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CATALOG DOCUMENTATION
EMAP-NATIONAL COASTAL ASSESSMENT PROGRAM LEVEL DATABASE
EMAP-WEST INSULAR PROVINCE HAWAII 2001-2002
EMAP-WEST INSULAR PROVINCE GUAM 2004
WATER QUALITY MEASUREMENT DATA

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1. DATA SET IDENTIFICATION

1.1 Title of Catalog document
National Coastal Assessment Database
EMAP-West Insular Province Hawaii 2001-2002
EMAP-West Insular Province Guam 2004
Water Quality Measurement Data

1.2 Authors of the Catalog entry
Larry Cooper - Southern California Coastal Water Resources Project
Environmental Protection Agency-Gulf Ecology Division

1.3 Catalog revision date
8 September 2011

1.4 Data set name
Water Quality Measurement Data

1.5 Task Group
EMAP-West
National Coastal Assessment

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
State of Hawaii
Environmental Protection Agency-Gulf Ecology Division

2.2 Investigation Participant-Sample Collection
NA

3. DATA SET ABSTRACT

3.1 Abstract of the Data Set
The Western Pilot-Coastal Monitoring is a large-scale, comprehensive environmental monitoring strategy designed to provide regional characterization of estuarine conditions along the West and Pacific Coasts of the United States. In 2001-02 the US EPA contracted the state of Hawaii to conduct a National Coastal Assessment survey. There were 130 stations sampled in 2001 and 79 stations sampled in 2002. In 2004, 50 stations were sampled in the coastal regions of Guam. The Water Quality Measurement data report physical data (temperature, salinity, pH, turbidity,

conductivity and dissolved oxygen) collected from water quality casts taken with a Hydrolab at 0.5 m increments from the surface to the bottom. Nutrient data (nitrate, nitrite, silicate, total nitrogen, total phosphorus, total dissolved nitrogen, total dissolved phosphorus, nitrate/nitrite, chlorophyll a, dissolved inorganic phosphorus, total suspended solids and ammonium) were measured from water column samples taken with a Niskin bottle at various depths. Dissolved inorganic nitrogen and light transmittance (%) @ 1 m were calculated from field data. The stations were located in the estuaries of Hawaii and Guam. The following station was abandoned: HI02-0065.

3.2 Keywords for the Data Set
Water quality measurements, nutrients, water column measurements

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 the water column and water column samples collected from estuaries along the coasts of Hawaii and Guam.

4.3 Background Discussion
Water column parameters were generally characterized at 0.5 meter increments from surface to bottom, while nutrient samples were collected at the surface, bottom and mid-depth of the water column. All measurements for vertical profiles are presented.

4.4 Summary of Data Set Parameters
Water quality components were recorded on instruments, while nutrient data were measured from surface, mid-depth 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
A Hydrolab H2O Datasonde was deployed in the water column to measure conductivity, temperature, depth, dissolved oxygen, pH, and turbidity from the surface to the bottom at 0.5 m increments. Salinity was measured separately. Dissolved oxygen was measured with a Hydrolab DO sensor on the Hydrolab H2O datasonde. Once physical measurements were completed at a station, water samples were collected at three depths for each station: within 20 cm of the surface, mid-depth in the water column, and at approximately 1-m above the sea floor, using a 2.2 liter Niskin sample bottle. Subsamples were withdrawn for nutrients (nitrate, nitrite, silicate, total nitrogen, total phosphorus, nitrate/nitrite, chlorophyll a, dissolved inorganic phosphorus, total dissolved nitrogen, total dissolved phosphorus, total suspended solids and ammonium) and dissolved silica. The nutrient samples were collected in acid-rinsed polyethylene bottles that were triple-rinsed with the sample water. These samples were held on ice for transportation to the laboratory. The nutrient samples were filtered through Whatman glass fiber filters (GF/F, 0.7 um particle retention) into 125-ml acid-washed, triple-rinsed polyethylene bottles and immediately placed on ice. Samples were air shipped to the NCA national contract laboratory for analysis.

All laboratory methods used in processing water column samples followed standard accepted protocols. Analyses for the various nutrients were to be carried out by national contract laboratories following standard procedures, protocols and QA/QC. Water samples were held on ice for no more than 24 hours prior to sample processing. If a holding time greater than 24 hours was required, nutrient samples were frozen. The exception was for the silica sample which was refrigerated.

5.1.3 Sampling Start Date
7 June 2001
1 April 2002
29 November 2004

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5.1.4 Sampling End Date
17 August 2001
30 October 2002
17 August 2005

5.1.5 Platform
Small boat.

5.1.6 Sampling Equipment
Hydrolab H2O datasonde
AGE laboratory salinometer
Niskin bottle

5.1.7 Manufacturer of Sampling Equipment
NA

5.1.8 Key Variables
These data contain surface, bottom and mid-depth (every 0.5 m) values for physical parameters recorded at the time of sampling. Surface, bottom and mid-depth samples collected for nutrients were analyzed later.

5.1.9 Sampling Method Calibration
NA

5.1.10 Sample Collection Quality Control
NA

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.

Nelson, Walter G., Brock, Richard, Lee II, Henry, Lamberson, Janet O., Cole, Faith. 2006. Condition of Estuaries and Bays of Hawaii for 2002: A Statistical Summary. Office of Research and Development, National Health and Environmental Effects Research Laboratory, Washington, DC. EPA/600/R-05/xxx.

5.2 Data Preparation and Sample Processing
5.2.1 Sample Processing Objective
Process samples to ensure quality measurements of nutrients and chlorophyll.

5.2.2 Sample Processing Methods Summary
Chlorophyll filters are kept in the dark and frozen at -50 deg C until they are ready to be analyzed. Nutrient samples were held on dry ice and frozen at -50 deg C. Frozen samples may be held up to three months.

NCA Insular Province-Hawaii: Samples were air shipped to the NCA national contract laboratory for analyses. All laboratory methods used in processing water column nutrient samples followed standard accepted protocols including those as given in Standard Methods (1985), Strickland and Parsons (1972), Grasshoff (1983). Analyses for the various nutrients were carried out by national contract laboratories following standard procedures, protocols and QA/QC.

EMAP-West Guam 2004 procedures: Total suspended solids samples were prepped and analyzed using SM2540D. Dissolved inorganic phosphate samples were prepped and analyzed using SM4500P method for a Flow Injection Analysis System. Ammonium samples were prepped and analyzed using EPA-350.1 procedure: Nitrogen, Ammonia - Semi-Automated Colorimetry. Nitrate and Nitrite samples were prepped and analyzed using US EPA Method 353.2: Nitrogen, Nitrate-Nitrite-Colorimetric/Cadmium.

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.

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

6.2 Data Manipulation Description
Dissolved inorganic nitrogen was calculated.

6.3 Data Manipulation Examples
NA

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
Collection Property	VARCHAR2(40)	Characterization of the sample
Method Used	VARCHAR2(40)	Analysis or collection method

7.1.6 Precision to which values are reported
Not available

7.1.7/7.1.8 Minimum and Maximum values in data set

2001	Minimum	Maximum
CHLA	0.0332	1.488 ug/L
DIN	0.001	0.03
NH4-N	0.001	0.014 mg N/L
DIP	0.001	0.006 mg P/L
Total N	0.066	0.175 mg N/L
Total P	0.006	0.024 mg/L
Turbidity	0.09	8.1 NTU
SiOH4-Si	34	739 ug/L
NO3+NO2-N	0.001	0.016 mg N/L
Total Dissolved Nitrogen	0.056	0.145 mg N/L
Total Dissolved Phosphorus	0.004	0.012 mg/L

2002	Minimum	Maximum
CHLA	0.07	8.57 ug/L
Conductivity	0.447	57.89 Siemens/m
DIN	0.0	0.284
NH4-N	0.005	0.081 mg N/L
NO2-N	0.003	0.010 mg N/L
NO3+NO2-N	0.005	0.212 mg N/L
NO3-N	0.001	0.212 mg N/L
Dissolved Oxygen	1.91	9.753 mg/L
DIP	0.002	1.180 mg P/L
Salinity	0.213	37.53 psu
Secchi	0.01	21.3
SiOH4-Si	55	14710 ug/L
Temperature	23.436	30.772 deg C
Turbidity	-0.466	1767.6 NTU
pH	5.6925	8.22 pH units

2004	Minimum	Maximum
DIN	0.01	0.319
Light transmittance	27.924	100
NH4-N	0.01	0.092 mg N/L

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NO2-N	0.015	0.015 mg N/L
NO3-N	0.27	0.27 mg N/L
Dissolved oxygen	4.33	8.78 mg/L
DIP	0.016	1.75 mg P/L
Salinity	29.48	34.11 psu
Temperature	27.57	29.81 deg C
Total suspended solids	1	26.0 mg/L

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,Collection Property,Method Used,QA Code

7.2.2 Example Data Records

EMAP-West Insular Province/Hawaii Region 9,2002,HI02-0001,6/18/2002,21.96528,
-160.12361,Surface1-down,Dissolved oxygen,6.70,mg/L,0.5,m,Field duplicate 1-downcast,CTD,,
EMAP-West Insular Province/Hawaii Region 9,2002,HI02-0001,6/18/2002,21.96528,
-160.12361,Surface1-down,Temperature,26.23,deg C,0.5,m,Field duplicate 1-downcast,CTD,,
EMAP-West Insular Province/Hawaii Region 9,2002,HI02-0002,6/18/2002,21.94056,
-160.14444,Mid-water7-1-down,pH,8.11,pH units,2.72,m,Field duplicate 1-downcast,CTD,,
EMAP-West Insular Province/Hawaii Region 9,2002,HI02-0002,6/18/2002,21.94056,
-160.14444,Mid-water7-1-down,Salinity,35.62,psu,s,2.72,m,Field duplicate 1-downcast,CTD,,

8. GEOGRAPHIC AND SPATIAL INFORMATION

8.1 Minimum Longitude

2001: -158.111
2002: -160.1444
2004: -144.837

8.2 Maximum Longitude

2001: -157.806
2002: -155.06195
2004: -144.671

8.3 Minimum Latitude

2001: 21.248
2002: 19.7233
2004: 13.254

8.4 Maximum Latitude

2001: 21.319
2002: 22.2169
2004: 13.519

8.5 Name of area or region

Stations were located in estuaries associated with Guam and the State of Hawaii.
The area includes the Insular biogeographical province.

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

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10.3 Data Access Contact Persons

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(401) 782-3030 (FAX)
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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.

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.

Nelson, Walter G., Brock, Richard, Lee II, Henry, Lamberson, Janet O., Cole, Faith. 2006. Condition of Estuaries and Bays of Hawaii for 2002: A Statistical Summary. Office of Research and Development, National Health and Environmental Effects Research Laboratory, Washington, DC. EPA/600/R-05/xxx.

12. TABLE OF ACRONYMS

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