Weeks Bay (WKB) NERR Nutrient Metadata
January - December 2008
Last Updated: September 03, 2014

I. Data Set and Research Descriptors

1) Principal Investigator(s) and Contact Persons:

Address: Weeks Bay NERR
11300 Highway 98
Fairhope, Al 36532
Phone: (251) 928-9792
Fax: (251) 928-1792

Contact Persons: Dr. Scott Phipps, Research Coordinator
E-mail: scott.phipps@dcnr.alabama.gov
(251) 928-9792

Eric Brunden, Stewardship Coordinator
E-mail: eric.brunden@dcnr.alabama.gov
(251) 928-9792

2) Research objectives:

a) Monthly Grab

Monthly grab samples were collected to quantify the spatial variability of important nutrients in the water column between sites representing the local salinity gradient.

b) Diel Sampling Program

Once per month, twelve samples were collected throughout a tidal cycle to quantify the temporal variability of important nutrients and sediment loading in the water column as a function of tidal forcing.

3) Research methods:

a) Monthly Grab Sampling Program

Monthly grab samples were taken at the four primary SWMP stations (also datasonde locations) within the Weeks Bay estuary: Weeks Bay (WB) Middle Bay (MB) Magnolia River (MR) and Fish River (FR). Grab samples were collected within two hours prior to slack low tide. When possible sampling dates were during spring tide conditions. Rainfall conditions *prior* to grab sampling were not considered. Grab samples were obtained in conjunction with the deployment of an Isco 3700 portable sampler. (See 3b) Triplicate samples were collected sequentially using a FieldMaster™ sample collection device lowered

to 0.5 meters from the bottom (sample collection times for replicates were advanced by one minute for database purposes). Water temperature, salinity, pH, dissolved oxygen and turbidity data for each grab sample can be obtained by correlating grab sample collection dates and time with datasonde data available via the Central Data Management Office website (http://cdmo.baruch.sc.edu/) All samples were collected in opaque, 500ml, Nalgene® sample bottles that were previously acid washed and then rinsed with distilled water. Samples were immediately placed on ice and stored in a dark cooler then returned to the laboratory. Once in the laboratory samples were processed for nutrientand Chla analysis. (See 8b)

b) Diel Sampling Program

At the FR sit, twelve samples are collected each month using an Isco 3700 portable auto sampler. Sampler was programmed to make one 1000 mL collection approximately every 133 minutes throughout a complete tidal cycle (12 samples evenly spaced over a predicted tidal cycle). Samples were collected under spring tide conditions. Samples are stored on ice in 1000ml semi-transparent Isco containers within the body of the sampler. Sample containers are acid washed and rinsed with distilled water prior to sampler deployment. Sampler was programmed to flush collection line 3 times prior to sample uptake. As soon as possible after the final collection time the samples were returned to the laboratory for nutrient, solids and Chla analysis.

4) Site Location and Character

Weeks Bay (30 23' N, 87 50' W) is a small, shallow, microtidal sub-estuary, located on the eastern shore of Mobile Bay in the northern Gulf of Mexico. It is nearly diamond shaped, and its longitudinal axis (3.4 km long) runs nearly north-south from the head, where the Fish River flows in, to the mouth, where water is exchanged with Mobile Bay. Its widest point (3.1 km) is located near the center of the estuary, where the Magnolia River discharges into the eastern side of Weeks Bay. Average depth is 1.4 m, although there are two areas where depths are significantly greater. The first is in the mouth of the bay, where the average depth is 6 m; the second is about 100 m upstream of the mouth of the Fish River, where the average depth is 3.5 m. Tides are principally diurnal, and have a mean range of 0.4 m at all 4 sampling sites in the estuary.

The Fish River drainage basin encompasses 14300 hectares and contributes approximately 73% to the total incoming freshwater flow with the Magnolia River supplying the rest. Mean combined discharge is 9 cubic meters per second; although freshets up to 4 times larger occur throughout the year. These characteristics result in a freshwater residence time of 13 days under average discharge conditions, with a range from 0.5 to 100 days. Salinity in Weeks Bay varies substantially both temporally and spatially. During periods of high flow in the river, salinity in the bay may be fresh from the head to the mouth, except in the deeper holes of the estuary that are not as easily flushed. However, during periods of low flow in the river, wind velocity and tidal stage are strong factors influencing salinity structure. Salinity greater than 25 ppt is infrequently observed in Weeks Bay and is usually restricted to the southern portion of the estuary near the mouth. There are no known pollutants in the estuary.

Site FR (Fish River; 30 24.97'N, 87 49.37'W) is located near the mouth of Fish River at a mean depth of about 2m. Sediment type is sandy-silt, and there are patches of *Vallisneria sp.* growing near (but not directly under) the Data logger. Land use in the water shed is agricultural, forested and residential with the residential portion rapidly increasing. Directly surrounding the site, land use is residential and forested. Nutrient concentrations at this site are variable and may be quite high, with nitrate and phosphate concentrations ranging from approximately 4-100 µM and <0.5 to 7.5 µM, respectively, over the previous 10 years (Alabama Department of Environmental Management, Geological Survey of Alabama). Over the past year, salinity ranged from 0 to 25 ppt at this site. The diel sampling program occurs at this site.

Site WB (Weeks Bay; 30 22.85' N, 87 49.92' W) is located near the southeast shore of Weeks Bay, about 0.5 kilometers from the mouth of the estuary. Mean water depth at this site is about 0.9 m; sediment type is sandy-silt. Land use around this site is almost exclusively residential, with agriculture occurring inland. Nutrient concentrations are much lower at this site than at site Fish River. Over the previous 10 years, nitrate and phosphate concentrations here ranged from approximately 0.1 to 50 µM and 0.04 to 0.45 µM, respectively. Salinity ranged from approximately 5 to 27 ppt over the past year.

Site MB (Middle Bay; 30 23.768 N, 87 50.010 W) is located near the middle of Weeks Bay, approximately 1.1 kilometers from the southeastern shoreline. Mean water depth at this site is 1.5m. Bottom sediments are a soft silty-clay with no sub-aquatic vegetation present. Salinity ranges from 0 to 25ppt.

Site MR (Magnolia River; 30 23.398 N, 87 49.059 W) is located near the mouth of the Magnolia River. Mean water depth at this site is 1.1m. Bottom sediments are silty-clay. Salinity ranges from 0 to 24 ppt. The site is approximately twenty meters from the southern shoreline. A bottomland hardwood forest interspersed with patches of woody shrubs dominates the southern shoreline. Approximately forty meters north of the site is a needle rush dominated marsh which extends approximately 200 meters along the Magnolia river and along the north and east fringes of the bay.

5) Coded variable definitions

a) Station codes (column 'A' of nutrient data report):
wkbwbnut = Weeks Bay NERR, site Weeks Bay nutrient data
wkbfrnut = Weeks Bay NERR, site Fish River nutrient data
wkbmrnut = Weeks Bay NERR, site Magnolia River nutrient data
wkbmbnut = Weeks Bay NERR, site Middle Bay nutrient data

b) Monitoring program (column "C" of nutrient data report):

1 = Monthly grab sample
2 = Diel grab sample

c) Nutrient parameter comment code columns (denoted with a 'F_' and found in columns immediately following reported data variable. Refer to section 10 for parameter titles and variable names by data category.)

6) Data collection period

The first water samples collected for 2008 SWMP nutrient monitoring program occurred on January 8 at 08:10 and the last was collected on December 16 at 11:13. Individual collection dates and times for both the monthly grab program and diel program are reported below

Monthly Grab Samples
wkbwb
1/8/2008 08:10
2/20/2008 07:46
3/17/2008 05:04
4/21/2008 21:00
5/4/2008 19:52
6/23/2008 21:45
7/14/2008 18:23
8/22/2008 11:30
9/9/2008 16:00
10/20/2008 13:15
11/17/2008 10:40
12/15/2008 08:30

wkbmb
1/8/2008 08:22
2/20/2008 07:51
3/17/2008 05:16
4/21/2008 21:15
5/4/2008 20:00
6/23/2008 21:55
7/14/2008 18:37
8/22/2008 11:45
9/9/2008 16:15
10/20/2008 13:30
11/17/2008 10:55
12/15/2008 08:45

wkbmr
1/8/2008 08:31
2/20/2008 07:57
3/17/2008 05:31
4/21/2008 21:30
5/4/2008 20:06
6/23/2008 22:10
7/14/2008 18:42
8/22/2008 12:00
9/9/2008 16:30
10/20/2008 13:45

11/17/2008 11:15
12/15/2008 09:00

wkbfr
1/8/2008 08:55
2/20/2008 08:05
3/17/2008 05:50
4/21/2008 21:45
5/4/2008 20:19
6/23/2008 22:25
7/14/2008 19:17
8/22/2008 12:15
9/9/2008 16:45
10/20/2008 14:00
11/17/2008 11:30
12/15/2008 09:15

Diel Samples

01/07/2008 08:34	01/08/2008 09:08
02/19/2008 07:45	02/20/2008 08:08
03/16/2008 05:19	03/17/2008 05:53
04/20/2008 22:09	04/21/2008 22:15
05/03/2008 19:44	05/04/2008 20:40
06/23/2008 00:14	06/24/2008 00:04
07/13/2008 18:30	07/14/2008 19:15
08/22/2008 13:00	08/23/2008 14:52
09/08/2008 16:45	09/09/2008 19:20
10/20/2008 14:16	10/21/2008 15:02
11/17/2008 11:37	11/18/2008 13:39
12/15/2008 10:11	12/16/2008 11:13

7) Associated researchers and projects

As part of the SWMP long-term monitoring program, WKB NERR also monitors Meteorological and Water Quality data which may be correlated with this Nutrient dataset. These data are available from the Research Coordinator or online at http://cdmo.baruch.sc.edu/.

Additional information regarding associated researchers and projects may be obtained by contacting Dr. Scott Phipps.

8) Distribution

NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from this NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and

Atmospheric Administration. The data set enclosed within this package/transmission is only as good as the quality assurance and quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR water quality / nutrient data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see Section 1. Principal investigators and contact persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general information link on the CDMO home page) and online at the CDMO home page http://cdmo.baruch.sc.edu. Data are available in text tab-delimited format.

II. Physical Structure Descriptors:

9) Entry verification

Samples were collected and analysis performed in accordance with Weeks Bay National Estuarine Research Reserve's Standard Operating Procedures for Water Chemistry. Analysis data was recorded in both a laboratory log book and electronically in spreadsheet form. This data was then transferred in general formatting into the comprehensive Excel form employed by the NERR system for yearly reporting purposes. Data was checked twice for transfer accuracy. Christine Walters was responsible for these tasks.

Nutrient data are entered into a Microsoft Excel worksheet and processed using the NutrientQAQC Excel macro. The NutrientQAQC macro sets up the data worksheet, metadata worksheets, and MDL worksheet; adds chosen parameters and facilitates data entry; allows the user to set the number of significant figures to be reported for each parameter and rounds using banker's rounding rules; allows the user to input MDL values and then automatically flags/codes measured values below MDL and inserts the MDL ; calculates parameters chosen by the user and automatically flags/codes for component values below MDL, negative calculated values, and missing data; allows the user to apply QAQC flags and codes to the data; produces summary statistics; graphs selected parameters for review; and exports the resulting data file to the CDMO for tertiary QAQC and assimilation into the CDMO's authoritative online database. Christine Walters was responsible for these tasks.

10) Parameter titles and variable names by data category. Required NOAA/NERRS System-wide Monitoring Program nutrient parameters are denoted by an asterisks "*".

Laboratory parameters

Data Category	Parameter	Variable	Unit

Phosphorous	Total Dissolved Phosphorous	TDP	mg/L as P
	Orthophosphate, filtered	PO4F*	mg/L as P
	Dissolved Organic Phosphate	DOP	mg/L as P
Nitrogen	Nitrite + Nitrate, filtered	NO23F*	mg/L as N
	Nitrite, filtered	NO2F*	mg/L as N
	Nitrate, filtered	NO3F*	mg/L as N
	Ammonium, filtered	NH4F*	mg/L as N
	Dissolved Inorganic Nitrogen	DIN	mg/L as N
Plant pigments	Chlorophyll a	CHLA N*	ug/L

Notes:
1. Time is coded based on a 2400 clock and is referenced to Local Standard Time.
2. Reserves have the option of measuring either NO2 and NO3 or they may substitute NO23 for individual analyses if they can show that NO2 is a minor component relative to NO3.

11) Measured and Calculated Laboratory Parameters

a) Parameters measured directly

Nitrogen species: NO23F, NO2F, NH4F
Phosphorus species: PO4F, TDP
Other: CHLA N

b) Calculated parameters

Nitrogen species:
NO3F = NO23F – NO2F
DIN = NO23F + NH4F
Phosphorus species:
DOP = TDP – PO4F

12) Limits of detection

Method Detection Limit (MDL), the lowest concentration of a parameter that an analytical procedure can reliably detect, has been established by the Weeks Bay laboratory technicians for each parameter. The MDL is determined as 3 times the standard deviation of a minimum of 7 replicates of a single low concentration sample.

Parameter	Start Date	End Date	MDL
CHLA_N	1/1/2008	12/31/2008	.01
NH4F	1/1/2008	12/31/2008	.005
NO23F	1/1/2008	12/31/2008	.005
NO2F	1/1/2008	12/31/2008	.005
PO4F	1/1/2008	12/31/2008	.005
TDP	1/1/2008	12/31/2008	.005

13) Laboratory Methods

a) Parameter: Chlorophyll *a*

Method References:
Weeks Bay National Estuarine Research Reserve - SOP
Standard Methods for the Examination of Water and Wastewater, 20th edition. p 10-18. 10200 H. Chlorophyll - Fluorometric Determination of Chlorophyll.
EPA Method 445.0 *In Vitro* Determination of Chlorophyll *a* by Fluorescence revision 1.2 pp. 22.

Method Descriptor:
Instrumentation: Fluorometer (Turner Designs Trilogy)
The method used requires filtering a known quantity of water through a glass fiber filter (4.7 cm GF/F). This filter is stored dry in a freezer at -20°C until extraction. In preparation for extraction, the filter is placed in a 15 mL centrifuge tube with 10mLs of DMSO/aqueous acetone solution. The tube is then placed in a dark freezer for a minimum of 1 hour for extraction. After extraction is complete, the tube is removed from the freezer and stored in a dark room for 30 minutes to allow for temperature equilibration. Three milliliters of the sample is then removed from the tube and placed in a 1.0 cm glass (or methacrylate) fluorometer cell. Fluorescence is read at excitation = 485 nm and emission = 685 nm (note: emission filter must be accurate to within 10 nm). Chlorophyll *a* concentration of the sample is determined by comparison with a standard curve of known chlorophyll *a* concentrations. The Turner Designs Trilogy performs this determination automatically against a standard curve with known concentrations that has been programmed into its memory.

Preservation Method:
A known quantity of water is filtered through a glass fiber filter (4.7 cm GF/F). This filter is stored dry in a freezer at -20°C until extraction.

c) Parameter: Ammonia

Method References:
Weeks Bay National Estuarine Research Reserve - SOP
Standard Methods for the Examination of Water and Wastewater, 20th edition. p 4-108. 4500-NH_3 F. Phenate Method.

Method Descriptor:
Instrumentation: Spectrophotometer (Spectronic Genesys 5).
An intensely blue compound, indophenol, is formed by the reaction of ammonia, hypochlorite, and phenol catalyzed by sodium nitroprusside. The indophenol blue is proportional to the ammonia concentration. The color develops at room temperature (22 to 27ºC) in subdued light after 1 hour and is stable for 24 hours. Absorbance is measured with a spectrophotometer at 640 nm.

Preservation Method:
Sample is filtered as soon as possible after collection. Ammonia analysis is begun as soon after filtering as possible. If necessary, samples can be held in a refrigerator at 4°C for a short period of time until analysis.

d) Parameter: Nitrite

Method References:
Weeks Bay National Estuarine Research Reserve - SOP
Standard Methods for the Examination of Water and Wastewater, 20th edition. p 4-112. 4500-NO_2^- B. Colorimetric Method.

Method Descriptor:
Instrumentation: Spectrophotometer (Spectronic Genesys 5).
Nitrite is determined through formation of a reddish purple dye produced at pH 2.0 to 2.5 by coupling diazotized sulfanilamide with N-(1-naphthyl)-ethylenediamine dihydrochloride (NED dihydrochloride). The color system obeys Beer's law up to 180 μg N/L with a 1-cm light path at 543 nm.

Preservation Method:
Sample is filtered as soon as possible after collection. Nitrite analysis is begun as soon after filtering as possible. If necessary, samples can be held in a refrigerator at 4°C for a short period of time until analysis.

e) Parameter: Nitrite + Nitrate

Method References:
Weeks Bay National Estuarine Research Reserve - SOP
Standard Methods for the Examination of Water and Wastewater, 20th edition. p 4-117. 4500-NO_3^- E. Cadmium Reduction Method.

Method Descriptor:
Instrumentation: Spectrophotometer (Spectronic Genesys 5).
Nitrate is reduced almost quantitatively to nitrite in the presence of cadmium (Cd). This method uses commercially available Cd granules treated with copper sulfate and packed in a glass column. The nitrite produced thus is determined by diazotizing with sulfanilamide and coupling with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a highly colored azo dye that is measured colorimetrically.

Preservation Method:
Sample is filtered as soon as possible after collection. Analysis is begun as soon after filtering as possible. If necessary, samples can be held in a refrigerator at 4°C for a short period of time until analysis.

f) Parameter: Orthophosphate (Dissolved Reactive Phosphorus)

Method References:
Weeks Bay National Estuarine Research Reserve - SOP
Standard Methods for the Examination of Water and Wastewater, 20th edition. p 4-146. 4500-P E. Ascorbic Acid Method.

Method Descriptor:
Instrumentation: Spectrophotometer (Spectronic Genesys 5).
Ammonium molybdate and potassium antimonyl tartrate react in acid medium with orthophosphate to form a heteropoly acid – phosphomolybdic acid – that is reduced to intensely colored molybdenum blue by ascorbic acid. Measure absorbance of each sample at 880 nm.

Preservation Method:
Sample is filtered as soon as possible after collection. Analysis is begun as soon after filtering as possible. If necessary, samples can be held in a refrigerator at 4°C for a short period of time until analysis.

g) Parameter: Total Dissolved Phosphorus

Method References:
Weeks Bay National Estuarine Research Reserve - SOP
Standard Methods for the Examination of Water and Wastewater, 20th edition. p 4-142. 4500-P B. 5. Persulfate Digestion Method. Then method 4500-P E. Ascorbic Acid Method (see above).

Method Descriptor:
Instrumentation: Spectrophotometer (Spectronic Genesys 5).
Di, tri, poly and organic phosphates are oxidized to mono-phosphates using $K_2S_2O_8$ (potassium persulphate) and heat. Mono-phosphates are then determined using the Ascorbic Acid Method outlined above (see Dissolved Reactive Phosphate).

Preservation Method:
Sample is filtered as soon as possible after collection. Analysis is begun as soon after filtering as possible. If necessary, samples can be held in a refrigerator at 4°C for a short period of time until analysis.

14) Field and Laboratory QA/QC programs

a) Precisions:

i) Field Variability – True field replicates are taken at each site during grab sampling (N=3). The one replicate is a successive grab. Sample XXXXXX-G1 is taken and then sampler emptied. The grab sampler is deployed once again to acquire XXXXXX-G2 and then again to collect XXXXXX-G3.
ii) Laboratory variability – none

iii) Inter-organizational splits – Samples were not split or analyzed by two different labs.

b) Accuracy:

i) Sample spikes – information unavailable
ii) Standard reference material analysis – information unavailable
iii) Cross calibration exercises – WKB NERR did not participate in cross calibration exercises.

15) QAQC flag definitions

QAQC flags provide documentation of the data and are applied to individual data points by insertion into the parameter's associated flag column (header preceded by an F_). QAQC flags are applied to the nutrient data during secondary QAQC to indicate data that are out of sensor range low (-4), rejected due to QAQC checks (-3), missing (-2), optional and were not collected (-1), suspect (1), and that have been corrected (5). All remaining data are flagged as having passed initial QAQC checks (0) when the data are uploaded and assimilated into the CDMO ODIS as provisional plus data. The historical data flag (4) is used to indicate data that were submitted to the CDMO prior to the initiation of secondary QAQC flags and codes (and the use of the automated primary QAQC system for WQ and MET data). This flag is only present in historical data that are exported from the CDMO ODIS.

-4 Outside Low Sensor Range
-3 Data Rejected due to QAQC
-2 Missing Data
-1 Optional SWMP Supported Parameter
0 Data Passed Initial QAQC Checks
1 Suspect Data
4 Historical Data: Pre-Auto QAQC
5 Corrected Data

16) QAQC code definitions

QAQC codes are used in conjunction with QAQC flags to provide further documentation of the data and are also applied by insertion into the associated flag column. There are three (3) different code categories, general, sensor, and comment. General errors document general problems with the sample or sample collection, sensor errors document common sensor or parameter specific problems, and comment codes are used to further document conditions or a problem with the data. Only one general or sensor error and one comment code can be applied to a particular data point. However, a record flag column (F_Record) in the nutrient data allows multiple comment codes to be applied to the entire data record.

General errors
GCM Calculated value could not be determined due to missing data

GCR Calculated value could not be determined due to rejected data
GDM Data missing or sample never collected
GQD Data rejected due to QA/QC checks
GQS Data suspect due to QA/QC checks

Sensor errors
SBL Value below minimum limit of method detection
SCB Calculated value could not be determined due to a below MDL component
SCC Calculation with this component resulted in a negative value
SNV Calculated value is negative
SRD Replicate values differ substantially
SUL Value above upper limit of method detection

Parameter Comments
CAB Algal bloom
CDR Sample diluted and rerun
CHB Sample held beyond specified holding time
CIP Ice present in sample vicinity
CIF Flotsam present in sample vicinity
CLE Sample collected later/earlier than scheduled
CRE Significant rain event
CSM See metadata
CUS Lab analysis from unpreserved sample

Record comments
CAB Algal bloom
CHB Sample held beyond specified holding time
CIP Ice present in sample vicinity
CIF Flotsam present in sample vicinity
CLE Sample collected later/earlier than scheduled
CRE Significant rain event
CSM See metadata
CUS Lab analysis from unpreserved sample

Cloud cover
CCL clear (0-10%)
CSP scattered to partly cloudy (10-50%)
CPB partly to broken (50-90%)
COC overcast (>90%)
CFY foggy
CHY hazy

CCC	cloud (no percentage)

Precipitation

PNP	none
PDR	drizzle
PLR	light rain
PHR	heavy rain
PSQ	squally
PFQ	frozen precipitation (sleet/snow/freezing rain)
PSR	mixed rain and snow

Tide stage

TSE	ebb tide
TSF	flood tide
TSH	high tide
TSL	low tide

Wave height

WH0	0 to <0.1 meters
WH1	0.1 to 0.3 meters
WH2	0.3 to 0.6 meters
WH3	0.6 to > 1.0 meters
WH4	1.0 to 1.3 meters
WH5	1.3 or greater meters

Wind direction

N	from the north
NNE	from the north northeast
NE	from the northeast
ENE	from the east northeast
E	from the east
ESE	from the east southeast
SE	from the southeast
SSE	from the south southeast
S	from the south
SSW	from the south southwest
SW	from the southwest
WSW	from the west southwest
W	from the west
WNW	from the west northwest
NW	from the northwest
NNW	from the north northwest

Wind speed

WS0	0 to 1 knot
WS1	> 1 to 10 knots

WS2	> 10 to 20 knots
WS3	> 20 to 30 knots
WS4	> 30 to 40 knots
WS5	> 40 knots

17) Other remarks/notes

Data may be missing due to problems with sample collection or processing. Laboratories in the NERRS System submit data that are censored at a lower detection rate limit, called the Method Detection Limit or MDL. MDLs for specific parameters are listed in the Laboratory Methods and Detection Limits Section (Section II, Part 12) of this document. Concentrations that are less than this limit are censored with the use of a QAQC flag and code, and the reported value is the method detection limit itself rather than a measured value. For example, if the measured concentration of NO23F was 0.0005 mg/l as N (MDL=0.0008), the reported value would be 0.0008 and would be flagged as out of sensor range low (-4) and coded SBL. In addition, if any of the components used to calculate a variable are below the MDL, the calculated variable is removed and flagged/coded -4 SCB. If a calculated value is negative, it is rejected and all measured components are marked suspect. If additional information on MDL's or missing, suspect, or rejected data is needed, contact the Research Coordinator at the Reserve submitting the data.

Note: The way below MDL values are handled in the NERRS SWMP dataset was changed in November of 2011. Previously, below MDL data from 2007-2010 were also flagged/coded, but either reported as the measured value or a blank cell. Any 2007-2011 nutrient/pigment data downloaded from the CDMO prior to November of 2011 will reflect this difference.