CATALOG DOCUMENTATION
EMAP-ESTUARIES PROGRAM LEVEL DATABASE
1990 VIRGINIAN PROVINCE
WATER QUALITY VERTICAL PROFILE DATA

TABLE OF CONTENTS

1. DATA SET IDENTIFICATION

1.1 Title of Catalog document

EMAP-Estuaries Program Level Database
1990 Virginian Province
Water Quality Vertical Profile Data Summarized by Station

1.2 Authors of the Catalog entry

Charles Strobel, U.S. EPA NHEERL-AED
Melissa Hughes, OAO Corp.

1.3 Catalog revision date

2 April 1996

1.4 Data set name

VP_WATR

1.5 Task Group

Estuaries

1.6 Data set identification code

00003

1.7 Version

001

1.8 Requested Acknowledgement

These data were produced as part of the U.S. EPA's Environmental Monitoring and Assessment Program (EMAP). If you plan to publish these data in any way, EPA requires a standard statement for work it has supported:

"Although the data described in this article has been funded wholly or in part by the U. S. Environmental Protection Agency through its EMAP-Estuaries Program, it has not been subjected to Agency review, and therefore does not necessarily reflect the views of the Agency and no official endorsement should be inferred."

2. INVESTIGATOR INFORMATION

2.1 Principal Investigator

Darryl Keith
U.S. Environmental Protection Agency
NHEERL-AED

2.2 Investigation Participant-Sample Collection

Charles J. Strobel
U.S. Environmental Protection Agency
NHEERL-AED

3. DATA SET ABSTRACT

3.1 Abstract of the Data Set

The VERTICAL PROFILE WATER QUALITY (VP_WATR) file provides a snapshot of the acceptable vertical profiles taken at a station. The reported surface measurements were taken within one (1) meter of the surface, while bottom measurements were taken within one (1) meter of the bottom. Several parameters were calculated, including surface and bottom density, maximum fluorescence, rate of light extinction and compensation depth. If a file specification is cited, Quality Assurance/

Quality Control code(s) are reported. Suspended solids concentration was measured from a surface water sample.

3.2 Keywords for the Data Set

Bottom values, dissolved oxygen, fluorescence, light extinction rate, PAR, pH, QA code, salinity, surface values, temperature, transmissivity, vertical profile data

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

The Environmental Monitoring and Assessment Program (EMAP) was designed to periodically estimate the status and trends of the Nation's ecological resources on a regional basis. EMAP provides a strategy to identify and bound the extent, magnitude and location of environmental degradation and improvement on a regional scale based on randomly located station sites. Only the randomly located Base Sampling Sites were included in this data set.

4.2 Data Set Objective

The objective of the Vertical Profile data set is to provide summary data of surface and bottom values of specific water column parameters at each station visited in the Virginian Province.

4.3 Data Set Background Discussion

Habitat indicators provide important information about the environmental setting of a sample site. Salinity and temperature are among the most important factors controlling the distribution of biota and ecological processes in estuaries. Water depth itself has little direct effect on estuarine biota because most estuaries are relatively shallow, and the pressure changes that occur are minor. However, in almost all estuaries, changes in water depth are associated with changes in sediment characteristics, dissolved oxygen concentration, and temperature regime. Therefore, information about depth is useful for explaining many of the observations that will be taken by EMAP-E.

Dissolved oxygen concentration, an EMAP-E abiotic condition indicator, is a parameter of overwhelming importance to assessment endpoints and is one of the most important factors contributing to fish and shellfish mortality in estuarine and coastal waters. Dissolved oxygen (DO) concentration is also a link in the eutrophication process, making it a critical component of the EMAP-E conceptual mode. Stresses that occur in conjunction with low DO (e.g., exposure to hydrogen sulfide) may cause as much, if not more, harm to aquatic biota than exposure to low DO alone. In addition, aquatic populations exposed to low DO may be more susceptible to the adverse effects of other stressors (e.g., disease, toxic chemicals).

One of the human use endpoints is visual aesthetics of the environment. A habitat is degraded for the aesthetics indicator if floating and deposited garbage and trash are abundant, if there are noxious odors, or if the water is not clean in appearance. Water clarity was measured in three ways: transmissometry, fluorometry, and photosynthetically active radiation (PAR). Transmissometry provided information on the turbidity of water; fluorometry provided information concerning the degree to which reduction in light penetration may be due to the presence of photosynthetic algae, and PAR provided information on the degree to which turbidity can inhibit photosynthetic activity. The incremental cost for measuring all three was small since each was obtained with a probe added to the SeaBird CTD package.

4.4 Summary of Data Set Parameters

Surface and bottom water quality parameters are reported for one vertical profile taken at a station. These include: temperature, salinity, dissolved oxygen concentration, pH, fluorescence, light transmission and photosynthetically active radiation (PAR). Suspended solids were measured at a subset of the total number of stations. Other summary values were calculated: density (sigma-t) and rates of light extinction. Depth of the water column at the time of sampling is also reported. Measurements were taken at one meter below the surface of the water and at one meter above the bottom. The transmissivity at 1 meter (TRANS_1MT), a rate of light extinction (AVG_K) and secchi depth (SECCHI) were not measured in the Virginian Province.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

To collect high-quality vertical water column profiles of salinity, temperature, dissolved oxygen concentration, transmissivity, fluorescence, pH and photosynthetically active radiation. One CTD cast was performed on each visit to EMAP sampling stations to collect these data. A surface water sample was collected for a suspended solids measurement.

5.1.2 Sample Collection Methods Summary

CTD: The first activity performed at a station was a CTD cast. The CTD was attached to the end of a winch cable with a shackle. The instrument was swung over the side of the boat, turned on and lowered to just below the water surface. The instrument was allowed to reach thermal equilibrium (about two minutes). The instrument was then lowered through the water column at a rate of approximately 1.0 meter per second until it reached the bottom. The boat's depth finder was used to prevent the CTD from impacting the bottom by stopping its descent when it was approximately one meter or less from the bottom. The unit was allowed to equilibrate and to collect bottom data for two minutes. The unit was then raised to the surface, turned off and brought back on the boat. If the water depth was too shallow (<3 meters to obtain a profile, the unit was suspended 1 meter above the bottom and allowed to collect data for two minutes following the equilibrium period.

After being brought back on the boat, the CTD was then connected to the on-board GRiD 386 computer and the data were uploaded using the Sea-Bird software. The data were viewed on the screen of the computer. If the cast was acceptable, appropriate entries were made on a data sheet. Up to three attempts were made to collect an acceptable CTD cast.

SUSPENDED SOLIDS: The suspended solids sample was collected at the same time as the CTD cast. After the CTD instrument reached equilibrium, a surface water sample was collected with a Go-Flo bottle or a bucket.

The surface water sample in the Go-Flo bottle was shaken to ensure a homogeneous distribution of sediments. A 625 ml plastic container was filled with water from the Go-Flo bottle. The sample was placed on ice.

5.1.3 Sampling Start Date

19 July 1990

5.1.4 Sampling End Date

30 September 1990

5.1.5 Platform

Sampling was conducted from 8 m (24 ft), twin-engine Chesapeake style work boats.

5.1.6 Sampling Gear

A Sea-Bird Electronics, Inc. model SBE-25 SeaLogger CTD is a self-contained array of instruments capable of measuring salinity, temperature, dissolved oxygen, pH, transmissivity (an estimate of suspended solids concentration), fluorescence (an estimate of chlorophyll_a concentration) and photosynthetically active radiation (PAR; a measurement of the intensity of light in the range of wavelengths used by algae in photosynthesis). Oxygen was measured with a Beckman polarographic DO electrode.

The core of the unit is a data logger which stores all data collected by the individual probes. The entire array is powered internally using batteries; therefore, it does not require any electronic connection to the boat during operation. Supplied with the instrument is the software required for communicating with the data logger and for downloading data to an on-board computer.

5.1.7 Manufacturer of Instrument

Sea-Bird Electronics, Inc.

5.1.8 Key Variables

This data set contains surface values collected at the time of sampling. Bottom values may be instantaneous measurements or may be values averaged over two (2) minutes of measurements.

5.1.9 Sampling Method Calibration

CTD units were calibrated at the Virginian Province Field Operations Center prior to the start of the sampling season. If a unit failed quality control checks in the field, it was shipped back to the Center for re-calibration.

5.1.10 Sample Collection Quality Control

A QC check was performed on the CTD unit every day. The CTD unit was lowered into the water and allowed to equilibrate for at least one minute. The DO probe on the CTD unit was checked against the results of two Winkler titrations. The salinity of a water sample taken from next to the CTD was measured using a refractometer and the temperature of the water sample was taken using a stem thermometer. The CTD was brought out of the water and the pH measurement from the CTD was checked using a pH 7 buffer. If the measurements from the CTD unit did not agree with the "ambient" measurements within 2oC temperature, 1 mg/L dissolved oxygen, 2 ppt salinity, and 0.5 pH unit, the QC process was repeated. If, after a second attempt, the unit still produced erroneous numbers, all DO data collected since the last successful QC check were flagged and the unit was re-calibrated.

5.1.11 Sample Collection Method Reference

Strobel, C.J. 1990. Environmental Monitoring and Assessment Program - Near Coastal Component: 1990 Demonstration Project Field Operations Manual. U.S. EPA, NHEERL-AED, Narragansett, RI. October 1990.

5.1.12 Sample Collection Method Deviations

None

5.2 Data Preparation and Sample Processing

5.2.1 Sample Processing Objective

Evaluate the quality of the data on a cast-by-cast basis in order to assign appropriate Quality Assurance Codes.

5.2.2 Sample Processing Methods Summary

SUSPENDED SOLIDS: The suspended solids samples were stored at four degrees C until analysis. To determine suspended solids (non-filterable residue) concentrations, the sample was well mixed and filtered through a glass fiber filter. Non-representative particulates such as leaves or sticks were excluded from the sample. The suspended solids concentration was usually determined from a 0.1 liter volume of sample. However, if the residue weight collected from 0.1 L of sample was less

than 1 mg, the sample was filtered a second time using 0.2 L. The residue retained on the filter was dried to constant weight at 103-105 degrees Centigrade for at least one hour. The filter was then cooled in a desiccator and weighed.

CTD: A cast was verified to have been taken at a particular station on a particular date by comparing date, time, bottom salinity and depth in the file to data recorded on field data sheets.

The CTD file processing involved the splitting of CTD casts into segments. The complete raw CTD files were split into sections by comparing time versus depth data to a graph from a CTD cast shown on a PC using a CTD splitting program. Each cast was split into several sections representing the surface equilibration, downcast, bottom soak and upcast.

For casts in shallow water (<2 meters), there was no vertical profile - only a bottom soak or occasionally a pre-deployment surface soak and a bottom soak separated by less than one meter in depth.

5.2.3 Sample Processing Method Calibration

NA

5.2.4 Sample Processing Quality Control

Notes were kept on any sections not included in the split casts and on any unusual patterns discerned in the time vs. depth graphs.

The following summarizes the quality control objectives of each SeaBird CTD probe:

Salinity: A refractometer measurement served as a gross check on the CTD probe. The instrument would be recalibrated if the probe and refractometer measurements differed by 1 ppt.

Temperature: The temperature sensor on the probe was calibrated by the manufacturer using a National Institutes of Standards and Technology (NIST) certified thermometer. If on-site calibration results differed from the original calibration by > 2 deg C, the data may be flagged.

pH: Standard pH solutions were used to check the unit calibration. The QC check should be within 0.2 pH units of the true value of the buffer solution. If the QC check is outside control limits, the data were flagged.

Fluorometry: The measurement of in situ chlorophyll_a fluorescence was accomplished using a fluorometer attached to the SeaBird CTD. The optical filters used in this fluorometer were selected for optimum estimation of chlorophyll_a fluorescence. The probe was not calibrated.

Transmissometry: A Sea Tech 10 cm pathlength transmissometer was used to provide in situ measurements of beam transmission and the concentration of suspended matter at each station occupied. Surface water samples were collected for later determination of suspended solids

concentration. These were to have provided a calibration of the field measurements, but a post-calibration was not conducted.

5.2.5 Sample Processing Method Reference

6. DATA MANIPULATIONS

6.1 Name of New or Modified Values

Surface data were generally measurements from the first record after the instrument had equilibrated. The bottom data were generally derived as a mean of a two minute bottom soak. TRANS_1MT and AVG_K were not calculated and SECCHI depth was not measured in the Virginian Province.

6.2 Data Manipulation Description

6.2.1 Alignment

Some files were subjected to alignment procedures if comparison of downcast and upcast plots suggested there were differences in DO, salinity and temperature v depth at the pycnocline. Such lags were a function of the rate of descent and the lag time of the individual probes. Delay factors of 1 to 5 or more seconds were applied to specific parameters, i.e., DO, salinity, temperature, until the upcast and downcast aligned at the pynocline.

The user should note that the depth measurements reported are from the depth sensor and are NOT adjusted for the relative position of the various probes on the CTD. The depth sensor is located at the bottom of the instrument at the same level as the pump intake. The dissolved oxygen, temperature and conductivity sensors are all included in the loop of pumped water; therefore, the readings from these probes correspond accurately to the depth reported for that line of data. The remaining probes are located at different levels within the CTD frame. As a result, the depth reported for these measurements is inaccurate and the user may desire to offset them. The transmissometer is positioned 8 inches (0.232 m) above the plane of the depth sensor; the fluorometer and pH probe are both 12 inches (0.305 m) above the plane of the depth sensor. The PAR meter is 28 inches (0.711 m) above the plane of the depth sensor. For example, the true depth of PAR measurement reported at a depth of 5.0 meters would actually be 5.0 - 0.711 = 4.289 meters. As stated above, the data reported in this package have not been adjusted for these offsets, and it is the responsibility of the user to do so if desired.

6.2.2 COMP_PAR: Compensation Depth

The first depth at which PAR is equal to or less than 1 % of the surface PAR value:

$$\text{PAR at depth } x < 0.01(\text{SRF\_PAR})$$

6.2.3 K_PAR

K_PAR is the slope of the line defined by the regression of light v depth at each station location.

6.2.4 MAX_FLR

The file associated with a station was searched to select the maximum fluorescence value found at a station

6.2.5 DENSITY

Surface and bottom density were calculated using the following equations incorporating surface and bottom temperature and salinity:

Surface density was calculated as follows:

```
     a4=(1.0281045)-(0.0000535633*srf_temp)-(0.00000678195*(srf_temp**2)
     a5=(0.000000070517*(srf_temp**3))-(0.00000000084794*(srf_temp**4)) +

       (0.000000000005057*(srf_temp**5))

a6=(0.00080792)-(0.0000032481*srf_temp)+(0.00000006423*(srf_temp**2))
            -   (0.000000000649*(srf_temp**3))
     a7=srf_salinity-35
     a8=(0.0000002045*(srf_salinity-35)**2))
     a9=a4 + a5 + a6 + a7 + a8

     SURFACE DENSITY  = (a9*1000)-1000
```

Bottom density was calculated as follows:

```
     a4=(1.0281045)-(0.0000535633*btm_temp)-(0.00000678195*(btm_temp**2)
     a5=(0.000000070517*(btm_temp**3))-(0.00000000084794*(btm_temp**4)) +

       (0.000000000005057*(btm_temp**5))

a6=(0.00080792)-(0.0000032481*btm_temp)+(0.00000006423*(btm_temp**2))-
       (0.000000000649*(btm_temp**3))
     a7=btm_salinity-35
     a8=(0.0000002045*(btm_salinity-35)**2))
     a9=a4 + a5 + a6 + a7 + a8

     BOTTOM DENSITY  = (a9*1000)-1000
```

6.2.6 The suspended solids concentration in mg/L was determined as:
(A-B)*1000/C

A = weight of filter and residue in mg
B = weight of filter in mg
C = mL of sample filtered

7. DATA DOCUMENTATION

7.1 Desciption of Parameters

#	Parameter SAS Name	Data Type	Len	Format	Parameter Label
1	STA_NAME	Char	8	8.	The Station Identifier
2	VST_DATE	Num	8	YYMMDD6.	The Date the Sample was Collected
3	SRF_DO	Num	8	5.1	Dissolved oxygen (mg/l) at the Surface
4	SRF_TEMP	Num	8	5.2	Temperature (C) at the Surface
5	SRF_SAL	Num	8	5.2	Salinity (ppt) at the Surface
6	SRF_PAR	Num	8	5.	PAR (mE/m2/s) at the Surface
7	SRF_PH	Num	8	5.1	pH (units) at the Surface
8	SRF_TRNS	Num	8	4.	Transmissivity (%) at the Surface
9	SRF_FLR	Num	8	4.	Fluorescence at the Surface
10	SRF_DENS	Num	8	5.2	Density (Sigma T) at the Surface
11	BTM_DO	Num	8	5.1	Dissolved Oxygen (mg/l) at the Bottom
12	BTM_TEMP	Num	8	5.2	Temperature (C) at the Bottom
13	BTM_SAL	Num	8	5.2	Salinity (ppt) at the Bottom
14	BTM_PAR	Num	8	5.	PAR (mE/m2/s) at the Bottom
15	BTM_PH	Num	8	5.1	pH (units) at the Bottom
16	BTM_TRNS	Num	8	4.	Transmissivity (%) at the Bottom
17	BTM_FLR	Num	8	4.	Fluorescence at the Bottom
18	BTM_DENS	Num	8	5.2	Density (Sigma T) at the Bottom
19	MAX_FLR	Num	8	4.	Maximum Fluorescence measured in VP file
20	K_PAR	Num	8	5.2	Rate of Light Extinction
21	COMP_PAR	Num	8	5.1	Depth where PAR = 1 % of SRF PAR
22	VP_NAME	Char	80	$80.	Full File Specification of Profile
24	SS_CONC	Num	8	7.1	Total Suspended Solids Conc. (mg/l)
23	QA_CODE	Char	30	$30.	Quality Assurance Code for Data

7.1.6 Precision to which values are reported

The number of decimal places for each value reflects the precision of the probe.

7.1.7 Minimum Value in Data Set by Parameter

SRF_DO	3.0
SRF_TEMP	18.18
SRF_SAL	0.03
SRF_PH	6.3
SRF_PAR	9
SRF_TRNS	0
SRF_FLR	0
SRF_DENS	-4.36
BTM_DO	0.0
BTM_TEMP	14.54
BTM_SAL	0.03
BTM_PH	6.3
BTM_PAR	2
BTM_TRNS	2
BTM_FLR	1
BTM_DENS	-4.34

MAX_FLR	2
K_PAR	-0.02
AVG_K	
COMP_PAR	1.8
TRNS_1MT	
SS_CONC	5.4
SECCHI	

7.1.7 Maximum Value in Data Set by Parameter

SRF_DO	9.7
SRF_TEMP	30.48
SRF_SAL	32.89
SRF_PH	9.0
SRF_PAR	3621
SRF_TRNS	90
SRF_FLR	30
SRF_DENS	22.51
BTM_DO	9.0
BTM_TEMP	30.43
BTM_SAL	32.91
BTM_PH	9.0
BTM_PAR	478
BTM_TRNS	91
BTM_FLR	30
BTM_DENS	23.91
MAX_FLR	30
K_PAR	4.46
AVG_K	
COMP_PAR	18.9
TRNS_1MT	
SS_CONC	122.2
SECCHI	

7.2 Data Record Example

7.2.1 Column Names for Example Records

STA_NAME VST_DATE SRF_DO SRF_TEMP SRF_SAL SRF_PH SRF_PAR SRF_TRNS SRF_FLR SRF_DENS BTM_DO BTM_TEMP BTM_SAL BTM_PH BTM_PAR

7.2.2 Example Data Records

OBS	STA_NAME	VST_DATE	SRF_DO	SRF_TEMP	SRF_SAL	SRF_PH	SRF_PAR	SRF_TRNS
1	VA90-021	900721	8.4	21.16	26.58	8.3	60	0
2	VA90-022	900723	7.0	21.96	26.75	8.4	775	75
3	VA90-023	900819	7.1	26.65	21.57	7.1	148	31

SRF_FLR	SRF_DENS	BTM_DO	BTM_TEMP	BTM_SAL	BTM_PH	BTM_PAR
0	18.06	6.1	18.42	28.19	8.1	3
8	17.97	3.8	18.18	27.94	7.8	4
30	12.74	6.6	26.45	21.87	7.1	24

```
OBS   BTM_TRNS   BTM_FLR   BTM_DENS   MAX_FLR   K_PAR   AVG_K   COMP_PAR   TRNS_1MT

 1       73         2       19.97        7      0.223     .         .         .
 2       75         3       19.83        9      0.443     .       10.4        .
 3       32        30       13.02       30      1.693     .         .         .

 OBS VP_NAME                                          QA_CODE   SS_CONC SECCHI

  1  naremp::disk$emap:[rawdata.ctdraw]399035.dwn       GD          .      .
  2  naremp::disk$emap:[rawdata.ctdraw]424035.dwn       GD        122.2    .
  3  naremp::disk$emap:[rawdata.ctdraw]765035.dwn       GD          .      .
```

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-77 Degrees 18 Minutes 58.80 Decimal Seconds

8.2 Maximum Longitude

-70 Degrees 01 Minutes 00.00 Decimal Seconds

8.3 Minimum Latitude

36 Degrees 56 Minutes 24.60 Decimal Seconds

8.4 Maximum Latitude

42 Degrees 08 Minutes 00.00 Decimal Seconds

8.5 Name of area or region

Virginian Province

Stations were located in estuaries along the East Coast of the United States from Cape Cod, Massachusetts, to Cape Henry, Virginia, at the mouth of the Chesapeake Bay. The area includes the District of Columbia and the States of Virginia, Maryland, New Jersey, Delaware, Pennsylvania, New York, Connecticut, Rhode Island and Massachusetts.

9. QUALITY CONTROL/QUALITY ASSURANCE

9.1 Data Quality Objectives

Measurement quality objectives were outlined in the Quality Assurance Project Plan (Valente et al., 1990). Accuracy and precision goals are outlined below:

Measurement Quality Objectives for EMAP-Estuaries Indicators and associated data.

Data Type	Accuracy Goal	Maximum Allowable Precision Goal	Completeness Goal
DO	0.5 mg/l	10 %	90 %
Salinity	1 ppt	10 %	90 %
Depth	0.5 m	10 %	90 %
Fluorometry	NA	10 %	90 %
Transmissometry	NA	10 %	90 %
pH	0.2 units	NA	90 %
Temperature	0.5 deg C	NA	90 %

9.2 Quality Assurance Procedures

9.2.1 1990 CTD Files

The front line of QC is the field crews who were required to follow the QC check procedures outlined in Section 3.1.6. The first step in the QC of CTD files was to verify the proper association between CTD cast and station, event and date. Raw CTD files were downloaded to the onboard computer immediately following completion of the CTD cast at each station. During this transfer, the CTD files were "time-stamped" with the date and time, giving each stored CTD file a unique identifier. After the field season, a check was performed to confirm that each CTD file was associated with the correct event (an event is defined as a visit to a station on a particular date). This check consisted of the following steps:

- Where applicable, the time-stamp on each CTD file was verified against the date and time of the associated event.

- When the time-stamp identifier on the CTD file was questionable, the CTD depth was checked against the boat's fathometer depth recorded on the field data sheet and the CTD salinity was checked against the refractometer salinity recorded on the data sheet.

Validating CTD data files involved three steps. A brief summary of each of these steps follows.

1) Performance check of CTD units at the end of the season.

At the conclusion of the sampling season, a performance check was made of the four CTD units. An outline of this procedure follows.

- Obtain simultaneous readings from all CTD units submerged in a 500 gallon seawater tank - compare individual readings to each other and to readings obtained with a thermometer and refractometer as a check on CTD temperature and salinity readings, respectively.

- Determine accuracy of dissolved oxygen readings by comparison to saturation table value and Winkler titration results.

- Determine accuracy of pH sensor readings by comparison with buffer solution values.

2) Visual inspection of graphs and data.

Each CTD cast was visually inspected to identify any unusual patterns of spikes that necessitated further review and/or the assignment of a qualifier code (flag). Specific parameters which were checked included:

- Amount of time at the surface (surface soak) - should be at least 60 seconds.

- Stability of dissolved oxygen sensor at the end of the surface soak (equilibration) -readings for the last 30 seconds prior to the downcast should not vary by more than 0.5 mg/liter.

- Stability of dissolved oxygen sensor during the entire CTD cast - readings should not show wide fluctuations indicative of electronic malfunction.

- Unexpected patterns or trends in the downcast or upcast (e.g., spikes or dissolved oxygen values which increase with depth or which show improbable supersaturated conditions).

- A reasonable match between downcast and upcast values.

- Amount of time at the bottom - should be at least 60 seconds to allow proper equilibration of the dissolved oxygen sensor.

- Indications that the CTD was lowered into the sediments and the CTD pump system became clogged (indicated by sharp, anomalous drops in both dissolved oxygen and salinity readings, lack of agreement between downcast and upcast, and/or a near-bottom spike in the transmissometry value).

3) Assign data qualifier code (QC code or flag) to the cast

After the above checks were made for each CTD cast obtained in 1990, one or more QC codes were assigned to the cast. Note that QC codes have not been applied to density measurements (sigma-t). Sigma-t is calculated from temperature and salinity; therefore, temperature and salinity QC codes apply to density measurements as well.

9.2.2 Suspended Solids

To assure the quality of suspended solids analyses, ten percent of analyses were replicated in order to compare the results. The results of the two filtrations should have been within ten percent of each other. If 0.1 L of sample produced a residue weight of less than 1.0 mg, the sample was re-filtered using 0.2 L. Only results which passed quality assurance procedures are included in the data base.

9.3 Unassessed Errors

Samples high in dissolved solids, such as saline waters, brines, and some wastes, may be subject to a positive interference. Washing of the filter and any dissolved solids in the filter was done with care to minimize this potential interference.

10. DATA ACCESS

10.1 Data Access Procedures

A Data Request Package can be requested from a contact under Section 10.3. Data can be downloaded from the WWW server.

10.2 Data Access Restrictions

Data are only accessible on-line from the EPA WWW public access server.

10.3 Data Access Contact Persons

John Paul, Ph.D.
U.S. EPA NHEERL-AED
(401) 782-3037 (Tel.)
(401) 782-3030 (FAX)
paul.john@epamail.epa.gov

Data Librarian EMAP-Estuaries
U.S. EPA NHEERL-AED
(401) 782-3184 (Tel.)
(401) 782-3030 (FAX)
hughes.melissa@epamail.epa.gov

10.4 Data Set Format

Data can be transmitted in a variety of formats derived from SAS data sets when a Data Request Form is submitted.

10.5 Information Concerning Anonymous FTP

Not accessible

10.6 Information Concerning WWW

Data can be downloaded from the WWW server

10.7 EMAP CD-ROM Containing the Data Set

Data not available on CD-ROM.

11. REFERENCES

Holland, A.F., ed. 1990. Near Coastal Program Plan for 1990: Estuaries. EPA 600/4-90/033. U.S. EPA, Office of Research and Development, NHEERL-AED, Narragansett, RI. November 1990.

Strobel, C.J. 1990. Environmental Monitoring and Assessment Program-Near Coastal Component: 1990 Demonstration Project Field Operations Manual. U.S. EPA Environmental Research Laboratory, Narragansett, RI. October 1990.

Valente, R.M., C.J. Strobel, J.E. Pollard, K.M. Peres, T.C. Chiang, and J. Rosen. 1990. Quality Assurance Project Plan for EMAP Near Coastal: 1990 Demonstration Project. U.S. EPA, Environmental Research Laboratory, Narragansett, RI.

12. TABLE OF ACRONYMS

13. PERSONNEL INFORMATION

Virginian Province Manager
Darryl Keith
U.S. Environmental Protection Agency
NHEERL-AED
27 Tarzwell Drive
Narragansett, RI 02882-1197
(401)782-3135 (Tel.)
(401)782-3030 (FAX)
keith.darryl@epamail.epa.gov

Virginian Province QA Officer
Charles J. Strobel
U.S. Environmental Protection Agency
NHEERL-AED
27 Tarzwell Drive
Narragansett, RI 02882-1197
(401)782-3180 (Tel.)
(401)782-3030 (FAX)
strobel.charles@epamail.epa.gov

John Paul, Ph.D.
U.S. Environmental Protection Agency
NHEERL-AED
27 Tarzwell Drive
Narragansett, RI 02882-1197
(401) 782-3037 (Tel.)
(401) 782-3030 (FAX)
paul.john@epamail.epa.gov

Data Librarian, EMAP-Estuaries
Melissa M. Hughes
OAO Corporation
U.S. EPA NHEERL-AED
27 Tarzwell Drive
Narragansett, RI 02882-1197
(401) 782-3184 (Tel.)
(401) 782-3030 (FAX)
hughes.melissa@epamail.epa.gov