CATALOG DOCUMENTATION
EMAP-ESTUARIES PROVINCE LEVEL DATABASE
CAROLINIAN PROVINCE 1994-1997
SURFACE AND BOTTOM WATER QUALITY DATA

TABLE OF CONTENTS

1. DATA SET IDENTIFICATION

1.1 Title of Catalog Document

EMAP-Estuaries Province Level Database
Carolinian Province
Surface and Bottom Water Quality Data

1.2 Authors of the Catalog entry

Timothy R. Snoots,
Dr. Jeffrey L. Hyland

1.3 Catalog Revision Date

February 20, 1998

1.4 Data Set Name

CP_WQ_S.DAT, CP_WQ_B.DAT

1.5 Task Group

Estuaries

1.6 Data set identification codes

2, 3

1.7 Version

001

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-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

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C. Hackney (UNC-W) - Lead P.I. for NC region team
G. McRae, G. Nelson, J. McKenna, J. Landsberg (FLDEP) - Lead P.I.s for FL region team (depending on year)

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3. DATA SET ABSTRACT

3.1 Abstract of the Data set

The Water Quality Vertical Profile data sets are summaries of the physio-chemical properties of the water at a station at the time of sampling. A Hydrolab DataSonde 3 was used to record water quality parameters at regular intervals from the surface to the bottom of the water column. Salinity, temperature, pH, dissolved oxygen, and specific conductance were measured and are reported for each station. Sigma t density, calculated from salinity and temperature, is also reported. In these summary data sets, only surface and bottom observations are reported. Surface and bottom observations were taken within 0.5 m of the surface and bottom respectively.

The following reports are products of these and other data collected during the 1994-1997 Sampling season in the Carolinian Province. These reports may contain additional information and summary statistics that are not contained in this data set catalog or its respective data sets. We therefore recommend referring to them when using this data.

Hyland, J.L., T.J. Herrlinger, T.R. Snoots, A.H. Ringwood, R.F. Van Dolah, C.T. Hackney, G.A. Nelson, J.S. Rosen, and S.A. Kokkinakis. 1996. Environmental quality of estuaries of the Carolinian Province: 1994. Annual statistical summary for the 1994 EMAP-Estuaries Demonstration Project in the Carolinian Province. NOAA Technical Memorandum NOS ORCA 97. NOAA/NOS, Office of Ocean Resources Conservation and Assessment, Silver Spring, MD. 102 p.

Hyland, J.L., L. Balthis, C.T. Hackney, G. McRae, A.H. Ringwood, T.R. Snoots, R.F. Van Dolah, and T.L. Wade. 1998. Environmental quality of estuaries of the Carolinian Province: 1995. Annual statistical summary for the 1995 EMAP-Estuaries Demonstration Project in the Carolinian Province. NOAA Technical Memorandum NOS ORCA 123 NOAA/NOS, Office of Ocean Resources Conservation and Assessment, Silver Spring, MD. 143 p.

See also: Grimley and Hackney (1996), McRae and Nelson (1996), Nelson (1995), Ringwood et al. (1995), Ringwood et al.(1996), Ringwood et al. (1997), Ringwood et al. (1998), Wheeler et al.(1995), Wheeler et al. (1996).

3.2 Keywords for the Data Set

water quality, temperature, dissolved oxygen, pH, salinity, specific conductance, sigma t density, hydrographic data EMAP Carolinian Province

4. OBJECTIVES AND INTRODUCTION

4.1 Program Objective

EMAP has three primary objectives:

1. To estimate the current status, extent, changes, and trends in indicators of the Nation's ecological resources on a regional basis;

2. To monitor indicators of pollutant exposure and habitat condition, and to seek correlative relationships between human-induced stresses and ecological condition that identify possible causes of adverse effects; and

3. To provide periodic statistical summaries and interpretive reports on ecological status and trends to the EPA Administrator and to the public.

4.2 Data Set Objective

The objective of the vertical profile water quality summary data sets is to provide an instantaneous "snapshot" of surface and bottom values of specific water column parameters at each station in the Carolinian Province.

4.3 Data Set Background Information

NA

4.4 Summary of Data Set Parameters

Salinity, temperature, pH, dissolved oxygen, and specific conductance were measured and are reported for each station. Sigma t density, calculated from salinity and temperature, is

also reported. In these summary data sets, only surface and bottom observations are reported. Surface and bottom observations were taken within 0.5 m of the surface and bottom respectively.

4.5 Year-Specific Information about Data

Methods and equipment were the same for all years.

5. DATA ACQUISITION AND PROCESSING METHODS

5.1 Data Acquisition

5.1.1 Sampling Objective

Collect water quality data suitable for describing the conditions that organisms are exposed to in surface and bottom waters of Carolinian Province estuaries.

5.1.2 Sample Collection Method Summary

Dissolved Oxygen (mg/L), Temperature (C), pH, Salinity (ppt), Specific Conductance (mS/cm @ 25C), and Depth (m) were recorded electronically with a DataSonde 3 (DS3) multiprobe data logger manufactured by Hydrolab Corporation. Observations were recorded vertically through the water column, at 0.5 m depth intervals for depths < 3 m, and 1.0 m intervals for depths > 3 m. Two profiles were recorded at each station, one on the downcast (stopping for observations while lowering), and one on the upcast (stopping for observations while raising the instrument back to the surface).

5.1.3 Beginning Sampling Dates

30 June 1994
05 July 1995
09 July 1996
07 July 1997

5.1.4 Ending Sampling Dates

31 August 1994
14 September 1995
19 September 1996
25 August 1997

5.1.5 Platform

Samples were collected from various gasoline or diesel powered boats equipped with at least the following equipment: "A" frame boom or davit, winch, LORAN-C or GPS for location, and a depth finder.

5.1.6 Sampling Equipment

DataSonde 3 (DS3) multiprobe data loggers manufactured by Hydrolab Corporation.

5.1.7 Manufacturer of Sampling Equipment

Hydrolab Corporation, TX

5.1.8 Key Variables

5.1.9 Sample Collection Method Calibration

DataSonde 3 multiprobes were maintained and calibrated per manufactures instructions.

See: Hyland et al. (1996),
Hyland et al. (1998),
Kokkinakis et al. (1994b)

5.1.10 Sample Collection Quality Control

Quality control procedures for water quality measurements included pre-deployment calibration of the DataSonde sensors against standards, and pre- and post-deployment precision checks based on side-by-side comparisons with other calibrated instruments.

See: Hyland et al. (1996),
Hyland et al. (1998),
Kokkinakis et al. (1994b)

5.1.11 Sample Collection Method References

See: Hyland et al. (1996),
Hyland et al. (1998),
Kokkinakis et al. (1994b)

5.1.12 Sample Collection Method Deviations

None

5.2 Data Preparation and Sample Processing

5.2.1 Sample Processing Objective

NA

5.2.2 Sample Processing Methods Summary

5.2.2.1 Field Summary

NA

5.2.2.2 Laboratory Summary

NA

5.2.3 Sample Processing Method Calibration

NA

5.2.4 Sample Processing Quality Control

NA

5.2.5 Sample Processing Method Reference

NA

5.2.6 Sample Processing Method Deviations

None

6. DATA ANALYSIS AND MANIPULATIONS

6.1 Name of New or Modified Value

DENS Sigma t Density

6.2 Data Manipulation Description

DENS Sigma t Density was calculated as follows:

```
DENS =
[
      {
            (
                  [1.0281045]
                  -[0.0000535633*T]
                  -[0.00000678195*{T^2}]
                  +[0.000000070517*{T^3}]
                  -[0.00000000084794*{T^4}]
                  +[0.000000000005057*{T^5}]
            )

            +

            (
                  [
                        {0.00080792}
                        -{0.0000032481*T}
                        +{0.00000006423*(T^2)}
                        -{0.000000000649*(T^3)}
                  ]
                  *[S-35]
            )

            +

            (
                  0.0000002045
                  *[(S-35)^2]
            )

      }
      *1000
]
-1000
```

where: T = Temperature (C)

S = Salinity (ppt)

6.3 Data Manipulation Examples

6.3.1 DENS

Where TEMP = 28.4 and SAL = 24.2, DENS = 14.13

7. DATA DESCRIPTION

7.1 Description of Parameters

Surface Data (CP_WQ_S.DAT)

Variable	Type	Format	Label
STA_NAME	Char	7	Carolinian Province Office Station Name
DATE	Date	YYMMDD	Profile Date
TIME	Time	HH:MM	Profile Start Time
DO	Num	4.1	Surface D.O. (mg/L)
TEMP	Num	4.1	Surface Temperature (C)
SAL	Num	4.1	Surface Salinity (ppt)
PH	Num	4.1	Surface pH
SPCOND	Num	4.1	Surface Specific Conductance (mS/cm 25C)
DENS	Num	6.2	Surface Sigma t Density

Bottom Data (CP_WQ_B.DAT)

Variable	Type	Format	Label
STA_NAME	Char	7	Carolinian Province Office Station Name
DATE	Date	YYMMDD	Profile Date
TIME	Time	HH:MM	Profile Start Time
DO	Num	4.1	Bottom D.O. (mg/L)
TEMP	Num	4.1	Bottom Temperature (C)
SAL	Num	4.1	Bottom Salinity (ppt)
PH	Num	4.1	Bottom pH
SPCOND	Num	4.1	Bottom Specific Conductance (mS/cm 25C)
DENS	Num	6.2	Bottom Sigma t Density
DEPTH	Num	4.1	Depth (m) of near-bottom observation

Note the conventions used in the Format column above:

For character (Char) variables, the number given is the maximum width (number of characters) for that variable.

For numeric (Num) variables, the format is given in W.D format, where W = maximum width (number of characters) for the number (including all digits and the decimal point), and D = number of digits to the right of the decimal point.

7.1.6 Precision to which values are reported

Variables DO, TEMP, SAL, PH, SPCOND, and DEPTH are reported to, and are valid to 0.1 units. Variable DENS is reported to 0.01, but is only valid to 0.1.

7.1.7 Minimum Value in Data Set

Surface (CP_WQ_S.DAT)

Variable	Minimum
DO	3.4
TEMP	19.6
SAL	0
PH	5.9
SPCOND	0.1
DENS	-4.34

Bottom (CP_WQ_B.DAT)

Variable	Minimum
DO	0.3
TEMP	19.6
SAL	0.0
PH	5.9
SPCOND	0.1
DENS	-3.83
DEPTH	0.1

7.1.8 Maximum Value in Data Set

Surface (CP_WQ_S.DAT)

Variable	Maximum
DO	10.8
TEMP	33.3
SAL	39.1
PH	9.2
SPCOND	58.6
DENS	26.48

Bottom (CP_WQ_B.DAT)

Variable	Maximum
DO	12.5
TEMP	33.0
SAL	39.1
PH	9.1
SPCOND	58.4
DENS	26.70
DEPTH	13.0

7.2 Data Record Example

7.2.1 Column Names for Example Records

Surface (CP_WQ_S.DAT)

STA_NAME;DATE;TIME;DO;TEMP;SAL;PH;SPCOND;DENS

Bottom (CP_WQ_B.DAT)

STA_NAME;DATE;TIME;DO;TEMP;SAL;PH;SPCOND;DENS;DEPTH

7.2.2 Example Data Records

Surface (CP_WQ_S.DAT)

CP94001;940815;12:31;6.7;28.4;24.2;7.8;38.1;14.13
CP94002;940815;15:43;6.5;29.1;4.0;7.7;7.3;-1.07
CP94003;940816;12:31;7.9;28.8;26.5;7.9;41.4;15.72
CP94004;940816;14:02;7.2;29.3;30.8;8.0;47.1;18.82

Bottom (CP_WQ_B.DAT)

CP94001;940815;12:31;6.7;28.4;24.3;7.8;38.2;14.24;1.2
CP94002;940815;15:43;3.4;27.8;19.9;7.6;30.1;11.10;3.0
CP94003;940816;12:31;7.5;28.8;26.6;7.9;41.4;15.83;1.7
CP94004;940816;14:02;6.7;29.3;30.8;8.0;47.3;18.82;1.0

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

-81 Degrees, 43.83 Minutes West Longitude

8.2 Maximum Longitude

-75 Degrees, 33.82 Minutes West Longitude

8.3 Minimum Latitude

27 Degrees, 12.07 Minutes North Latitude

8.4 Maximum Latitude

36 Degrees, 43.43 Minutes North Latitude

8.5 Name of area or region

Coastal distribution of sampling is along the southeastern US from Cape Henry, VA, through St. Lucie Inlet, FL. States represented: Virginia, North Carolina, South Carolina, Georgia, and Florida.

9. QUALITY CONTROL/QUALITY ASSURANCE

9.1 Measurement Quality Objectives

See section 5.1.9 (Sample Collection Method Calibration) and section 5.1.10 (Sample Collection Quality Control) above.

9.2 Quality Assurance/Control Methods

See section 5.1.9 (Sample Collection Method Calibration) and section 5.1.10 (Sample Collection Quality Control) above.

9.3 Quality Assessment Results

Unless specifically mentioned in this section (9.3), or in the accompanying QA data set CP_WQ_Q.TXT, all data reported in the CP_WQ_S.DAT and CP_WQ_B.DAT data sets fully met the QA/QC guidelines given above and are acceptable without further qualification.

10. DATA ACCESS

10.1 Data Access Procedures

Data can be downloaded from the WWW site.

10.2 Data Access Restrictions

Data can only be accessed from the WWW site.

10.3 Data Access Contact Persons

For programmatic/policy matters, contact:
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10.4 Data file Format

Delimited ASCII Text

10.5 Information Concerning Anonymous FTP

Not accessible

10.6 Information Concerning Gopher and WWW

Data can be downloaded from the WWW.

10.7 EMAP CD-ROM Containing the Data file

Data not available on CD-ROM.

11. REFERENCES

Grimley, J. and C.T. Hackney. 1996 Year end summary. EMAP Carolinian Province: North Carolina Estuaries Component. Final year-three report under NOAA Cooperative Agreement No. NA47OA0148. University of North Carolina at Wilmington, Center for Marine Research, Wilmington, NC.

Hyland, J.L., T.J. Herrlinger, T.R. Snoots, A.H. Ringwood, R.F. Van Dolah, C.T. Hackney, G.A. Nelson, J.S. Rosen, and S.A. Kokkinakis. 1996. Environmental quality of estuaries of the Carolinian Province: 1994. Annual statistical summary for the 1994 EMAP-Estuaries Demonstration Project in the Carolinian Province. NOAA Technical Memorandum NOS ORCA 97. NOAA/NOS, Office of Ocean Resources Conservation and Assessment, Silver Spring, MD. 102 p.

Hyland, J.L., L. Balthis, C.T. Hackney, G. McRae, A.H. Ringwood, T.R. Snoots, R.F. Van Dolah, and T.L. Wade. 1998. Environmental quality of estuaries of the Carolinian Province: 1995. Annual statistical summary for the 1995 EMAP-Estuaries Demonstration Project in the Carolinian Province. NOAA Technical Memorandum NOS ORCA 123 NOAA/NOS, Office of Ocean Resources Conservation and Assessment, Silver Spring, MD.

Kokkinakis, S.A., C. Mageau, and A. Robertson. 1994a. Carolinian Demonstration Project - 1994 Quality Assurance Project Plan. Joint National Status and Trends/Environmental Monitoring and Assessment Program. NOAA/NOS/ORCA, Silver Spring, MD.

Kokkinakis, S.A., J.L. Hyland, and A. Robertson. 1994b. Carolinian Demonstration Project - 1994 Field Operations Manual. Joint National Status and Trends/Environmental Monitoring and Assessment Program. NOAA/NOS/ORCA, Silver Spring, MD.

McRae, G. and G.A. Nelson. 1996. Data summary report for the 1994 EMAP Carolinian Province demonstration project: Florida region. Part I: Core program results. Final year-two report under NOAA Cooperative Agreement No. NA47OA0178. Florida Department of Environmental Protection, Florida Marine Research Institute, Melbourne, FL.

Nelson, G.A. 1995. Data summary report for the 1994 EMAP Carolinian Province demonstration project: Florida region. Part I: Core program results. Final year-one report under NOAA Cooperative Agreement No. NA47OA0178. Florida Department of Environmental Protection, Florida Marine Research Institute, Melbourne, FL.

Ringwood, A.H., A.F. Holland, R. Kneib, and P. Ross. 1996. EMAP/NS&T pilot studies in the Carolinian Province: Indicator testing and evaluation in southeastern estuaries. Final Report under Grant NA9OAA-D-SG79O through S.C. Sea Grant College Program. S.C. Dept. of Natural Resources, Marine Resources Research Institute, Charleston, S.C. NOAA Technical Memorandum NOS ORCA 1O2. 113 p.

Ringwood, A.H., C. Keppler, R.F. Van Dolah, P. Maier, J. Jones, M.E. DeLorenzo. 1998. EMAP Activities in the Carolinian Province by Marine Resources Research Institute in 1997: Results and Summaries. Final Annual Report under NOAA Cooperative Agreement No. NA77OAO214. South Carolina Department of Natural Resources, Marine Resources Research Institute, Charleston, SC.

Ringwood, A.H., R. Van Dolah, A.F. Holland, and M.G. Delorenzo. 1995. Year one demonstration project studies conducted in the Carolinian Province by Marine Resources Research Institute: Results and summaries. Final Annual Report under NOAA Cooperative Agreement No. NA47OA0177. South Carolina Department of Natural Resources, Marine Resources Research Institute, Charleston, S.C

Ringwood, A.H., R. Van Dolah, A.F. Holland, M.G. Delorenzo, C. Keppler, P. Maier, J. Jones, and M. Armstrong-Taylor. 1997. Year two demonstration project studies conducted in the Carolinian Province by Marine Resources Research Institute: Results and summaries. Final Annual Report under NOAA Cooperative Agreement No. NA47OA0177. South Carolina Department of Natural Resources, Marine Resources Research Institute, Charleston, SC.

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.

Wheeler, T., M. Smith, K. Stokesbury, J. Merritt, M. Posey, S. Ross, and C.T. Hackney. 1995. 1994 Year end summary. EMAP Carolinian Province: North Carolina Estuaries Component. Final year-one report under NOAA Cooperative Agreement No. NA47OA0148. University of North Carolina at Wilmington, Center for Marine Research, Wilmington, NC.

Wheeler, T., M. Smith, K. Stokesbury, M. Posey, S. Ross, and C.T. Hackney. 1996. 1995 Year end summary. EMAP Carolinian Province: North Carolina Estuaries Component. Final year-two report under NOAA Cooperative Agreement No. NA47OA0148. University of North Carolina at Wilmington, Center for Marine Research, Wilmington, NC.

12. TABLE OF ACRONYMS

C	Degrees Celsius
cm2	Square centimeters
CMBAD	Coastal Monitoring and Bioeffects Assessment Division
CU	Clemson University
EMAP	Environmental Monitoring and Assessment Program
EPA	U.S. Environmental Protection Agency
EPA-AED	EPA-Atlantic Ecology Division
EPA-GED	EPA-Gulf Ecology Division
EPA-RTP	EPA-Research Triangle Park, NC
FLDEP	Florida Dept. of Environmental Protection
FMRI	Florida Marine Research Institute
FTP	File Transfer Protocol
GIS	Geographical Information System
JCWS	Johnson Controls Word Services
km2	Square kilometers
m2	Square meters
mg/L	Milligrams per liter
mS/cm	MilliSiemens per centimeter (equiv. to milliohms/cm)
MRRI	Marine Resources Research Institute
NCNERR	North Carolina National Estuarine Research Reserve
NCSU	North Carolina State University, NC
NA	Not Applicable
ng/g	Nanograms per gram
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
ORCA	Office of Ocean Resources Conservation and Assessment

QA/QC	Quality Assurance/Quality Control
ppb	Parts per billion (equiv. to ng/g)
ppm	Parts per million (equiv. to ug/g)
ppt	Parts per thousand
SAIC	Science Applications International Corporation
SCDNR	South Carolina Dept. of Natural Resources
TOC	Total Organic Carbon
TAMU/GERG	Texas A&M University, Geochemical and Environmental Research Group
TPMC	Technology Planning and Management Corporation
ug/g	Micrograms per gram
um	Micrometers
UC	University of Charleston, SC
UGA	University of Georgia, GA
UNC-W	University of North Carolina - Wilmington, NC
USGS-GB	US Geological Survey - Gulf Breeze, FL
wt.	Weight
WWW	World Wide Web -Internet

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