**Weeks Bay (WKB) NERR Nutrient Metadata**

January - December 2019

Last Updated: July 10, 2024

**I. Data Set and Research Descriptors**

**1) Principal Investigator(s) and Contact Persons:**

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**2) Research objectives:**

a) Monthly grab sampling program

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 through 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 samples were collected under 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 at the Fish River site. (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 Centralized Data Management Office website (www.nerrsdata.org). All samples were collected in opaque, 500 ml, 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 nutrient and chlorophyll *a* analysis. (See 8b)

**b) Diel sampling program**

At the FR site, twelve samples are collected each month using an ISCO 3700 portable auto sampler. Sampler was programmed to make one 250 ml collection approximately every 135 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 1000 ml semi-transparent ISCO bottles within the body of the sampler. Sample bottles are acid washed and rinsed with distilled water prior to sampler deployment. The sampler was programmed to flush the 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 Chl *a* analysis.

**4) Site location and character**

Weeks Bay (30° 23' N, 87° 50' W) is a small, shallow, micro-tidal 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 four 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 psu 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.

**All Weeks Bay NERR historical nutrient/pigment monitoring stations:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Station Code | SWMP Status | Station Name | Location | Active Dates | Reason Decommissioned | Notes |
| wkbfrnut | P | Fish River | 30° 24' 58.32 N, 87° 49' 22.08 W | 02/01/2002 - current | NA | NA |
| wkmbnut | P | Middle Bay | 30° 23' 45.96 N, 87° 50' 0.60 W | 02/01/2002 - current | NA | NA |
| wkbmrnut | P | Magnolia River | 30° 23' 24.00 N, 87° 49' 3.72 W | 02/01/2002 current | NA | NA |
| wkbwbnut | P | Weeks Bay | 30° 22' 50.88 N, 87° 49' 55.20 W | 02/01/2002 - current | NA | NA |
| wkbwsnut | P | Weather Station | 30° 24' 53.32 N, 87° 49' 33.60 W | 11/19/2002 - 12/28/2004 | Dock destroyed in Hurricane Ivan | ISCO deployment near FR site (FR was originally located on a private dock and not suitable for ISCO deployment). Location of original weather station. |

**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 2 m. Sediment type is sandy-silt, and there are small 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 highly variable. 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 at this site are variable and typically much lower than at the Fish River site.

**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 1.5 m. Bottom sediments are a soft silty-clay with no sub-aquatic vegetation present.

**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 1.1 m. Bottom sediments are silty-clay. 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.

Additional abiotic water quality data (temperature, specific conductivity, salinity, dissolved oxygen, depth, pH and turbidity) are available at <http://cdmo.baruch.sc.edu/get/export.cfm>.

**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 2019 SWMP nutrient monitoring program occurred on January 14th at 08:00 and the last was collected on November 27th at 09:15. Individual collection dates and times for both the monthly grab program and diel program are reported below

Monthly grab samples

wkbwbnut

1/14/2019 08:00 – 08:02

2/7/2019 09:30 – 09:32

3/20/2019 08:00 – 08:02

4/17/2019 06:00 – 06:02

5/29/2019 10:15 – 10:17

6/27/2019 18:45 – 18:47

7/25/2019 16:00 – 16:02

8/22/2019 11:00 – 11:02

9/20/2019 Samples not collected

10/22/2019 14:30 – 14:32

11/27/2019 08:45 – 08:47

12/27/2019 Samples not collected

wkbmbnut

1/14/2019 08:15 – 08:17

2/7/2019 09:45 – 09:47

3/20/2019 08:15 – 08:17

4/17/2019 06:15 – 06:17

5/29/2019 10:30 – 10:32

6/27/2019 19:00 – 19:02

7/25/2019 16:15 – 16:17

8/22/2019 11:15 – 11:17

09/20/2019 Samples not collected

10/22/2019 14:45 – 14:47

11/27/2019 09:00 – 09:02

12/27/2019 Samples not collected

wkbmrnut
1/14/2019 08:30 – 08:32

2/7/2019 10:00 – 10:02

3/20/2019 8:30 – 08:32

4/17/2019 6:30 – 06:32

5/29/2019 10:45 – 10:47

6/27/2019 19:15 – 19:17

7/25/2019 16:30 – 16:32

8/22/2019 11:30 – 11:32

9/20/2019 Samples not collected

10/22/2019 15:00 – 15:02

11/27/2019 09:15 – 09:17

12/27/2019 Samples not collected

wkbfrnut

1/14/2019 08:45 – 08:47

2/7/2019 10:15 – 10:17

3/20/2019 08:45 – 08:47

4/17/2019 06:45 – 06:47

5/29/2019 11:00 – 11:03

6/27/2019 19:30 – 19:32

7/24/2019 23:00 – 23:02

8/22/2019 11:45 – 11:47

9/20/2019 Samples not collected

10/22/2019 15:15 – 15:17

11/27/2019 09:30 – 09:32

12/27/2019 Samples not collected

Monthly diel sampling

wkbfrnut

1/13/2019 10:00 - 1/14/2019 08:55

2/6/2019 09:30 - 2/7/2019 09:20

3/19/2019 08:45 - 3/20/2019 09:30

4/16/2019 07:30 - 4/17/2019 06:25

5/28/2019 12:15 - 5/29/2019 11:10

6/28/2019 00:55 - 6/28/2019 23:50

7/24/2019 18:45 - 7/25/2019 16:45

8/21/2019 13:00 - 8/22/2019 11:55

9/19/2019 – 9/20/2019 Samples not collected

10/21/2019 17:15 - 10/22/2019 18:00

11/26/2019 08:30 - 11/27/2019 09:15

12/26/2019 – 12/27/2019 Samples not collected

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

**8) Distribution**

NOAA retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data.  The NERRS retains the right to be fully credited for having collected and processed the data.  Following academic courtesy standards, the NERR site where the data were collected should be contacted and fully acknowledged in any subsequent publications in which any part of the data are used.  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.

Requested citation format:

NOAA National Estuarine Research Reserve System (NERRS). System-wide Monitoring Program. Data accessed from the NOAA NERRS Centralized Data Management Office website: [www.nerrsdata.org](http://www.nerrsdata.org); *accessed* 12 October 2020.

NERR nutrient data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see 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 [www.nerrsdata.org](http://cfcdmo.baruch.sc.edu/). Data are available in comma separated version 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.

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.

Eric Brunden was responsible for these tasks.

**10) Parameter titles and variable names by category**

Required NOAA/NERRS System-wide Monitoring Program nutrient parameters are denoted by an asterisks “\*”.

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 µg/L

 Other lab parameters

Total Suspended Solids TSS mg/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 or calculated laboratory parameters**

1. Parameters measured directly

Nitrogen species: NO23F, NO2F, NH4F

Phosphorus species: PO4F, TDP

Other: TSS, CHLA N (See Section 13 Lab Methods)

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. MDL’s can vary slightly from year to year.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Start Date | End Date | MDL | Date Last Revised |
| CHLA\_N | 1/1/2019 | 12/31/2019 | 0.01 | 01/2/2019 |
| NH4F | 1/1/2019 | 12/31/2019 | 0.005 | 01/2/2019 |
| NO23F | 1/1/2019 | 12/31/2019 | 0.002 | 01/2/2019 |
| NO2F | 1/1/2019 | 12/31/2019 | 0.002 | 01/2/2019 |
| PO4F | 1/1/2019 | 12/31/2019 | 0.003 | 01/2/2019 |
| TDP | 1/1/2019 | 12/31/2019 | 0.005 | 01/2/2015 |
| TSS | 1/1/2019 | 12/31/2019 | 0.1 | 01/2/2019 |

**13) Laboratory methods**

#  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 10 ml 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.

**b) 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-NH3 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 4oC for a short period of time until analysis.

**c) 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-NO2- 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 g 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 4oC for a short period of time until analysis.

1. **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-NO3- 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 4oC for a short period of time until analysis.

1. **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 4oC 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 K2S2O8 (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 4oC for a short period of time until analysis.

**h) Parameter: Total Suspended Solids**

Method References:

Weeks Bay National Estuarine Research Reserve - SOP

Standard Methods for the Examination of Water and Wastewater, 20th edition. Suspended Solids Analysis pp. 2/57 - 2/59

Method Descriptor:

Instrumentation: Mettler Toledo AG285 Analytical Balance. Mg total fixed solids = [(A - B) X 1000]/C where: A = weight of filter + residue after ignition, mg, B = weight of filter, mg, C = sample volume, ml. Measurements repeatable to 0.1 mg/L

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 undisturbed in drying oven for extended period of time.

**14) Field and Laboratory QA/QC programs**

* 1. Precisions:
1. Field Variability – True field replicates are taken at each site during grab sampling (N=3). Each replicate is a successive grab. Sample XXXXX-G1 is taken and then sampler emptied. The grab sampler is deployed once again to acquire XXXXX-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.

* 1. Accuracy:
1. Sample spikes – information unavailable
2. Standard reference material analysis – information unavailable
3. Cross calibration exercises within reserve system – information unavailable

**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

 GSM See metadata

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.

It is possible for interested researchers to correlate meteorological and abiotic water quality parameters with diel and grab sampling times by referencing the 2019 Weeks Bay NERR meteorological and water quality data available via the Central Data Management Office or contacting the Weeks Bay NERR Research Coordinator.

**CSM Comment Codes:**

Chl *a* and TSS samples for April were rejected due to improper sample preparation and measurement during training of an intern.

**Sample and processing dates** **for 2019**: Nutrient samples are generally held at 4°C, chlorophyll samples (filters) are held at -20ºC, and TSS samples are held in the drying oven. NERRS SOP allows up to 5 days for samples to be collected, processed, and shipped. In addition, nutrient samples can be held for 24 hours at 4ºC (28 days at -20ºC), chlorophyll filters 30 days at -20ºC, TN/TDN and TP/TDP for up to 6 months at any temp, and TSS for up to 6 months at -20ºC or -80ºC prior to analysis. Samples held beyond that time period are flagged suspect and coded CHB. **Dates in bold indicate samples that were frozen after filtering and thawed one day prior to first reported analysis date**

The MB 10/22 grab replicates should be considered suspect given there substantial difference. Replicates 2 and 3 were flagged/coded <1> [SRD]. Replicate 1 was already flagged/coded as below detection limit so a CSM code was added.

|  |  |
| --- | --- |
| **Date Collected** | **Date Analyzed** |
| ALL | PO4F | TDP | NH4F | NO2F | NO23F | CHLA\_N | TSS |
|   | Grab Samples |
| 1/14/2019 | 1/16/2019 | 1/15/2019 | 1/15/2019 | 1/16/2019 | 1/16/2019 | 1/17/2019 | 1/17/2019 |
| 2/7/2019 | **2/12/2019** | **2/11/2019** | **2/11/2019** | **2/12/2019** | **2/11/2019** | **2/13/2019** | **2/13/2019** |
| 3/20/2019 | **4/2/2019** | **4/3/2019** | **4/3/2019** | **4/2/2019** | **4/1/2019** | **4/4/2019** | **4/4/2019** |
| 4/17/2019 | 4/19/2019 | 4/22/2019 | 4/19/2019 | 4/19/2019 | 4/22/2019 | 4/23/2019 | 4/23/2019 |
| 5/29/2019 | 5/31/2019 | 5/30/2019 | 5/29/2019 | No analysis | 5/30/2019 | 6/3/2019 | No analysis |
| 6/27/2019 | **7/3/2019** | **7/3/2019** | **7/2/2019** | **7/2/2019** | **7/2/2019** | **7/8/2019** | **7/8/2019** |
| 7/25/2019 | **7/29/2019** | **7/30/2019** | **7/30/2019** | **7/29/2019** | **7/30/2019** | **8/2/2019** | **8/2/2019** |
| 8/22/2019 | **9/3/2019** | **9/4/2019** | **9/4/2019** | No analysis | **9/4/2019** | **9/5/2019** | **9/5/2019** |
| Samples not collected | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** |
| 10/22/2019 | **10/28/2019** | **10/29/2019** | **10/29/2019** | **10/28/2019** | **10/29/2019** | **10/30/2019** | **10/30/2019** |
| 11/27/2019 | **12/3/2019** | **12/3/2019** | **12/3/2019** | **12/4/2019** | **12/4/2019** | **12/5/2019** | **12/5/2019** |
| Samples not collected | **XXXXXXXXX** | **XXXXXXXXX** |  **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** |
| First sample date and time | Diel Sample |
|   |   |   |   |   |   |   |   |
| 1/13/2019 | 1/16/2019 | 1/15/2019 | 1/15/2019 | 1/16/2019 | 1/16/2019 | 1/17/2019 | 1/17/2019 |
| 2/6/2019 | **2/12/2019** | **2/11/2019** | **2/11/2019** | **2/12/2019** | **2/11/2019** | **2/13/2019** | **2/13/2019** |
| 3/19/2019 | **4/2/2019** | **4/3/2019** | **4/3/2019** | **4/2/2019** | **4/1/2019** | **4/4/2019** | **4/4/2019** |
| 4/16/2019 | 4/19/2019 | 4/22/2019 | 4/19/2019 | 4/19/2019 | 4/22/2019 | 4/23/2019 | 4/23/2019 |
| 5/28/2019 | 5/31/2019 | 5/30/2019 | 5/29/2019 | No analysis | 5/30/2019 | 6/3/2019 | No analysis |
| 6/28/2019 | **7/3/2019** | **7/3/2019** | **7/2/2019** | **7/2/2019** | **7/2/2019** | **7/5/2019** | **7/5/2019** |
| 7/24/2019 | **7/29/2019** | **7/30/2019** | **7/30/2019** | **7/29/2019** | **7/30/2019** | **8/2/2019** | **8/2/2019** |
| 8/21/2019 | **9/3/2019** | **9/4/2019** | **9/4/2019** | No analysis | **9/4/2019** | **9/5/2019** | **9/5/2019** |
| Samples not collected |  **XXXXXXXXX** |  **XXXXXXXXX** |  **XXXXXXXXX** |  **XXXXXXXXX** |  **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** |
| 10/22/2019 | **10/28/2019** | **10/29/2019** | **10/29/2019** | **10/28/2019** | **10/29/2019** | **10/30/2019** | **10/30/2019** |
| 11/26/2019 | **12/3/2019** | **12/3/2019** | **12/3/2019** | **12/4/2019** | **12/4/2019** | **12/5/2019** | **12/5/2019** |
| Samples not collected | **XXXXXXXXX** | **XXXXXXXXX** |  **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** | **XXXXXXXXX** |
|  |