Elkhorn Slough (ELK) NERR Nutrient Metadata
January - December 2009
Latest Update: October 15, 2012

I). Data Set and Research Descriptors

1) **Principal investigator(s) and contact persons** –

a) Reserve Contact

John Haskins
Elkhorn Slough NERR
1700 Elkhorn Rd
Watsonville, California 95076
Phone: 831-728-2822
E-mail: john@elkhornslough.org

b) **Laboratory Contact**

Same as above

c) **Other Contacts and Programs**

Sara Tanner
Moss Landing Marine Labs
8272 Moss Landing Rd.
Moss Landing, California 94939

2) **Research objectives** – Elkhorn Slough (ESNERR) is a unique estuary along the central Californian coast. There are fresh water inputs during the wet season (October through May) causing a brackish environment, while during the dry season (June through September) there is very little freshwater input resulting in a much more saline environment. The surrounding area is mostly farmlands, which causes concern, as they may be a source of significant amounts of nutrients entering the slough possibly causing eutrophication. With the base-monitoring program we are able to quantify the variability of these nutrients in different areas of the slough and possibly correlate any changes in land use with changes in nutrient concentrations.

a) **Monthly Grab**

Monthly grab samples are collected to quantify the spatial variability of important nutrients in the water column at sites representing the estuarine endpoints of the Elkhorn Slough estuary.

b) **Diel Sampling Program**

Once per month, samples are collected every hour through a 24-hour tidal cycle to quantify the temporal variability of important nutrients in the water column as a function of tidal forcing.

3) **Research methods**

a) **Monthly Grab Sampling Program**

Monthly grab samples were taken at four stations within the Elkhorn Slough estuary. Samples were taken at the four principle ESNERR data sonde stations (Azevedo Pond, North

Marsh, South Marsh and Vierra Mouth). All grab samples were taken on the same day between +3 hrs before slack low water and low water. At each station either replicate samples were taken (n = 2) or at one of the four stations, a triplicate samples was taken (n = 3) and then only a single sample was taken at one of the other four stations. Each month, we grabbed a total of n = 8 samples at the four stations collectively. If we arrived at a station after low tide, no sample was grabbed. No distinction was made between neap and spring tide conditions. Efforts were made to allow for an antecedent dry period of 72 hours prior to sampling. Replicate (N=2) samples were collected by hand at an approximate depth of 10 cm. At the time of sample collection, water temperature, salinity, and dissolved oxygen was measured with a YSI Model 650 meter. These are not included in this dataset, but are available directly through the Reserve. All samples were collected in amber, narrow-mouth, nalgene sample bottles that were previously acid washed (10%), rinsed (3x) with distilled-deionized water, dried, and followed by rinsing (3x) with ambient water prior to collection of the sample. Samples were immediately placed on ice in the dark and returned to the laboratory. Once in the laboratory, samples were shaken and processed for nutrient and Chl-a analysis.

b) **Diel Sampling Program**
Within the same 24-hour period of grab sample collection, we deploy an ISCO water sampler from the bank of the marsh at South Marsh. This device automatically samples 500 ml of water every 1 hrs 2min. All samples are pumped into polyethylene sample bottles that were previously acid washed (10% HCL), rinsed (3x) with distilled-deionized water and dried. Samples are kept cold with ice until the end of the 24 hr period; the 24 samples are kept in the dark and returned to the laboratory for immediate processing.

4) **Site location and character**
Elkhorn Slough is located on the West Coast of the United States in Central California. It connects with the Pacific Ocean in central Monterey Bay near Moss Landing, California. There are four sampling sites.

Azevedo Pond (AP) (36°50’44.64”N, 121°45’13.24”W) receives fertilizer and pesticide runoff from a strawberry field in year-round production. The sample station is located about 10m from a culvert connecting the pond to the slough. Tide ranges from 0 to 1.3 meters while salinity ranges from 8.8 during heavy runoff to 41 ppt during strong evaporation. Depth at mean low is approximately 1.5 meters. The YSI sonde associated with this site (collecting readings for the water quality dataset) is located approximately 30 cm off the bottom, which is composed of silty mud.

North Marsh (NM) (36°50’04.75”N, 121°44’18.33”W) is located in between South Marsh and Azevedo Pond. This site is impacted by both agricultural and urban runoff. The tidal range is approximately 0.4 meters while salinity ranges between 20 and 40 parts per thousand. There is freshwater runoff from upland and agricultural sites. Depth at mean low water is approximately 1 meter. The YSI sonde associated with this site (WQ dataset) is approximately 30 cm off the bottom, which is composed of silty mud.

South Marsh (SM) (36°49’05.00”N, 121°44’21.83”W), located about 3 km south of NM, is in a side channel of the slough and is relatively free from impact by anthropogenic influences as it is surrounded by mostly reserve land. The sample site is located on the side of a bank in one of the secondary slough channels. This site receives runoff mostly from uplands and some from cattle ranches, receiving the least amount of pollution. Tidal ranges from 0 to 3

meters while the salinity range is from 22 to 36 parts per thousand. Depth at mean low water is approximately 3 meters. The YSI sonde associated with this site (WQ dataset) is approximately 30 cm off the bottom, which is composed of compacted silty mud.

The fourth site Vierra Mouth (VM) (36°48'39.95"N, 121°46'45.22"W) is located at the mouth of the slough and is used to identify oceanic influence. The tidal range is from 0 to 3.2 meters while salinity ranges from 26 to 34 parts per thousand. Depth at mean low water is approximately 4 meters. The YSI sonde associated with this site (WQ dataset) is located approximately 30 cm off the bottom which is composed of compacted mud and sand due to strong tidal currents. This site receives drainage from the entire watershed due to its location at the mouth. There are several auto wreaking yards located approximately 2 km east of this site.

5) **Code variable definitions**

elkapnut = Elkhorn Slough Reserve Azevedo Pond Site nutrient data
elknmnut = Elkhorn Slough Reserve North Marsh Site nutrient data
elksmnut = Elkhorn Slough Reserve South Marsh Site nutrient data
elkvmnut = Elkhorn Slough Reserve Vierra Mouth Site nutrient data
Monthly grab sample program= 1
Diel grab sample program= 2

6) **Data Collection Period**

Sampling occurred between January 5, 10:23 and December 16, 16:02

Diel Sampling

Site	Start Date	Start Time	End Date	End Time
elksm	1/5/2009	22:23	1/6/2009	22:09
elksm	2/2/2009	20:38	2/3/2009	20:24
elksm	3/9/2009	02:34	3/10/2009	02:20
elksm	4/7/2009	02:34	4/8/2009	02:20
elksm	5/5/2009	10:39	5/6/2009	10:25
elksm	6/2/2009	00:41	6/3/2009	00:27
elksm	7/6/2009	21:00	7/7/2009	20:46
elksm	8/4/2009	03:43	8/5/2009	03:29
elksm	9/1/2009	02:32	9/2/2009	02:18
elksm	10/6/2009	04:37	10/7/2009	04:23
elksm	11/9/2009	22:23	11/10/2009	22:09
elksm	12/15/2009	02:23	12/16/2009	02:09

Grab Sampling

Site	Start Date	Start Time	End Date	End Time
Elkap	1/6/2009	12:00	01/6/2009	12:03
Elkap	2/3/2009	11:00	2/3/2009	11:03
Elkap	3/9/2009	14:10	3/9/2009	14:11
Elkap	4/7/2009	13:10	4/7/2009	13:11
Elkap	5/4/2009	12:00	5/4/2009	12:02
Elkap	6/2/2009	10:20	6/2/2009	10:21
Elkap	7/7/2009	14:25	7/7/2009	14:26
Elkap	8/4/2009	13:46	8/4/2009	13:47
Elkap	9/1/2009	12:38	9/1/2009	12:39
Elkap	10/5/2009	16:10	10/5/2009	16:12

Elkap	11/10/2009	10:07	11/10/2009	10:08
Elkap	12/15/2009	14:45	12/15/2009	14:46

Site	Start Date	Start Time	End Date	End Time
Elknm	1/6/2009	11:20	1/6/2009	11:20
Elknm	2/3/2009	10:15	2/3/2009	10:15
Elknm		MISSING		
Elknm	4/7/2009	12:25	4/7/2009	12:26
Elknm	5/4/2009	11:35	5/4/2009	11:35
Elknm	6/2/2009	9:40	6/2/2009	9:40
Elknm	7/7/2009	13:30	7/7/2009	13:31
Elknm	8/4/2009	13:05	8/4/2009	13:05
Elknm	9/1/2009	12:05	9/1/2009	12:06
Elknm	10/5/2009	15:30	10/5/2009	15:31
Elknm	11/10/2009	9:30	11/10/2009	9:31
Elknm	12/15/2009	13:55	12/15/2009	13:55

Site	Start Date	Start Time	End Date	End Time
Elksm	1/6/2009	10:20	1/6/2009	10:21
Elksm	2/3/2009	9:26	2/3/2009	9:27
Elksm	3/9/2009	11:50	3/9/2009	11:51
Elksm	4/7/2009	11:30	4/7/2009	11:32
Elksm	5/4/2009	10:45	5/4/2009	10:47
Elksm	6/2/2009	9:00	6/2/2009	9:02
Elksm	7/7/2009	12:40	7/7/2009	12:42
Elksm	8/4/2009	12:19	8/4/2009	12:20
Elksm	9/1/2009	11:30	9/1/2009	11:31
Elksm	10/5/2009	14:45	10/5/2009	14:46
Elksm	11/10/2009	9:20	11/10/2009	9:23
Elksm	12/15/2009	13:15	12/15/2009	13:16

Site	Start Date	Start Time	End Date	End Time
Elkvm	1/6/2009	12:45	1/6/2009	12:46
Elkvm	2/3/2009	11:55	2/3/2009	11:56
Elkvm		MISSING		
Elkvm	4/7/2009	14:25	4/7/2009	14:25
Elkvm	5/4/2009	14:30	5/4/2009	14:31
Elkvm	6/2/2009	11:15	6/2/2009	11:16
Elkvm		MISSING		
Elkvm	8/4/2009	14:29	8/4/2009	14:31
Elkvm	9/1/2009	13:30	9/1/2009	13:31
Elkvm	10/5/2009	17:30	10/5/2009	17:30
Elkvm	11/10/2009	10:50	11/10/2009	10:50
Elkvm	12/15/2009	16:00	12/15/2009	16:02

7) **Associated researchers and projects**

As part of the SWMP long-term monitoring program, ELK 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/.

Ken Johnson *et al.* are looking at nutrient budgets in the slough with real time nitrate loggers in the main channel of the slough. Adina Paytan, Scott Wankle *et al* are looking at nitrogen isotopes to assess the contributions of nitrogen through ground water. Nicholas Welshmier *et al* are looking at nutrients and phytoplankton populations in the main channel of the slough on a weekly basis. Marc Los Huertos *et al* are investigating nutrient budgets in the Elkhorn Slough watershed and identifying "hot spots" of nutrients in the slough while working with local farmers to attempt to decrease high nutrient loads. Gage Daton *et al* from Moss Landing Marine Laboratories are investigating the functionality of wetlands as nitrate source reduction.

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, Microsoft Excel spreadsheet format and comma-delimited format.

II. Physical Structure Descriptors

9) **Entry verification** –

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.

Monthly nutrient data is measured and entered into an excel file consisting of sampling station ID, date and time, and parameter values expressed in unit concentrations. John Haskins verify all parameter values in the excel file by cross comparison with laboratory data sheets and by graphing the data and identifying anomalous data points or other problems. Monthly excel files were compiled into a yearly excel file. Missing data are verified through inspection of field.

Moss Landing Marine Laboratories calculates and reports results in µM. For purposes of consistency in the NERR System, Elkhorn Slough NERR calculates the concentrations as mg/l-1 based on atomic weights of 14.01 and 30.97, for N, P respectively. Therefore, Elkhorn Slough NERR staff multiplies the concentrations reported by the University of Washington Marine Chemistry Laboratory by 0.01401 and 0.03097 to yield concentrations in mg/L as N and P respectively.

10) **Parameter Titles and Variable Names by Data Category**

Required NOAA/NERRS System-wide Monitoring Program water quality parameters are denoted by an asterisks "*".

Data Category	Parameter	Variable Name	Units of Measure
i) Phosphorus:	*Orthophosphate	PO4F	mg/L as P
ii) 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
iii) Plant pigments:			
	*Chlorophyll a, Fluorometric	CHLA_N	µg/L

Notes:
1. Time is coded based on a 2400 hour clock and is referenced to Pacific Standard Time (PST).
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) Variables Measured Directly

Nitrogen species: NO2F, NO23F, NH4F

Phosphorus species: PO4F
Other: CHLA

b) Computed Variables
NO3: NO23F-NO2F
DIN: NH4F + NO23F

12) **Limits of Detection** -
The Moss Landing Marine Lab (MLML) Nutrient Analytical Laboratory has established Method Detection Limits (MDL), the lowest concentration of a parameter that an analytical procedure can reliably detect. The MDL is determined as 3 times the standard deviation of a minimum of 7 replicates of a single low concentration sample. The following chart presents the current MDL's; these values are periodically reviewed and revised.

MDL TABLE

Parameter	Start Date	End Date	MDL
NH4F	1/1/2009	1/31/2009	0.0013
NH4F	2/1/2009	2/28/2009	0.0015
NH4F	3/1/2009	3/31/2009	0.0009
NH4F	4/1/2009	4/30/2009	0.0013
NH4F	5/1/2009	5/31/2009	0.0033
NH4F	6/1/2009	6/30/2009	0.0018
NH4F	7/1/2009	7/31/2009	0.0019
NH4F	8/1/2009	8/31/2009	0.0012
NH4F	9/1/2009	9/30/2009	0.003
NH4F	10/1/2009	10/31/2009	0.0023
NH4F	11/1/2009	11/30/2009	0.0019
NH4F	12/1/2009	12/31/2009	0.0032
PO4F	1/1/2009	1/31/2009	0.0014
PO4F	2/1/2009	2/28/2009	0.0021
PO4F	3/1/2009	3/31/2009	0.0022
PO4F	4/1/2009	4/30/2009	0.0018
PO4F	5/1/2009	5/31/2009	0.0022
PO4F	6/1/2009	6/30/2009	0.0012
PO4F	7/1/2009	7/31/2009	0.0014
PO4F	8/1/2009	8/31/2009	0.0018
PO4F	9/1/2009	9/30/2009	0.0023
PO4F	10/1/2009	10/31/2009	0.0091
PO4F	11/1/2009	11/30/2009	0.0031
PO4F	12/1/2009	12/31/2009	0.0014
NO23F	1/1/2009	1/31/2009	0.0023
NO23F	2/1/2009	2/28/2009	0.0021
NO23F	3/1/2009	3/31/2009	0.0021
NO23F	4/1/2009	4/30/2009	0.0027
NO23F	5/1/2009	5/31/2009	0.0013

NO23F	6/1/2009	6/30/2009	0.0018
NO23F	7/1/2009	7/31/2009	0.002
NO23F	8/1/2009	8/31/2009	0.0027
NO23F	9/1/2009	9/30/2009	0.0019
NO23F	10/1/2009	10/31/2009	0.0025
NO23F	11/1/2009	11/30/2009	0.002
NO23F	12/1/2009	12/31/2009	0.0034
NO2F	1/1/2009	1/31/2009	0.0002
NO2F	2/1/2009	2/28/2009	0.0002
NO2F	3/1/2009	3/31/2009	0.0002
NO2F	4/1/2009	4/30/2009	0.0002
NO2F	5/1/2009	5/31/2009	0.0002
NO2F	6/1/2009	6/30/2009	0.0002
NO2F	7/1/2009	7/31/2009	0.0002
NO2F	8/1/2009	8/31/2009	0.0003
NO2F	9/1/2009	9/30/2009	0.0002
NO2F	10/1/2009	10/31/2009	0.0002
NO2F	11/1/2009	11/30/2009	0.0001
NO2F	12/1/2009	12/31/2009	0.0003
CHLA	1/1/2009	1/31/2009	0.045
CHLA	2/1/2009	2/28/2009	0.045
CHLA	3/1/2009	3/31/2009	0.045
CHLA	4/1/2009	4/30/2009	0.045
CHLA	5/1/2009	5/31/2009	0.045
CHLA	6/1/2009	6/30/2009	0.045
CHLA	7/1/2009	7/31/2009	0.045
CHLA	8/1/2009	8/31/2009	0.045
CHLA	9/1/2009	9/30/2009	0.045
CHLA	10/1/2009	10/31/2009	0.045
CHLA	11/1/2009	11/30/2009	0.045
CHLA	12/1/2009	12/31/2009	0.045

13) **Laboratory Methods** –

a) **Parameter: NH4F**

i) Method Reference: Stricklin and Parsons Determination of Ammonia.

ii) Method Descriptor: Samples collected and stored on ice in amber bottles prior to being filtered with a 0.45 μm GFF filter and subsequently subjected to hypochlorite-phenol in the presence of NH3. Sodium nitroprusside is then used as a catalyst in the reaction. An oxidizing solution is then added (a mixture of sodium hypochlorite and alkaline reagent). The sample is then allowed to stand at a temperature between 20 and 27 C for at least 1 hour and then placed in a 10 cm cuvette and absorbance is measured at 640 nm.

iii) Preservation Method: Samples filtered and stored at 4 °C up to 24 hours.

b) **Parameter: NO23F, NO3F, and NO2F**

i) Method Reference: Stricklin and Parsons Determination of Nitrite.
ii) Method Descriptor: The water sample is first filtered then is passed through a cadmium column where the nitrate is reduced to nitrite. When only analyzing for nitrite the sample is not exposed to cadmium and thus the nitrite in the water is quantified. The nitrite is then exposed to sulfanilamide solution and allowed to react for 2 minutes then is exposed to N-(1-naphthyl)-ethylenediamine dihydrochloride solution and allowed to react for at least 10 minutes. The sample is then placed in a 1 cm cuvette where the absorbance is measured at 543 nm. Nitrate concentration equals the NO23F (nitrate + nitrite) concentration minus the nitrite concentration. Thus NO3 is calculated by subtracting NO23F - N02F.iii) Preservation Method: Sample is filtered through a 0.45 um filter and analyzed the same day.

c) **Parameter: PO4F**

i) Method Reference. Same as Nitrite with Alpkem analyzer.
ii) Method Descriptor: Ammonium molybdate is added to a water sample to produce phosphomolybdic acid, which is then reduced to phosphomolybdous acid (a blue compound) following the addition of dihydrazine (or hydrazine) sulfate. The sample is passed through a 50 mm flow cell and absorbance is measured at 820 nm.
iii) Preservation Method: Sample is filtered through a 0.45 um filter and analyzed the same day.

d) **Parameter: ChlA**

i) Method Reference. EPA method 445.0*UNESCO* (1994) Protocols for the joint global ocean flux study (JGOFS) core measurements. pp. 97-100.
ii) Method Descriptor: CHLA is extracted in 10 ml 90% acetone for 24 hrs and then fluorescence is measured and recorded (Fo).
iii) Preservation Method: A known volume of sample is filtered onto a 25 mm GF/F filter, folded in half and placed in a know volume of 90% acetone and then stored a -4ºC until analysis 24 hrs later.

14) Field and Laboratory QA/QC Programs –

a. Precision

i) **Field Variability** –ELKNERR collects two successive grab samples for the determination of water mass variability within each site.
ii) **Laboratory Variability** – In determining laboratory variability, replicates are split from a single diel sample. Laboratory replicates are done for ammonium, nitrite, nitrate and phosphate standards on a semi-regular basis. Variability was found to be within 12%.

Average percent difference

Nitrite	9.5%
Ammonia	8.2%
Nitrate	9.8%
Phosphate	5.2%

iii) **Inter-organizational splits** – None

b. Accuracy

iv) **Sample Spikes** – Sample spikes were split from a single diel sample. Sample spikes are done for nitrite and ammonium on a monthly basis. Average percent recovery was found to be 112% and 94% respectively.

v) **Standard Reference Material Analysis –** Standard reference materials are diluted from a single concentrated stock sample. Standard reference analysis is conducted for nitrite and ammonium on a semi-regular basis. Average percent difference was found to be 7% and 6% respectively.

vi) **Cross Calibration Exercises** – An inter-comparison study is conducted annually of a know concentration of nutrients in seawater as part of the NOAA National Estuarine Research Reserve System-Wide Monitoring Program. Our analyses of all the nutrients have been within one standard deviation of all nutrients analyzed among all labs in the program.

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.