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UNIVERSITY OF MARYLAND CENTER for ENVIRONMENTAL SCIENCE
CHESAPEAKE BIOLOGICAL LABORATORY

*MONITORING OF SEDIMENT OXYGEN AND
NUTRIENT EXCHANGES IN MARYLAND'S UPPER
AND LOWER WESTERN SHORE TRIBUTARIES IN
SUPPORT OF TMDL DEVELOPMENT*

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Monitoring of Sediment Oxygen and Nutrient Exchanges in Maryland's Upper and Lower Western Shore Tributaries in Support of TMDL Development

Prepared by:

E M. Bailey¹ Advanced Senior Faculty Research Assistant
W.R. Boynton¹ Principal Investigator

Prepared for:

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¹University of Maryland Center for Environmental Science
Chesapeake Biological Laboratory
P.O. Box 38, Solomons, MD 20688-0038

TABLE OF CONTENTS

	Page No.
List of Figures	iii
List of Tables	iii
1. INTRODUCTION	1
1.1. Background	1
1.2. Description of Project	1
References	2
2. ACQUISITION AND ANALYSIS OF TMDL SEDIMENT-WATER AND NUTRIENT EXCHANGES DATA	3
2.1. Location of TMDL Stations	3
2.2. Sampling Frequency	3
2.3. Field Methods for TMDL Study	3
2.3.1. Water Column Profiles	3
2.3.2. Water Column Nutrients	3
2.3.3. Sediment Profiles	3
2.3.4. Sediment Flux Measurements	5
2.3.5. Water Column Respiration	8
2.4. Chemical Analyses Used in TMDL Study	8
2.5. Methods and Data Quality Indicators	9
References	9
3. DATA MANAGEMENT PROCEDURES	11
3.1. QA/QC Field Checks	11
3.1.1. Preparation of Collection Gear	11
3.1.2. Potential Contamination	11
3.1.3. Calibration Procedures and Frequency	12
3.1.4. Recording of Field Data	12
3.2. General Information Related to Data Sets	12
3.2.1. Naming Conventions	12
3.2.2. Incorporation of Error Codes in Data Tables	12
3.3. Western Shore TMDL Data Sets	14
3.3.1. Data Tables QA/QC	14
3.4. Analytical Methods QA/QC	14
3.4.1. Sample Custody	16
3.4.2. Instrument Maintenance	16
3.5. Calculations	16
3.5.1. Oxygen Saturation	16
3.5.2. Eh	16
3.5.3. Flux Variables	16
3.5.3.1 Equations	16

TABLE OF CONTENTS

	Page No.
3. DATA MANAGEMENT PROCEDURES (Continued)	
3.5.3.2 Criteria for accepting, rejecting and modifying variable slopes used in calculating net sediment water fluxes	17
References	18

APPENDICES

MARYLAND WESTERN SHORE DATA SETS:

2005

A-1.	WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at Maryland’s Western Shore TMDL stations FILE NAME: TMDLWSPFxx	A1-1
B-1.	WATER COLUMN NUTRIENTS: Dissolved nutrient concentrations in bottom waters at Maryland’s Western Shore TMDL stations..... FILE NAME: TMDLWSNTxx	B1-1
C-1.	SEDIMENT PROFILES: Vertical profiles of Eh and surficial sediment characteristics at Maryland’s Western Shore TMDL stations	C1-1
D-1.	CORE DATA: Dissolved nutrient and oxygen concentrations in Maryland’s Western Shore TMDL sediment-water flux chambers..... FILE NAME: TMDLWSCDxx	D1-1
E-1.	SEDIMENT-WATER FLUX: Net sediment-water exchange rates of dissolved oxygen (g O ₂ m ⁻² d ⁻¹) and nutrients (μmoles-N m ⁻² h ⁻¹ ; and μmoles-P m ⁻² h ⁻¹)..... FILE NAME: TMDLWSFLxx	E1-1
F-1.	WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters (g O ₂ m ⁻³ d ⁻¹)..... FILE NAME: TMDLWSWKxx	F1-1

TABLE OF CONTENTS

Page No.

LIST OF FIGURES

2-1.	Location (decimal degrees, Datum NAD83).	4
2-2.	Schematic Diagram of the Incubation Chamber.	7

LIST OF TABLES

2-1.	TMDL Station Code, Grid Locations and Mean Depths (m).	5
2-2.	A summary of laboratory methods and performance criteria (from Rohland <i>et al.</i> , 2001).	9
3-1.	Analysis Problem Codes	13

1. 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 *et 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 small, western 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 Western Shore. 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 2005 at twenty four stations in Maryland's Upper and Lower Western Shore tributaries. These measurements were made in conjunction with other efforts in the development of TMDLs for these estuaries.

References

Boynton, W.R., J.H. Garber, R. Summers and W.M. Kemp. 1995. Inputs, Transformations, and Transport of Nitrogen and Phosphorus in Chesapeake Bay and Selected Tributaries. *Estuaries* 18(1B): 285-314.

Boynton, W.R., W.M. Kemp, J.M. Barnes, L.L. Matteson, J.L. Watts, S. Stammerjohn, D.A. Jasinski and F.M. Rohland. 1991. Ecosystem Processes Component Level 1 Interpretive 8. Chesapeake Biological Laboratory (CBL), University of Maryland Center for Environmental Science, Solomons, MD 20688-0038. Ref. No.[UMCES] CBL 91-110a.

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

2.1. Location of TMDL Stations

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

2.2. Sampling Frequency

The sampling frequency was based on the seasonal patterns of sediment water exchanges observed in previous studies conducted in the Chesapeake Bay region (Kemp and Boynton, 1980, 1981; Boynton *et al.*, 1982; Boynton and Kemp, 1985). Based on these results the monitoring design adopted for this TMDL study involved three monthly measurements: June, July and August 2005.

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 (NH₄⁺), nitrite (NO₂⁻), nitrite plus nitrate (NO₂⁻ + NO₃⁻) and dissolved inorganic phosphorus corrected for salinity (DIP or PO₄⁻³).

2.3.3. Sediment Profiles

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

Figure 2-1. Location (decimal degrees, Datum NAD83) of twenty four TMDL stations sampled in Maryland's Western Shore tributaries.

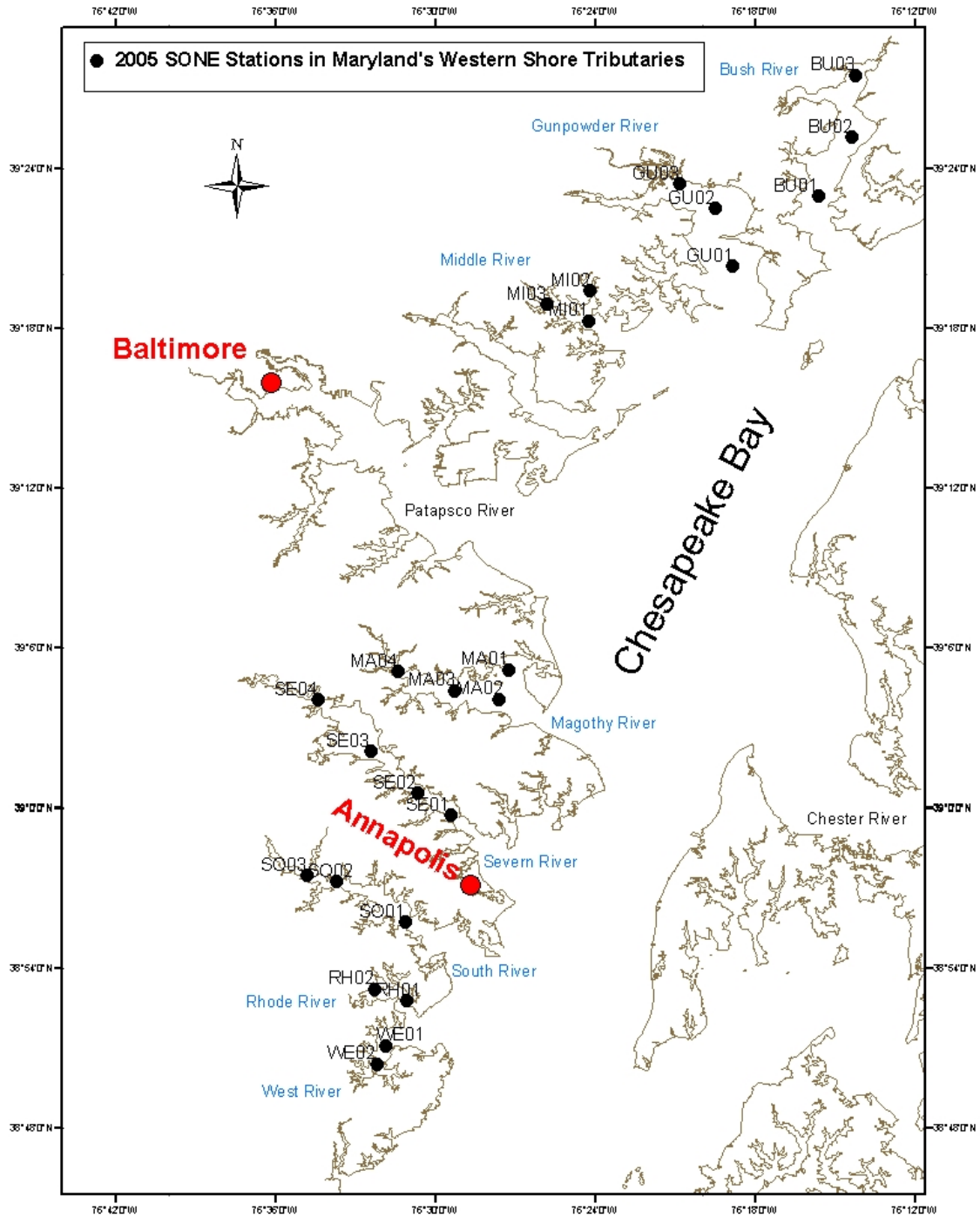


Table 2-1. TMDL Station Code, Grid Locations and Mean Depths (m).

Datum NAD 83

Latitude and longitude values are expressed as decimal degrees.

Station	Tributary	Latitude	Longitude	Mean Depth (m)
		Decimal Degrees	Decimal Degrees	
BU01	Bush River	39.3828 °N	76.2602 °W	3.3
BU02	Bush River	39.4195 °N	76.2393 °W	2.4
BU03	Bush River	39.4583 °N	76.2375 °W	1.4
GU01	Gunpowder River	39.3389 °N	76.3139 °W	2.2
GU02	Gunpowder River	39.3750 °N	76.3250 °W	1.9
GU03	Gunpowder River	39.3905 °N	76.3473 °W	1.1
MI01	Middle River	39.3048 °N	76.4042 °W	2.9
MI02	Middle River	39.3236 °N	76.4028 °W	1.7
MI03	Middle River	39.3151 °N	76.4302 °W	2.2
MA01	Magothy River	39.0865 °N	76.4542 °W	3.3
MA02	Magothy River	39.0681 °N	76.4597 °W	4.2
MA03	Magothy River	39.0734 °N	76.4875 °W	4.6
MA04	Magothy River	39.0853 °N	76.5229 °W	4.7
SE01	Severn River	38.9957 °N	76.4902 °W	5.7
SE02	Severn River	39.0094 °N	76.5108 °W	5.8
SE03	Severn River	39.0355 °N	76.5400 °W	7.7
SE04	Severn River	39.0679 °N	76.5729 °W	5.3
SO01	South River	38.9288 °N	76.5180 °W	5.3
SO02	South River	38.9542 °N	76.5611 °W	5.1
SO03	South River	38.9580 °N	76.5799 °W	3.6
RH01	Rhode River	38.8797 °N	76.5176 °W	2.1
RH02	Rhode River	38.8870 °N	76.5375 °W	2.1
WE01	West River	38.8516 °N	76.5310 °W	2.0
WE02	West River	38.8403 °N	76.5361 °W	2.5

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.

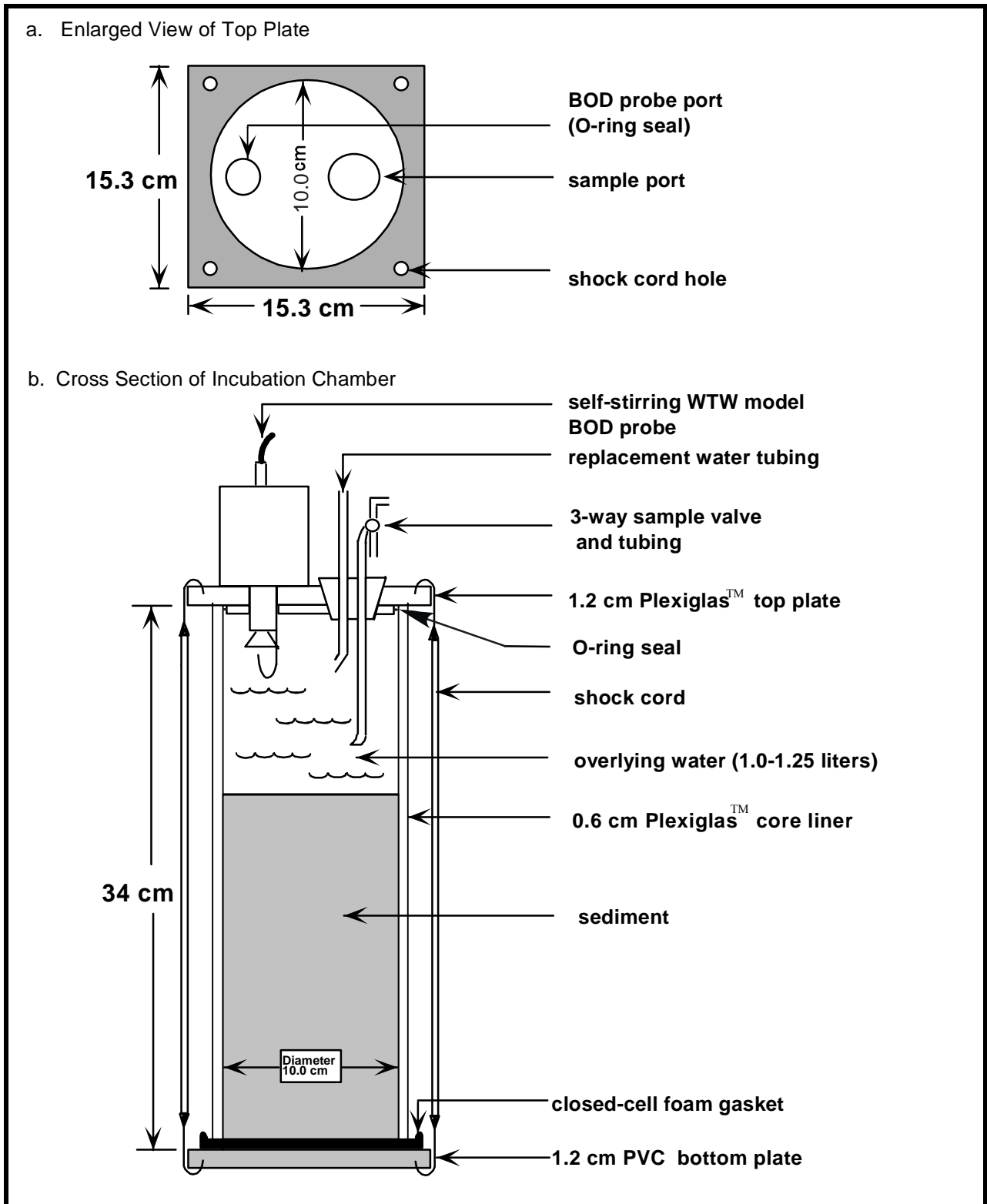
A single intact sediment core was collected at each station using a modified Bouma box corer. These cores were then transferred to a Plexiglass cylinder (15 cm diameter x 30 cm length) and inspected for disturbances from large macrofauna or cracks in the sediment surface. If the sample was satisfactory, 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 ($\text{NO}_2^- + \text{NO}_3^-$) 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 ($\text{NO}_2^- + \text{NO}_3^-$), 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- <i>a</i> (μg l ⁻¹)	Flourescence after acidification (EPA 445.0)	0.79 μg l ⁻¹	-	-
Sediment	Total Chlorophyll- <i>a</i> (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.

References

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- Strickland, J.D.H. and T.R. Parsons.** 1972. *A practical handbook of seawater analysis*. Fish. Res. Bd. Can. Bull. 167 (second edition).

3. DATA MANAGEMENT PROCEDURES

3.1. QA/QC Field Checks

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

3.1.1. Preparation of Collection Gear

Two to three weeks prior to initiating a research cruise 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 (<i>e.g.</i> , PO ₄ F>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. Western Shore TMDL Data Sets

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

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

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

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

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

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

3.3.1 Data Tables QA/QC

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

3.4. Analytical Methods QA/QC Control

The Nutrient Analytical Services Laboratory (NASL) at the Chesapeake Biological Laboratory provides nutrient analyses to University, State and Federal agencies. As part of the laboratory's QA/QC program, NASL participates in cross calibration exercises

with other institutions and agencies whenever possible. Refer to 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 [$\text{NO}_2^- + \text{NO}_3^-$] 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 (cm²)
- c* converts measurement units to m

General method for calculating net sediment-water fluxes:

$$NET\ DO\ FLUX\ (gO_2\ m^{-2}\ d^{-1}) = [(DO\ SLOPE) * (CORE\ H2O\ DEPTH^a) * (1440^b)]$$

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

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 NH₄⁺, NO₂⁻, NO₂⁻ + NO₃⁻ and DIP
- d* converts time units from minutes to hours
- e* converts concentration to moles

Specific calculations:

a. Dissolved oxygen:

$$DO\ FLUX\ (gO_2\ m^{-2}\ d^{-1}) = [(DO\ SLOPE) * 1440 * (CORE\ H2O\ DEPTH)]$$

b. Ammonium:

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

c. Nitrite:

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

d. Nitrite plus nitrate

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

e. Dissolved Inorganic Phosphorus

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

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

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

1. If the slope of the nutrient concentrations vs. time plot was statistically significant, the slope was used in calculating fluxes without modification.
2. Occasionally, there are plots which indicated a clear increasing or decreasing trend in concentrations over time but had **one** data point which diverged strongly (either higher or lower concentration) from the trend. We consider these divergent data to represent contaminated samples (either by addition of the compound or addition of water having a much lower concentration of the compound) and they are not used. The slope was recalculated using lower degrees of freedom and a higher “r” value as a criteria for significance. If the slope is statistically significant, it was used in calculating fluxes.
3. If the concentration vs. time plots were erratic (*i.e.* no statistically significant increasing or decreasing trend in concentration over time) and if the difference in concentration among variables was **greater than** twice the detection limit for that variable, the data for that variable were considered to be non-interpretable. The slope was not calculated and the entry for that variable in the data file was recorded as "NI".
4. If the concentration vs. time plots were erratic (*i.e.* no statistically significant increasing or decreasing trend in concentration over time) and if the difference in concentration among variables was **less than** twice the detection limit for that variable, then the slope was taken to be zero and the net sediment-water flux was reported as zero. Occasionally, statistically significant slopes have been found for some variables (mostly nitrite and dissolved inorganic phosphorus) where concentration differences over the incubation period do not exceed twice the reported detection limit. These slopes were used to calculate net sediment-water exchanges.

References

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- Weiss R.F.** 1970. The solubility of nitrogen, oxygen and argon in water and seawater. Deep Sea Research 17:721-735.

APPENDICES A-F
Maryland's Western Shore, 2005

TMDL Data Sets

Table 2-1. TMDL Station Code, Grid Locations and Mean Depths (m).

Datum NAD 83

Latitude and longitude values are expressed as decimal degrees.

This table is added here for reference.

Station	Tributary	Latitude	Longitude	Mean Depth (m)
		Decimal Degrees	Decimal Degrees	
BU01	Bush River	39.3828 °N	76.2602 °W	3.3
BU02	Bush River	39.4195 °N	76.2393 °W	2.4
BU03	Bush River	39.4583 °N	76.2375 °W	1.4
GU01	Gunpowder River	39.3389 °N	76.3139 °W	2.2
GU02	Gunpowder River	39.3750 °N	76.3250 °W	1.9
GU03	Gunpowder River	39.3905 °N	76.3473 °W	1.1
MI01	Middle River	39.3048 °N	76.4042 °W	2.9
MI02	Middle River	39.3236 °N	76.4028 °W	1.7
MI03	Middle River	39.3151 °N	76.4302 °W	2.2
MA01	Magothy River	39.0865 °N	76.4542 °W	3.3
MA02	Magothy River	39.0681 °N	76.4597 °W	4.2
MA03	Magothy River	39.0734 °N	76.4875 °W	4.6
MA04	Magothy River	39.0853 °N	76.5229 °W	4.7
SE01	Severn River	38.9957 °N	76.4902 °W	5.7
SE02	Severn River	39.0094 °N	76.5108 °W	5.8
SE03	Severn River	39.0355 °N	76.5400 °W	7.7
SE04	Severn River	39.0679 °N	76.5729 °W	5.3
SO01	South River	38.9288 °N	76.5180 °W	5.3
SO02	South River	38.9542 °N	76.5611 °W	5.1
SO03	South River	38.9580 °N	76.5799 °W	3.6
RH01	Rhode River	38.8797 °N	76.5176 °W	2.1
RH02	Rhode River	38.8870 °N	76.5375 °W	2.1
WE01	West River	38.8516 °N	76.5310 °W	2.0
WE02	West River	38.8403 °N	76.5361 °W	2.5

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 (<i>e.g.</i> , PO ₄ F>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 WESTERN SHORE TMDL DATA SET, 2005:**

Page No.

A-1. **WATER COLUMN PROFILES:**
Vertical profiles of temperature, salinity, dissolved oxygen and other
characteristics at Maryland's Western Shore TMDL stations..... A1-1
FILE NAME: TMDLWSPFxx

2005

A-1 June 2005..... A1-1
A-2 July 2005..... A2-1
A-3 August 2005..... A3-1

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE : 1
 FILENAME: TMDLWSPF01
 REVISED: 20061020

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
BU01	20050619	9:54	3.4	0.4	0.5	25.1	4.3	2.3	11.50	141.3
					1.0	25.1	4.4	2.3	11.40	140.1
					2.0	25.1	4.6	2.4	11.30	138.9
					3.0	25.1	4.7	2.5	11.10	136.5
BU02	20050607	9:36	2.7	0.6	0.5	24.1	1.3	0.7	10.56	126.2
					1.0	23.9	1.3	0.7	10.32	122.9
					1.5	23.9	1.3	0.7	9.73	115.8
					2.0	23.9	1.4	0.7	10.06	119.7
BU03	20050607	12:14	1.5	0.2	0.5	26.5	0.3	0.2	10.42	129.7
					1.0	26.2	0.3	0.2	10.08	124.8
					1.5	25.7	0.3	0.2	8.56	105.1
GU01	20050619	11:54	1.9	0.5	0.5	24.3	3.2	1.7	12.60	152.0
					1.0	24.3	3.2	1.7	12.60	152.0
					1.5	24.3	3.2	1.7	12.50	150.8
					2.0	24.3	3.2	1.7	12.10	145.9
GU02	20050619	13:03	1.7	0.4	0.5	24.9	1.7	0.8	12.50	151.7
					1.0	24.9	1.7	0.8	12.40	150.5
					1.5	24.9	1.7	0.8	12.20	148.1
GU03	20050607	14:29	1.5	0.3	0.5	25.2	0.3	0.1	7.60	92.4
					1.0	24.5	0.3	0.1	6.88	82.6
MI01	20050613	10:38	3.1	0.8	0.5	27.9	4.7	2.5	10.97	142.0
					1.0	27.8	4.7	2.5	10.80	139.5
					2.0	27.5	4.8	2.6	10.45	134.2
					3.0	27.2	6.3	3.4	8.76	112.5
MI02	20050613	9:52	2.0	0.6	0.5	27.9	3.8	2.0	10.16	131.2
					1.0	27.9	3.9	2.1	10.22	132.0
					1.5	27.9	3.9	2.1	10.20	131.6
					2.0	27.9	3.9	2.1	9.87	127.3
MI03	20050613	8:57	2.4	0.5	0.5	27.8	3.4	1.8	11.30	145.4
					1.0	27.8	3.4	1.8	10.76	138.4
					1.5	27.8	3.5	1.8	10.53	135.4
					2.0	27.7	3.5	1.8	10.35	133.0

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE : 1
 FILENAME: TMDLWSPF01
 REVISED: 20061020

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
MA01	20050608	11:36	3.5	1.2	0.5	26.7	11.8	6.7	9.74	126.3
					1.0	26.2	11.8	6.7	9.67	124.3
					2.0	22.7	12.4	7.1	4.89	59.1
					3.0	20.7	13.3	7.7	3.72	43.4
MA02	20050608	10:44	4.3	1.2	0.5	24.5	11.1	6.3	9.54	118.7
					1.0	23.9	11.2	6.3	9.84	121.0
					2.0	23.6	12.0	6.8	9.39	115.2
					3.0	21.1	13.7	7.9	5.09	59.9
MA03	20050608	9:47	4.6	1.3	0.5	24.0	10.7	6.1	9.18	112.9
					1.0	23.5	11.1	6.3	9.51	116.0
					2.0	22.4	12.6	7.2	8.52	102.3
					3.0	21.5	12.6	7.3	6.67	78.8
MA04	20050608	8:23	4.8	1.1	0.5	24.9	9.3	5.2	8.54	106.3
					1.0	23.1	10.7	6.1	8.90	107.6
					2.0	21.3	11.5	6.6	5.61	65.7
					3.0	19.6	12.3	7.1	1.93	21.9
SE01	20050608	17:02	7.1	0.7	0.5	24.8	12.6	7.2	11.84	148.9
					1.0	24.4	12.8	7.3	11.90	148.5
					2.0	23.8	13.0	7.5	10.89	134.4
					3.0	20.6	14.5	8.4	4.49	52.4
SE02	20050608	15:59	6.3	0.8	0.5	25.6	12.0	6.8	9.07	115.4
					1.0	25.3	12.1	6.9	10.19	129.1
					2.0	21.7	12.8	7.4	7.48	88.8
					3.0	20.9	13.4	7.8	5.66	66.2
SE01	20050608	17:02	7.1	0.7	4.0	20.4	14.9	8.6	3.66	42.7
					5.0	20.3	15.2	8.9	3.46	40.3
					6.0	20.3	15.3	9.0	3.32	38.7
					7.0	20.3	15.3	9.0	3.32	38.7
SE02	20050608	15:59	6.3	0.8	4.0	20.3	13.9	8.0	4.04	46.9
					5.0	20.2	14.2	8.3	3.70	42.9
					6.0	19.6	14.4	8.4	1.29	14.8

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE : 1
 FILENAME: TMDLWSPF01
 REVISED: 20061020

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
SE03	20050608	14:54	7.6	0.7	0.5	26.2	11.2	6.4	10.54	135.3
					1.0	26.0	11.3	6.4	11.18	142.8
					2.0	21.3	12.2	7.0	6.68	78.4
					3.0	20.7	12.5	7.2	5.29	61.5
					4.0	20.3	12.7	7.3	3.50	40.4
					5.0	17.4	13.9	8.1	-0.27	-3.0
					6.0	17.4	14.0	8.1	-0.47	-5.1
SE04	20050608	13:59	5.0	0.4	0.5	27.6	8.7	4.8	11.39	148.5
					1.0	27.2	9.0	5.0	12.16	157.5
					2.0	21.9	11.4	6.5	8.58	101.7
					3.0	21.1	11.7	6.7	5.96	69.6
					4.0	18.4	12.5	7.2	-0.37	-4.1
					5.0	16.6	13.5	7.8	-0.32	-3.4
					SO01	20050609	10:31	5.1	1.0	0.5
1.0	25.8	12.9	7.4	11.49						147.3
2.0	24.2	13.8	8.0	9.51						118.8
3.0	21.9	13.3	7.7	5.93						70.8
4.0	21.8	14.0	8.1	6.55						78.2
SO02	20050609	9:32	5.3	0.6	0.5	26.5	10.2	5.7	14.18	182.1
					1.0	25.9	10.9	6.1	10.40	132.5
					2.0	26.1	11.2	6.4	9.87	126.4
					3.0	22.0	12.2	7.0	4.69	55.8
					4.0	20.5	13.2	7.6	3.84	44.6
SO03	20050609	8:24	3.6	0.6	0.5	26.5	8.3	4.6	12.86	164.3
					1.0	26.3	9.7	5.5	11.39	145.7
					2.0	25.2	10.1	5.7	7.15	89.7
					3.0	21.5	12.2	7.0	3.60	42.4
RH01	20050613	15:02	2.0	0.9	0.5	29.0	13.6	7.8	10.57	143.7
					1.0	29.0	13.6	7.8	10.06	136.7
					1.5	29.0	13.6	7.8	9.96	135.3
					2.0	28.2	14.6	8.4	9.67	130.1

TABLE A-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE : 1
 FILENAME: TMDLWSPF01
 REVISED: 20061020

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
RH02	20050613	14:08	2.3	0.7	0.5	29.3	12.6	7.2	9.26	126.1
					1.0	29.2	12.6	7.2	9.23	125.4
					1.5	28.7	13.2	7.5	8.88	119.9
					2.0	27.4	13.7	7.9	7.46	98.7
WE01	20050609	13:15	1.5	0.8	0.5	25.6	14.2	8.2	11.40	146.1
					1.0	25.3	14.3	8.3	11.18	142.6
					1.5	22.5	15.7	9.2	10.30	125.4
WE02	20050609	12:18	2.5	0.9	0.5	24.9	13.9	8.1	10.65	134.7
					1.0	24.7	14.0	8.1	10.32	130.0
					1.5	24.4	14.1	8.2	9.99	125.3
					2.0	21.7	15.5	9.1	8.04	96.3
					2.5	21.5	15.8	9.2	7.70	91.9

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE: 2
 FILENAME: TMDLWSPF02
 REVISED: 20061020

STATION	DATE	TIME	TOTAL	SECCHI	SAMPLE	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
			DEPTH (m)	DEPTH (m)	DEPTH (m)					
BU01	20050724	9:44	3.5	0.6	0.5	29.0	4.6	2.4	9.75	128.6
					1.0	28.9	4.6	2.4	9.80	129.1
					2.0	28.9	4.6	2.5	9.62	126.6
					3.0	28.9	4.6	2.5	9.57	125.9
BU02	20050719	8:29	2.3	0.4	0.5	29.7	2.1	1.0	11.55	153.0
					1.0	29.8	2.6	1.3	7.33	97.3
					1.5	29.7	2.6	1.4	7.25	96.3
BU03	20050719	9:24	1.5	0.4	0.5	30.4	0.6	0.3	11.13	148.6
					1.0	30.1	0.6	0.3	7.13	94.8
					1.5	30.1	0.7	0.3	6.20	82.3
GU01	20050724	11:21	2.5	0.8	0.5	29.1	7.0	3.8	9.11	121.2
					1.0	28.8	6.9	3.8	9.63	127.5
					1.5	28.7	6.9	3.8	9.78	129.3
					2.0	28.6	6.9	3.8	9.46	124.8
					2.5	28.5	7.0	3.8	9.12	120.1
GU02	20050724	12:13	2.2	0.7	0.5	29.5	2.5	1.3	11.26	148.7
					1.0	29.0	3.1	1.6	10.20	133.9
					1.5	28.5	3.3	1.7	9.64	125.6
					2.0	28.5	3.5	1.8	9.89	128.9
GU03	20050719	11:24	0.9	0.3	0.5	29.7	0.7	0.3	9.78	129.1
					1.0	29.7	0.7	0.3	9.19	121.3
MI01	20050719	15:24	2.9	0.9	0.5	31.2	6.7	3.6	11.14	153.6
					1.0	31.1	6.7	3.6	7.68	105.6
					1.5	30.5	6.8	3.7	7.68	104.6
					2.0	30.0	6.9	3.7	7.57	102.3
					2.5	29.6	7.3	4.0	6.95	93.4
MI02	20050719	14:44	1.5	0.5	0.5	31.1	5.9	3.2	11.42	156.8
					1.0	30.9	6.0	3.2	9.47	129.6
					1.5	30.6	6.0	3.2	8.21	111.8
MI03	20050719	13:56	2.1	0.4	0.5	30.3	6.0	3.2	10.25	138.9
					1.0	29.9	5.9	3.2	7.34	98.7

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE: 2
 FILENAME: TMDLWSPF02
 REVISED: 20061020

STATION	DATE	TIME	TOTAL	SECCHI	SAMPLE	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
			DEPTH (m)	DEPTH (m)	DEPTH (m)					
					1.5	29.8	6.0	3.3	7.42	99.6
					2.0	29.6	6.3	3.4	7.26	97.3
MA01	20050720	10:19	2.9	0.8	0.5	29.8	14.6	8.4	11.92	164.7
					1.0	29.7	14.6	8.4	9.33	128.7
					1.5	29.7	14.6	8.4	7.96	109.7
					2.0	29.6	14.6	8.4	7.52	103.5
					2.5	29.4	14.6	8.4	7.50	103.0
MA02	20050720	9:30	4.2	0.7	0.5	29.1	14.2	8.2	12.06	164.5
					1.0	29.1	14.1	8.1	8.44	115.0
					2.0	29.3	14.4	8.3	7.60	104.0
					3.0	29.3	14.5	8.3	7.36	100.8
					4.0	28.5	14.9	8.6	5.18	70.1
MA03	20050720	8:36	4.7	0.8	0.5	29.3	14.3	8.2	10.50	143.7
					1.0	29.3	14.3	8.2	7.78	106.4
					2.0	29.2	14.3	8.2	7.19	98.2
					3.0	29.1	14.3	8.3	7.22	98.5
					4.0	28.2	14.5	8.4	3.92	52.7
MA04	20050720	7:33	4.7	1.1	0.5	29.5	13.3	7.6	9.22	126.2
					1.0	29.4	13.9	8.0	7.88	108.0
					2.0	28.9	14.5	8.3	4.66	63.4
					3.0	28.1	14.6	8.4	1.65	22.1
					4.0	27.5	14.6	8.5	0.37	4.9
SE01	20050720	15:45	2.5	0.8	0.5	30.5	15.9	9.2	12.71	178.5
					1.0	29.6	16.1	9.3	7.08	97.9
					1.5	29.1	16.1	9.4	6.12	84.0
					2.0	28.6	16.3	9.5	5.58	75.9
					2.5	28.5	16.4	9.6	6.25	85.0
SE02	20050720	14:46	5.4	0.8	0.5	30.6	15.0	8.6	13.04	183.0
					1.0	30.7	15.0	8.6	8.36	117.5
					2.0	30.3	15.0	8.7	8.02	111.9
					3.0	29.0	15.8	9.2	5.62	76.9
					4.0	27.8	16.6	9.7	4.13	55.6
					5.0	27.5	17.0	9.5	3.35	44.7

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE: 2
 FILENAME: TMDLWSPF02
 REVISED: 20061020

STATION	DATE	TIME	TOTAL	SECCHI	SAMPLE	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
			DEPTH (m)	DEPTH (m)	DEPTH (m)					
SE03	20050720	13:49	7.6	0.9	0.5	30.9	14.3	8.2	11.03	155.2
					1.0	30.6	14.3	8.2	9.83	137.6
					2.0	29.9	14.6	8.4	8.45	117.1
					3.0	27.8	15.7	9.1	2.16	29.0
					4.0	27.0	16.1	9.4	0.57	7.5
					5.0	26.3	16.2	9.5	0.36	4.7
					6.0	25.5	16.5	9.7	0.34	4.4
SE04	20050720	12:55	5.1	0.9	0.5	29.9	13.6	7.8	9.50	131.0
					1.0	29.6	14.2	8.2	6.36	87.4
					2.0	28.2	15.2	8.8	2.84	38.3
					3.0	27.2	15.4	8.9	0.49	6.5
					4.0	26.3	15.7	9.2	0.35	4.6
SO01	20050721	9:10	5.5	0.8	0.5	29.7	16.1	9.4	9.7	133.8
					1.0	29.5	16.2	9.4	6.0	83.0
					2.0	29.5	16.6	9.7	5.1	71.1
					3.0	28.8	17.4	10.2	3.8	52.4
					4.0	28.5	17.6	10.3	3.0	41.5
SO02	20050721	8:13	5.1	0.6	0.5	29.5	14.9	8.6	8.21	112.9
					1.0	29.5	15.3	8.9	7.02	96.7
					2.0	29.5	16.3	9.5	4.61	63.8
					3.0	28.2	17.3	10.1	1.29	17.5
					4.0	28.0	17.3	10.1	0.60	8.1
SO03	20050721	7:14	3.6	0.7	0.5	29.4	14.4	8.3	7.84	107.5
					1.0	29.4	14.5	8.4	7.28	99.9
					2.0	28.4	9.6	13.6	0.30	4.2
					3.0	27.8	16.9	9.9	0.26	3.5
RH01	20050721	13:43	2.3	0.5	0.5	31.5	17.4	10.1	14.07	201.9
					1.0	31.5	17.4	10.1	7.92	113.6
					1.5	31.4	17.4	10.2	8.11	116.3
					2.0	31.4	17.4	10.2	8.30	118.9

TABLE A-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE: 2
 FILENAME: TMDLWSPF02
 REVISED: 20061020

STATION	DATE	TIME	TOTAL	SECCHI	SAMPLE	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
			DEPTH (m)	DEPTH (m)	DEPTH (m)					
RH02	20050721	12:52	2.1	0.6	0.5	32.0	17.0	9.9	9.99	144.3
					1.0	30.6	17.0	9.9	7.83	110.7
					1.5	29.9	17.2	10.0	6.19	86.5
					2.0	29.6	17.3	10.1	4.49	62.4
WE01	20050721	11:43	2.2	0.7	0.5	30.4	17.4	10.2	7.09	100.0
					1.0	30.2	17.4	10.2	6.46	90.7
					1.5	29.7	17.5	10.3	4.82	67.1
					2.0	29.0	17.7	10.4	2.73	37.6
WE02	20050721	10:32	2.5	0.5	0.5	30.5	17.2	10.0	8.33	117.5
					1.0	30.3	17.2	10.1	7.43	104.6
					1.5	30.1	17.3	10.1	7.18	100.7
					2.0	29.8	17.4	10.2	5.77	80.5
					2.5	29.4	17.5	10.3	3.37	46.7

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSPF03
 REVISED: 20061020

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
BU01	20050814	9:38	3.1	0.6	0.5	29.9	5.4	2.9	7.59	101.9
					1.0	29.9	5.3	2.8	7.41	99.4
					1.5	29.8	5.5	2.9	6.92	92.8
					2.0	29.8	5.7	3.0	6.70	89.9
					2.5	29.8	5.8	3.1	6.59	88.5
					3.0	29.9	5.8	3.1	6.48	87.1
BU02	20050815	7:51	2.1	0.4	0.5	30.4	2.7	1.4	7.85	105.4
					1.0	30.4	2.8	1.4	7.56	101.5
					1.5	30.4	2.8	1.4	7.40	99.4
					2.0	30.4	3.1	1.6	6.76	90.9
BU03	20050815	8:43	1.2	0.4	0.5	30.4	1.5	0.7	6.90	92.4
					1.0	30.4	1.5	0.7	6.69	89.6
GU01	20050814	11:11	2.1	0.6	0.5	30.2	6.0	3.2	8.00	108.2
					1.0	30.2	6.0	3.2	7.57	102.4
					1.5	30.1	6.2	3.4	7.19	97.1
					2.0	29.8	6.8	3.7	6.79	91.5
GU02	20050814	12:04	1.9	0.7	0.5	30.6	3.8	2.0	8.99	121.5
					1.0	30.6	3.8	2.0	8.40	113.6
					1.5	30.5	3.8	2.0	8.15	110.1
GU03	20050815	10:23	0.9	0.6	0.5	30.7	2.6	1.4	6.78	91.6
MI01	20050815	14:17	2.8	0.9	0.5	30.8	7.9	4.3	8.49	116.7
					1.0	30.8	7.9	4.3	8.30	114.1
					1.5	30.8	7.9	4.3	8.17	112.3
					2.0	30.8	7.9	4.3	8.00	109.9
					2.5	30.5	8.7	4.8	5.78	79.2
MI02	20050815	13:37	1.7	0.5	0.5	31.4	7.1	3.9	8.38	116.1
					1.0	31.4	7.2	3.9	8.04	111.3
					1.5	31.2	7.3	4.0	7.42	102.5
MI03	20050815	12:49	2.1	0.7	0.5	31.3	6.8	3.7	8.15	112.5
					1.0	31.1	6.8	3.7	7.90	108.8
					1.5	30.7	6.8	3.7	7.08	96.8
					2.0	30.7	6.9	3.7	7.02	96.0

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSPF03
 REVISED: 20061020

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
MA01	20050816	10:03	3.6	0.5	0.5	28.8	17.1	10.0	6.08	83.4
					1.0	28.9	17.1	10.0	5.97	81.9
					2.0	28.9	17.1	10.0	5.86	80.4
					3.0	28.8	17.1	10.0	5.68	77.9
MA02	20050816	9:19	4.2	0.5	0.5	29.2	16.6	9.7	6.52	89.8
					1.0	29.2	16.6	9.7	6.25	86.1
					2.0	29.2	16.6	9.7	6.22	85.6
					3.0	29.1	17.0	9.9	5.22	71.9
				4.0	28.2	17.9	10.5	0.63	8.6	
MA03	20050816	8:35	4.5	0.6	0.5	29.3	16.1	9.4	6.70	92.3
					1.0	29.4	16.1	9.4	6.43	88.6
					2.0	29.4	16.1	9.4	6.35	87.6
					3.0	29.4	16.1	9.4	6.32	87.1
				4.0	29.3	16.3	9.5	5.88	81.0	
MA04	20050816	7:35	4.5	0.8	0.5	29.5	14.7	8.5	6.81	93.6
					1.0	29.5	14.8	8.5	5.68	78.1
					2.0	29.5	15.0	8.7	5.34	73.6
					3.0	29.3	15.5	9.0	2.27	31.2
				4.0	28.1	16.1	9.4	0.71	9.6	
SE01	20050817	7:00	7.6	0.9	0.5	28.3	17.8	10.5	6.21	84.5
					1.0	28.3	17.9	10.5	5.74	78.2
					2.0	28.3	18.1	10.6	5.60	76.3
					3.0	28.3	18.2	10.7	5.50	75.0
					4.0	28.3	18.3	10.8	5.46	74.5
					5.0	28.3	18.3	10.8	5.41	73.9
					6.0	28.3	18.4	10.8	5.35	73.1
7.0	28.4	18.8	11.1	4.98	68.2					
SE02	20050816	14:10	5.7	0.7	0.5	29.2	17.5	10.3	7.11	98.2
					1.0	29.2	17.5	10.3	6.96	96.1
					2.0	29.2	17.5	10.3	6.63	91.6
					3.0	29.3	18.0	10.6	5.05	70.0
					4.0	29.2	18.3	10.8	3.95	54.8
				5.0	29.0	19.1	11.3	4.14	57.3	

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSPF03
 REVISED: 20061020

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
SE03	20050816	13:19	7.9	1.0	0.5	29.4	16.8	9.9	6.75	93.4
					1.0	29.4	16.8	9.8	6.35	87.8
					2.0	29.4	16.9	9.8	5.81	80.4
					3.0	29.1	17.3	10.2	1.85	25.5
					4.0	28.8	18.1	10.6	1.49	20.5
					5.0	28.1	18.8	11.1	0.69	9.4
					6.0	27.8	18.8	11.1	0.70	9.5
SE04	20050816	12:30	5.7	0.8	0.5	29.5	15.8	9.1	7.07	97.5
					1.0	29.5	15.8	9.2	6.48	89.4
					2.0	29.5	15.8	9.2	6.72	92.7
					3.0	29.6	16.0	9.3	5.60	77.5
					4.0	29.1	17.0	9.9	1.29	17.8
SO01	20050817	10:35	5.4	0.8	0.5	28.9	17.9	10.5	6.53	89.9
					1.0	28.7	18.2	10.7	5.74	78.8
					2.0	28.7	18.4	10.9	5.27	72.4
					3.0	28.7	18.7	11.1	4.70	64.7
					4.0	28.7	19.6	11.6	3.84	53.0
SO02	20050817	9:46	5.0	0.7	0.5	28.9	16.2	9.5	6.60	90.3
					1.0	28.8	16.5	9.6	5.66	77.4
					2.0	28.9	17.3	10.1	3.91	53.7
					3.0	28.9	17.3	10.1	3.49	48.0
					4.0	29.1	18.1	10.6	1.20	16.6
SO03	20050817	8:59	3.5	0.5	0.5	28.6	15.6	9.1	5.79	78.6
					1.0	28.7	15.9	9.3	5.23	71.3
					2.0	29.1	16.5	9.6	3.56	48.9
					3.0	29.2	17.4	10.2	1.09	15.1
RH01	20050817	14:12	2.1	0.4	0.5	30.8	19.2	11.4	11.68	166.7
					1.0	30.7	19.3	11.4	11.33	161.6
					1.5	30.7	19.4	11.4	11.67	166.5
					2.0	29.8	19.7	11.6	9.80	137.8

TABLE A-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN PROFILES: Vertical profiles of temperature, salinity, dissolved oxygen and other characteristics at TMDL stations.

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSPF03
 REVISED: 20061020

STATION	DATE	TIME	TOTAL DEPTH (m)	SECCHI DEPTH (m)	SAMPLE DEPTH (m)	TEMP (°C)	COND (mS cm ⁻¹)	SALIN	DO (mg l ⁻¹)	DO SAT (%)
RH02	20050817	13:34	1.9	0.4	0.5	30.1	18.5	10.9	8.76	123.3
					1.0	28.4	18.1	10.7	5.44	74.3
					1.5	28.6	18.4	10.8	4.87	66.8
WE01	20050817	12:43	2.4	0.4	0.5	29.0	19.7	11.7	8.08	112.1
					1.0	28.6	19.7	11.7	7.17	98.8
					1.5	28.4	19.7	11.7	6.10	83.7
					2.0	28.2	19.7	11.7	5.69	77.9
WE02	20050817	12:01	2.5	0.4	0.5	29.0	19.4	11.5	7.19	99.7
					1.0	28.8	19.4	11.5	6.65	91.9
					1.5	28.7	19.3	11.4	6.31	87.0
					2.0	28.5	19.4	11.5	5.75	79.0
					2.5	28.3	19.4	11.5	5.09	69.7

**SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
IN MARYLAND'S WESTERN SHORE TMDL DATA SET, 2005:**

Page No.

B-1. WATER COLUMN NUTRIENTS:

Dissolved nutrient concentrations in bottom waters
at Maryland's Western Shore TMDL stations..... B1-1

FILE NAME: TMDLWSNTxx

2005

B-1 June 2005..... B1-1

B-2 July 2005..... B2-1

B-3 August 2005..... B3-1

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

WESTERN SHORE CRUISE: 1
 FILENAME: TMDLWSNT01
 REVISED: 20061023

STATION	DATE	TOTAL DEPTH (m)	SAMPLE DEPTH (m)	SAMPLE #	DISSOLVED NUTRIENTS			CORR DIP (μM)
					NH_4^+ (μM)	NO_2^- (μM)	$\text{NO}_2^- + \text{NO}_3^-$ (μM)	
BU01	20050619	3.4	3.0	ST22	2.30	0.32	10.80	0.07
BU02	20050607	2.7	2.0	ST1	1.07	0.25	3.13	0.12
BU03	20050607	1.5	2.0	ST2	2.21	0.78	17.50	0.16
GU01	20050619	1.9	2.0	ST23	0.74	0.27	15.30	0.06
GU02	20050619	1.7	1.5	ST24	1.60	0.43	19.30	0.06
GU03	20050607	1.5	1.0	ST3	6.27	0.97	65.20	0.08
MI01	20050613	3.1	3.0	ST19	5.20	0.26	21.20	0.08
MI02	20050613	2.0	2.0	ST18	1.82	0.33	12.10	0.06
MI03	20050613	2.4	2.0	ST17	5.00	0.47	9.08	0.06
MA01	20050608	3.5	3.0	ST7	2.49	0.35	21.50	0.06
MA02	20050608	4.3	4.0	ST6	4.20	0.51	24.40	0.06
MA03	20050608	4.6	4.0	ST5	1.48	0.29	24.30	0.06
MA04	20050608	4.8	4.0	ST4	0.75	0.41	13.60	0.08
SE01	20050608	7.1	7.0	ST11	2.07	0.45	19.60	0.05
SE02	20050608	6.3	6.0	ST10	3.69	0.28	13.50	0.07
SE03	20050608	7.6	7.0	ST9	18.03	0.60	1.18	2.78
SE04	20050608	5.0	5.0	ST8	28.17	0.40	0.19	1.95
SO01	20050609	5.1	5.0	ST14	4.69	0.33	6.41	0.07
SO02	20050609	5.3	5.0	ST13	5.76	0.26	3.26	0.12
SO03	20050609	3.6	3.0	ST12	6.37	0.49	0.47	0.21
RH01	20050613	2.0	2.0	ST21	2.99	0.16	2.55	0.10
RH02	20050613	2.3	2.0	ST20	7.14	0.20	1.15	0.08
WE01	20050609	1.5	1.5	ST16	0.58	0.26	10.50	0.07
WE02	20050609	2.5	2.5	ST15	0.35	0.29	10.80	0.08

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

WESTERN SHORE CRUISE: 2
 FILENAME: TMDLWSNT02
 REVISED: 20061023

STATION	DATE	TOTAL DEPTH (m)	SAMPLE DEPTH (m)	SAMPLE #	DISSOLVED NUTRIENTS			CORR DIP (μM)
					NH_4^+ (μM)	NO_2^- (μM)	$\text{NO}_2^- + \text{NO}_3^-$ (μM)	
BU01	20050724	3.5	3.0	ST22	10.90	0.40	9.91	0.36
BU02	20050719	2.3	1.5	ST1	0.56	0.11	0.51	0.07
BU03	20050719	1.5	1.5	ST2	0.46	0.03	0.11	0.08
GU01	20050724	2.5	2.5	ST23	7.05	0.17	11.90	0.12
GU02	20050724	2.2	2.0	ST24	2.87	0.30	11.70	0.12
GU03	20050719	0.9	1.0	ST3	5.72	0.97	39.10	0.15
MI01	20050719	2.9	2.5	ST6	9.38	0.12	6.54	0.31
MI02	20050719	1.5	1.5	ST5	4.01	0.09	0.39	0.10
MI03	20050719	2.1	2.0	ST4	3.17	0.07	1.03	0.09
MA01	20050720	2.9	2.5	ST10	10.55	0.24	3.98	0.05
MA02	20050720	4.2	4.0	ST9	17.25	0.46	3.04	0.18
MA03	20050720	4.7	4.0	ST8	17.16	0.30	2.71	0.43
MA04	20050720	4.7	4.0	ST7	18.96	0.03	0.89	2.41
SE01	20050720	2.5	2.5	ST14	7.24	0.52	1.45	0.09
SE02	20050720	5.4	5.0	ST13	17.63	0.38	1.48	0.33
SE03	20050720	7.6	7.0	ST12	60.61	-0.03	0.43	6.37
SE04	20050720	5.1	5.0	ST11	39.28	0.13	0.69	4.20
SO01	20050721	5.5	5.0	ST17	3.72	0.10	0.36	0.26
SO02	20050721	5.1	5.0	ST16	7.24	0.10	0.28	1.73
SO03	20050721	3.6	3.0	ST15	15.67	0.01	0.20	5.74
RH01	20050721	2.3	2.0	ST21	N	N	N	N
RH02	20050721	2.1	2.0	ST20	N	N	N	N
WE01	20050721	2.2	2.0	ST19	7.59	0.08	0.24	0.22
WE02	20050721	2.5	2.5	ST18	15.00	0.09	0.26	0.28

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

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSNT03
 REVISED: 20061023

STATION	DATE	TOTAL	SAMPLE	SAMPLE	DISSOLVED NUTRIENTS			CORR DIP
		DEPTH	DEPTH		NH ₄ ⁺	NO ₂ ⁻	NO ₂ ⁻ +NO ₃ ⁻	
		(m)	(m)	#	(μM)	(μM)	(μM)	(μM)
BU01	20050814	3.1	3.0	ST1	8.29	0.38	8.27	0.08
BU02	20050815	2.1	2.0	ST4	0.21	0.16	0.36	0.10
BU03	20050815	1.2	1.0	ST5	0.21	0.12	0.18	0.15
GU01	20050814	2.1	2.0	ST2	5.21	0.16	5.41	0.11
GU02	20050814	1.9	1.5	ST3	0.29	0.15	0.34	0.08
GU03	20050815	0.9	0.5	ST6	1.86	0.24	1.50	0.09
MI01	20050815	2.8	2.5	ST9	8.50	0.14	2.51	0.31
MI02	20050815	1.7	1.5	ST8	1.43	0.12	0.53	0.07
MI03	20050815	2.1	2.0	ST7	0.21	0.09	0.13	0.06
MA01	20050816	3.6	3.0	ST13	0.21	0.14	0.30	0.09
MA02	20050816	4.2	4.0	ST12	15.86	0.59	0.70	0.82
MA03	20050816	4.5	4.0	ST11	28.36	0.03	0.38	3.33
MA04	20050816	4.5	4.0	ST10	51.14	0.02	1.64	6.21
SE01	20050817	7.6	7.0	ST17	6.21	0.21	0.83	0.25
SE02	20050816	5.7	5.0	ST16	5.21	0.26	1.12	0.11
SE03	20050816	7.9	7.0	ST15	53.21	0.06	0.15	5.75
SE04	20050816	5.7	5.0	ST14	39.50	0.02	0.27	4.62
SO01	20050817	5.4	5.0	ST20	10.50	0.15	0.39	1.34
SO02	20050817	5.0	5.0	ST19	1.50	0.03	1.15	4.39
SO03	20050817	3.5	3.0	ST18	0.36	0.02	0.15	6.63
RH01	20050817	2.1	2.0	ST24	0.21	0.04	0.22	0.18
RH02	20050817	1.9	1.5	ST23	1.71	0.06	0.32	0.80
WE01	20050817	2.4	2.0	ST22	1.64	0.09	0.57	0.61
WE02	20050817	2.5	2.5	ST21	4.57	0.16	0.45	0.94

**SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
IN MARYLAND'S WESTERN SHORE TMDL DATA SET, 2005:**

Page No.

C-1. SEDIMENT PROFILES:

Vertical profiles of Eh and surficial sediment characteristics
at Maryland's Western Shore TMDL stations..... C-1
FILE NAME: TMDLWSSPxx

2005

C-1 June 2005..... C1-1
C-2 July 2005..... C2-1
C-3 August 2005..... C3-1

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
 MARYLAND WESTERN SHORE:MINI-SONE
 SEDIMENT PROFILES:

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

WESTERN SHORE CRUISE: 1
 FILENAME: TMDLWSSP01
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					
						SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
BU01	20050619	17:44	1.0	40.8	285						
			0.0	43.5	288						
			-1.0	-35.2	209	3.89	0.410	0.1416	138.8	46.5	(1 cm)
			-2.0	-87.7	156						
BU02	20050607	20:13	1.0	-367.2	-123						
			0.0	-449.2	-205						
			-1.0	-442.5	-199	4.32	0.470	0.1400	125.8	54.6	(1 cm)
			-2.0	-444.8	-201						
BU03	20050607	20:14	1.0	-264.3	-20						
			0.0	-567.3	-323						
			-1.0	-572.9	-329	3.06	0.320	0.0890	59.8	22.5	(1 cm)
			-2.0	-568.9	-325						
GU01	20050619	19:01	1.0	121.4	365						
			0.0	174.3	418						
			-1.0	126.9	371	2.71	0.280	0.0987	56.8	9.1	(1 cm)
			-2.0	22.0	266						
GU02	20050619	18:22	1.0	102.3	346						
			0.0	87.7	332						
			-1.0	-133.5	111	2.94	0.320	0.1065	30.8	6.0	(1 cm)
			-2.0	-146.5	98						
GU03	20050607	20:21	1.0	-358.8	-115						
			0.0	-365.9	-122						
			-1.0	-413.7	-170	3.03	0.300	0.0947	84.2	34.8	(1 cm)
			-2.0	-424.7	-181						
MI01	20050613	15:36	1.0	134.0	378						
			0.0	137.7	382						
			-1.0	73.6	318	3.39	0.360	0.1604	103.4	19.0	(1 cm)
			-2.0	104.3	348						
MI02	20050613	14:23	1.0	113.6	358						
			0.0	-225.9	18						
			-1.0	-334.9	-91	3.42	0.370	0.0874	53.3	13.3	(1 cm)
			-2.0	-351.5	-108						

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
 MARYLAND WESTERN SHORE:MINI-SONE
 SEDIMENT PROFILES:

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

WESTERN SHORE CRUISE: 1
 FILENAME: TMDLWSSP01
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					(1 cm)
						SED PC % (wt)	SED PN % (wt)	SED PP % (wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
MI03	20050613	14:56	1.0	76.4	320	4.00	0.410	0.1035	81.2	19.0	(1 cm)
			0.0	-35.7	208						
			-1.0	-275.9	-32						
			-2.0	-165.4	79						
MA01	20050608	15:13	1.0	72.8	317	4.06	0.420	0.1170	51.7	5.9	(1 cm)
			0.0	-46.7	197						
			-1.0	40.3	284						
			-2.0	123.7	368						
MA02	20050608	15:17	1.0	-93.0	151	3.62	0.370	0.1060	77.8	6.7	(1 cm)
			0.0	-74.8	169						
			-1.0	-70.8	173						
			-2.0	-74.9	169						
MA03	20050608	17:11	1.0	-62.1	182	4.64	0.560	0.1341	101.6	16.5	(1 cm)
			0.0	-59.6	184						
			-1.0	-123.6	120						
			-2.0	-117.9	126						
MA04	20050608	17:50	1.0	-112.2	132	7.26	0.850	0.1421	139.0	33.0	(1 cm)
			0.0	-148.3	96						
			-1.0	-77.9	166						
			-2.0	-26.0	218						
SE01	20050608	22:03	1.0	-4.5	240	2.28	0.260	0.1132	126.7	7.2	(1 cm)
			0.0	16.0	260						
			-1.0	13.6	258						
			-2.0	43.1	287						
SE02	20050608	23:18	1.0	27.7	272	3.02	0.350	0.1171	116.7	11.5	(1 cm)
			0.0	28.4	272						
			-1.0	33.1	277						
			-2.0	60.6	305						
SE03	20050608	20:55	1.0	0.6	245	5.31	0.670	0.1738	118.1	41.4	(1 cm)
			0.0	34.6	279						
			-1.0	-27.0	217						
			-2.0	32.5	277						

TABLE C-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
 MARYLAND WESTERN SHORE:MINI-SONE
 SEDIMENT PROFILES:

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

WESTERN SHORE CRUISE: 1
 FILENAME: TMDLWSSP01
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					
						SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
SE04	20050608	22:41	1.0	14.6	259						
			0.0	-10.4	234						
			-1.0	-49.9	194	6.32	0.770	0.1274	152.5	40.4	(1 cm)
			-2.0	22.0	266						
SO01	20050609	15:55	1.0	-365.5	-122						
			0.0	-430.5	-187						
			-1.0	-411.1	-167	2.48	0.260	0.0758	95.6	13.0	(1 cm)
			-2.0	-8.2	236						
SO02	20050609	14:59	1.0	-83.4	161						
			0.0	-363.0	-119						
			-1.0	-356.5	-113	5.16	0.650	0.1616	147.0	48.8	(1 cm)
			-2.0	-357.5	-114						
SO03	20050609	14:45	1.0	15.8	260						
			0.0	-157.8	86						
			-1.0	-138.1	106	5.80	0.750	0.1738	120.5	42.1	(1 cm)
			-2.0	-128.0	116						
RH01	20050613	19:05	1.0	146.4	390						
			0.0	157.7	402						
			-1.0	45.8	290	0.41	0.050	0.0526	64.7	15.7	(1 cm)
			-2.0	56.1	300						
RH02	20050613	18:27	1.0	22.7	267						
			0.0	27.8	272						
			-1.0	46.0	290	3.03	0.360	0.0938	75.8	16.1	(1 cm)
			-2.0	-159.7	84						
WE01	20050609	17:36	1.0	-463.8	-220						
			0.0	-490.4	-246						
			-1.0	-486.5	-243	0.80	0.100	0.0258	62.7	19.4	(1 cm)
			-2.0	-487.7	-244						
WE02	20050609	18:27	1.0	-507.8	-264						
			0.0	-492.2	-248						
			-1.0	-508.1	-264	2.76	0.340	0.0835	66.7	7.3	(1 cm)
			-2.0	-509.4	-265						

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

WESTERN SHORE CRUISE: 2
 FILENAME: TMDLWSSP02
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					
						SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
BU01	20050724	16:48	1.0	99.2	343						
			0.0	-54.0	190						
			-1.0	-187.1	57	3.64	0.350	0.1191	56.3	10.0	(1 cm)
			-2.0	-91.1	153						
BU02	20050719	15:55	1.0	57.0	301						
			0.0	132.0	376						
			-1.0	144.0	388	4.08	0.410	0.0985	81.8	38.0	(1 cm)
			-2.0	-87.7	156						
BU03	20050719	16:25	1.0	130.2	374						
			0.0	-122.7	121						
			-1.0	-18.4	226	3.24	0.340	0.0706	73.7	35.6	(1 cm)
			-2.0	-23.0	221						
GU01	20050724	17:30	1.0	137.4	381						
			0.0	117.4	361						
			-1.0	118.5	363	2.70	0.270	0.0870	55.7	9.7	(1 cm)
			-2.0	27.8	272						
GU02	20050724	17:52	1.0	132.9	377						
			0.0	64.1	308						
			-1.0	13.2	257	2.98	0.340	0.1053	57.9	8.3	(1 cm)
			-2.0	62.4	306						
GU03	20050719	17:04	1.0	110.7	355						
			0.0	75.5	320						
			-1.0	82.4	326	3.32	0.310	0.0726	43.3	14.3	(1 cm)
			-2.0	106.5	351						
MI01	20050719	21:36	1.0	129.5	374						
			0.0	-15.6	228						
			-1.0	-243.9	0	3.38	0.380	0.1661	67.5	8.8	(1 cm)
			-2.0	-220.1	24						
MI02	20050719	20:48	1.0	-259.7	-16						
			0.0	-288.4	-44						
			-1.0	-215.7	28	3.36	0.370	0.0731	58.9	20.0	(1 cm)
			-2.0	-272.7	-29						

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

WESTERN SHORE CRUISE: 2
 FILENAME: TMDLWSSP02
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					
						SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
MI03	20050719	20:16	1.0	-154.8	89						
			0.0	-186.8	57						
			-1.0	-174.7	69	4.32	0.520	0.1274	62.6	14.9	(1 cm)
			-2.0	-234.9	9						
MA01	20050720	15:40	1.0	141.5	386						
			0.0	-202.6	41						
			-1.0	-155.2	89	4.02	0.430	0.1091	65.7	9.7	(1 cm)
			-2.0	-196.8	47						
MA02	20050720	15:06	1.0	50.8	295						
			0.0	-178.5	66						
			-1.0	-237.1	7	3.83	0.420	0.1002	79.6	11.2	(1 cm)
			-2.0	-210.6	33						
MA03	20050720	14:30	1.0	-33.1	211						
			0.0	-130.1	114						
			-1.0	-217.7	26	4.73	0.590	0.1306	83.2	24.5	(1 cm)
			-2.0	-228.2	16						
MA04	20050720	13:59	1.0	-177.8	66						
			0.0	-446.8	-203						
			-1.0	-424.8	-181	6.70	0.850	0.1086	103.3	31.4	(1 cm)
			-2.0	-405.6	-162						
SE01	20050720	19:04	1.0	137.8	382						
			0.0	137.8	382						
			-1.0	104.9	349	0.75	0.080	0.0291	48.8	1.5	(1 cm)
			-2.0	-108.0	136						
SE02	20050720	20:50	1.0	151.0	395						
			0.0	-129.3	115						
			-1.0	-231.4	13	2.81	0.340	0.0949	51.4	8.3	(1 cm)
			-2.0	-180.9	63						
SE03	20050720	20:13	1.0	101.4	345						
			0.0	-234.0	10						
			-1.0	-229.6	14	5.56	0.750	0.1065	95.6	30.8	(1 cm)
			-2.0	-232.1	12						

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

WESTERN SHORE CRUISE: 2
 FILENAME: TMDLWSSP02
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					
						SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
SE04	20050720	19:34	1.0	98.5	343						
			0.0	-371.5	-128						
			-1.0	-368.1	-124	6.81	0.910	0.1160	98.1	33.7	(1 cm)
			-2.0	-378.1	-134						
SO01	20050721	15:33	1.0	138.9	383						
			0.0	-205.8	38						
			-1.0	-226.7	17	3.44	0.430	0.1131	77.2	13.2	(1 cm)
			-2.0	-219.9	24						
SO02	20050721	14:50	1.0	111.8	356						
			0.0	-348.6	-105						
			-1.0	-271.3	-27	4.45	0.520	0.0651	81.3	19.1	(1 cm)
			-2.0	-375.6	-132						
SO03	20050721	14:18	1.0	108.0	352						
			0.0	-328.3	-84						
			-1.0	-387.5	-144	5.88	0.770	0.1294	144.5	46.7	(1 cm)
			-2.0	-452.5	-209						
RH01	20050721	17:18	1.0	144.6	389						
			0.0	-80.5	164						
			-1.0	-135.9	108	N	N	N	N	N	(1 cm)
			-2.0	-102.7	141						
RH02	20050721	17:52	1.0	123.4	367						
			0.0	-229.6	14						
			-1.0	-204.5	40	N	N	N	N	N	(1 cm)
			-2.0	-197.0	47						
WE01	20050721	16:46	1.0	150.0	394						
			0.0	-82.8	161						
			-1.0	-155.4	89	1.29	0.170	0.0439	50.3	15.0	(1 cm)
			-2.0	-193.5	51						
WE02	20050721	16:07	1.0	142.9	387						
			0.0	-168.3	76						
			-1.0	-177.6	66	2.57	0.320	0.0760	41.8	7.0	(1 cm)
			-2.0	-206.2	38						

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

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSSP03
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					
						SED PC % (wt)	SED PN % (wt)	SED PP % (wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
BU01	20050814	18:14	1.0	61.8	306						
			0.0	-129.7	114						
			-1.0	-142.7	101	3.05	0.350	0.1342	85.6	9.5	(1 cm)
			-2.0	-129.1	115						
BU02	20050815	15:00	1.0	106.4	350						
			0.0	23.6	268						
			-1.0	-20.4	224	4.05	0.400	0.0938	104.6	44.9	(1 cm)
			-2.0	-82.4	162						
BU03	20050815	15:29	1.0	37.4	281						
			0.0	-93.2	151						
			-1.0	-125.5	119	2.90	0.330	0.0812	90.2	46.3	(1 cm)
			-2.0	-142.2	102						
GU01	20050814	18:45	1.0	114.3	358						
			0.0	-138.3	106						
			-1.0	-146.9	97	2.57	0.250	0.0768	66.0	6.5	(1 cm)
			-2.0	-145.3	99						
GU02	20050814	19:24	1.0	103.9	348						
			0.0	-156.0	88						
			-1.0	-149.0	95	2.97	0.330	0.1095	64.3	8.4	(1 cm)
			-2.0	-163.5	81						
GU03	20050815	16:01	1.0	-34.7	209						
			0.0	-149.9	94						
			-1.0	-162.0	82	2.98	0.270	0.0783	68.8	16.5	(1 cm)
			-2.0	-130.6	113						
MI01	20050815	19:47	1.0	26.7	271						
			0.0	-132.3	112						
			-1.0	-128.3	116	3.31	0.370	0.1684	93.4	10.2	(1 cm)
			-2.0	-118.8	125						
MI02	20050815	20:19	1.0	55.5	300						
			0.0	-139.6	104						
			-1.0	-131.7	112	1.18	0.130	0.0146	79.1	22.2	(1 cm)
			-2.0	-113.9	130						

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

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSSP03
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					
						SED PC % (wt)	SED PN % (wt)	SED PP % (wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
MI03	20050815	19:06	1.0	126.6	371						
			0.0	-76.7	167						
			-1.0	-115.6	128	4.13	0.500	0.1227	65.4	11.1	(1 cm)
			-2.0	-147.5	97						
MA01	20050816	15:13	1.0	-137.9	106						
			0.0	-216.3	28						
			-1.0	-187.1	57	4.03	0.430	0.1169	89.5	24.4	(1 cm)
			-2.0	-150.2	94						
MA02	20050816	14:00	1.0	-42.0	202						
			0.0	-173.3	71						
			-1.0	-189.9	54	3.63	0.370	0.0984	70.9	11.1	(1 cm)
			-2.0	-202.0	42						
MA03	20050816	14:33	1.0	-88.4	156						
			0.0	-220.9	23						
			-1.0	-220.5	24	5.06	0.640	0.1290	93.6	25.2	(1 cm)
			-2.0	-208.1	36						
MA04	20050816	13:10	1.0	-204.5	40						
			0.0	-315.3	-71						
			-1.0	-353.1	-109	8.66	1.110	0.1257	131.5	35.3	(1 cm)
			-2.0	-370.9	-127						
SE01	20050817	13:27	1.0	118.0	362						
			0.0	-123.2	121						
			-1.0	-169.9	74	3.26	0.390	0.1217	77.4	13.3	(1 cm)
			-2.0	-149.7	94						
SE02	20050816	20:06	1.0	99.2	343						
			0.0	-113.6	130						
			-1.0	-43.6	200	3.30	0.390	0.1215	70.1	9.4	(1 cm)
			-2.0	-146.9	97						
SE03	20050816	19:33	1.0	113.7	358						
			0.0	-265.9	-22						
			-1.0	-240.2	4	4.84	0.620	0.0987	64.6	20.8	(1 cm)
			-2.0	-124.8	119						

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

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSSP03
 REVISED: 20061023

STATION	DATE	TIME	CORE DEPTH (cm)	Eh MEAS (mV)	Eh CORR (mV)	SURFICIAL SEDIMENT PARTICULATES					
						SED PC %(wt)	SED PN %(wt)	SED PP %(wt)	SED CHLa TOTAL (mg m ⁻²)	SED CHLa ACTIVE (mg m ⁻²)	
SE04	20050816	18:54	1.0	-63.6	180						
			0.0	-365.9	-122						
			-1.0	-376.1	-132	6.83	0.850	0.1086	163.9	51.7	(1 cm)
			-2.0	-368.4	-124						
SO01	20050817	15:07	1.0	106.7	351						
			0.0	-153.3	91						
			-1.0	-176.9	67	3.09	0.360	0.0896	81.2	13.8	(1 cm)
			-2.0	-156.6	87						
SO02	20050817	14:34	1.0	60.3	304						
			0.0	-340.8	-97						
			-1.0	-397.5	-154	5.47	0.700	0.1030	115.1	30.8	(1 cm)
			-2.0	-315.2	-71						
SO03	20050817	13:59	1.0	117.8	362						
			0.0	-381.1	-137						
			-1.0	-422.6	-179	6.40	0.880	0.1302	156.1	70.0	(1 cm)
			-2.0	-379.6	-136						
RH01	20050817	20:32	1.0	-64.5	180						
			0.0	-120.1	124						
			-1.0	-161.0	83	0.56	0.070	0.0475	53.7	10.4	(1 cm)
			-2.0	-145.1	99						
RH02	20050817	19:47	1.0	48.6	293						
			0.0	-114.4	130						
			-1.0	-112.7	131	0.67	0.080	0.0130	48.7	11.2	(1 cm)
			-2.0	-87.7	156						
WE01	20050817	19:02	1.0	72.5	317						
			0.0	-114.6	129						
			-1.0	-122.6	121	1.18	0.150	0.1258	68.2	20.0	(1 cm)
			-2.0	-129.1	115						
WE02	20050817	18:34	1.0	136.5	381						
			0.0	-129.2	115						
			-1.0	-113.4	131	2.53	0.290	0.0645	30.6	5.1	(1 cm)
			-2.0	-54.9	189						

**SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
IN MARYLAND'S WESTERN SHORE TMDL DATA SET, 2005:**

Page No.

D-1. CORE DATA:

Dissolved nutrient and oxygen concentrations in Maryland's
Western Shore TMDL sediment –water flux chambers..... D-1

FILE NAME: TMDLWSCDxx

2005

D-1 June 2005..... D1-1

D-2 July 2005..... D2-1

D-3 August 2005..... D3-1

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 1

FILENAME: TMDLWSCD01

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE		TIME DELTA	TIME SUM	DO (mg l ⁻¹)	AA	NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
			(h)	(min)	(min)	(min)		VIAL NO				
BU01	20050619	1	18	25	0	0	7.21	85	0.24	3.13	0.06	10.80
			19	28	63	63	6.66	86	0.28	4.32	0.07	11.00
			20	36	68	131	5.89	87	0.28	7.05	0.16	10.90
			21	26	50	181	5.48	88	0.30	7.71	0.19	10.80
BU02	20050607	1	20	46	0	0	7.94	1	0.20	2.13	0.10	2.88
			21	46	60	60	7.63	2	0.22	3.62	0.09	3.17
			22	48	62	122	7.17	3	0.47	4.32	0.07	3.43
			23	47	59	181	6.85	4	0.35	4.71	0.08	3.97
BU03	20050607	1	20	55	0	0	6.30	5	0.74	5.42	0.09	17.20
			21	55	60	60	5.90	6	0.74	8.21	0.09	16.90
			22	55	60	120	5.52	7	0.79	11.30	0.08	16.40
			23	56	61	181	5.19	8	0.76	14.03	0.07	16.60
GU01	20050619	1	18	30	0	0	7.69	89	0.29	2.34	0.08	14.80
			19	30	60	60	7.06	90	0.26	1.61	0.07	14.80
			20	39	69	129	6.63	91	0.27	2.69	0.08	14.60
			21	31	52	181	6.32	92	0.29	3.14	0.08	14.50
GU02	20050619	1	18	50	0	0	7.31	93	0.40	1.85	0.07	19.10
			19	50	60	60	6.84	94	0.40	3.20	0.07	19.00
			20	51	61	121	6.59	95	0.40	3.39	0.07	18.90
			21	45	54	175	6.32	96	0.37	4.61	0.07	19.00
GU03	20050607	1	21	35	0	0	5.60	9	0.99	8.07	0.10	65.80
			22	35	60	60	5.31	10	1.08	10.49	0.08	65.40
			23	35	60	120	4.97	11	1.15	11.02	0.08	64.20
			0	37	62	182	4.69	12	1.22	13.54	0.09	63.60
MI01	20050613	1	15	50	0	0	5.80	73	0.23	5.34	0.09	21.00
			16	51	61	61	5.63	74	0.25	5.07	0.09	21.00
			17	51	60	121	5.45	75	0.22	6.48	0.12	21.20
			18	50	59	180	5.27	76	0.19	5.82	0.11	21.20
MI02	20050613	1	15	30	0	0	6.53	69	0.32	2.24	0.07	11.80
			16	30	60	60	6.12	70	0.23	3.72	0.06	11.20
			17	30	60	120	5.76	71	0.24	4.58	0.08	11.40
			18	29	59	179	5.49	72	0.25	5.30	0.06	11.20

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 1

FILENAME: TMDLWSCD01

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE		TIME DELTA	TIME SUM	DO (mg l ⁻¹)	AA VIAL NO	NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
			(h)	(min)	(min)	(min)						
MI03	20050613	1	15	7	0	0	5.74	65	0.38	5.14	0.07	9.03
			16	9	62	62	5.03	66	0.50	7.03	0.08	8.71
			17	8	59	121	4.86	67	0.39	7.71	0.08	8.54
			18	7	59	180	4.61	68	0.40	9.42	0.08	8.74
MA01	20050608	1	16	40	0	0	3.65	25	0.27	0.54	0.07	20.70
			17	40	60	60	2.78	26	0.28	1.93	0.10	19.60
			18	40	60	120	2.25	27	0.28	2.56	0.11	18.90
			19	40	60	180	1.74	28	0.29	3.74	0.12	18.30
MA02	20050608	1	16	5	0	0	4.35	21	0.41	2.20	0.06	23.50
			17	5	60	60	3.71	22	0.33	2.42	0.08	22.90
			18	5	60	120	3.28	23	0.33	2.69	0.09	22.70
			19	3	58	178	2.89	24	0.44	4.12	0.10	22.00
MA03	20050608	1	15	59	0	0	4.96	17	0.34	2.33	0.07	23.80
			16	59	60	60	4.51	18	0.45	5.66	0.07	23.00
			17	59	60	120	4.10	19	0.32	4.54	0.06	22.10
			18	59	60	180	3.80	20	0.34	4.79	0.06	21.40
MA04	20050608	1	15	55	0	0	1.59	13	0.25	1.78	0.09	13.60
			16	55	60	60	1.53	14	0.27	3.36	0.08	12.90
			17	55	60	120	1.45	15	0.27	4.34	0.07	11.70
			18	55	60	180	1.38	16	0.27	5.47	0.09	11.30
SE01	20050608	1	22	10	0	0	3.90	41	0.42	0.84	0.06	18.40
			23	10	60	60	3.09	42	0.35	1.97	0.08	17.40
			0	11	61	121	2.48	43	0.31	1.73	0.09	16.60
			1	0	49	170	2.09	44	0.40	3.19	0.11	16.60
SE02	20050608	1	21	55	0	0	1.96	37	0.28	1.52	0.08	11.70
			22	52	57	57	1.38	38	0.35	1.93	0.10	10.60
			23	55	63	120	0.97	39	0.31	2.33	0.11	9.60
			0	57	62	182	0.72	40	0.38	3.24	0.13	8.56
SE03	20050608	1	21	17	0	0	0.67	33	0.36	19.61	0.96	0.69
			22	18	61	61	0.60	34	0.42	22.45	0.80	1.02
			23	16	58	119	0.54	35	0.33	21.14	0.52	0.90
			24	16	60	179	0.46	36	0.32	24.18	0.41	0.65

TABLE D-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 1

FILENAME: TMDLWSCD01

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE		TIME DELTA	TIME SUM	DO	AA	NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
			(h)	(min)	(min)	(min)	(mg l ⁻¹)	VIAL NO				
SE04	20050608	1	21	15	0	0	0.09	29	0.06	33.68	1.43	0.15
			22	15	60	60	0.02	30	0.07	33.86	1.36	0.15
			23	14	59	119	0.04	31	0.04	28.60	1.29	0.16
			24	15	61	180	0.04	32	0.22	31.82	1.65	0.26
SO01	20050609	1	15	16	0	0	1.72	53	0.31	5.38	0.07	6.36
			16	14	58	58	1.13	54	0.35	8.27	0.10	5.61
			17	15	61	119	0.73	55	0.34	8.19	0.11	4.77
			18	16	61	180	0.49	56	0.31	10.84	0.12	4.04
SO02	20050609	1	15	0	0	0	1.00	49	0.27	6.44	0.14	3.28
			16	0	60	60	0.86	50	0.25	10.94	0.49	3.28
			17	0	60	120	0.72	51	0.94	6.15	0.51	3.04
			18	5	65	185	0.57	52	0.36	18.45	0.76	2.80
SO03	20050609	1	14	45	0	0	0.64	45	0.22	5.27	0.15	0.43
			15	45	60	60	0.49	46	0.19	7.20	0.29	0.43
			16	44	59	119	0.45	47	0.19	7.55	0.39	0.32
			17	45	61	180	0.39	48	0.18	10.46	0.48	0.58
RH01	20050613	1	19	15	0	0	5.73	81	0.16	2.39	0.10	2.46
			20	14	59	59	5.25	82	0.13	3.57	0.10	2.49
			21	10	56	115	4.79	83	0.20	4.55	0.11	3.17
			22	12	62	177	4.35	84	0.16	5.38	0.11	2.61
RH02	20050613	1	19	9	0	0	3.50	77	0.16	9.61	0.09	1.18
			20	9	60	60	2.87	78	0.12	9.71	0.09	1.13
			21	7	58	118	2.34	79	0.25	14.28	0.10	1.19
			22	6	59	177	1.95	80	0.18	15.18	0.12	1.03
WE01	20050609	1	18	44	0	0	6.23	61	0.39	1.61	0.07	10.20
			19	44	60	60	5.60	62	0.31	3.10	0.07	10.10
			20	45	61	121	5.05	63	0.32	4.61	0.07	10.10
			21	45	60	181	4.70	64	0.29	3.74	0.08	10.00
WE02	20050609	1	18	40	0	0	3.49	57	0.41	0.79	0.07	9.74
			19	40	60	60	3.00	58	0.47	2.83	0.06	9.66
			20	43	63	123	2.52	59	0.35	2.63	0.09	9.87
			21	41	58	181	2.13	60	0.31	3.35	0.08	9.38

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 2

FILENAME: TMDLWSCD02

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE		TIME DELTA	TIME SUM	DO (mg l ⁻¹)	AA	NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
			(h)	(min)	(min)	(min)		VIAL NO				
BU01	20050724	1	17	35	0	0	6.25	85	0.30	6.88	0.24	9.82
			18	34	59	59	5.65	86	0.32	10.88	0.30	10.90
			19	33	59	118	5.11	87	0.33	14.00	0.30	10.60
			20	35	62	180	4.59	88	0.38	17.19	0.41	9.92
BU02	20050719	1	16	25	0	0	6.70	1	0.06	2.32	0.09	0.32
			17	25	60	60	6.23	2	0.11	4.23	0.08	0.54
			18	25	60	120	5.87	3	0.15	5.64	0.07	0.45
			19	25	60	180	5.57	4	0.19	6.45	0.09	0.52
BU03	20050719	1	16	55	0	0	6.31	5	0.02	2.48	0.11	0.27
			17	55	60	60	5.28	6	0.11	8.04	0.09	0.38
			18	55	60	120	4.54	7	0.18	12.71	0.09	0.56
			19	54	59	179	3.90	8	0.25	17.01	0.10	0.71
GU01	20050724	1	17	37	0	0	5.99	89	0.22	7.67	0.15	11.60
			18	37	60	60	5.52	90	0.18	7.16	0.13	11.70
			19	35	58	118	5.61	91	0.19	7.58	0.78	12.00
			20	37	62	180	5.31	92	0.20	8.41	0.18	11.40
GU02	20050724	1	17	39	0	0	6.33	93	0.30	2.94	0.14	11.50
			18	40	61	61	6.17	94	0.34	5.12	0.18	11.50
			19	37	57	118	5.42	95	0.29	5.08	0.16	11.10
			20	38	61	179	5.09	96	0.29	5.78	0.17	9.94
GU03	20050719	1	17	5	0	0	5.45	9	0.93	6.15	0.16	39.00
			18	11	66	66	4.72	10	0.95	9.72	0.28	38.00
			19	9	58	124	4.82	11	0.97	14.33	0.45	37.30
			20	5	56	180	4.06	12	0.98	19.80	0.60	36.70
MI01	20050719	1	21	0	0	0	5.75	21	0.10	9.13	0.33	6.03
			22	0	60	60	5.48	22	0.10	9.55	0.38	6.34
			23	10	70	130	5.13	23	0.09	9.99	0.43	6.39
			24	0	50	180	4.96	24	0.10	10.72	0.48	6.54
MI02	20050719	1	20	50	0	0	7.44	17	0.03	1.13	0.08	0.33
			21	50	60	60	6.68	18	0.04	3.07	0.06	0.32
			22	51	61	121	6.20	19	0.06	4.75	0.07	0.49
			23	50	59	180	5.74	20	0.08	5.86	0.07	0.56

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 2

FILENAME: TMDLWSCD02

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE		TIME DELTA	TIME SUM	DO (mg l ⁻¹)	AA	NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
			(h)	(min)	(min)	(min)		VIAL NO				
MI03	20050719	1	20	30	0	0	5.24	13	0.07	3.69	0.09	0.76
			21	34	64	64	4.70	14	0.06	6.06	0.09	0.75
			22	44	70	134	4.32	15	0.08	8.41	0.10	0.88
			23	32	48	182	4.11	16	0.09	9.75	0.10	0.82
MA01	20050720	1	15	45	0	0	4.05	37	0.22	11.95	0.08	3.89
			16	46	61	61	3.64	38	0.23	14.67	0.10	3.88
			17	52	66	127	3.30	39	0.23	16.71	0.10	3.77
			18	37	45	172	3.06	40	0.27	18.25	0.12	3.66
MA02	20050720	1	15	20	0	0	3.16	33	0.22	17.65	0.12	3.05
			16	25	65	65	2.95	34	0.24	18.78	0.14	3.32
			17	17	52	117	2.80	35	0.22	20.01	0.17	3.10
			18	28	71	188	2.48	36	0.25	24.08	0.25	2.91
MA03	20050720	1	14	51	0	0	1.90	29	0.22	18.28	0.63	2.90
			15	51	60	60	1.48	30	0.20	20.31	0.44	2.52
			16	50	59	119	1.26	31	0.22	23.48	0.46	2.48
			17	55	65	184	1.08	32	0.22	24.87	0.55	2.20
MA04	20050720	1	14	49	0	0	0.11	25	0.01	20.05	2.03	0.45
			15	48	59	59	0.02	26	0.02	22.55	2.64	0.24
			16	48	60	119	0.01	27	0.03	27.01	3.05	0.16
			17	53	65	184	0.01	28	-0.05	31.53	3.52	0.12
SE01	20050720	1	20	0	0	0	4.64	53	0.17	6.71	0.08	1.12
			20	55	55	55	4.46	54	0.15	7.11	0.09	1.14
			22	0	65	120	4.26	55	0.14	7.62	0.10	1.21
			23	0	60	180	4.14	56	0.15	8.28	0.11	1.22
SE02	20050720	1	19	45	0	0	2.57	49	0.21	16.93	0.34	1.40
			20	48	63	63	2.33	50	0.18	19.02	0.34	1.40
			21	45	57	120	2.21	51	0.20	20.68	0.33	1.38
			22	42	57	177	2.07	52	0.20	21.29	0.34	1.54
SE03	20050720	1	20	25	0	0	0.04	45	-0.10	58.05	7.04	0.27
			21	23	58	58	0.03	46	-0.09	61.16	7.54	0.23
			22	25	62	120	0.03	47	-0.06	64.29	8.55	0.22
			23	25	60	180	0.01	48	-0.09	66.82	8.22	0.27

TABLE D-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 2

FILENAME: TMDLWSCD02

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE		TIME DELTA	TIME SUM	DO (mg l ⁻¹)	AA VIAL NO	NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
			(h)	(min)	(min)	(min)						
SE04	20050720	1	20	1	0	0	0.04	41	-0.10	38.92	4.49	0.28
			21	0	59	59	0.02	42	-0.09	41.19	4.67	0.22
			22	3	63	122	0.03	43	-0.11	42.15	4.64	0.20
			23	1	58	180	0.02	44	0.01	43.34	4.86	0.20
SO01	20050721	1	15	15	0	0	1.94	65	0.08	4.33	0.30	0.30
			16	15	60	60	1.58	66	0.06	9.88	1.16	0.30
			17	15	60	120	1.18	67	0.07	18.99	2.27	0.30
			18	15	60	180	0.94	68	0.05	23.74	2.55	0.30
SO02	20050721	1	15	0	0	0	1.01	61	0.05	8.03	1.66	0.23
			15	57	57	57	0.78	62	0.03	10.85	1.75	0.34
			17	4	67	124	0.64	63	0.04	15.27	2.03	0.25
			18	4	60	184	0.53	64	0.05	18.07	2.34	0.19
SO03	20050721	1	14	40	0	0	0.79	57	0.05	15.94	5.06	0.11
			15	40	60	60	0.65	58	0.02	18.50	5.11	0.15
			16	42	62	122	0.63	59	0.03	22.39	5.29	0.40
			17	40	58	180	0.59	60	0.09	25.16	5.38	0.28
RH01	20050721	1	18	55	0	0	8.36	81	0.04	0.63	0.12	0.27
			19	54	59	59	7.39	82	0.06	0.62	0.12	0.22
			20	57	63	122	6.50	83	0.10	1.66	0.11	0.74
			21	53	56	178	5.73	84	0.08	3.61	0.14	0.46
RH02	20050721	1	18	50	0	0	1.78	77	0.10	5.41	0.53	0.14
			19	52	62	62	1.12	78	0.06	6.80	0.56	0.15
			20	55	63	125	0.97	79	0.02	8.52	0.57	0.14
			21	51	56	181	0.85	80	0.02	9.88	0.62	0.14
WE01	20050721	1	16	0	0	0	1.93	73	0.07	8.10	0.18	0.22
			17	0	60	60	1.40	74	0.21	10.80	0.35	0.48
			18	0	60	120	1.21	75	0.08	11.95	0.29	0.22
			18	59	59	179	1.02	76	0.08	15.24	0.39	0.29
WE02	20050721	1	15	35	0	0	1.98	69	0.08	17.05	0.25	0.25
			16	35	60	60	1.50	70	0.08	17.57	0.26	0.44
			17	35	60	120	1.64	71	0.34	18.56	0.27	0.28
			18	37	62	182	1.50	72	0.10	20.30	0.31	0.33

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 3

FILENAME: TMDLWSCD03

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE		TIME DELTA	TIME SUM	DO (mg l ⁻¹)	AA VIAL NO	NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
			(h)	(min)	(min)	(min)						
BU01	20050814	1	18	55	0	0	5.54	1	0.34	10.86	0.13	7.54
			19	54	59	59	3.30	2	0.37	23.00	0.39	7.30
			20	52	58	117	1.59	3	0.38	31.57	0.61	6.74
			21	57	65	182	0.62	4	0.41	39.71	0.83	6.40
BU02	20050815	1	15	40	0	0	5.90	13	0.11	1.79	0.11	0.17
			16	44	64	64	5.21	14	0.19	6.21	0.11	0.31
			17	49	65	129	4.60	15	0.24	10.71	0.16	0.41
			18	37	48	177	4.19	16	0.33	14.21	0.21	0.68
BU03	20050815	1	15	47	0	0	4.93	17	0.12	0.50	0.10	0.12
			16	46	59	59	4.34	18	0.15	3.43	0.09	0.32
			17	50	64	123	3.82	19	0.16	5.50	0.09	0.16
			18	40	50	173	3.54	20	0.21	8.79	0.12	0.18
GU01	20050814	1	19	0	0	0	5.65	5	0.17	5.79	0.10	5.14
			19	57	57	57	4.94	6	0.18	8.57	0.17	5.17
			20	54	57	114	4.33	7	0.17	11.79	0.23	5.16
			21	59	65	179	3.72	8	0.19	14.29	0.28	5.09
GU02	20050814	1	19	2	0	0	6.63	9	0.11	0.50	0.09	0.23
			20	0	58	58	5.88	10	0.12	3.21	0.11	0.52
			20	56	56	114	5.24	11	0.15	6.00	0.15	0.79
			22	1	65	179	4.88	12	0.16	7.14	0.19	0.96
GU03	20050815	1	15	49	0	0	6.05	21	0.24	2.36	0.09	1.60
			16	48	59	59	5.75	22	0.24	3.21	0.08	1.52
			17	52	64	123	5.52	23	0.26	4.29	0.07	1.64
			18	42	50	173	5.33	24	0.24	4.79	0.08	1.59
MI01	20050815	1	19	40	0	0	5.28	33	0.18	8.86	0.31	2.35
			20	38	58	58	4.72	34	0.16	10.14	0.46	2.43
			21	38	60	118	4.34	35	0.15	12.29	0.51	2.73
			22	35	57	175	4.01	36	0.13	12.93	0.55	2.51
MI02	20050815	1	19	38	0	0	6.58	29	0.11	0.50	0.08	0.65
			20	35	57	57	5.76	30	0.13	2.43	0.06	0.45
			21	36	61	118	5.12	31	0.14	4.50	0.08	0.80
			22	33	57	175	4.71	32	0.19	6.07	0.08	0.91

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 3

FILENAME: TMDLWSCD03

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	TIME DELTA (min)	TIME SUM (min)	DO (mg l ⁻¹)	AA		NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
							VIAL NO					
MI03	20050815	1	19	30	0	0	6.30	25	0.10	0.43	0.08	0.15
			20	30	60	60	5.79	26	0.09	0.79	0.06	0.16
			21	35	65	125	5.44	27	0.10	2.21	0.07	0.61
			22	31	56	181	5.15	28	0.11	3.21	0.07	0.43
MA01	20050816	1	13	59	0	0	5.25	49	0.10	0.43	0.08	0.26
			15	0	61	61	4.85	50	0.11	1.79	0.08	0.35
			16	2	62	123	4.50	51	0.20	3.71	0.08	0.36
			16	54	52	175	4.26	52	0.14	4.71	0.09	0.45
MA02	20050816	1	13	57	0	0	0.86	45	0.56	16.50	0.54	0.80
			14	54	57	57	0.79	46	0.50	17.64	0.57	0.82
			16	0	66	123	0.69	47	0.43	19.50	0.80	0.72
			16	52	52	175	0.52	48	0.44	21.36	0.82	0.73
MA03	20050816	1	13	55	0	0	0.31	41	0.02	27.43	3.17	0.17
			14	52	57	57	0.27	42	0.02	28.64	3.18	0.17
			15	59	67	124	0.18	43	0.02	30.14	3.30	0.26
			16	51	52	176	0.14	44	0.02	32.43	3.46	0.25
MA04	20050816	1	13	53	0	0	0.03	37	0.02	52.57	6.41	0.41
			14	50	57	57	0.02	38	0.02	55.43	7.38	0.32
			15	57	67	124	0.01	39	0.02	58.64	8.09	0.96
			16	49	52	176	0.02	40	0.02	63.36	8.38	0.43
SE01	20050817	1	14	35	0	0	4.64	65	0.22	6.93	0.30	1.21
			15	35	60	60	4.33	66	0.23	8.36	0.42	0.85
			16	37	62	122	4.04	67	0.25	10.57	0.56	0.96
			17	40	63	185	3.81	68	0.24	12.50	0.72	0.94
SE02	20050816	1	19	45	0	0	3.41	61	0.26	5.64	0.15	0.85
			20	37	52	52	3.06	62	0.26	7.36	0.29	0.90
			21	36	59	111	2.84	63	0.26	9.21	0.44	0.87
			22	29	53	164	2.67	64	0.26	10.64	0.57	0.86
SE03	20050816	1	19	30	0	0	0.06	57	0.02	53.93	5.89	0.19
			20	35	65	65	0.04	58	0.02	56.21	6.63	0.62
			21	34	59	124	0.02	59	0.02	59.36	7.02	0.17
			22	27	53	177	0.01	60	0.02	61.86	7.70	0.55

TABLE D-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES

MARYLAND WESTERN SHORE: MINI-SONE

CORE DATA:

Dissolved nutrient and oxygen concentrations in MINI-SONE sediment-water flux chambers.

WESTERN SHORE CRUISE: 3

FILENAME: TMDLWSCD03

REVISED: 20061023

STATION	DATE	CORE NO	TIME OF SAMPLE (h)	TIME DELTA (min)	TIME SUM (min)	DO (mg l ⁻¹)	AA		NO ₂ ⁻ (μM)	NH ₄ ⁺ (μM)	DIP (μM)	NO ₂ ⁻ +NO ₃ ⁻ (μM)
							VIAL NO	NO				
SE04	20050816	1	19	28	0	0	0.06	53	0.02	39.50	4.63	1.19
			20	33	65	65	0.03	54	0.02	42.50	5.11	0.54
			21	32	59	124	0.02	55	0.02	44.93	5.47	0.31
			22	25	53	177	0.00	56	0.02	46.36	5.83	1.21
SO01	20050817	1	14	50	0	0	2.84	77	0.14	11.64	1.41	0.48
			15	41	51	51	2.60	78	0.14	13.07	1.56	0.37
			16	43	62	113	2.40	79	0.14	15.00	1.75	0.45
			17	45	62	175	2.26	80	0.15	17.07	1.88	0.40
SO02	20050817	1	14	48	0	0	0.74	73	0.02	1.79	4.21	0.13
			15	39	51	51	0.39	74	0.02	2.43	3.88	0.22
			16	41	62	113	0.15	75	0.02	3.50	3.82	0.15
			17	43	62	175	0.03	76	0.02	4.43	3.75	0.11
SO03	20050817	1	14	37	0	0	0.79	69	0.02	1.57	4.72	0.25
			15	37	60	60	0.34	70	0.02	1.43	4.37	0.12
			16	39	62	122	0.06	71	0.02	2.36	4.47	0.15
			17	42	63	185	0.03	72	0.02	3.50	4.72	0.15
RH01	20050817	1	19	23	0	0	8.15	93	0.04	0.21	0.19	0.14
			20	21	58	58	7.23	94	0.08	1.29	0.27	0.33
			21	27	66	124	6.44	95	0.06	3.00	0.41	0.36
			22	31	64	188	5.86	96	0.08	4.14	0.37	0.42
RH02	20050817	1	19	21	0	0	3.96	89	0.04	2.93	0.81	0.48
			20	20	59	59	3.70	90	0.05	3.64	0.79	0.24
			21	25	65	124	3.44	91	0.05	4.29	0.80	0.22
			22	31	66	190	3.16	92	0.05	5.29	0.83	0.42
WE01	20050817	1	19	20	0	0	5.02	85	0.10	3.07	0.65	0.52
			20	17	57	57	4.70	86	0.10	4.07	0.67	0.58
			21	23	66	123	4.36	87	0.11	5.57	0.73	0.63
			22	29	66	189	4.14	88	0.12	7.14	0.76	0.62
WE02	20050817	1	19	18	0	0	5.01	81	0.11	4.93	0.96	0.47
			20	15	57	57	4.72	82	0.11	5.43	0.95	0.44
			21	21	66	123	4.48	83	0.13	6.50	0.97	0.54
			22	25	64	187	4.28	84	0.13	7.29	0.98	0.47

**SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
IN MARYLAND'S WESTERN SHORE TMDL DATA SET, 2005:**

Page No.

E-1. **SEDIMENT-WATER FLUX:**
Net sediment-water exchange rates of dissolved oxygen ($\text{g O}_2 \text{ m}^{-2} \text{ d}^{-1}$)
and nutrients ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ h}^{-1}$).....E-1
FILE NAME: TMDLWSFLxx

2005

E-1 June 2005.....E1-1
E-2 July 2005.....E2-1
E-3 August 2005.....E3-1

TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 1
FILENAME: TMDLWSFL01
REVISED: 20061023

STATION	DATE	NO	CORE			DO SLOPE ($\text{mg l}^{-1} \text{ min}^{-1}$)	DO FLUX ($\text{g O}_2 \text{ m}^{-2} \text{ d}^{-1}$)
			H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm^2)		
BU01	20050619	1	1660	0.199	83.32	-0.009779	-2.81
BU02	20050607	1	1335	0.160	83.32	-0.006169	-1.42
BU03	20050607	1	1430	0.172	83.32	-0.006151	-1.52
GU01	20050619	1	1605	0.193	83.32	-0.007427	-2.06
GU02	20050619	1	1390	0.167	83.32	-0.005503	-1.32
GU03	20050607	1	1370	0.164	83.32	-0.005065	-1.20
MI01	20050613	1	1710	0.205	83.32	-0.002950	-0.87
MI02	20050613	1	1510	0.181	83.32	-0.005831	-1.52
MI03	20050613	1	1710	0.205	83.32	-0.006426	-1.90
MA01	20050608	1	1700	0.204	83.32	-0.010433	-3.07
MA02	20050608	1	1660	0.199	83.32	-0.008103	-2.32
MA03	20050608	1	1065	0.128	83.32	-0.006483	-1.19
MA04	20050608	1	1010	0.121	83.32	-0.001183	-0.21
SE01	20050608	1	2070	0.248	83.32	-0.010624	-3.80
SE02	20050608	1	1600	0.192	83.32	-0.008220	-2.27
SE03	20050608	1	1270	0.152	83.32	-0.001160	-0.25
SE04	20050608	1	1320	0.158	83.32	*	*
SO01	20050609	1	1540	0.185	83.32	-0.008304	-2.21
SO02	20050609	1	1240	0.149	83.32	-0.002325	-0.50
SO03	20050609	1	1265	0.152	83.32	-0.001319	-0.29
RH01	20050613	1	1670	0.200	83.32	-0.007832	-2.26
RH02	20050613	1	1490	0.179	83.32	-0.008797	-2.27
WE01	20050609	1	1485	0.178	83.32	-0.008510	-2.18
WE02	20050609	1	1500	0.180	83.32	-0.007527	-1.95

* DO too low for usable measurements.

TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 1
FILENAME: TMDLWSFL01
REVISED: 20061023

STATION	DATE	NO	CORE			NH ₄ ⁺ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	NH ₄ ⁺ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
			H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm ²)		
BU01	20050619	1	1660	0.199	83.32	0.027170	324.79
BU02	20050607	1	1335	0.160	83.32	0.013958	134.19
BU03	20050607	1	1430	0.172	83.32	0.047957	493.84
GU01	20050619	1	1605	0.193	83.32	0.004095	47.33
GU02	20050619	1	1390	0.167	83.32	0.014404	144.18
GU03	20050607	1	1370	0.164	83.32	0.027976	276.00
MI01	20050613	1	1710	0.205	83.32	NI	NI
MI02	20050613	1	1510	0.181	83.32	0.016826	182.96
MI03	20050613	1	1710	0.205	83.32	0.022594	278.22
MA01	20050608	1	1700	0.204	83.32	0.017050	208.73
MA02	20050608	1	1660	0.199	83.32	0.004083	48.81
MA03	20050608	1	1065	0.128	83.32	0.014345	110.02
MA04	20050608	1	1010	0.121	83.32	0.020083	146.07
SE01	20050608	1	2070	0.248	83.32	0.013487	201.04
SE02	20050608	1	1600	0.192	83.32	0.009149	105.41
SE03	20050608	1	1270	0.152	83.32	0.024059	220.03
SE04	20050608	1	1320	0.158	83.32	NI	NI
SO01	20050609	1	1540	0.185	83.32	0.027060	300.09
SO02	20050609	1	1240	0.149	83.32	0.064183	573.12
SO03	20050609	1	1265	0.152	83.32	0.026625	242.54
RH01	20050613	1	1670	0.200	83.32	0.016930	203.60
RH02	20050613	1	1490	0.179	83.32	0.032627	350.08
WE01	20050609	1	1485	0.178	83.32	0.024793	265.13
WE02	20050609	1	1500	0.180	83.32	0.014271	154.15

* DO too low for usable measurements.

TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 1
FILENAME: TMDLWSFL01
REVISED: 20061023

STATION	DATE	NO	CORE			NO ₂ ⁻ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	NO ₂ ⁻ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
			H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm ²)		
BU01	20050619	1	1660	0.199	83.32	0.000326	3.90
BU02	20050607	1	1335	0.160	83.32	0.000864	8.31
BU03	20050607	1	1430	0.172	83.32	0.000118	1.22
GU01	20050619	1	1605	0.193	83.32	0.000242	2.80
GU02	20050619	1	1390	0.167	83.32	0.000000	0.00
GU03	20050607	1	1370	0.164	83.32	0.001254	12.37
MI01	20050613	1	1710	0.205	83.32	-0.000504	-6.21
MI02	20050613	1	1510	0.181	83.32	0.000168	1.83
MI03	20050613	1	1710	0.205	83.32	0.000107	1.32
MA01	20050608	1	1700	0.204	83.32	0.000100	1.22
MA02	20050608	1	1660	0.199	83.32	NI	NI
MA03	20050608	1	1065	0.128	83.32	0.000000	0.00
MA04	20050608	1	1010	0.121	83.32	0.000000	0.00
SE01	20050608	1	2070	0.248	83.32	-0.000908	-13.53
SE02	20050608	1	1600	0.192	83.32	NI	NI
SE03	20050608	1	1270	0.152	83.32	-0.000228	-2.09
SE04	20050608	1	1320	0.158	83.32	0.000940	8.94
SO01	20050609	1	1540	0.185	83.32	-0.000328	-3.64
SO02	20050609	1	1240	0.149	83.32	NI	NI
SO03	20050609	1	1265	0.152	83.32	-0.000226	-2.06
RH01	20050613	1	1670	0.200	83.32	NI	NI
RH02	20050613	1	1490	0.179	83.32	NI	NI
WE01	20050609	1	1485	0.178	83.32	-0.000556	-5.95
WE02	20050609	1	1500	0.180	83.32	-0.000542	-5.85

* DO too low for usable measurements.

TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 1
FILENAME: TMDLWSFL01
REVISED: 20061023

STATION	DATE	NO	CORE			$\text{NO}_2^- + \text{NO}_3^-$ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	$\text{NO}_2^- + \text{NO}_3^-$ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
			H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm^2)		
BU01	20050619	1	1660	0.199	83.32	-0.001682	-20.11
BU02	20050607	1	1335	0.160	83.32	0.005827	56.02
BU03	20050607	1	1430	0.172	83.32	-0.003194	-32.89
GU01	20050619	1	1605	0.193	83.32	-0.001637	-18.92
GU02	20050619	1	1390	0.167	83.32	-0.001653	-16.55
GU03	20050607	1	1370	0.164	83.32	-0.012868	-126.95
MI01	20050613	1	1710	0.205	83.32	0.000000	0.00
MI02	20050613	1	1510	0.181	83.32	-0.003349	-36.42
MI03	20050613	1	1710	0.205	83.32	-0.004059	-49.98
MA01	20050608	1	1700	0.204	83.32	-0.013167	-161.19
MA02	20050608	1	1660	0.199	83.32	-0.007904	-94.48
MA03	20050608	1	1065	0.128	83.32	-0.013500	-103.53
MA04	20050608	1	1010	0.121	83.32	-0.013500	-98.19
SE01	20050608	1	2070	0.248	83.32	-0.014871	-221.67
SE02	20050608	1	1600	0.192	83.32	-0.017095	-196.97
SE03	20050608	1	1270	0.152	83.32	-0.003142	-28.74
SE04	20050608	1	1320	0.158	83.32	0.000000	0.00
SO01	20050609	1	1540	0.185	83.32	-0.012977	-143.91
SO02	20050609	1	1240	0.149	83.32	-0.003838	-34.27
SO03	20050609	1	1265	0.152	83.32	0.000893	8.13
RH01	20050613	1	1670	0.200	83.32	0.000872	10.49
RH02	20050613	1	1490	0.179	83.32	-0.000848	-9.10
WE01	20050609	1	1485	0.178	83.32	-0.000992	-10.61
WE02	20050609	1	1500	0.180	83.32	-0.002036	-21.99

* DO too low for usable measurements.

TABLE E-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 1
FILENAME: TMDLWSFL01
REVISED: 20061023

STATION	DATE	NO	CORE			DIP SLOPE ($\mu\text{moles-P l}^{-1} \text{ min}^{-1}$)	DIP FLUX ($\mu\text{moles-P m}^{-2} \text{ h}^{-1}$)
			H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm^2)		
BU01	20050619	1	1660	0.199	83.32	0.000788	9.42
BU02	20050607	1	1335	0.160	83.32	-0.000106	-1.02
BU03	20050607	1	1430	0.172	83.32	-0.000116	-1.19
GU01	20050619	1	1605	0.193	83.32	0.000000	0.00
GU02	20050619	1	1390	0.167	83.32	0.000000	0.00
GU03	20050607	1	1370	0.164	83.32	NI	NI
MI01	20050613	1	1710	0.205	83.32	0.000000	0.00
MI02	20050613	1	1510	0.181	83.32	0.000000	0.00
MI03	20050613	1	1710	0.205	83.32	0.000000	0.00
MA01	20050608	1	1700	0.204	83.32	0.000267	3.27
MA02	20050608	1	1660	0.199	83.32	0.000219	2.62
MA03	20050608	1	1065	0.128	83.32	-0.000060	-0.46
MA04	20050608	1	1010	0.121	83.32	-0.000167	-1.21
SE01	20050608	1	2070	0.248	83.32	0.000279	4.16
SE02	20050608	1	1600	0.192	83.32	0.000262	3.02
SE03	20050608	1	1270	0.152	83.32	-0.003240	-29.63
SE04	20050608	1	1320	0.158	83.32	-0.001176	-11.18
SO01	20050609	1	1540	0.185	83.32	0.000265	2.94
SO02	20050609	1	1240	0.149	83.32	0.003056	27.29
SO03	20050609	1	1265	0.152	83.32	0.001819	16.57
RH01	20050613	1	1670	0.200	83.32	0.000000	0.00
RH02	20050613	1	1490	0.179	83.32	0.000257	2.76
WE01	20050609	1	1485	0.178	83.32	0.000000	0.00
WE02	20050609	1	1500	0.180	83.32	0.000000	0.00

* DO too low for usable measurements.

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{m}^{-2} \text{d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{hr}^{-1}$).

WESTERN SHORE CRUISE: 2
FILENAME: TMDLWSFL02
REVISED: 20061023

STATION	DATE	CORE				DO SLOPE ($\text{mg l}^{-1} \text{min}^{-1}$)	DO FLUX ($\text{g O}_2 \text{m}^{-2} \text{d}^{-1}$)
		NO	H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm^2)		
BU01	20050724	1	1030	0.124	83.32	-0.009211	-1.64
BU02	20050719	1	1750	0.210	83.32	-0.006250	-1.89
BU03	20050719	1	885	0.106	83.32	-0.013355	-2.04
GU01	20050724	1	1800	0.216	83.32	-0.003704	-1.15
GU02	20050724	1	1660	0.199	83.32	-0.007501	-2.15
GU03	20050719	1	1545	0.185	83.32	-0.007510	-2.01
MI01	20050719	1	1460	0.175	83.32	-0.004477	-1.13
MI02	20050719	1	1350	0.162	83.32	-0.009286	-2.17
MI03	20050719	1	1500	0.180	83.32	-0.006157	-1.60
MA01	20050720	1	1285	0.154	83.32	-0.005697	-1.27
MA02	20050720	1	1550	0.186	83.32	-0.003572	-0.96
MA03	20050720	1	1050	0.126	83.32	-0.004371	-0.79
MA04	20050720	1	1120	0.134	83.32	*	*
SE01	20050720	1	1880	0.226	83.32	-0.002807	-0.91
SE02	20050720	1	1725	0.207	83.32	-0.002764	-0.82
SE03	20050720	1	980	0.118	83.32	*	*
SE04	20050720	1	1320	0.158	83.32	*	*
SO01	20050721	1	1520	0.182	83.32	-0.005667	-1.49
SO02	20050721	1	1105	0.133	83.32	-0.002543	-0.49
SO03	20050721	1	925	0.111	83.32	-0.002333	-0.37
RH01	20050721	1	1240	0.149	83.32	-0.014710	-3.15
RH02	20050721	1	1390	0.167	83.32	-0.002271	-0.55
WE01	20050721	1	1270	0.152	83.32	-0.004895	-1.07
WE02	20050721	1	1650	0.198	83.32	-0.002664	-0.76

* DO too low for usable measurements.

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 2
FILENAME: TMDLWSFL02
REVISED: 20061023

STATION	DATE	CORE				NH_4^+ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	NH_4^+ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
		NO	H_2O		SIZE (cm^2)		
			VOL (ml)	DEPTH (m)			
BU01	20050724	1	1030	0.124	83.32	0.056810	421.4
BU02	20050719	1	1750	0.210	83.32	0.023000	289.8
BU03	20050719	1	885	0.106	83.32	0.080852	515.3
GU01	20050724	1	1800	0.216	83.32	0.010451	135.5
GU02	20050724	1	1660	0.199	83.32	0.016173	193.3
GU03	20050719	1	1545	0.185	83.32	0.075805	843.4
MI01	20050719	1	1460	0.175	83.32	0.008446	88.8
MI02	20050719	1	1350	0.162	83.32	0.026419	256.8
MI03	20050719	1	1500	0.180	83.32	0.033436	361.2
MA01	20050720	1	1285	0.154	83.32	0.036036	333.5
MA02	20050720	1	1550	0.186	83.32	0.020057	223.9
MA03	20050720	1	1050	0.126	83.32	0.037430	283.0
MA04	20050720	1	1120	0.134	83.32	0.063670	513.5
SE01	20050720	1	1880	0.226	83.32	0.008636	116.9
SE02	20050720	1	1725	0.207	83.32	0.025170	312.7
SE03	20050720	1	980	0.118	83.32	0.048890	345.0
SE04	20050720	1	1320	0.158	83.32	0.023553	223.9
SO01	20050721	1	1520	0.182	83.32	0.112233	1228.5
SO02	20050721	1	1105	0.133	83.32	0.055893	444.8
SO03	20050721	1	925	0.111	83.32	0.052435	349.3
RH01	20050721	1	1240	0.149	83.32	0.024947	222.8
RH02	20050721	1	1390	0.167	83.32	0.024968	249.9
WE01	20050721	1	1270	0.152	83.32	0.037786	345.6
WE02	20050721	1	1650	0.198	83.32	0.017756	211.0

* DO too low for usable measurements.

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 2
FILENAME: TMDLWSFL02
REVISED: 20061023

STATION	DATE	CORE				NO ₂ ⁻ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	NO ₂ ⁻ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
		NO	H ₂ O		SIZE (cm ²)		
			VOL (ml)	DEPTH (m)			
BU01	20050724	1	1030	0.124	83.32	0.000452	3.35
BU02	20050719	1	1750	0.210	83.32	0.000717	9.04
BU03	20050719	1	885	0.106	83.32	0.001273	8.11
GU01	20050724	1	1800	0.216	83.32	0.000167	2.16
GU02	20050724	1	1660	0.199	83.32	0.000000	0.00
GU03	20050719	1	1545	0.185	83.32	0.000285	3.17
MI01	20050719	1	1460	0.175	83.32	0.000000	0.00
MI02	20050719	1	1350	0.162	83.32	0.000283	2.75
MI03	20050719	1	1500	0.180	83.32	0.000257	2.78
MA01	20050720	1	1285	0.154	83.32	0.000299	2.77
MA02	20050720	1	1550	0.186	83.32	0.000000	0.00
MA03	20050720	1	1050	0.126	83.32	0.000000	0.00
MA04	20050720	1	1120	0.134	83.32	0.000168	1.35
SE01	20050720	1	1880	0.226	83.32	0.000000	0.00
SE02	20050720	1	1725	0.207	83.32	0.000000	0.00
SE03	20050720	1	980	0.118	83.32	0.000000	0.00
SE04	20050720	1	1320	0.158	83.32	0.000000	0.00
SO01	20050721	1	1520	0.182	83.32	0.000000	0.00
SO02	20050721	1	1105	0.133	83.32	0.000157	1.25
SO03	20050721	1	925	0.111	83.32	0.000000	0.00
RH01	20050721	1	1240	0.149	83.32	0.000217	1.94
RH02	20050721	1	1390	0.167	83.32	-0.000640	-6.41
WE01	20050721	1	1270	0.152	83.32	0.000000	0.00
WE02	20050721	1	1650	0.198	83.32	0.000000	0.00

* DO too low for usable measurements.

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 2
FILENAME: TMDLWSFL02
REVISED: 20061023

STATION	DATE	CORE				$\text{NO}_2^- + \text{NO}_3^-$ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	$\text{NO}_2^- + \text{NO}_3^-$ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
		NO	H ₂ O		SIZE (cm^2)		
			VOL (ml)	DEPTH (m)			
BU01	20050724	1	1030	0.124	83.32	-0.008123	-60.25
BU02	20050719	1	1750	0.210	83.32	0.001107	13.95
BU03	20050719	1	885	0.106	83.32	0.002512	16.01
GU01	20050724	1	1800	0.216	83.32	0.000000	0.00
GU02	20050724	1	1660	0.199	83.32	-0.013288	-158.84
GU03	20050719	1	1545	0.185	83.32	-0.012749	-141.84
MI01	20050719	1	1460	0.175	83.32	0.002820	29.65
MI02	20050719	1	1350	0.162	83.32	0.001284	12.48
MI03	20050719	1	1500	0.180	83.32	0.000000	0.00
MA01	20050720	1	1285	0.154	83.32	-0.001959	-18.13
MA02	20050720	1	1550	0.186	83.32	-0.003295	-36.78
MA03	20050720	1	1050	0.126	83.32	-0.003771	-28.51
MA04	20050720	1	1120	0.134	83.32	-0.000955	-7.70
SE01	20050720	1	1880	0.226	83.32	0.000615	8.33
SE02	20050720	1	1725	0.207	83.32	0.000000	0.00
SE03	20050720	1	980	0.118	83.32	0.000000	0.00
SE04	20050720	1	1320	0.158	83.32	-0.000652	-6.20
SO01	20050721	1	1520	0.182	83.32	0.000000	0.00
SO02	20050721	1	1105	0.133	83.32	-0.001184	-9.42
SO03	20050721	1	925	0.111	83.32	0.000964	6.42
RH01	20050721	1	1240	0.149	83.32	0.000000	0.00
RH02	20050721	1	1390	0.167	83.32	0.000000	0.00
WE01	20050721	1	1270	0.152	83.32	0.000000	0.00
WE02	20050721	1	1650	0.198	83.32	0.000414	4.92

* DO too low for usable measurements.

TABLE E-2. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 2
FILENAME: TMDLWSFL02
REVISED: 20061023

STATION	DATE	CORE				DIP SLOPE ($\mu\text{moles-P l}^{-1} \text{ min}^{-1}$)	DIP FLUX ($\mu\text{moles-P m}^{-2} \text{ h}^{-1}$)
		NO	H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm^2)		
BU01	20050724	1	1030	0.124	83.32	0.000939	6.96
BU02	20050719	1	1750	0.210	83.32	-0.000167	-2.10
BU03	20050719	1	885	0.106	83.32	0.000000	0.00
GU01	20050724	1	1800	0.216	83.32	0.000000	0.00
GU02	20050724	1	1660	0.199	83.32	0.000168	2.01
GU03	20050719	1	1545	0.185	83.32	0.002483	27.63
MI01	20050719	1	1460	0.175	83.32	0.000817	8.59
MI02	20050719	1	1350	0.162	83.32	-0.000060	-0.58
MI03	20050719	1	1500	0.180	83.32	0.000066	0.71
MA01	20050720	1	1285	0.154	83.32	0.000226	2.09
MA02	20050720	1	1550	0.186	83.32	0.000908	10.13
MA03	20050720	1	1050	0.126	83.32	0.000896	6.77
MA04	20050720	1	1120	0.134	83.32	0.007961	64.21
SE01	20050720	1	1880	0.226	83.32	0.000165	2.23
SE02	20050720	1	1725	0.207	83.32	0.000000	0.00
SE03	20050720	1	980	0.118	83.32	0.006404	45.19
SE04	20050720	1	1320	0.158	83.32	0.001983	18.85
SO01	20050721	1	1520	0.182	83.32	0.013100	143.39
SO02	20050721	1	1105	0.133	83.32	0.003760	29.92
SO03	20050721	1	925	0.111	83.32	0.001896	12.63
RH01	20050721	1	1240	0.149	83.32	0.000000	0.00
RH02	20050721	1	1390	0.167	83.32	0.000459	4.59
WE01	20050721	1	1270	0.152	83.32	0.001136	10.39
WE02	20050721	1	1650	0.198	83.32	0.000167	1.98

* DO too low for usable measurements.

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{m}^{-2} \text{d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{hr}^{-1}$).

WESTERN SHORE CRUISE: 3
FILENAME: TMDLWSFL03
REVISED: 20061023

STATION	DATE	CORE				DO SLOPE ($\text{mg l}^{-1} \text{min}^{-1}$)	DO FLUX ($\text{g O}_2 \text{m}^{-2} \text{d}^{-1}$)
		NO	H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm^2)		
BU01	20050814	1	1060	0.127	83.32	-0.033773	-6.19
BU02	20050815	1	1450	0.174	83.32	-0.009656	-2.42
BU03	20050815	1	1500	0.180	83.32	-0.008077	-2.09
GU01	20050814	1	1240	0.149	83.32	-0.010754	-2.30
GU02	20050814	1	1450	0.174	83.32	-0.012197	-3.06
GU03	20050815	1	1495	0.179	83.32	-0.004103	-1.06
MI01	20050815	1	1600	0.192	83.32	-0.007163	-1.98
MI02	20050815	1	950	0.114	83.32	-0.010665	-1.75
MI03	20050815	1	1650	0.198	83.32	-0.006253	-1.78
MA01	20050816	1	1410	0.169	83.32	-0.005670	-1.38
MA02	20050816	1	1700	0.204	83.32	*	*
MA03	20050816	1	1120	0.134	83.32	*	*
MA04	20050816	1	930	0.112	83.32	*	*
SE01	20050817	1	1770	0.212	83.32	-0.004502	-1.38
SE02	20050816	1	1780	0.214	83.32	-0.004419	-1.36
SE03	20050816	1	1340	0.161	83.32	*	*
SE04	20050816	1	1040	0.125	83.32	*	*
SO01	20050817	1	1625	0.195	83.32	-0.003283	-0.92
SO02	20050817	1	1100	0.132	83.32	*	*
SO03	20050817	1	1140	0.137	83.32	*	*
RH01	20050817	1	870	0.104	83.32	-0.012126	-1.82
RH02	20050817	1	1670	0.200	83.32	-0.004188	-1.21
WE01	20050817	1	1540	0.185	83.32	-0.004694	-1.25
WE02	20050817	1	1710	0.205	83.32	-0.003864	-1.14

* DO too low for usable measurements.

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 3
FILENAME: TMDLWSFL03
REVISED: 20061023

STATION	DATE	CORE				NH ₄ ⁺ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	NH ₄ ⁺ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
		NO	H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm ²)		
BU01	20050814	1	1060	0.127	83.32	0.157118	1199.3
BU02	20050815	1	1450	0.174	83.32	0.070013	731.1
BU03	20050815	1	1500	0.180	83.32	0.045942	496.3
GU01	20050814	1	1240	0.149	83.32	0.048240	430.8
GU02	20050814	1	1450	0.174	83.32	0.038047	397.3
GU03	20050815	1	1495	0.179	83.32	0.014416	155.2
MI01	20050815	1	1600	0.192	83.32	0.024589	283.3
MI02	20050815	1	950	0.114	83.32	0.032057	219.3
MI03	20050815	1	1650	0.198	83.32	0.016062	190.8
MA01	20050816	1	1410	0.169	83.32	0.025201	255.9
MA02	20050816	1	1700	0.204	83.32	0.027761	339.8
MA03	20050816	1	1120	0.134	83.32	0.027561	222.3
MA04	20050816	1	930	0.112	83.32	0.059459	398.2
SE01	20050817	1	1770	0.212	83.32	0.030683	391.1
SE02	20050816	1	1780	0.214	83.32	0.030582	392.0
SE03	20050816	1	1340	0.161	83.32	0.045529	439.3
SE04	20050816	1	1040	0.125	83.32	0.039190	293.5
SO01	20050817	1	1625	0.195	83.32	0.031087	363.8
SO02	20050817	1	1100	0.132	83.32	0.015347	121.6
SO03	20050817	1	1140	0.137	83.32	0.016564	136.0
RH01	20050817	1	870	0.104	83.32	0.021448	134.4
RH02	20050817	1	1670	0.200	83.32	0.012185	146.5
WE01	20050817	1	1540	0.185	83.32	0.021706	240.7
WE02	20050817	1	1710	0.205	83.32	0.013036	160.5

* DO too low for usable measurements.

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 3
FILENAME: TMDLWSFL03
REVISED: 20061023

STATION	DATE	CORE				NO ₂ ⁻ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	NO ₂ ⁻ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
		NO	H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm ²)		
BU01	20050814	1	1060	0.127	83.32	0.000365	2.79
BU02	20050815	1	1450	0.174	83.32	0.001180	12.32
BU03	20050815	1	1500	0.180	83.32	0.000473	5.11
GU01	20050814	1	1240	0.149	83.32	0.000107	0.96
GU02	20050814	1	1450	0.174	83.32	0.000302	3.15
GU03	20050815	1	1495	0.179	83.32	0.000000	0.00
MI01	20050815	1	1600	0.192	83.32	-0.000273	-3.15
MI02	20050815	1	950	0.114	83.32	0.000465	3.18
MI03	20050815	1	1650	0.198	83.32	0.000165	1.96
MA01	20050816	1	1410	0.169	83.32	0.000233	2.37
MA02	20050816	1	1700	0.204	83.32	-0.001057	-12.94
MA03	20050816	1	1120	0.134	83.32	0.000000	0.00
MA04	20050816	1	930	0.112	83.32	0.000000	0.00
SE01	20050817	1	1770	0.212	83.32	0.000104	1.33
SE02	20050816	1	1780	0.214	83.32	0.000000	0.00
SE03	20050816	1	1340	0.161	83.32	0.000000	0.00
SE04	20050816	1	1040	0.125	83.32	0.000000	0.00
SO01	20050817	1	1625	0.195	83.32	0.000000	0.00
SO02	20050817	1	1100	0.132	83.32	0.000000	0.00
SO03	20050817	1	1140	0.137	83.32	0.000000	0.00
RH01	20050817	1	870	0.104	83.32	0.000206	1.29
RH02	20050817	1	1670	0.200	83.32	0.000000	0.00
WE01	20050817	1	1540	0.185	83.32	0.000152	1.69
WE02	20050817	1	1710	0.205	83.32	0.000000	0.00

* DO too low for usable measurements.

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 3
FILENAME: TMDLWSFL03
REVISED: 20061023

STATION	DATE	CORE				$\text{NO}_2^- + \text{NO}_3^-$ SLOPE ($\mu\text{moles-N l}^{-1} \text{ min}^{-1}$)	$\text{NO}_2^- + \text{NO}_3^-$ FLUX ($\mu\text{moles-N m}^{-2} \text{ h}^{-1}$)
		NO	H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm^2)		
BU01	20050814	1	1060	0.127	83.32	-0.006581	-50.23
BU02	20050815	1	1450	0.174	83.32	0.002683	28.02
BU03	20050815	1	1500	0.180	83.32	0.000000	0.00
GU01	20050814	1	1240	0.149	83.32	0.000000	0.00
GU02	20050814	1	1450	0.174	83.32	0.004130	43.12
GU03	20050815	1	1495	0.179	83.32	0.000000	0.00
MI01	20050815	1	1600	0.192	83.32	0.000881	10.15
MI02	20050815	1	950	0.114	83.32	0.001453	9.94
MI03	20050815	1	1650	0.198	83.32	0.000000	0.00
MA01	20050816	1	1410	0.169	83.32	0.000981	9.96
MA02	20050816	1	1700	0.204	83.32	0.000000	0.00
MA03	20050816	1	1120	0.134	83.32	0.000000	0.00
MA04	20050816	1	930	0.112	83.32	NI	NI
SE01	20050817	1	1770	0.212	83.32	-0.001539	-19.62
SE02	20050816	1	1780	0.214	83.32	-0.000360	-4.61
SE03	20050816	1	1340	0.161	83.32	NI	NI
SE04	20050816	1	1040	0.125	83.32	-0.007146	-53.52
SO01	20050817	1	1625	0.195	83.32	-0.000434	-5.08
SO02	20050817	1	1100	0.132	83.32	-0.000887	-7.03
SO03	20050817	1	1140	0.137	83.32	0.000000	0.00
RH01	20050817	1	870	0.104	83.32	0.000691	4.33
RH02	20050817	1	1670	0.200	83.32	NI	NI
WE01	20050817	1	1540	0.185	83.32	0.000891	9.88
WE02	20050817	1	1710	0.205	83.32	0.000000	0.00

* DO too low for usable measurements.

TABLE E-3. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
MARYLAND WESTERN SHORE: MINI-SONE

SEDIMENT-WATER FLUX: Net sediment-water exchange rates
of dissolved oxygen ($\text{gO}_2 \text{ m}^{-2} \text{ d}^{-1}$) and
nutrients ($\mu\text{moles-N m}^{-2} \text{ hr}^{-1}$ and $\mu\text{moles-P m}^{-2} \text{ hr}^{-1}$).

WESTERN SHORE CRUISE: 3
FILENAME: TMDLWSFL03
REVISED: 20061023

STATION	DATE	CORE				DIP SLOPE ($\mu\text{moles-P l}^{-1} \text{ min}^{-1}$)	DIP FLUX ($\mu\text{moles-P m}^{-2} \text{ h}^{-1}$)
		NO	H ₂ O VOL (ml)	DEPTH (m)	SIZE (cm^2)		
BU01	20050814	1	1060	0.127	83.32	0.003836	29.28
BU02	20050815	1	1450	0.174	83.32	0.000878	9.17
BU03	20050815	1	1500	0.180	83.32	0.000000	0.00
GU01	20050814	1	1240	0.149	83.32	0.001007	8.99
GU02	20050814	1	1450	0.174	83.32	0.000574	5.99
GU03	20050815	1	1495	0.179	83.32	-0.000163	-1.75
MI01	20050815	1	1600	0.192	83.32	0.000770	8.87
MI02	20050815	1	950	0.114	83.32	0.000000	0.00
MI03	20050815	1	1650	0.198	83.32	-0.000059	-0.70
MA01	20050816	1	1410	0.169	83.32	0.000000	0.00
MA02	20050816	1	1700	0.204	83.32	0.001835	22.46
MA03	20050816	1	1120	0.134	83.32	0.002326	18.76
MA04	20050816	1	930	0.112	83.32	0.011162	74.75
SE01	20050817	1	1770	0.212	83.32	0.002270	28.93
SE02	20050816	1	1780	0.214	83.32	0.002559	32.80
SE03	20050816	1	1340	0.161	83.32	0.009854	95.09
SE04	20050816	1	1040	0.125	83.32	0.006719	50.32
SO01	20050817	1	1625	0.195	83.32	0.002720	31.83
SO02	20050817	1	1100	0.132	83.32	-0.001048	-8.30
SO03	20050817	1	1140	0.137	83.32	0.002803	23.01
RH01	20050817	1	870	0.104	83.32	0.001782	11.16
RH02	20050817	1	1670	0.200	83.32	0.000000	0.00
WE01	20050817	1	1540	0.185	83.32	0.000618	6.85
WE02	20050817	1	1710	0.205	83.32	0.000104	1.28

* DO too low for usable measurements.

**SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
IN MARYLAND'S WESTERN SHORE TMDL DATA SET, 2005:**

Page No.

F-1. WATER COLUMN RESPIRATION:
Respiration rates in surface waters at Maryland's Western
Shore TMDL stations ($\text{g O}_2 \text{ m}^{-3} \text{ d}^{-1}$)..... F-1
FILE NAME: TMDLWSWKxx

2005

F-1 June 2005..... F1-1
F-2 July 2005..... F2-1
F-3 August 2005..... F3-1

TABLE F-1. SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
 MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
 (g O₂ m⁻³ d⁻¹)

WESTERN SHORE CRUISE: 1 T_I : TIME INITIAL
 FILENAME: TMDLWSWK01 T_F : TIME FINAL
 REVISED: 20060517

STATION	DATE	SAMPLE	DATE/TIME		DO (mg l ⁻¹)		Respiration Rate (g O ₂ m ⁻³ day ⁻¹)
			T _I	T _F	T _I	T _F	
BU01	20050619	A	6/19/2005 10:18	6/20/2005 10:25	7.42	6.90	0.51
		B			7.50	7.00	
BU02	20050607	A	6/7/2005 11:54	6/8/2005 11:55	10.30	8.10	1.97
		B			10.25	8.50	
BU03	20050607	A	6/7/2005 13:08	6/8/2005 13:35	9.15	7.30	2.01
		B			9.20	6.95	
GU01	20050619	A	6/19/2005 12:11	6/20/2005 12:15	7.72	7.25	0.56
		B			7.83	7.17	
GU02	20050619	A	6/19/2005 13:16	6/20/2005 13:20	7.75	7.10	0.67
		B			7.65	6.95	
GU03	20050607	A	6/7/2005 15:05	6/8/2005 15:07	6.95	5.85	0.92
		B			6.55	5.80	
MI01	20050613	A	6/13/2005 11:22	6/14/2005 11:17	8.20	7.01	1.04
		B			7.87	6.98	
MI02	20050613	A	6/13/2005 10:28	6/14/2005 10:28	6.87	6.08	0.78
		B			6.92	6.15	
MI03	20050613	A	6/13/2005 9:39	6/14/2005 9:34	6.85	5.90	1.20
		B			7.15	5.71	
MA01	20050608	A	6/8/2005 12:19	6/9/2005 11:45	11.21	9.91	1.43
		B			11.30	9.80	
MA02	20050608	A	6/8/2005 11:25	6/9/2005 11:40	10.55	9.52	0.94
		B			10.55	9.68	
MA03	20050608	A	6/8/2005 10:32	6/9/2005 10:40	4.55	3.61	0.87
		B			4.82	4.02	
MA04	20050608	A	6/8/2005 9:30	6/9/2005 9:35	7.70	5.48	2.38
		B			7.61	5.05	
SE01	20050608	A	6/8/2005 18:06	6/9/2005 18:10	11.61	9.90	1.87
		B			12.00	9.95	
SE02	20050608	A	6/8/2005 16:51	6/9/2005 16:51	11.22	9.42	2.19
		B			11.88	9.30	
SE03	20050608	A	6/8/2005 15:45	6/9/2005 15:50	12.05	9.90	2.19
		B			12.05	9.80	
SE04	20050608	A	6/8/2005 14:40	6/9/2005 17:47	11.85	10.10	1.35
		B			11.51	10.21	
SO01	20050609	A	6/9/2005 11:17	6/10/2005 11:17	6.82	5.48	1.18
		B			7.01	6.00	
SO02	20050609	A	6/9/2005 10:12	6/10/2005 10:15	9.48	7.20	2.94
		B			9.71	6.10	
SO03	20050609	A	6/9/2005 9:18	6/10/2005 9:20	9.20	5.21	3.96
		B			9.15	5.20	
RH01	20050613	A	6/13/2005 15:45	6/14/2005 15:47	6.65	4.60	2.01
		B			6.60	4.62	
RH02	20050613	A	6/13/2005 14:50	6/14/2005 14:50	5.78	3.38	2.28
		B			5.75	3.60	
WE01	20050609	A	6/9/2005 14:00	6/10/2005 14:03	6.45	5.12	1.28
		B			6.41	5.18	
WE02	20050609	A	6/9/2005 13:01	6/10/2005 13:05	5.41	4.78	0.77
		B			5.48	4.57	

TABLE F-2.

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
 MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
 (g O₂ m⁻³ d⁻¹)

WESTERN SHORE CRUISE: 2

T_I : TIME INITIAL

FILENAME: TMDLWSWK02

T_F : TIME FINAL

REVISED: 20061023

STATION	DATE	SAMPLE	DATE/TIME		DO (mg l ⁻¹)		Respiration Rate (g O ₂ m ⁻³ day ⁻¹)
			T _I	T _F	T _I	T _F	
BU01	20050724	A	7/24/2005 10:36	7/25/2005 10:35	6.72	6.39	0.56
		B			6.98	6.20	
BU02	20050719	A	7/19/2005 9:13	7/20/2005 9:40	9.30	7.32	1.96
		B			9.62	7.60	
BU03	20050719	A	7/19/2005 10:00	7/20/2005 9:45	8.32	6.88	1.52
		B			8.45	6.89	
GU01	20050724	A	7/24/2005 11:56	7/25/2005 12:05	6.71	6.70	0.10
		B			6.70	6.50	
GU02	20050724	A	7/24/2005 12:50	7/25/2005 12:53	8.45	7.22	0.93
		B			8.38	7.75	
GU03	20050719	A	7/19/2005 11:58	7/20/2005 11:57	7.22	7.50	-0.24
		B			7.31	7.50	
MI01	20050719	A	7/19/2005 16:11	7/20/2005 16:10	9.35	8.55	0.84
		B			9.38	8.50	
MI02	20050719	A	7/19/2005 15:15	7/20/2005 14:45	9.45	7.60	1.66
		B			9.41	8.01	
MI03	20050719	A	7/19/2005 14:32	7/20/2005 14:15	7.80	6.60	1.20
		B			7.82	6.65	
MA01	20050720	A	7/20/2005 11:06	7/21/2005 10:09	7.60	6.77	0.89
		B			7.70	6.82	
MA02	20050720	A	7/20/2005 10:07	7/21/2005 10:09	8.00	7.15	0.73
		B			7.90	7.28	
MA03	20050720	A	7/20/2005 9:20	7/21/2005 9:29	7.13	5.75	1.58
		B			7.38	5.58	
MA04	20050720	A	7/20/2005 8:23	7/21/2005 9:29	4.61	1.51	2.40
		B			4.03	2.11	
SE01	20050720	A	7/20/2005 16:35	7/21/2005 16:30	8.31	6.85	1.52
		B			8.68	7.12	
SE02	20050720	A	7/20/2005 15:26	7/21/2005 15:40	8.89	7.05	1.78
		B			8.62	6.87	
SE03	20050720	A	7/20/2005 14:35	7/21/2005 14:25	9.00	8.02	1.15
		B			9.15	7.85	
SE04	20050720	A	7/20/2005 13:38	7/21/2005 13:45	3.75	2.19	1.56
		B			3.08	1.50	
SO01	20050721	A	7/21/2005 10:00	7/22/2005 10:00	7.85	5.58	2.33
		B			7.81	5.42	
SO02	20050721	A	7/21/2005 8:55	7/22/2005 9:00	4.85	3.58	1.16
		B			4.91	3.85	
SO03	20050721	A	7/21/2005 8:00	7/22/2005 8:15	5.65	4.68	1.05
		B			5.71	4.55	
RH01	20050721	A	7/21/2005 14:26	7/22/2005 14:20	11.62	7.35	4.18
		B			11.35	7.29	
RH02	20050721	A	7/21/2005 13:33	7/22/2005 14:20	9.83	6.95	2.94
		B			9.81	6.62	
WE01	20050721	A	7/21/2005 12:16	7/22/2005 14:20	5.74	5.31	0.73
		B			6.49	5.33	
WE02	20050721	A	7/21/2005 11:08	7/22/2005 11:25	7.10	4.85	2.25
		B			7.12	4.82	

TABLE F-3.

SEDIMENT OXYGEN AND NUTRIENT EXCHANGES
 MARYLAND WESTERN SHORE: MINI-SONE
 WATER COLUMN RESPIRATION: Dissolved oxygen in surface waters.
 (g O₂ m⁻³ d⁻¹)

WESTERN SHORE CRUISE: 3
 FILENAME: TMDLWSWK03
 REVISED: 20061023

T_I : TIME INITIAL
 T_F : TIME FINAL

STATION	DATE	SAMPLE	DATE/TIME		DO (mg l ⁻¹)		Respiration Rate (g O ₂ m ⁻³ day ⁻¹)
			T _I	T _F	T _I	T _F	
BU01	20050814	A	8/14/2005 10:25	8/15/2005 13:20	7.70	5.41	1.85
		B			7.30	5.45	
BU02	20050815	A	8/15/2005 8:31	8/16/2005 8:25	7.75	5.42	2.21
		B			7.85	5.78	
BU03	20050815	A	8/15/2005 9:12	8/16/2005 9:20	6.95	3.60	3.42
		B			7.02	3.49	
GU01	20050814	A	8/14/2005 11:49	8/15/2005 13:20	7.00	6.50	0.67
		B			7.48	6.55	
GU02	20050814	A	8/14/2005 12:39	8/15/2005 13:20	8.25	6.68	1.06
		B			7.52	6.90	
GU03	20050815	A	8/15/2005 10:53	8/16/2005 10:51	6.75	6.40	0.36
		B			6.95	6.58	
MI01	20050815	A	8/15/2005 14:56	8/16/2005 15:10	8.50	7.87	0.43
		B			8.18	7.95	
MI02	20050815	A	8/15/2005 14:07	8/16/2005 13:50	7.95	7.30	0.69
		B			7.90	7.18	
MI03	20050815	A	8/15/2005 13:22	8/16/2005 13:20	7.82	7.22	0.67
		B			7.56	6.82	
MA01	20050816	A	8/16/2005 10:44	8/17/2005 10:46	5.78	4.30	1.36
		B			5.75	4.51	
MA02	20050816	A	8/16/2005 9:52	8/17/2005 9:42	5.62	3.85	1.59
		B			5.40	4.01	
MA03	20050816	A	8/16/2005 9:10	8/17/2005 9:12	5.80	4.72	1.76
		B			5.90	3.45	
MA04	20050816	A	8/16/2005 8:19	8/17/2005 8:20	5.25	4.12	0.83
		B			5.29	4.75	
SE01	20050817	A	8/17/2005 8:09	8/18/2005 10:15	5.41	4.62	0.75
		B			5.45	4.60	
SE02	20050816	A	8/16/2005 14:51	8/17/2005 13:10	6.65	5.31	1.46
		B			6.62	5.25	
SE03	20050816	A	8/16/2005 13:58	8/17/2005 13:10	5.80	5.32	0.49
		B			5.82	5.35	
SE04	20050816	A	8/16/2005 13:07	8/17/2005 13:10	6.43	5.40	1.06
		B			6.38	5.28	
SO01	20050817	A	8/17/2005 11:11	8/18/2005 11:12	5.80	4.48	1.35
		B			5.83	4.45	
SO02	20050817	A	8/17/2005 10:19	8/18/2005 10:15	5.20	4.20	1.33
		B			5.39	3.73	
SO03	20050817	A	8/17/2005 9:35	8/18/2005 10:15	4.85	2.82	1.67
		B			3.95	2.55	
RH01	20050817	A	8/17/2005 15:13	8/18/2005 15:15	11.62	7.25	4.05
		B			11.05	7.31	
RH02	20050817	A	8/17/2005 14:04	8/18/2005 14:04	7.23	5.20	1.61
		B			6.59	5.41	
WE01	20050817	A	8/17/2005 13:19	8/18/2005 13:19	8.15	5.03	3.03
		B			8.72	5.78	
WE02	20050817	A	8/17/2005 12:32	8/18/2005 12:34	6.08	4.30	1.77
		B			6.15	4.38	