

US EPA ARCHIVE DOCUMENT

CATALOG DOCUMENTATION  
EMAP-ESTUARIES PROGRAM LEVEL DATABASE  
EMAP-WEST 1999-2006  
WATER QUALITY AND NUTRIENT DATA

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1. DATA SET IDENTIFICATION

1.1 Title of Catalog document  
National Coastal Assessment Database  
1999-2006 EMAP-West  
Water Quality and Nutrient Data

1.2 Authors of the Catalog entry  
Larry Cooper, Southern California Coastal Water Resources Project

1.3 Catalog revision date  
8 September 2001

1.4 Data set name  
Water Quality and Nutrient Data

1.5 Task Group  
EMAP-West

1.6 Data set identification code  
3

1.7 Version  
1

1.8 Requested Acknowledgment

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 have been funded wholly or in part by the U. S. Environmental Protection Agency through its EMAP-National Coastal Assessment 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  
States of California, Oregon and Washington  
Moss Landing Marine Lab (California)  
Oregon Department of Environmental Quality  
Washington Department of Ecology (Washington)

2.2 Investigation Participant-Sample Collection  
NA

3. DATA SET ABSTRACT

3.1 Abstract of the Data Set

The Water Quality data reports physical data collected from water quality casts taken with CTDs or hand casts taken with a Hydrolab or YSI datasonde. Nutrient data were measured from water column samples taken at various depths. The stations were located in estuaries on the West Coast of the United States.

### 3.2 Keywords for the Data Set

Water quality measurements, nutrients, water column measurements, water quality

## 4. OBJECTIVES AND INTRODUCTION

### 4.1 Program Objective

EPA's National Coastal Assessment (NCA), is a five-year effort led by EPA's Office of Research and Development to evaluate the assessment methods it has developed to advance the science of ecosystem condition monitoring. C2000 represents the current state of evolution of EPA's Environmental Monitoring and Assessment Program (EMAP). EMAP was originally designed to provide a quantitative assessment of the regional extent of environmental problems by measuring status and change in selected indicators of ecological condition. EMAP provides a strategy to identify and bound the extent, magnitude and location of environmental degradation and improvement on a regional scale.

### 4.2 Data Set Objective

The objective of the water quality and nutrient data is to characterize the components of water column samples collected from estuaries on the West Coast.

### 4.3 Background Discussion

Water column parameters were characterized generally at 1 meter increments from surface to bottom, while nutrient samples were collected at the surface, bottom and mid-depth of the water column. Only surface and bottom measurements are presented for vertical profile measurements.

### 4.4 Summary of Data Set Parameters

Water quality components were recorded on instruments, while nutrient data were measured from surface and bottom samples collected at a station.

## 5. DATA ACQUISITION AND PROCESSING METHODS

### 5.1 Data Acquisition

#### 5.1.1 Sampling Objective

To collect samples suitable for nutrient measurements and deploy instrumentation suitable for water column measurements.

#### 5.1.2 Sample Collection Methods Summary

California: The Hydrolab H20 multiprobe water quality profiling was used for basic water quality parameters of temperature, salinity, pH, dissolved oxygen (DO), and depth. The Hydrolab units and underwater readings for Photosynthetically Active Radiation always used a Quantum (spherical, LI-192SA) sensor. On the boat, the deck sensor recording ambient light was a cosine collector (the flat sensor; LI-190SA). The conversion is roughly 4 times between the two sensors. At walk-in stations ambient irradiance was taken with the Quantum sensor and then several subsurface readings with the same sensor. At times a cosine sensor was used. A Kemmerer Sampler was deployed to collect samples for nutrients.

Washington: A CTD (SBE19 Seacat) was deployed in the water column to measured conductivity, temperature, depth, dissolved oxygen, pH, and turbidity. Continuous sampling was performed at a rate of 2 scans per second. The CTD is hand lowered into the water so that it is completely submerged at just below the surface where it soaks for 3 minutes to allow the water pump to purge any air in the system. After the 3 minute soak the CTD is raised to the water surface (so that the yellow mark on the CTD cage is at the water's surface), held there for 6 seconds, then lowered slowly to the bottom at a rate of about 0.25 meters per second. Once the CTD has reached the bottom it is raised slightly off the benthos (0.5 - 1.0 meters) and held there for a period of 1 minute. After that minute has elapsed, the CTD is pulled back into the boat at approximately the same rate it was lowered. Two separate sensors are deployed simultaneously during sampling to measure PAR. A Li-Cor LI-190SA Quantum Sensor is used to measure PAR in the 400-700nm waveband in terrestrial applications. A Li-Cor LI-193SA Spherical Quantum Sensor is used to measure PAR in the 400-700 nm waveband in underwater applications. Both sensors are connected to a Li-Cor LI-1400 datalogger in order to record and view data. A Niskin bottle was used to collect samples for nutrients.

Oregon: Water depth (m), salinity (‰), temperature (deg C), pH, and dissolved oxygen (DO, mg/L) were measured with a Yellow Springs Instruments (YSI) model 6920 datasonde and 610DM datalogger. Photosynthetically available radiation (PAR) was measured with LiCor PAR sensors. The datasonde and underwater PAR sensor were fitted in tandem for water column profiling. Water quality indicators were recorded at discrete depth intervals, depending on the total station depth:

| Total Depth (m) | Sample Depth Increment                         |
|-----------------|--|
| <1.5            | Mid-depth                                      |
| < 2             | Every 0.5m                                     |
| >2 and <100.5m  | Every 1m to 0.5 m off bottom                   |
| >100.5m         | Every 1m up to 10m; every 5m to 0.5 off bottom |

Near-bottom measurements were taken after a 3 minute delay in the event that the sediment surface had been disturbed. Data were recorded for descending and ascending profiles, and

sensors were allowed to equilibrate at each depth. The datasonde was calibrated weekly with laboratory control standards, and calibration was checked daily just prior to deployment.

All: The secchi disk is cast during the deployment and retrieval of the CTD or Hydrolab. The depth of the cast is determined as the precise point at which the viewer can no longer detect the disk in the water column. Depths vary due to suspended materials in the water, turbidity, and the sun's brightness striking the water at the time of sampling.

#### 5.1.3 Sampling Start Date

1999: 17 July 1999  
2000: 6 June 2000  
2001: 17 July 2001  
2002: 31 May 2002  
2003: 1 June 2003  
2004: 3 June 2004  
2005: 7 July 2005  
2006: 6 June 2006

#### 5.1.4 Sampling End Date

1999: 14 October 1999  
2000: 8 October 2000  
2001: 18 September 2001  
2002: 12 November 2002  
2003: 4 June 2004  
2004: 26 October 2004  
2005: 30 September 2005  
2006: 27 September 2006

#### 5.1.5 Platform

Small boat whenever possible or walk in.

#### 5.1.6 Sampling Equipment

Washington: CTD (SBE19 Seacat), Quantum (spherical, LI-193SA) sensor for underwater PAR measurements, LI-190SA sensor for ambient (air) PAR measurements, Niskin bottle

California: Hydrolab H20 Multiprobe, LICOR light meter, Kemmerer Sampler

Oregon: Yellow Springs Instruments (YSI) model 6920 datasonde and 610DM datalogger, LiCor PAR sensors

#### 5.1.7 Manufacturer of Sampling Equipment

Yellow Springs Instruments  
General Oceanics

#### 5.1.8 Key Variables

These data contain surface, bottom and mid-depth values recorded at the time of sampling. Samples collected for nutrients were analyzed later.

#### 5.1.9 Sampling Method Calibration

California: The H20s will be calibrated daily, preferably at dockside on the morning of their intended use; the calibration will be documented on the Hydrographic Profile Data Sheet. Calibration of the dissolved oxygen polarographic sensor is based on using a water-saturated air environment as the standard; for pH, a two point calibration curve is established with standard buffer solution of pH 7 and 10; the salinity/conductivity probe is calibrated using a secondary seawater standard that has been standardized against IAPSO Standard Seawater using a WESCOR vapor pressure osmometer; the depth sensor, a pressure activated transducer, is set to a zero pressure while out of the water. Temperature is a fixed function set by the manufacturer and cannot be adjusted in the field (to date, no problems have been encountered with the temperature sensor); the instrument reading is verified against a hand-held laboratory thermometer.

#### 5.1.10 Sample Collection Quality Control

For each of the water quality parameters, a maximum range of allowable difference that the instrument may deviate from the calibration standard has been established:

Hydrolab Daily Temperature Thermometer +/- 1EC  
Salinity Standard seawater +/- 0.2 ppt  
pH pH buffer solution +/- 0.1 pH units  
DO 100% saturation +/- 3.0%  
Depth Sea level +/- 0.2 m

Failed QC or calibration checks should initiate a thorough inspection of the unit for obvious sign of malfunction (e.g., loose connections, damaged probes, power source, fouling on DO membrane, etc.). After any maintenance required to correct problems, a unit was re-calibrated

with documentation on the appropriate field data form. In most cases, unless a probe is actually broken or damaged, the Hydrolab H20 can be corrected in the field. If the unit is in compliance, continue with the water column measurements; if one or more parameters remain suspect, record the problem on the field form and report the situation to the Regional Coordinator for resolution. Depending on the importance of the suspect parameter, the site may require a revisit to log an acceptable water column profile.

The same person should cast the sensor and lowering frame each time, in order to maintain consistency.

#### 5.1.11 Sample Collection Method Reference

U.S. Environmental Protection Agency. 2001. Environmental Monitoring and Assessment Program (EMAP) National Coastal Assessment: Field Operations Manual. Office of Research and Development, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, FL. EPA/620/R-01/003.

## 5.2 Data Preparation and Sample Processing

### 5.2.1 Sample Processing Objective

Process samples to ensure quality measurements of nutrients, chlorophyll and total suspended solids.

### 5.2.2 Sample Processing Methods Summary

Total Suspended Solids samples were held on ice and/or refrigerated at 4 deg C for a seven day holding period. Chlorophyll filters were kept in the dark and chilled to -20 deg C until ready to be analyzed. Nutrient samples were to be frozen or held on ice. Frozen samples could be held up to three months. Each of the analyses were conducted in accord with generally accepted laboratory procedures.

#### California Nutrients:

EMAP-West California 1999-2000 and 2002-2003 procedures: Chlorophyll a and phaeophytin were measured on a Turner Designs 10-005R Fluorometer. Total suspended solids were measured using SM2540D. Ammonium (NH<sub>4</sub>-N) and Nitrate (NO<sub>3</sub>-N) were measured using SM4500NH<sub>3</sub>. Nitrite (NO<sub>2</sub>) was measured using SM4500NO<sub>3</sub>. Ortho-phosphate (PO<sub>4</sub>) was measured using SM4500P.

EMAP-West California Santa Monica Bay 2003 procedures: Chlorophyll a was measured using the Fluorometric analysis method. Total suspended solids were measured using EPA 160.2: Gravimetric method with a lower limit measurement range of 4 mg/L. Ammonium (NH<sub>4</sub>-N), Nitrate (NO<sub>3</sub>-N), Nitrite (NO<sub>2</sub>) and Silicate were measured using a AlpKem RFA 300 Series Nutrient Analyzer.

EMAP-West California Morro Bay 2003 procedures: Chlorophyll a was measured on a Turner Designs 700 Fluorometer. Total suspended solids were measured using modified SM 2040D. Ammonium (NH<sub>4</sub>-N), Nitrate (NO<sub>3</sub>-N), Nitrite (NO<sub>2</sub>) and Dissolved inorganic phosphorus were measured on a Technicon AutoAnalyzer II.

EMAP-West California 2004-2006 procedures: NH<sub>4</sub>, DIP, DIN, NO<sub>3</sub>, and NO<sub>2</sub> were prepped and measured using analytical procedures for a Technicon AutoAnalyzer II. Total suspended solids samples were prepped and measured using SM2540D Modified. Chlorophyll a samples were prepped and measured using EPA 445.0 Modified: In Vitro Chlorophyll and Pheophytin by fluorescence modified.

#### Oregon Nutrients

EMAP-West Oregon 1999-2000 and 2002-2003 procedures: NH<sub>4</sub>, DIP, DIN, NO<sub>3</sub>, NO<sub>2</sub>, and Si were prepped for analytical procedures for a Technicon AutoAnalyzer II. Total suspended solids samples were analyzed using EPA procedure EPA-160.2. Dissolved inorganic phosphate samples were analyzed using EPA-365.2. Silicate samples were analyzed using the basic method of Armstrong et al. (1967). EPA-350.1 procedure was used to analyze ammonium samples. A modification of US EPA Method 353.2 (Nitrite + Nitrate (method EPA-353.2). US EPA. Method 353.2 Nitrogen, Nitrate-Nitrite (Colorimetric, Automated, Cadmium Reduction). Total. Revised. 1978) was used to analyze nitrate, nitrite and Nitrite + Nitrate samples. Chlorophyll a and phaeophyton were analyzed using EPA method 445.0.

EMAP-West Oregon 2001 procedures: Total suspended solids samples were analyzed using EPA procedure EPA-160.2: Gravimetric method with a lower limit measurement range of 4 mg/L. Dissolved inorganic phosphate samples were analyzed using EPA-365.2: Colorimetric/One Reagent. EPA-350.1 procedure was used to analyze ammonium samples by semi-Automated Colorimetry. A modification of US EPA Method 353.2 (Nitrite + Nitrate (method EPA-353.2). US EPA. Method 353.2 Nitrogen, Nitrate-Nitrite (Colorimetric, Automated, Cadmium Reduction). Total. Revised. 1978)) was used to analyze Nitrite + Nitrate samples. Chlorophyll a and phaeophyton were analyzed using EPA method 445.0: In Vitro Chlorophyll and Pheophytin by fluorescence.

Washington Nutrients:

EMAP-West Washington 1999-2000 and 2002-2003 procedures: NH<sub>4</sub>, DIP, DIN, NO<sub>3</sub>, NO<sub>2</sub>, and Si followed lab sample analytical procedures for a Technicon AutoAnalyzer II. Chlorophyll a was measured using a 10-005R Fluorometer. Total suspended solids were measured using EPA procedure EPA 160.2. Dissolved inorganic phosphate was analyzed using a modification of the Bernhardt and Wilhelms (1967) method. Silicate was analyzed using the basic method of Armstrong et al. (1967). A modification of the Slawyk and MacIsaac (1972) procedure was used for the analysis of ammonium. A modification of the Armstrong et al. (1967) procedure was used for the analysis of nitrate and nitrite.

EMAP-West Washington 2004-2006 procedures: Chlorophyll a samples were prepped using a 90% Acetone method: 90% Acetone Extract for chlorophyll a and phaeopigment and were measured using a Fluorometric analysis method. Dissolved inorganic phosphate was analyzed using a modification of the Bernhardt and Wilhelms (1967) method. A modification of the Slawyk and MacIsaac (1972) procedure was used for the analysis of ammonium. A modification of the Armstrong et al. (1967) procedure was used for the analysis of nitrate and nitrite.

EMAP-West Oregon 2004-06 procedures: Total suspended solids samples were analyzed using EPA procedure EPA-160.2: Gravimetric method with a lower limit measurement range of 4 mg/L. Dissolved inorganic phosphate samples were analyzed using EPA-365.2: Colorimetric/One Reagent. SM4500NH3B procedure was used to prep ammonium samples: Flow Injection Analysis System Method B. EPA-350.1 procedure was used to analyze ammonium samples by semi-Automated Colorimetry. US EPA Method 353.2 was used to analyze Nitrogen, Nitrate-Nitrite (Colorimetric, Automated, Cadmium Reduction). Chlorophyll a samples were prepped and analyzed using EPA method 445.0: In Vitro Chlorophyll and Pheophytin by fluorescence.

5.2.3 Sample Processing Method Calibration  
Sample results will be compared against standards.

5.2.4 Sample Processing Quality Control  
Forceps were always used to handle GFF filters holding chlorophyll samples.

5.2.5 Sample Processing Method Reference  
U.S. Environmental Protection Agency. 2001. Environmental Monitoring and Assessment Program (EMAP) National Coastal Assessment: Quality Assurance Project Plan 2001-2004. Office of Research and Development, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, FL. EPA/620/R-01/002.

6. DATA MANIPULATIONS  
6.1 Name of new or modified values  
NA

6.2 Data Manipulation Description  
Concentrations or measurements were averaged if replicates were taken.

6.3 Data Manipulation Examples  
Not applicable

7. DATA DESCRIPTION  
7.1 Description of Parameters  
7.1.1 Parameter Name

| Attribute Name            | Format       | Description                         |
|---------------------------|--------------|-------------------------------------|
| Data Group                | VARCHAR2(4)  | Group (program) conducting sampling |
| Sampling Year             | NUMBER(4,0)  | Year of data collection             |
| Station Name              | VARCHAR2(20) | Station identifier                  |
| Sampling Collection Date  | DATE         | Date of sample collection           |
| Latitude Decimal Degrees  | NUMBER(9,3)  | Station: decimal degrees latitude   |
| Longitude Decimal Degrees | NUMBER(9,3)  | Station: decimal degrees longitude  |
| Water Column Sampled      | VARCHAR2(8)  | Collection location (e.g., Surface) |
| Water Measurement Name    | VARCHAR2(40) | Name of measurement                 |
| Water Measurement Value   | NUMBER(13,6) | Measurement or concentration        |
| Measurement Units         | VARCHAR2(15) | Units of measure                    |
| Measurement Depth         | NUMBER(5,1)  | Measurement depth                   |
| Depth Units               | VARCHAR2(15) | Units of measure                    |
| Type Measurement          | VARCHAR2(40) | Vertical profile or ambient         |
| Method Used               | VARCHAR2(40) | Analysis or collection method       |

7.1.6 Precision to which values are reported

|  |                   |
|--|-------------------|
| Measurement Depth                                | 0.1               |
| <br>   |                   |
| WATER_MEASUREMENT_NAME                           |                   |
| Ammonium   | 1 ug/L            |
| Chlorophyll a                                    | 0.01 ug/L         |
| Conductivity                                     | 0.0001 Siemens/m  |
| Dissolved oxygen                                 | 0.1 mg/L          |
| Dissolved oxygen (saturation)                    | 0.01 % saturation |
| Nitrate  | 0.1 ug/L          |
| Nitrate+Nitrite                                  | 0.01 ug/L         |
| Nitrite  | 0.01 ug/L         |
| Phaeophytin                                      | 0.1 ug/L          |
| Photosynthetically active radiation (ambient)    | 0.1 umol/m2/s     |
| Photosynthetically active radiation (subsurface) | 1 umol/m2/s       |
| Photosynthetically active radiation (surface)    | 1 umol/m2/s       |
| Photosynthetically active radiation (underwater) | 0.1 umol/m2/s     |
| Salinity   | 0.1 psu           |
| Silicate   | 0.01 ug/L         |
| Temperature                                      | 0.1 deg C         |
| Total suspended solids                           | 0.01 mg/L         |
| Transmissivity                                   | 0.01 % light      |
| Transparency                                     | 1 m               |
| Dissolved inorganic phosphorus                   | 0.1 ug/L          |
| pH   | 0.01 pH units     |

7.1.7 Minimum value in data set/7.1.8 Maximum value in data set

|  |                             |
|--|-----------------------------|
| WATER_MEASUREMENT_NAME                         |                             |
| Ambient photosynthetically active radiation    | 0 - 4178 umol/m2/s          |
| Ammonium NH4                                   | 0 - 0.58 mg N/L             |
| Chlorophyll a                                  | 0 - 213.97 ug/L             |
| Conductivity                                   | 0.007 - 4175 Siemens/m      |
| Dissolved inorganic nitrogen                   | 0 - 3.5188 mg N/L           |
| Dissolved inorganic phosphorous                | 0.00525 - 0.06387 mg P/L    |
| Dissolved inorganic phosphorus                 | 0 - 1.42 mg P/L             |
| Dissolved oxygen                               | 0 - 46.637 mg/L             |
| Dissolved oxygen (saturation)                  | 2.29 - 6895.104004 %        |
| Fluorescence                                   | 0.41 - 27.04 flr units      |
| Light transmittance (%) @ 1 m                  | 0.0132 - 100 % trans. @ 1 m |
| Nitrate  | 0 - 3.4041 mg N/L           |
| Nitrate and nitrite                            | 0.00298 - 3.472 mg N/L      |
| Nitrite  | 0 - 0.1843 mg N/L           |
| Phaeophytin                                    | 0 - 50.96 ug/L              |
| Salinity                                       | 33.0562 - 35.060001 PSU     |
| Salinity                                       | 0.02 - 37 ppt               |
| Salinity                                       | 0 - 55.3536 psu             |
| Secchi depth                                   | 0 - 14.3 m                  |
| Silicate                                       | 116.29 - 10435.72 ug/L      |
| Silicon (SiOH4-Si)                             | 0 - 2070.67 ug/L            |
| Submerged photosynthetically active radiation  | 0 - 3780.5 umol/m2/s        |
| Temperature                                    | 3.6242 - 32.936401 deg C    |
| Total suspended solids                         | 0.1 - 3071 mg/L             |
| Transmissivity                                 | 1.04 - 98.976097 %          |
| Underwater photosynthetically active radiation | 0 - 3847 umol/m2/s          |
| pH   | 0 - 10.2 pH units           |

7.2 Data Record Example

7.2.1 Column Names for Example Records

Data Group, Sampling Year, Station Name, Sampling Collection Date, Latitude Decimal Degrees, Longitude Decimal Degrees, Water Column Sampled, Water Measurement Name, Water Measurement Value, Measurement Units, Measurement Depth, Depth Units, Type Measurement, Method Used, QA Code

7.2.2 Example Data Records

EMAP-West/Moss Landing Marine Lab,1999,CA99-0001,04-AUG-1999,41.161,-124.116,Bottom,  
Dissolved oxygen,12.2,mg/L,0.6,m,Vertical profile,,  
EMAP-West/Moss Landing Marine Lab,1999,CA99-0001,04-AUG-1999,41.161,-124.116,Bottom,  
Salinity,18.1,psu,0.6,m,Vertical profile,,  
EMAP-West/Moss Landing Marine Lab,1999,CA99-0001,04-AUG-1999,41.161,-124.116,Surface,  
Dissolved oxygen,10.8,mg/L,0.5,m,Vertical profile,,  
EMAP-West/Moss Landing Marine Lab,1999,CA99-0001,04-AUG-1999,41.161,-124.116,Surface,  
Salinity,18.2,psu,0.5,m,Vertical profile,,

## 8. GEOGRAPHIC AND SPATIAL INFORMATION

### 8.1 Minimum Longitude

1999: -124.706  
2000: -124.045  
2001: -124.400  
2002: -124.538  
2003: -125.016  
2004: -124.400  
2005: -124.300  
2006: -124.637

### 8.2 Maximum Longitude

1999: -117.129  
2000: -121.834  
2001: -121.816  
2002: -117.107  
2003: -117.116  
2004: -117.100  
2005: -117.100  
2006: -117.125

### 8.3 Minimum Latitude

1999: 32.6387  
2000: 37.4108  
2001: 37.441  
2002: 32.557  
2003: 32.551  
2004: 32.600  
2005: 32.600  
2006: 32.633

### 8.4 Maximum Latitude

1999: 48.3199  
2000: 48.9842  
2001: 46.000  
2002: 48.970  
2003: 48.315  
2004: 49.000  
2005: 48.900  
2006: 48.384

### 8.5 Name of area or region

EMAP-West

Stations were located in estuaries along the West Coast of the United States in Washington, Oregon and California. The area includes parts of the Columbian and Californian biogeographical provinces.

## 9. QUALITY CONTROL AND QUALITY ASSURANCE

### 9.1 Data Quality Objectives

Compliance with the Quality Assurance Plan.

For each of the water quality parameters, a maximum range of allowable difference that the instrument may

deviate from the calibration standard has been established:

Hydrolab Daily Temperature Thermometer +- 1EC

Salinity Standard seawater +- 0.2 ppt

pH pH buffer solution +- 0.1 pH units

DO 100% saturation +- 3.0%

Depth Sea level +- 0.2 m

### 9.2 Data Quality Assurance Procedures

Compliance with the Quality Assurance Plan and field operations document were maintained.

## 10. DATA ACCESS

### 10.1 Data Access Procedures

Data can be downloaded from the WWW server at: <http://www.epa.gov/emap/nca/html/data/>

### 10.2 Data Access Restrictions

NA

### 10.3 Data Access Contact Persons

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### 10.4 Data Set Format

Data can be downloaded in Tab delimited format from the web application:  
<http://www.epa.gov/emap/nca/html/data/>

### 10.5 Information Concerning Anonymous FTP

NA

### 10.6 Information Concerning WWW

Data can be downloaded from an application on the WWW server:  
<http://www.epa.gov/emap/nca/html/data/>

### 10.7 EMAP CD-ROM Containing the Data Set

Data not available on CD-ROM.

## 11. REFERENCES

U.S. Environmental Protection Agency. 2001. Environmental Monitoring and Assessment Program (EMAP) National Coastal Assessment: Quality Assurance Project Plan 2001-2004. Office of Research and Development, National Health and Environmental Effects Research Laboratory, Gulf Ecology Division, Gulf Breeze, FL. EPA/620/R-01/002.

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U.S. EPA. 1995. Environmental Monitoring and Assessment Program (EMAP): Laboratory Methods Manual-Estuaries, Volume 1: Biological and Physical Analyses. U.S. Environmental Protection Agency, Office of Research and Development, Narragansett, RI. EPA/620/R-95/008.

## 12. TABLE OF ACRONYMS

### 13. PERSONNEL INFORMATION

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