 cm)
			-2.0	92	336						
AS04	20030709	14:46	1.0	133	377						
			0.0	35	279						
			-1.0	-113	131	4.96	0.430	0.048	29.1	21.9	(1 cm)
			-2.0	-190	54						
AS05	20030709	13:40	1.0	137	381						
			0.0	42	286						
			-1.0	-19	225	3.43	0.270	0.045	26.4	19.7	(1 cm)
			-2.0	10	254						
AS06	20030709	14:46	1.0	174	418						
			0.0	155	399						
			-1.0	156	400	2.03	0.170	0.037	48.9	33.2	(1 cm)
			-2.0	152	396						
IW01	20030710	14:45	1.0	143	387						
			0.0	53	297						
			-1.0	46	290	1.60	0.140	0.043	35.3	27.5	(1 cm)
			-2.0	37	281						
IW02	20030709	19:30	1.0	133	377						
			0.0	8	252						
			-1.0	-169	75	5.88	0.530	0.060	36.4	22.4	(1 cm)
			-2.0	-271	-27						
IW03	20030709	18:53	1.0	161	405						
			0.0	81	325						
			-1.0	69	313	3.50	0.270	0.038	4.1	1.0	(1 cm)
			-2.0	111	355						

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBSP01
REVISED: 20040506

						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})	
IW04	20030710	15:10	1.0	165	409						
			0.0	112	356						
			-1.0	-60	184	0.10	0.010	0.003	26.6	26.9	(1 cm)
			-2.0	-177	67						
IW05	20030709	18:53	1.0	182	426						
			0.0	155	399						
			-1.0	158	402	2.69	0.220	0.045	48.3	32.2	(1 cm)
			-2.0	162	406						
IW06	20030710	15:10	1.0	135	379						
			0.0	-51	193						
			-1.0	44	288	2.23	0.200	0.054	53.1	35.4	(1 cm)
			-2.0	16	260						
IW07	20030709	21:26	1.0	165	409						
			0.0	-5	239						
			-1.0	54	298	4.35	0.370	0.058	37.6	28.7	(1 cm)
			-2.0	57	301						
IW08	20030709	21:26	1.0	180	424						
			0.0	158	402						
			-1.0	158	402	4.77	0.420	0.055	48.1	38.6	(1 cm)
			-2.0	119	363						
IW09	20030710	14:45	1.0	169	413						
			0.0	107	351						
			-1.0	133	377	0.08	0.010	0.009	71.5	84.7	(1 cm)
			-2.0	143	387						
MC01	20030708	18:40	1.0	142	386						
			0.0	-119	125						
			-1.0	-272	-28	5.13	0.470	0.062	91.3	81.4	(1 cm)
			-2.0	-322	-78						

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBSP01
REVISED: 20040506

						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})	
NB01	20030708	12:10	1.0	155	399						
			0.0	146	390						
			-1.0	150	394	0.27	0.020	0.016	4.0	1.0	(1 cm)
			-2.0	33	277						
NB02	20030708	12:00	1.0	90	334						
			0.0	13	257						
			-1.0	-4	240	1.12	0.060	0.028	20.9	14.7	(1 cm)
			-2.0	22	266						
NB03	20030708	15:42	1.0	109	353						
			0.0	-11	233						
			-1.0	-24	220	1.72	0.140	0.033	44.8	30.7	(1 cm)
			-2.0	17	261						
NB04	20030708	19:10	1.0	120	364						
			0.0	-11	233						
			-1.0	56	300	0.49	0.050	0.015	10.6	2.4	(1 cm)
			-2.0	24	268						
SP04	20030708	20:03	1.0	110	354						
			0.0	-15	229						
			-1.0	-74	170	0.69	0.060	0.026	39.8	29.1	(1 cm)
			-2.0	-41	204						
TC01	20030708	15:00	1.0	141	385						
			0.0	-210	34						
			-1.0	-327	-83	6.79	0.560	0.059	75.2	59.0	(1 cm)
			-2.0	-371	-127						

TABLE C-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBSP02
REVISED: 20040506

						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})	
AS02	20030723	12:50	1.0	144	388						
			0.0	9	253						
			-1.0	34	278	0.12	0.010	0.0138	15.9	5.5	(1 cm)
			-2.0	43	287						
AS03	20030723	12:50	1.0	167	411						
			0.0	90	334						
			-1.0	116	360	1.80	0.150	0.0383	19.7	7.2	(1 cm)
			-2.0	149	393						
AS04	20030723	13:25	1.0	126	370						
			0.0	2	246						
			-1.0	-90	154	5.00	0.440	0.0479	10.5	4.3	(1 cm)
			-2.0	-92	152						
AS05	20030723	13:25	1.0	179	423						
			0.0	147	391						
			-1.0	130	374	3.42	0.280	0.0452	4.8	1.1	(1 cm)
			-2.0	114	358						
AS06	20030723	15:55	1.0	134	378						
			0.0	13	257						
			-1.0	-22	222	2.38	0.200	0.0447	9.2	2.7	(1 cm)
			-2.0	50	294						
IW01	20030724	13:13	1.0	106	350						
			0.0	48	292						
			-1.0	-1	243	1.49	0.140	0.0550	5.3	1.4	(1 cm)
			-2.0	-56	188						
IW02	20030723	16:35	1.0	149	393						
			0.0	-239	5						
			-1.0	-239	5	6.39	0.620	0.0713	13.2	4.7	(1 cm)
			-2.0	-310	-66						
IW03	20030723	15:55	1.0	180	424						
			0.0	124	368						
			-1.0	140	384	4.37	0.400	0.0611	19.5	8.0	(1 cm)
			-2.0	148	392						

TABLE C-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBSP02
REVISED: 20040506

						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})	
IW04	20030724	12:30	1.0	104	348						
			0.0	1	245						
			-1.0	44	288	0.03	0.010	0.0014	25.3	20.0	(1 cm)
			-2.0	57	301						
IW05	20030723	21:00	1.0	98	342						
			0.0	15	259						
			-1.0	-1	243	2.82	0.250	0.0564	22.5	6.0	(1 cm)
			-2.0	21	265						
IW06	20030724	13:54	1.0	60	304						
			0.0	-34	210						
			-1.0	-282	-38	3.42	0.300	0.0515	47.8	27.4	(1 cm)
			-2.0	-308	-64						
IW07	20030723	20:30	1.0	170	414						
			0.0	-43	201						
			-1.0	-151	93	4.35	0.380	0.0639	23.3	10.2	(1 cm)
			-2.0	-178	66						
IW08	20030723	20:30	1.0	149	393						
			0.0	-336	-92						
			-1.0	-365	-121	4.80	0.440	0.0620	80.8	50.1	(1 cm)
			-2.0	-377	-133						
IW09	20030724	13:20	1.0	181	425						
			0.0	159	403						
			-1.0	149	393	0.11	0.010	0.0100	50.2	43.9	(1 cm)
			-2.0	167	411						
MC01	20030722	17:43	1.0	146	390						
			0.0	-338	-94						
			-1.0	-376	-132	5.14	0.460	0.0562	50.4	31.6	(1 cm)
			-2.0	-379	-135						

TABLE C-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBSP02
REVISED: 20040506

						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})	
NB01	20030722	13:15	1.0	173	417						
			0.0	133	377						
			-1.0	127	371	0.24	0.020	0.0168	8.9	2.4	(1 cm)
			-2.0	152	396						
NB02	20030722	13:15	1.0	154	398						
			0.0	79	323						
			-1.0	90	334	0.66	0.060	0.0380	7.0	1.9	(1 cm)
			-2.0	87	331						
NB03	20030722	13:50	1.0	143	387						
			0.0	81	325						
			-1.0	85	329	2.38	0.200	0.0365	29.6	7.9	(1 cm)
			-2.0	86	330						
NB04	20030724	15:35	1.0	135	379						
			0.0	-26	218						
			-1.0	31	275	0.48	0.050	0.0165	6.9	1.9	(1 cm)
			-2.0	23	267						
SP04	20030724	15:35	1.0	182	426						
			0.0	123	367						
			-1.0	121	365	0.82	0.080	0.0302	23.7	10.3	(1 cm)
			-2.0	138	382						
TC01	20030722	17:43	1.0	175	419						
			0.0	87	331						
			-1.0	-91	153	6.37	0.490	0.0438	46.2	28.5	(1 cm)
			-2.0	-168	76						

TABLE C-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBSP03
REVISED: 20040506

						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})	
AS02	20030820	12:45	1.0	136	380						
			0.0	49	293						
			-1.0	81	325	0.12	0.020	0.004	17.7	7.9	(1 cm)
			-2.0	57	301						
AS03	20030820	12:45	1.0	167	411						
			0.0	126	370						
			-1.0	65	309	1.84	0.160	0.034	41.2	15.7	(1 cm)
			-2.0	19	263						
AS04	20030820	13:25	1.0	159	403						
			0.0	128	372						
			-1.0	125	369	5.00	0.430	0.047	59.0	29.8	(1 cm)
			-2.0	123	367						
AS05	20030820	13:25	1.0	132	376						
			0.0	-6	238						
			-1.0	-50	194	3.34	0.260	0.040	38.8	11.5	(1 cm)
			-2.0	4	248						
AS06	20030820	17:00	1.0	168	412						
			0.0	136	380						
			-1.0	136	380	0.56	0.050	0.014	64.2	20.5	(1 cm)
			-2.0	139	383						
IW01	20030821	12:35	1.0	136	380						
			0.0	-10	234						
			-1.0	24	268	1.70	0.160	0.056	50.7	19.0	(1 cm)
			-2.0	33	277						
IW02	20030820	17:00	1.0	87	331						
			0.0	50	294						
			-1.0	-329	-85	6.27	0.590	0.070	70.2	29.0	(1 cm)
			-2.0	-339	-95						
IW03	20030820	17:34	1.0	159	403						
			0.0	139	383						
			-1.0	-10	234	4.20	0.370	0.052	48.2	18.8	(1 cm)
			-2.0	-131	113						

TABLE C-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBSP03
REVISED: 20040506

						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})	
IW04	20030821	12:35	1.0	156	400						
			0.0	112	356						
			-1.0	122	366	0.04	0.010	0.001	69.8	61.9	(1 cm)
			-2.0	116	360						
IW05	20030820	17:34	1.0	138	382						
			0.0	46	290						
			-1.0	-17	227	2.87	0.260	0.060	40.0	11.5	(1 cm)
			-2.0	3	247						
IW06	20030821	13:05	1.0	147	391						
			0.0	-130	114						
			-1.0	-36	208	2.75	0.260	0.072	66.4	20.0	(1 cm)
			-2.0	34	278						
IW07	20030820	19:28	1.0	149	393						
			0.0	94	338						
			-1.0	-48	196	4.22	0.380	0.048	49.4	16.4	(1 cm)
			-2.0	-149	96						
IW08	20030820	19:28	1.0	175	419						
			0.0	110	354						
			-1.0	-329	-85	4.86	0.440	0.054	66.1	31.1	(1 cm)
			-2.0	-383	-139						
IW09	20030821	13:05	1.0	129	373						
			0.0	76	320						
			-1.0	36	280	0.06	0.010	0.013	77.3	70.5	(1 cm)
			-2.0	-11	234						
MC01	20030819	16:20	1.0	20	264						
			0.0	-365	-121						
			-1.0	-391	-147	6.54	0.510	0.062	115.0	66.8	(1 cm)
			-2.0	-385	-141						

TABLE C-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
SEDIMENT PROFILES: Vertical sediment profiles of Eh and surficial sediment characteristics at TMDL stations

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBSP03
REVISED: 20040506

						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})	
NB01	20030819	12:50	1.0	181	425						
			0.0	176	420						
			-1.0	160	404	0.21	0.020	0.017	30.7	9.3	(1 cm)
			-2.0	160	404						
NB02	20030819	12:50	1.0	152	396						
			0.0	113	357						
			-1.0	78	322	0.70	0.070	0.051	22.9	5.6	(1 cm)
			-2.0	70	314						
NB03	20030819	13:30	1.0	142	386						
			0.0	120	364						
			-1.0	59	303	2.06	0.180	0.039	49.1	14.6	(1 cm)
			-2.0	83	327						
NB04	20030819	13:30	1.0	176	420						
			0.0	170	414						
			-1.0	143	387	0.46	0.040	0.013	30.0	7.1	(1 cm)
			-2.0	156	400						
SP04	20030819	16:55	1.0	149	393						
			0.0	141	385						
			-1.0	83	327	0.46	0.050	0.021	47.6	14.6	(1 cm)
			-2.0	103	347						
TC01	20030819	16:20	1.0	178	422						
			0.0	163	407						
			-1.0	-159	85	6.26	0.580	0.066	124.3	58.2	(1 cm)
			-2.0	-353	-109						

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S COASTAL BAYS TMDL DATA SET, 2003:

Page No.

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBCD01
REVISED: 20040506

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)
AS02	20030709	1	12	0	0	0	4.57	42	0.07	0.86	0.13	0.32
			13	0	60	60	4.21	43	0.07	0.79	0.16	0.42
			14	0	60	120	4.01	44	0.06	0.93	0.11	0.13
			15	0	60	180	3.70	45	0.12	2.43	0.37	1.73
AS03	20030709	1	11	55	0	0	4.37	37	0.09	2.07	0.22	0.47
			12	55	60	60	4.03	38	0.08	1.07	0.11	0.10
			13	54	59	119	3.77	39	0.06	0.79	0.22	0.18
			14	55	61	180	3.45	40	0.09	1.79	0.13	0.19
AS04	20030709	1	15	35	0	0	5.37	47	0.09	0.79	0.13	0.19
			16	35	60	60	4.94	48	0.08	1.07	0.20	0.30
			17	34	59	119	4.48	49	0.09	2.57	0.12	0.12
			18	35	61	180	3.90	50	0.09	0.86	0.12	0.10
AS05	20030709	1	15	50	0	0	5.41	52	0.09	0.57	0.11	0.28
			16	50	60	60	5.18	53	0.10	0.57	0.17	0.36
			17	54	64	124	4.86	54	0.04	0.71	0.28	0.71
			18	50	56	180	4.60	55	0.09	0.93	0.11	0.14
AS06	20030709	1	16	10	0	0	4.34	57	0.07	1.57	0.35	0.57
			17	10	60	60	3.94	58	0.08	2.29	0.33	0.38
			18	10	60	120	3.67	59	0.08	3.36	0.24	0.17
			19	10	60	180	3.44	60	1.01	9.50	1.06	0.85
IW01	20030710	1	14	30	0	0	4.75	92	0.10	4.86	0.55	0.40
			15	30	60	60	4.30	93	0.10	5.43	0.60	0.52
			16	30	60	120	4.00	94	0.09	6.29	0.70	0.39
			17	30	60	180	3.78	95	0.09	7.14	0.74	0.44
IW02	20030709	1	19	20	0	0	6.69	62	0.05	0.79	0.20	0.34
			20	20	60	60	6.13	63	0.11	0.93	0.21	0.61
			21	21	61	121	5.59	64	0.09	0.93	0.15	0.14
			22	22	61	182	5.08	65	0.09	1.43	0.24	0.37
IW03	20030709	1	19	35	0	0	6.35	67	0.05	0.64	0.71	0.62
			20	35	60	60	5.98	68	0.06	1.21	0.23	0.13
			21	35	60	120	5.66	69	0.06	1.14	0.36	0.68
			22	36	61	181	5.35	70	0.10	1.64	0.31	0.28
IW04	20030710	1	14	10	0	0	5.22	87	0.05	0.57	0.19	0.43
			15	11	61	61	5.05	88	0.04	0.50	0.14	0.58
			16	10	59	120	4.84	89	0.06	0.71	0.13	0.19
			17	9	59	179	4.71	90	0.33	2.14	0.39	0.13

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBCD01
REVISED: 20040506

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)
IW05	20030709	1	19	45	0	0	5.73	72	0.07	1.36	0.34	0.20
			20	45	60	60	5.26	73	0.19	1.57	0.43	0.87
			21	45	60	120	4.77	74	0.06	0.71	0.52	0.14
			22	45	60	180	4.38	75	0.20	0.93	0.72	0.58
IW06	20030710	1	14	45	0	0	2.60	97	0.06	11.14	1.44	0.30
			15	46	61	61	2.28	98	0.09	16.71	2.09	0.28
			16	45	59	120	1.95	99	0.09	23.57	3.00	0.25
			17	45	60	180	1.62	100	0.08	30.00	3.75	0.23
IW07	20030709	1	22	0	0	0	6.82	77	0.06	0.64	0.21	0.24
			23	0	60	60	6.30	78	0.06	0.57	0.22	0.19
			24	0	60	120	5.80	79	0.05	0.57	0.25	0.30
			0	0	60	180	5.30	80	0.06	0.93	0.34	0.27
IW08	20030709	1	21	50	0	0	7.29	82	0.06	0.79	0.31	0.35
			22	50	60	60	6.58	83	0.13	1.21	0.29	0.62
			23	50	60	120	5.98	84	0.04	0.57	0.23	0.19
			24	50	60	180	5.41	85	0.06	1.21	0.28	0.18
IW09	20030710	1	15	0	0	0	5.36	102	0.07	0.86	0.28	0.42
			16	0	60	60	5.26	103	0.06	0.79	0.29	0.22
			17	0	60	120	5.20	104	0.03	1.29	0.28	0.25
			18	0	60	180	5.03	105	0.03	1.14	0.28	0.23
MC01	20030708	1	19	20	0	0	7.72	27	0.09	1.21	0.12	0.14
			20	20	60	60	7.11	28	0.16	2.07	0.38	0.76
			21	21	61	121	6.64	29	0.08	0.93	0.18	0.38
			22	24	63	184	6.12	30	0.14	3.29	0.28	0.97
NB01	20030708	1	13	55	0	0	5.23	3	0.04	1.07	0.14	0.53
			14	55	60	60	5.02	4	0.09	0.79	0.10	0.23
			15	56	61	121	4.80	5	0.07	1.29	0.19	0.97
			16	55	59	180	4.65	6	0.11	2.00	0.19	0.71
NB02	20030708	1	14	40	0	0	5.12	7	0.07	0.93	0.15	0.30
			15	40	60	60	4.79	8	0.11	1.21	0.17	0.29
			16	47	67	127	4.40	9	0.13	1.36	0.25	0.60
			17	41	54	181	4.01	10	0.18	2.86	0.22	0.37
NB03	20030708	1	16	50	0	0	5.55	17	0.06	0.86	0.29	0.50
			17	54	64	64	4.86	18	0.01	1.00	0.21	0.23
			18	56	62	126	4.41	19	0.10	1.79	0.18	0.20
			19	50	54	180	4.00	20	0.09	0.86	0.17	0.14

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBCD01
REVISED: 20040506

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)
NB04	20030708	1	19	25	0	0	7.05	22	0.05	0.86	0.11	0.14
			20	24	59	59	6.80	23	0.06	0.79	0.12	0.17
			21	24	60	119	6.31	24	0.05	0.64	0.21	0.44
			22	25	61	180	5.83	25	0.11	1.71	0.28	1.20
SP04	20030708	1	20	36	0	0	6.49	32	0.06	0.93	0.24	0.13
			21	35	59	59	6.16	33	0.15	1.21	0.28	0.25
			22	35	60	119	5.75	34	0.05	0.71	0.36	0.48
			23	35	60	179	5.29	35	0.09	1.43	0.35	0.29
TC01	20030708	1	16	25	0	0	5.83	12	0.11	2.00	0.31	0.48
			18	25	120	120	4.66	14	0.12	0.93	0.17	0.24
			19	25	60	180	4.16	15	0.12	0.93	0.14	0.18

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBCD02
REVISED: 20040506

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)
AS02	20030723	1	12	50	0	0	5.39	32	0.05	1.00	0.11	0.26
			13	50	60	60	5.03	33	0.01	0.43	0.08	0.14
			14	50	60	120	4.70	34	0.00	0.64	0.10	0.13
			15	50	60	180	4.43	35	0.00	0.50	0.12	0.11
AS03	20030723	1	12	45	0	0	4.82	27	0.05	0.64	0.06	0.13
			13	46	61	61	4.45	28	0.02	0.64	0.06	0.12
			14	45	59	120	4.20	29	0.01	0.64	0.07	0.14
			15	45	60	180	4.00	30	0.10	2.14	0.06	0.14
AS04	20030723	1	13	30	0	0	4.72	42	0.18	1.36	0.15	0.16
			14	30	60	60	4.30	43	0.05	0.64	0.14	0.12
			15	30	60	120	3.78	44	0.03	0.50	0.16	0.13
			16	30	60	180	3.55	45	0.08	1.29	0.14	0.11
AS05	20030723	1	13	20	0	0	4.90	37	0.03	0.57	0.06	0.11
			14	20	60	60	4.54	38	0.01	0.43	0.09	0.15
			15	21	61	121	4.37	39	0.01	0.50	0.09	0.15
			16	20	59	180	4.09	40	0.09	1.57	0.09	0.13
AS06	20030723	1	16	55	0	0	4.88	47	0.04	0.57	0.11	0.14
			17	56	61	61	4.39	48	0.02	0.50	0.12	0.14
			18	58	62	123	3.99	49	0.04	1.07	0.12	0.18
			19	55	57	180	3.70	50	0.03	1.50	0.15	0.31
IW01	20030724	1	13	5	0	0	5.13	82	0.20	5.21	0.59	1.76
			14	6	61	61	4.89	83	0.04	3.21	0.69	1.71
			15	5	59	120	4.58	84	0.06	4.36	0.71	1.63
			16	5	60	180	4.38	85	0.11	6.00	0.82	1.97
IW02	20030723	1	17	0	0	0	4.85	52	0.07	0.71	0.35	0.14
			18	0	60	60	4.11	53	0.08	0.86	0.26	0.14
			19	0	60	120	3.46	54	0.16	1.07	0.31	0.15
			20	0	60	180	2.91	55	0.11	1.79	0.26	0.12
IW03	20030723	1	17	10	0	0	4.06	57	0.04	0.79	0.45	0.15
			18	9	59	59	3.66	58	0.06	0.79	0.52	0.15
			19	19	70	129	3.29	59	0.09	1.57	0.55	0.15
			20	9	50	179	2.93	60	0.13	2.00	0.57	0.14
IW04	20030724	1	13	0	0	0	5.54	77	0.04	0.64	0.46	0.23
			14	5	65	65	5.44	78	0.06	1.07	0.48	0.24
			15	0	55	120	5.33	79	0.22	5.43	0.51	1.35
			16	0	60	180	5.18	80	0.07	1.43	0.45	0.21

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBCD02
REVISED: 20040506

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)
IW05	20030723	1	20	11	0	0	5.72	62	0.08	1.29	0.49	0.17
			21	10	59	59	5.35	63	0.04	1.00	0.49	0.11
			22	10	60	119	5.06	64	0.04	0.79	0.51	0.19
			23	10	60	179	4.71	65	0.14	3.07	0.49	0.14
IW06	20030724	1	13	15	0	0	4.54	87	0.02	1.71	0.97	0.24
			14	15	60	60	4.21	88	0.11	4.21	1.12	0.20
			15	15	60	120	4.01	89	0.09	6.21	1.11	0.11
			16	15	60	180	3.78	90	0.06	8.71	1.28	0.77
IW07	20030723	1	20	15	0	0	6.87	72	0.04	0.57	0.53	0.17
			21	15	60	60	6.32	73	0.02	0.93	0.53	0.15
			22	15	60	120	5.84	74	0.05	1.14	0.54	0.21
			23	15	60	180	5.49	75	0.04	0.93	0.52	0.17
IW08	20030723	1	20	25	0	0	7.40	67	0.05	1.21	0.25	0.19
			21	25	60	60	6.33	68	0.05	0.57	0.32	0.15
			22	25	60	120	5.75	69	0.04	0.71	0.44	0.15
			23	25	60	180	5.34	70	0.06	1.50	0.46	0.15
IW09	20030724	1	13	25	0	0	5.93	92	0.04	1.57	0.76	0.15
			14	25	60	60	5.65	93	-0.01	0.57	0.77	0.18
			15	25	60	120	5.46	94	-0.01	0.79	0.75	0.19
			16	25	60	180	5.38	95	0.18	3.14	0.77	0.27
MC01	20030722	1	18	10	0	0	6.13	22	0.12	10.93	0.23	0.16
			19	10	60	60	5.08	23	0.31	10.07	0.12	0.14
			20	10	60	120	4.49	24	0.08	6.21	0.15	0.17
			21	10	60	180	3.97	25	0.09	5.64	0.12	0.17
NB01	20030722	1	13	55	0	0	5.49	2	0.02	0.29	0.23	0.20
			14	55	60	60	5.27	3	0.05	0.79	0.24	0.16
			15	55	60	120	5.01	4	0.61	4.29	0.44	0.19
			16	55	60	180	4.89	5	0.05	1.00	0.29	0.16
NB02	20030722	1	14	0	0	0	5.47	7	0.85	9.43	0.42	0.77
			15	0	60	60	5.18	8	0.05	0.43	0.46	0.18
			16	0	60	120	4.97	9	0.35	5.86	0.48	0.16
			17	2	62	182	4.80	10	0.18	2.57	0.52	0.18
NB03	20030722	1	14	20	0	0	5.42	12	0.39	1.57	0.25	0.19
			15	20	60	60	5.03	13	0.06	0.64	0.27	0.30
			16	20	60	120	4.65	14	0.14	1.86	0.22	0.19
			17	20	60	180	4.41	15	0.06	0.71	0.24	0.16

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBCD02
REVISED: 20040506

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)
NB04	20030724	1	15	50	0	0	7.20	102	0.02	0.57	0.40	0.15
			16	50	60	60	6.90	103	0.06	1.21	0.40	0.40
			17	50	60	120	6.68	104	0.03	0.64	0.41	3.86
			18	49	59	179	6.46	105	0.26	2.93	0.39	0.28
SP04	20030724	1	15	40	0	0	6.64	97	0.05	0.93	0.33	0.16
			16	40	60	60	6.30	98	0.04	0.93	0.38	0.15
			17	40	60	120	5.99	99	0.04	1.71	0.37	0.19
			18	41	61	181	5.74	100	0.17	7.00	0.42	0.48
TC01	20030722	1	18	0	0	0	6.15	17	0.06	0.57	0.17	0.16
			19	0	60	60	5.35	18	0.16	1.14	0.23	0.36
			20	0	60	120	4.55	19	0.09	0.86	0.14	0.16
			21	0	60	180	3.98	20	0.12	0.93	0.12	0.13

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBCD03
REVISED: 20040506

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)
AS02	20030820	1	13	35	0	0	6.12	42	0.06	3.70	0.18	0.26
			14	35	60	60	5.85	43	0.08	2.50	0.16	0.13
			15	35	60	120	5.57	44	0.41	3.90	0.58	0.29
			16	35	60	180	5.36	45	0.03	1.90	0.21	0.39
AS03	20030820	1	13	20	0	0	4.99	37	0.06	1.90	0.08	1.93
			14	20	60	60	4.63	38	0.11	2.40	0.38	0.32
			15	20	60	120	4.21	39	0.05	3.00	0.14	0.10
			16	21	61	181	3.92	40	0.09	3.10	0.24	0.44
AS04	20030820	1	13	50	0	0	7.45	47	0.05	3.50	0.16	0.26
			14	51	61	61	6.82	48	0.08	4.30	0.51	1.34
			15	50	59	120	6.16	49	0.14	4.80	0.19	0.10
			16	49	59	179	5.63	50	0.18	4.50	0.17	0.10
AS05	20030820	1	14	5	0	0	4.83	52	0.04	2.50	0.19	0.37
			15	5	60	60	4.48	53	0.11	2.90	0.21	0.34
			16	5	60	120	4.19	54	0.02	2.20	0.11	0.13
			17	5	60	180	3.91	55	0.04	2.40	0.14	0.08
AS06	20030820	1	17	50	0	0	6.40	57	0.06	1.50	0.22	0.31
			18	50	60	60	5.97	58	0.06	1.60	0.18	0.24
			19	50	60	120	5.55	59	0.06	2.00	0.18	0.11
			20	50	60	180	5.12	60	0.06	2.10	0.18	0.10
IW01	20030821	1	13	15	0	0	4.84	92	0.06	2.30	0.33	0.74
			14	15	60	60	4.52	93	0.09	1.60	0.34	0.26
			15	15	60	120	4.29	94	0.06	1.60	0.30	0.19
			16	15	60	180	4.03	95	0.07	2.90	0.36	0.17
IW02	20030820	1	18	5	0	0	7.60	62	0.07	2.90	0.32	0.11
			19	5	60	60	6.62	63	0.14	2.80	0.34	0.15
			20	5	60	120	5.73	64	0.09	2.90	0.32	0.07
			21	5	60	180	4.79	65	0.10	2.80	0.28	0.12
IW03	20030820	1	18	20	0	0	7.81	67	0.06	2.80	0.18	0.22
			19	20	60	60	7.24	68	0.06	3.10	0.15	0.19
			20	20	60	120	6.65	69	0.05	3.10	0.12	0.08
			21	20	60	180	6.24	70	0.34	4.60	0.40	0.10
IW04	20030821	1	13	0	0	0	5.17	87	0.05	1.90	0.30	0.68
			14	0	60	60	4.91	88	0.05	1.60	0.33	1.52
			15	0	60	120	4.72	89	0.04	1.40	0.27	0.29
			16	0	60	180	4.47	90	0.05	1.70	0.27	0.78

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBCD03
REVISED: 20040506

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)
IW05	20030820	1	18	40	0	0	7.05	72	0.08	1.40	0.16	0.20
			19	45	65	65	6.37	73	0.09	2.30	0.23	0.24
			20	40	55	120	5.94	74	0.05	2.00	0.22	0.10
			21	40	60	180	5.42	75	0.04	1.90	0.30	0.60
IW06	20030821	1	13	25	0	0	4.14	97	0.11	2.40	0.55	0.23
			14	26	61	61	3.77	98	0.18	3.50	0.72	2.30
			15	25	59	120	3.58	99	0.10	5.40	0.81	0.61
			16	25	60	180	3.38	100	0.09	5.90	0.98	1.68
IW07	20030820	1	21	25	0	0	8.07	82	0.05	2.20	0.26	0.08
			22	25	60	60	7.65	83	0.06	2.50	0.26	0.21
			23	25	60	120	7.14	84	0.06	2.40	0.18	0.08
			24	25	60	180	6.64	85	0.05	2.60	0.17	0.07
IW08	20030820	1	20	0	0	0	8.94	77	0.11	2.10	0.13	0.11
			21	0	60	60	8.26	78	0.09	1.90	0.12	0.11
			22	0	60	120	7.76	79	0.07	1.30	0.12	0.14
			23	0	60	180	7.20	80	0.09	0.70	0.15	0.15
IW09	20030821	1	13	35	0	0	6.40	102	0.09	1.80	0.30	0.13
			14	35	60	60	6.24	103	0.05	2.10	0.33	0.66
			15	35	60	120	5.97	104	0.05	1.90	0.30	0.63
			16	35	60	180	5.88	105	0.19	3.30	0.28	0.51
MC01	20030819	1	17	30	0	0	8.54	27	0.14	6.10	0.22	0.12
			18	30	60	60	7.88	28	0.14	5.50	0.22	0.18
			19	30	60	120	7.19	29	0.16	5.30	0.18	0.14
			20	30	60	180	6.66	30	0.21	5.70	0.17	0.12
NB01	20030819	1	13	30	0	0	7.19	2	0.05	2.70	0.12	0.13
			14	30	60	60	6.49	3	0.06	2.80	0.37	0.30
			15	30	60	120	6.01	4	0.06	2.60	0.13	0.14
			16	30	60	180	5.14	5	0.06	2.60	0.14	0.13
NB02	20030819	1	13	45	0	0	5.64	7	0.04	2.80	0.12	0.14
			14	45	60	60	5.38	8	0.05	2.90	0.14	0.14
			15	45	60	120	5.13	9	0.06	2.80	0.16	0.10
			16	45	60	180	4.96	10	0.06	2.90	0.15	0.13
NB03	20030819	1	14	15	0	0	5.89	17	0.08	3.20	0.12	0.11
			15	15	60	60	5.40	18	0.11	3.10	0.12	0.16
			16	15	60	120	4.98	19	0.06	3.10	0.15	0.21
			17	15	60	180	4.57	20	0.05	2.90	0.11	0.11

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: MINI-SONE
CORE DATA: Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBCD03
REVISED: 20040506

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)
NB04	20030819	1	14	0	0	0	6.35	12	0.03	2.90	0.11	0.12
			15	0	60	60	6.02	13	0.06	3.10	0.10	0.13
			16	1	61	121	5.69	14	0.08	3.10	0.13	0.16
			17	0	59	180	5.33	15	0.06	2.80	0.18	0.23
SP04	20030819	1	17	50	0	0	7.32	32	0.03	2.60	0.47	0.12
			18	49	59	59	6.76	33	0.07	2.10	0.56	0.10
			19	50	61	120	6.28	34	0.07	2.60	0.66	0.11
			20	49	59	179	5.82	35	0.08	2.60	0.77	0.33
TC01	20030819	1	17	5	0	0	5.68	22	0.14	4.40	0.29	0.11
			18	5	60	60	4.63	23	0.09	4.10	0.20	0.14
			19	5	60	120	3.94	24	0.10	4.10	0.23	0.16
			20	5	60	180	3.27	25	0.11	4.00	0.18	0.10

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S COASTAL BAYS TMDL DATA SET, 2003:

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TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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})

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBFL01
REVISED: 20040628

		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})
AS02	20030709	1	1275	0.153	83.32	-0.004683	-1.03	0.000000	0.0
AS03	20030709	1	1730	0.208	83.32	-0.005042	-1.51	-0.010773	-134.2
AS04	20030709	1	1925	0.231	83.32	-0.008133	-2.71	0.014929	206.9
AS05	20030709	1	1685	0.202	83.32	-0.004553	-1.33	0.002981	36.2
AS06	20030709	1	1760	0.211	83.32	-0.004950	-1.51	0.014917	189.1
IW01	20030710	1	1420	0.170	83.32	-0.005350	-1.31	0.012833	131.2
IW02	20030709	1	1900	0.228	83.32	-0.008846	-2.90	0.003602	49.3
IW03	20030709	1	1750	0.210	83.32	-0.005505	-1.66	0.005240	66.0
IW04	20030710	1	1360	0.163	83.32	-0.002920	-0.69	0.013898	136.1
IW05	20030709	1	1370	0.164	83.32	-0.007567	-1.79	0.000000	0.0
IW06	20030710	1	1465	0.176	83.32	-0.005459	-1.38	0.105879	1117.0
IW07	20030709	1	1615	0.194	83.32	-0.008433	-2.35	0.000000	0.0
IW08	20030709	1	1290	0.155	83.32	-0.010400	-2.32	NI	NI
IW09	20030710	1	2025	0.243	83.32	-0.001750	-0.61	0.000000	0.0
MC01	20030708	1	1895	0.227	83.32	-0.008593	-2.81	0.011084	151.3
NB01	20030708	1	1760	0.211	83.32	-0.003263	-0.99	0.010073	127.7
NB02	20030708	1	YY	UU	83.32	-0.006087	UU	0.003364	UU
NB03	20030708	1	1680	0.202	83.32	-0.008495	-2.47	0.000000	0.0
NB04	20030708	1	1700	0.204	83.32	-0.006923	-2.03	0.000000	0.0
SP04	20030708	1	1600	0.192	83.32	-0.006719	-1.86	0.002653	30.6
TC01	20030708	1	2000	0.240	83.32	-0.009345	-3.23	0.000000	0.0

TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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 $m^{-2}\ hr^{-1}$)

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBFL01
REVISED: 20040628

		CORE							
STATION	DATE	NO	H_2O VOL (ml)	DEPTH (m)	SIZE (cm^2)	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 $m^{-2}\ h^{-1}$)
AS02	20030709	1	1275	0.153	83.32	0.000000	0.00	0.000000	0.00
AS03	20030709	1	1730	0.208	83.32	0.000000	0.00	0.000000	0.00
AS04	20030709	1	1925	0.231	83.32	0.000000	0.00	-0.000512	-7.10
AS05	20030709	1	1685	0.202	83.32	0.000000	0.00	0.003490	42.35
AS06	20030709	1	1760	0.211	83.32	0.000000	0.00	-0.003333	-42.24
IW01	20030710	1	1420	0.170	83.32	0.000000	0.00	0.000000	0.00
IW02	20030709	1	1900	0.228	83.32	0.000000	0.00	0.000000	0.00
IW03	20030709	1	1750	0.210	83.32	0.000284	3.58	0.000000	0.00
IW04	20030710	1	1360	0.163	83.32	0.000000	0.00	-0.001723	-16.87
IW05	20030709	1	1370	0.164	83.32	0.000000	0.00	0.000000	0.00
IW06	20030710	1	1465	0.176	83.32	0.000000	0.00	-0.000400	-4.22
IW07	20030709	1	1615	0.194	83.32	0.000000	0.00	0.000000	0.00
IW08	20030709	1	1290	0.155	83.32	0.000000	0.00	0.000000	0.00
IW09	20030710	1	2025	0.243	83.32	-0.000333	-4.86	0.000000	0.00
MC01	20030708	1	1895	0.227	83.32	0.000000	0.00	0.004088	55.79
NB01	20030708	1	1760	0.211	83.32	0.000368	4.66	0.000000	0.00
NB02	20030708	1	YY	UU	83.32	0.000569	UU	0.000000	UU
NB03	20030708	1	1680	0.202	83.32	0.000000	0.00	-0.000769	-9.30
NB04	20030708	1	1700	0.204	83.32	0.000000	0.00	0.008523	104.34
SP04	20030708	1	1600	0.192	83.32	0.000000	0.00	0.002944	33.92
TC01	20030708	1	2000	0.240	83.32	0.000000	0.00	-0.001714	-24.69

TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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})

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBFL01
REVISED: 20040628

		CORE					
STATION	DATE	NO	H_2O VOL (ml)	DEPTH (m)	SIZE (cm^2)	DIP SLOPE (µmoles-P l^{-1} min^{-1})	DIP FLUX (µmoles-P m^{-2} h^{-1})
AS02	20030709	1	1275	0.153	83.32	0.000000	0.00
AS03	20030709	1	1730	0.208	83.32	0.000000	0.00
AS04	20030709	1	1925	0.231	83.32	0.000000	0.00
AS05	20030709	1	1685	0.202	83.32	0.001375	16.68
AS06	20030709	1	1760	0.211	83.32	0.000000	0.00
IW01	20030710	1	1420	0.170	83.32	0.001117	11.42
IW02	20030709	1	1900	0.228	83.32	0.000000	0.00
IW03	20030709	1	1750	0.210	83.32	0.000000	0.00
IW04	20030710	1	1360	0.163	83.32	0.000000	0.00
IW05	20030709	1	1370	0.164	83.32	0.002050	20.22
IW06	20030710	1	1465	0.176	83.32	0.013083	138.02
IW07	20030709	1	1615	0.194	83.32	0.001000	11.63
IW08	20030709	1	1290	0.155	83.32	0.000000	0.00
IW09	20030710	1	2025	0.243	83.32	0.000000	0.00
MC01	20030708	1	1895	0.227	83.32	NI	NI
NB01	20030708	1	1760	0.211	83.32	0.000000	0.00
NB02	20030708	1	YY	UU	83.32	0.000391	UU
NB03	20030708	1	1680	0.202	83.32	-0.000348	-4.21
NB04	20030708	1	1700	0.204	83.32	0.001002	12.27
SP04	20030708	1	1600	0.192	83.32	0.001009	11.63
TC01	20030708	1	2000	0.240	83.32	-0.000976	-14.06

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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})

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBFL02
REVISED: 20040628

		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})
AS02	20030723	1	1320	0.158	83.32	-0.005350	-1.22	0.000000	0.0
AS03	20030723	1	1405	0.169	83.32	-0.004527	-1.10	0.000000	0.0
AS04	20030723	1	1580	0.190	83.32	-0.006717	-1.83	-0.007167	-81.5
AS05	20030723	1	1600	0.192	83.32	-0.004325	-1.20	0.000000	0.0
AS06	20030723	1	1380	0.166	83.32	-0.006554	-1.56	0.008415	83.6
IW01	20030724	1	1410	0.169	83.32	-0.004273	-1.04	0.023456	238.2
IW02	20030723	1	1345	0.161	83.32	-0.010783	-2.51	0.003000	29.1
IW03	20030723	1	1640	0.197	83.32	-0.006175	-1.75	0.010151	119.9
IW04	20030724	1	1660	0.199	83.32	-0.001996	-0.57	0.004244	50.7
IW05	20030723	1	1655	0.199	83.32	-0.005560	-1.59	-0.004200	-50.1
IW06	20030724	1	1715	0.206	83.32	-0.004133	-1.23	0.038333	473.4
IW07	20030723	1	1640	0.197	83.32	-0.007700	-2.18	0.004750	56.1
IW08	20030723	1	1790	0.215	83.32	-0.011267	-3.49	0.007750	99.9
IW09	20030724	1	1630	0.196	83.32	-0.003917	-1.10	NI	NI
MC01	20030722	1	1820	0.218	83.32	-0.011783	-3.71	NI	NI
NB01	20030722	1	1790	0.215	83.32	-0.003433	-1.06	0.003631	46.8
NB02	20030722	1	1880	0.226	83.32	-0.003660	-1.19	NI	NI
NB03	20030722	1	2000	0.240	83.32	-0.005683	-1.96	NI	NI
NB04	20030724	1	2080	0.250	83.32	-0.004088	-1.47	0.013363	200.2
SP04	20030724	1	1660	0.199	83.32	-0.004990	-1.43	0.000000	0.0
TC01	20030722	1	1170	0.140	83.32	-0.012183	-2.46	0.002060	17.4

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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})

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBFL02
REVISED: 20040628

		CORE							
STATION	DATE	NO	H_2O VOL (ml)	DEPTH (m)	SIZE (cm^2)	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})
AS02	20030723	1	1320	0.158	83.32	-0.000417	-3.96	-0.000250	-2.38
AS03	20030723	1	1405	0.169	83.32	0.000000	0.00	0.000000	0.00
AS04	20030723	1	1580	0.190	83.32	0.000000	0.00	0.000000	0.00
AS05	20030723	1	1600	0.192	83.32	0.000000	0.00	0.000000	0.00
AS06	20030723	1	1380	0.166	83.32	0.000000	0.00	0.001417	14.08
IW01	20030724	1	1410	0.169	83.32	0.000589	5.98	-0.001082	-10.99
IW02	20030723	1	1345	0.161	83.32	0.000226	2.19	0.000000	0.00
IW03	20030723	1	1640	0.197	83.32	0.000490	5.79	0.000000	0.00
IW04	20030724	1	1660	0.199	83.32	0.000157	1.88	0.000000	0.00
IW05	20030723	1	1655	0.199	83.32	0.000000	0.00	0.000000	0.00
IW06	20030724	1	1715	0.206	83.32	-0.000417	-5.15	-0.001083	-13.38
IW07	20030723	1	1640	0.197	83.32	0.000000	0.00	0.000000	0.00
IW08	20030723	1	1790	0.215	83.32	0.000000	0.00	0.000000	0.00
IW09	20030724	1	1630	0.196	83.32	0.000000	0.00	0.000679	7.97
MC01	20030722	1	1820	0.218	83.32	0.000000	0.00	0.000000	0.00
NB01	20030722	1	1790	0.215	83.32	0.000000	0.00	0.000000	0.00
NB02	20030722	1	1880	0.226	83.32	-0.003747	-50.73	0.000000	0.00
NB03	20030722	1	2000	0.240	83.32	0.000000	0.00	0.000000	0.00
NB04	20030724	1	2080	0.250	83.32	0.001389	20.80	0.000000	0.00
SP04	20030724	1	1660	0.199	83.32	0.000000	0.00	0.000000	0.00
TC01	20030722	1	1170	0.140	83.32	0.000000	0.00	0.000000	0.00

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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})

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBFL02
REVISED: 20040628

		CORE					
STATION	DATE	NO	H_2O VOL (ml)	DEPTH (m)	SIZE (cm^2)	DIP SLOPE (µmoles-P l^{-1} min^{-1})	DIP FLUX (µmoles-P m^{-2} h^{-1})
AS02	20030723	1	1320	0.158	83.32	0.000333	3.17
AS03	20030723	1	1405	0.169	83.32	0.000000	0.00
AS04	20030723	1	1580	0.190	83.32	0.000000	0.00
AS05	20030723	1	1600	0.192	83.32	0.000000	0.00
AS06	20030723	1	1380	0.166	83.32	0.000226	2.25
IW01	20030724	1	1410	0.169	83.32	0.001187	12.05
IW02	20030723	1	1345	0.161	83.32	0.000000	0.00
IW03	20030723	1	1640	0.197	83.32	0.000644	7.61
IW04	20030724	1	1660	0.199	83.32	0.000413	4.94
IW05	20030723	1	1655	0.199	83.32	0.000000	0.00
IW06	20030724	1	1715	0.206	83.32	0.001667	20.59
IW07	20030723	1	1640	0.197	83.32	0.000000	0.00
IW08	20030723	1	1790	0.215	83.32	0.001250	16.11
IW09	20030724	1	1630	0.196	83.32	0.000000	0.00
MC01	20030722	1	1820	0.218	83.32	-0.000619	-8.11
NB01	20030722	1	1790	0.215	83.32	0.000345	4.45
NB02	20030722	1	1880	0.226	83.32	0.000528	7.15
NB03	20030722	1	2000	0.240	83.32	0.000000	0.00
NB04	20030724	1	2080	0.250	83.32	0.000000	0.00
SP04	20030724	1	1660	0.199	83.32	0.000000	0.00
TC01	20030722	1	1170	0.140	83.32	0.000000	0.00

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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})

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBFL03
REVISED: 20040628

		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})
AS02	20030820	1	1200	0.144	83.32	-0.004267	-0.88	NI	NI
AS03	20030820	1	1555	0.187	83.32	-0.006018	-1.62	0.009167	102.7
AS04	20030820	1	1490	0.179	83.32	-0.010270	-2.64	0.010846	116.4
AS05	20030820	1	1740	0.209	83.32	-0.005083	-1.53	0.000000	0.0
AS06	20030820	1	1490	0.179	83.32	-0.007100	-1.83	0.003667	39.3
IW01	20030821	1	1960	0.235	83.32	-0.004433	-1.50	NI	NI
IW02	20030820	1	1580	0.190	83.32	-0.015533	-4.24	0.000000	0.0
IW03	20030820	1	1680	0.202	83.32	-0.008833	-2.56	0.010357	125.3
IW04	20030821	1	1675	0.201	83.32	-0.003817	-1.10	-0.004167	-50.3
IW05	20030820	1	1420	0.170	83.32	-0.008958	-2.20	0.000000	0.0
IW06	20030821	1	1810	0.217	83.32	-0.004127	-1.29	0.020690	269.7
IW07	20030820	1	1840	0.221	83.32	-0.008000	-2.54	0.002143	28.4
IW08	20030820	1	1670	0.200	83.32	-0.009533	-2.75	-0.008000	-96.2
IW09	20030821	1	1730	0.208	83.32	-0.003050	-0.91	0.008571	106.8
MC01	20030819	1	1550	0.186	83.32	-0.010550	-2.83	NI	NI
NB01	20030819	1	1660	0.199	83.32	-0.011050	-3.17	0.000000	0.0
NB02	20030819	1	1645	0.197	83.32	-0.003817	-1.09	0.000000	0.0
NB03	20030819	1	1555	0.187	83.32	-0.007300	-1.96	0.000000	0.0
NB04	20030819	1	1385	0.166	83.32	-0.005640	-1.35	0.000000	0.0
SP04	20030819	1	1110	0.133	83.32	-0.008327	-1.60	0.000000	0.0
TC01	20030819	1	1640	0.197	83.32	-0.013200	-3.74	-0.002262	-26.7

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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})

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBFL03
REVISED: 20040628

		CORE							
STATION	DATE	NO	H_2O VOL (ml)	DEPTH (m)	SIZE (cm^2)	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})
AS02	20030820	1	1200	0.144	83.32	0.000000	0.00	0.002167	18.73
AS03	20030820	1	1555	0.187	83.32	0.000000	0.00	0.000000	0.00
AS04	20030820	1	1490	0.179	83.32	0.000754	8.09	0.000000	0.00
AS05	20030820	1	1740	0.209	83.32	0.000000	0.00	-0.001800	-22.55
AS06	20030820	1	1490	0.179	83.32	0.000000	0.00	-0.001267	-13.59
IW01	20030821	1	1960	0.235	83.32	0.000000	0.00	-0.000750	-10.59
IW02	20030820	1	1580	0.190	83.32	0.000000	0.00	0.000000	0.00
IW03	20030820	1	1680	0.202	83.32	0.000000	0.00	-0.000679	-8.21
IW04	20030821	1	1675	0.201	83.32	0.000000	0.00	NI	NI
IW05	20030820	1	1420	0.170	83.32	-0.000226	-2.31	0.000000	0.00
IW06	20030821	1	1810	0.217	83.32	0.000000	0.00	0.000000	0.00
IW07	20030820	1	1840	0.221	83.32	0.000000	0.00	0.000000	0.00
IW08	20030820	1	1670	0.200	83.32	-0.000333	-4.00	0.000226	2.72
IW09	20030821	1	1730	0.208	83.32	0.000000	0.00	-0.001250	-15.57
MC01	20030819	1	1550	0.186	83.32	0.000583	6.51	0.000000	0.00
NB01	20030819	1	1660	0.199	83.32	0.000000	0.00	0.000000	0.00
NB02	20030819	1	1645	0.197	83.32	0.000167	1.98	0.000000	0.00
NB03	20030819	1	1555	0.187	83.32	0.000000	0.00	0.000833	9.33
NB04	20030819	1	1385	0.166	83.32	0.000413	4.12	0.000831	8.29
SP04	20030819	1	1110	0.133	83.32	0.000287	2.29	0.000000	0.00
TC01	20030819	1	1640	0.197	83.32	0.000167	1.97	0.000417	4.92

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND COASTAL BAYS: 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})

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBFL03
REVISED: 20040628

		CORE					
STATION	DATE	NO	H_2O VOL (ml)	DEPTH (m)	SIZE (cm^2)	DIP SLOPE (µmoles-P l^{-1} min^{-1})	DIP FLUX (µmoles-P m^{-2} h^{-1})
AS02	20030820	1	1200	0.144	83.32	0.000000	0.00
AS03	20030820	1	1555	0.187	83.32	0.000000	0.00
AS04	20030820	1	1490	0.179	83.32	0.000000	0.00
AS05	20030820	1	1740	0.209	83.32	0.000000	0.00
AS06	20030820	1	1490	0.179	83.32	0.000000	0.00
IW01	20030821	1	1960	0.235	83.32	0.000000	0.00
IW02	20030820	1	1580	0.190	83.32	-0.000500	-5.69
IW03	20030820	1	1680	0.202	83.32	0.000000	0.00
IW04	20030821	1	1675	0.201	83.32	0.000000	0.00
IW05	20030820	1	1420	0.170	83.32	0.000758	7.75
IW06	20030821	1	1810	0.217	83.32	0.002305	30.04
IW07	20030820	1	1840	0.221	83.32	-0.000524	-6.94
IW08	20030820	1	1670	0.200	83.32	0.000000	0.00
IW09	20030821	1	1730	0.208	83.32	0.000000	0.00
MC01	20030819	1	1550	0.186	83.32	-0.000286	-3.19
NB01	20030819	1	1660	0.199	83.32	0.000000	0.00
NB02	20030819	1	1645	0.197	83.32	0.000333	3.94
NB03	20030819	1	1555	0.187	83.32	0.000000	0.00
NB04	20030819	1	1385	0.166	83.32	0.000666	6.64
SP04	20030819	1	1110	0.133	83.32	0.001672	13.36
TC01	20030819	1	1640	0.197	83.32	-0.000595	-7.03

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES IN MARYLAND'S COASTAL BAYS TMDL DATA SET, 2003:

Page No.

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

COASTAL BAYS CRUISE: 1
FILENAME: TMDLCBWK01
REVISED: 20040628

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 ($g\ O_2\ m^{-3}\ day^{-1}$)
NB01	20030708	A	7/8/03 9:50	7/9/03 9:50	6.58	4.80	1.78
		B	7/8/03 9:50	7/9/03 9:50	6.30	5.10	1.20
NB03	20030708	A	7/8/03 12:31	7/9/03 12:30	6.09	4.30	1.79
		B	7/8/03 12:31	7/9/03 12:30	5.12	3.71	1.41
TC01	20030708	A	7/8/03 13:37	7/9/03 13:35	6.87	2.55	4.33
		B	7/8/03 13:37	7/9/03 13:35	6.11	2.87	3.24
IW02	20030709	A	7/9/03 15:20	7/10/03 15:20	6.45	3.30	3.15
		B	7/9/03 15:20	7/10/03 15:20	5.20	1.99	3.21
IW05	20030709	A	7/9/03 17:11	7/10/03 17:07	6.82	4.70	2.13
		B	7/9/03 17:11	7/10/03 17:07	6.70	4.70	2.01
IW08	20030709	A	7/9/03 19:11	7/10/03 19:12	8.29	5.44	2.85
		B	7/9/03 19:11	7/10/03 19:12	7.96	5.18	2.78
IW09	20030710	A	7/10/03 12:00	7/11/03 11:55	6.01	4.70	1.31
		B	7/10/03 12:00	7/11/03 11:55	5.98	4.65	1.33
AS03	20030709	A	7/9/03 8:51	7/10/03 8:50	4.61	3.31	1.30
		B	7/9/03 8:51	7/10/03 8:50	5.09	3.40	1.69
AS04	20030709	A	7/9/03 11:36	7/10/03 11:56	4.00	1.19	2.77
		B	7/9/03 11:36	7/10/03 11:56	3.82	1.39	2.40
AS06	20030709	A	7/9/03 13:26	7/10/03 13:26	4.43	3.45	0.98
		B	7/9/03 13:26	7/10/03 13:26	4.80	3.59	1.21

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

COASTAL BAYS CRUISE: 2
FILENAME: TMDLCBWK02
REVISED: 20040628

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 ($g\ O_2\ m^{-3}\ day^{-1}$)
NB01	20030722	A	7/22/2003 9:23	7/23/2003 9:24	5.88	4.51	1.37
		B	7/22/2003 9:23	7/23/2003 9:24	5.79	4.93	0.86
NB03	20030722	A	7/22/2003 11:37	7/23/2003 11:40	5.78	4.11	1.67
		B	7/22/2003 11:37	7/23/2003 11:40	6.03	4.21	1.82
TC01	20030722	A	7/22/2003 13:30	7/23/2003 13:32	7.90	4.25	3.64
		B	7/22/2003 13:30	7/23/2003 13:32	7.92	4.19	3.72
IW02	20030723	A	7/23/2003 13:37	7/24/2003 13:36	5.17	1.83	3.34
		B	7/23/2003 13:37	7/24/2003 13:36	5.45	1.79	3.66
IW05	20030723	A	7/23/2003 16:06	7/24/2003 16:06	6.66	4.69	1.97
		B	7/23/2003 16:06	7/24/2003 16:06	6.67	4.65	2.02
IW08	20030723	A	7/23/2003 17:12	7/24/2003 17:48	7.61	5.77	1.80
		B	7/23/2003 17:12	7/24/2003 17:48	8.03	5.19	2.77
IW09	20030724	A	7/24/2003 10:49	7/25/2003 10:49	6.12	5.30	0.82
		B	7/24/2003 10:49	7/25/2003 10:49	6.71	5.31	1.40
AS03	20030723	A	7/23/2003 8:21	7/24/2003 9:04	5.27	4.29	0.95
		B	7/23/2003 8:21	7/24/2003 9:04	5.70	4.34	1.32
AS04	20030723	A	7/23/2003 10:33	7/24/2003 10:37	5.88	2.71	3.16
		B	7/23/2003 10:33	7/24/2003 10:37	5.70	2.40	3.29
AS06	20030723	A	7/23/2003 12:33	7/24/2003 12:33	5.28	4.53	0.75
		B	7/23/2003 12:33	7/24/2003 12:33	5.24	4.55	0.69

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

COASTAL BAYS CRUISE: 3
FILENAME: TMDLCBWK03
REVISED: 20040628

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 ($g\ O_2\ m^{-3}\ day^{-1}$)
NB01	20030819	A	8/19/2003 8:52	8/20/2003 8:50	6.90	5.50	1.40
		B	8/19/2003 8:52	8/20/2003 8:50	6.51	5.50	1.01
NB03	20030819	A	8/19/2003 11:52	8/20/2003 11:52	7.68	5.39	2.29
		B	8/19/2003 11:52	8/20/2003 11:52	7.52	5.68	1.84
TC01	20030819	A	8/19/2003 13:31	8/20/2003 13:20	6.90	3.11	3.82
		B	8/19/2003 13:31	8/20/2003 13:20	7.50	3.57	3.96
IW02	20030820	A	8/20/2003 14:00	8/21/2003 14:05	6.04	3.73	2.30
		B	8/20/2003 14:00	8/21/2003 14:05	9.25	1.55	7.67
IW05	20030820	A	8/20/2003 15:38	8/21/2003 15:41	8.62	5.31	3.30
		B	8/20/2003 15:38	8/21/2003 15:41	8.60	5.18	3.41
IW08	20030820	A	8/20/2003 17:15	8/21/2003 17:15	10.69	7.05	3.64
		B	8/20/2003 17:15	8/21/2003 17:15	11.10	7.14	3.96
IW09	20040821	A	8/21/2003 10:55	8/22/2003 10:55	7.00	5.22	1.78
		B	8/21/2003 10:55	8/22/2003 10:55	7.10	5.11	1.99
AS03	20030820	A	8/20/2003 8:45	8/21/2003 8:47	6.40	4.20	2.20
		B	8/20/2003 8:45	8/21/2003 8:47	6.31	4.40	1.91
AS04	20030820	A	8/20/2003 10:19	8/21/2003 10:20	6.89	3.70	3.19
		B	8/20/2003 10:19	8/21/2003 10:20	7.10	4.41	2.69
AS06	20030820	A	8/20/2003 13:03	8/21/2003 13:00	8.02	5.69	2.33
		B	8/20/2003 13:03	8/21/2003 13:00	8.40	5.79	2.62