Kachemak Bay (KAC) NERR Nutrient Metadata
January – December 2024
Latest Update: 05/02/2025

Note: This is a provisional metadata document; it has not been authenticated as of its download date. Contents of this document are subject to change throughout the QAQC process and it should not be considered a final record of data documentation until that process is complete. Contact the CDMO (cdmosupport@baruch.sc.edu) or reserve with any additional questions.

I. Data Set and Research Descriptors

1) Principal investigator(s) and contact persons –

Contact Persons:
Chris Guo, SWMP Coordinator, chguo@alaska.edu
Lauren Sutton, Research Coordinator, lsutton7@alaska.edu

Address:
Kachemak Bay Research Reserve
2181 Kachemak Dr.
Homer, AK 99603

Laboratory Contact:
Carol Pollard
VIMS Analytical Service Center
Rt 1208 Greate Road
Gloucester Point, VA 23062
Phone: 804-684-7213
e-mail: pollard@vims.edu

2) Research objectives –

The Kachemak Bay Research Reserve (KBRR) is a temperate region fjord with hydrographic conditions unique among the NERR system estuaries. The circulation in the bay is driven primarily by tidal forcing. Regional circulation is generally characterized by cyclonic ocean currents in the Gulf of Alaska flowing onto the shelf off Cook Inlet. Nutrient rich bottom water is upwelled and mixed with the surface water. These enriched waters stream into Kachemak Bay and the inflow tends to stay along the southern shore while water flowing out of the bay stays along the northern shore. These trapped coastal flows divide the bay into two distinct ecosystems. As the inflowing water proceeds up the bay, freshwater runoff from the surrounding ice fields and watersheds dilute the salinity and increase the sediment load. The in-flowing water, therefore, initially supports a marine system while the northern out-flowing water is more estuarine. The vertical profile is stratified all year with the stratification increasing in strength during the summer. We are monitoring to quantify the variability of the nutrient stratification of both the marine and estuarine ecosystems within Kachemak Bay.

a) Monthly Grab

Monthly grab samples are collected to quantify the vertical and horizontal spatial variability of important nutrients in the water column at sites representing the marine and estuarine endpoints of the local salinity gradient.

b) Diel Sampling Program

Once per month, samples are collected every two hours thirty minutes (11 samples total) through a 24-hour tidal cycle to quantify the temporal variability of important nutrients in the water column as a function of tidal forcing.

2) Research methods –

a) Monthly Grab Sampling Program

Monthly grab samples are collected at two depths (near-surface and near-bottom) at the Homer and Seldovia data sonde stations. Unless delayed by weather, all grab samples from both stations were taken within a 24-hour period. To clearly delineate the stratification, we attempt to sample near high tide. The Homer station is accessed year round by vehicle. Because the Seldovia station (24-kilometers from Homer) is not connected to the road system, access is via airplane or boat and is weather-dependent. At each station, two replicate (N=2) samples are collected using a triggered vertical Nisken bottle at a depth of one meter from the surface. Two replicates are also collected one meter from the bottom. All samples are transferred to wide-mouth Nalgene sample bottles that were previously acid washed (10% HCL), rinsed (3x) with distilled-deionized water, dried and followed by rinsing (3x) of ambient water prior to collection of the sample. Samples are immediately shielded from light and returned to the laboratory. Once in the laboratory, samples are shaken and processed for nutrient and chl-a analysis.

b) Diel Sampling Program

Within the same 24-hour period as our grab sample collection, we deploy an ISCO water sampler from a floating dock in the Homer Harbor. This device automatically samples 850 ml of water every 2 hrs 30 min. All samples are pumped into polyethylene sample bottles that were previously acid washed (10% HCL), rinsed (3x) with distilled-deionized water and dried. The 11 samples are kept in the dark and at the end of the 24-hr period are returned to the laboratory for immediate processing.

4) Site location and character –

Site name	Homer Surface and Deep
Latitude and longitude	59.6028ºN 151.4081ºW
Tidal range *(meters)*	7.5 to 16.8
Salinity range *(psu)*	20.5 to 32.0
Type and amount of freshwater input	Most of the freshwater during the summer comes from snow and ice melt on the glaciers. Starting in August, rainfall reduces salinity until November when the rain begins to shift to snow, and there is very little fresh water input into the bay.
Water depth (*meters, MLW*)	Surveyed 0.505
Sonde distance from bottom (*meters*)	1.0
Bottom habitat or type	Predominantly sand
Pollutants in area	Minimal
Description of watershed	Coastal marine

Site name	Seldovia Surface and Deep
Latitude and longitude	59.4413ºN 151.7186ºW
Tidal range *(meters)*	4.3 to 13.3
Salinity range *(psu)*	25.0 to 33.9
Type and amount of freshwater input	Most of the freshwater during the summer comes from snow and ice melt on the glaciers. Starting in August, rainfall reduces salinity until November when the rain begins to shift to snow, and there is very little fresh water input into the Bay.
Water depth (*meters, MLW*)	Surveyed 0.517
Sonde distance from bottom (*meters*)	1.0
Bottom habitat or type	Predominantly sand
Pollutants in area	Minimal
Description of watershed	Coastal marine

Site name	Homer Harbor
Latitude and longitude	59.60308ºN 151.41815ºW
Tidal range *(meters)*	4.0 to 13.3
Salinity range *(psu)*	20.5 to 32.0
Type and amount of freshwater input	Most of the freshwater during the summer comes from snow and ice melt on the glaciers. Starting in August, rainfall reduces salinity until November when the rain begins to shift to snow, and there is very little fresh water input into the Bay.
Water depth (*meters, MLW*)	0.505
Sonde distance from bottom (*meters*)	NA
Bottom habitat or type	Rocky
Pollutants in area	Minimal but possibility of hydrocarbon pollutants due to site location on a fuel dock
Description of watershed	Coastal marine

All KAC NERR historical nutrient/pigment monitoring stations:

Station Code	SWMP Status	Station Name	Location	Active Dates	Reason Decommissioned	Notes

kachdnut	P	Homer Deep	59° 36' 7.24 N, 151° 24' 31.61 W	02/01/2002 - current	NA	NA
kachhnut	P	Homer Harbor	59° 36' 12.31 N, 151° 25' 2.14 W	02/01/2002 - current	NA	NA
kachsnut	P	Homer Shallow	59° 36' 7.24 N, 151° 24' 31.61 W	02/01/2002 current	NA	NA
kacsdnut	P	Seldovia Deep	59° 26' 27.56 N, 151° 43' 15.46 W	02/01/2002 - current	NA	NA
kacssnut	P	Seldovia Shallow	59° 26' 27.56 N, 151° 43' 15.46 W	02/01/2002 - current	NA	NA
kachdnut	P	Homer Deep	59° 36' 7.24 N, 151° 24' 31.61 W	02/01/2002 - current	NA	NA

5) Coded variable definitions –

Station Code = reserve/deployment site/file definition/year
(ex: kacssnut2016 = Kachemak Bay/Seldovia Surface/Nutrients/2016).

Monitoring Programs: Grab Sampling (1), Diel Sampling (2)

Station code	Sampling station	Sampling site code	Monitoring Program
kachsnut	Homer Surface	HS	1
kachdnut	Homer Deep	HD	1
kachhnut	Homer Harbor	HH	2
kacssnut	Seldovia Surface	SS	1
kacsdnut	Seldovia Deep	SD	1

6) Data collection period –

The first water samples for the SWMP nutrient monitoring program were collected 01/03/2024 at 11:00 and the last were collected on 12/04/2024 at 14:35. It normally takes 20 minutes to collect the four grab samples— 2 "surface" and 2 "deep" taking 5-minutes per sample —at both the Homer and Seldovia sites. The surface replicates are always followed by the deep replicates. We report collection times for the first replicate of the surface grab sample, with the rest of the grabs occurring in subsequent 5-minute intervals. We report diel sample start and end times. All collection times are in Alaska Standard Time

Homer Surface and Deep

Station code	Time of first sample	Notes
kachsnut, kachdnut	01/03/2024 15:00	Sea ice
kachsnut, kachdnut	02/12/2024 15:35	
kachsnut, kachdnut	03/05/2024 14:30	
kachsnut, kachdnut	04/01/2024 11:40	
kachsnut, kachdnut	05/06/2024 10:40	
kachsnut, kachdnut	05/27/2024 11:05	
kachsnut, kachdnut	07/02/2024 13:10	

kachsnut, kachdnut	08/01/2024 13:50	
kachsnut, kachdnut	09/02/2024 11:25	
kachsnut, kachdnut	10/01/2024 09:40	
kachsnut, kachdnut	11/04/2024 11:50	
kachsnut, kachdnut	12/04/2024 14:20	

Seldovia Surface and Deep

Station code	Time of first sample	Notes
kacssnut, kacsdnut	01/05/2024 12:30	
kacssnut, kacsdnut	02/02/2024 12:15	
kacssnut, kacsdnut	03/06/2024 13:45	
kacssnut, kacsdnut	04/03/2024 12:45	
kacssnut, kacsdnut	05/03/2024 11:10	
kacssnut, kacsdnut	05/29/2024 10:20	
kacssnut, kacsdnut	07/02/2024 09:20	
kacssnut, kacsdnut	08/01/2024 10:40	
kacssnut, kacsdnut	09/04/2024 08:45	
kacssnut, kacsdnut	10/02/2024 09:20	
kacssnut, kacsdnut	11/01/2024 10:25	
kacssnut, kacsdnut	12/03/2024 11:15	

Homer Harbor

Station code	Diel Start	Diel End	Notes
kachhnut	01/03/2024 11:00	01/04/2024 12:00	Sea ice
kachhnut	02/06/2024 13:10	02/07/2024 14:10	Sea ice
kachhnut	03/05/2024 14:00	03/06/2024 15:00	Sea ice
kachhnut	04/01/2024 09:30	04/02/2024 10:30	
kachhnut	05/01/2024 09:00	05/02/2024 10:00	
kachhnut	05/27/2024 09:30	05/28/2024 10:30	
kachhnut	07/02/2024 12:10	07/03/2024 13:10	
kachhnut	08/01/2024 13:05	08/02/2024 14:05	
kachhnut	09/02/2024 10:40	09/03/2024 11:40	
kachhnut	10/01/2024 10:15	10/02/2024 11:15	
kachhnut	11/04/2024 12:20	11/05/2024 13:20	
kachhnut	12/02/2024 11:45	12/03/2024 12:45	

7) Associated researchers and projects–

As part of the SWMP long-term monitoring program, KAC NERR also monitors 15-minute meteorological and water quality data which may be correlated with this nutrient/pigment dataset. These data are available at www.nerrsdata.org.

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; *accessed* 12 October 2024.

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. Data are available in comma separated version 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.

10) Parameter titles and variable names by category –

Required NOAA NERRS System-wide Monitoring Program nutrient parameters are denoted by an asterisk "*".

Data Category	Parameter	Variable Name	Units of Measure
Phosphorus and Nitrogen:			
	*Orthophosphate	PO4F	mg/L as P
	*Ammonium, Filtered	NH4F	mg/L as N
	*Nitrite + Nitrate, Filtered	NO23F	mg/L as N
Plant Pigments:			
	*Chlorophyll a	CHLA_N	µg/L
Other Lab Parameters:			
	Silicate, Filtered	SiO4F	mg/L as SI

Notes:
1. Time is coded based on a 2400 clock and is referenced to 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 –

a) **Parameters measured directly**

Nitrogen species:	NH4F, NO23F
Phosphorus species:	PO4F
Other:	CHLA_N, SiO4F

12) Limits of detection –

Method Detection Limits (MDL), the lowest concentration of a parameter that an analytical procedure can reliably detect, have been established by the VIMS Nutrient Analytical Laboratory. The MDL is determined as 3 times the standard deviation of a minimum of 7 replicates of a single low concentration sample. These values are reviewed and revised periodically.

Parameter	Start Date	End Date	MDL	Revisited
NH4F	01/01/24	12/31/24	0.0062	01/31/25
NO23F	01/01/24	12/31/24	0.0055	01/31/25
PO4F	01/01/24	12/31/24	0.0029	01/31/25
SiO4F	01/01/24	12/31/24	0.0620	01/31/25
CHLA_N	01/01/24	12/31/24	0.0289	04/29/25

13) Laboratory methods –

a) **Parameter: NH4F**

VIMS Laboratory Method: *3000*
EPA or other Reference Method: *170.1*
Method Reference: *US.EPA 1983. USEPA-600/4-79-020. Method 170.1*
Method Descriptor: *Alkaline phenol and hypochlorite react with ammonia to form indophenol blue that is proportional to the ammonia concentration. The blue color formed is intensified with sodium nitroprusside. Reaction is heat catalyzed at 37o C.*
Preservation Method: *Samples filtered and stored at 4 °C up to 24 hours.*

b) **Parameter: NO23F**

VIMS Laboratory Method: *3001*
EPA or other Reference Method: *353.4*
Method Reference: *US.EPA 1983. USEPA-600/R-97/072. Method 353.4*
Method Descriptor: *Nitrate is reduced to nitrite by a copper/cadmium redactor column. The nitrite ion then reacts with sulfanilamide to form a diazo compound. This compound then couples with n-1-napthylenediamine dihydrochloride to form a reddish/purple azo dye. The color development chemistry is the same as that used in Nitrite. Nitrate concentration equals the (nitrate + nitrite) concentration minus the nitrite concentration.*
Preservation Method: *Samples filtered and stored frozen at –20 °C up to 14 days.*

c) **Parameter: PO4F**

VIMS Laboratory Method: *3003*
EPA or other Reference Method: *365.5*
Method Reference: *US.EPA 1983. USEPA-600/R-97/072. Method 365.5*
Method Descriptor: *Nitrate is reduced to nitrite by a copper/cadmium redactor column. The nitrite ion then reacts with sulfanilamide to form a diazo compound. This compound then couples with n-1-napthylenediamine dihydrochloride to form a reddish/purple azo dye. The color development chemistry is the same as that used in Nitrite. Nitrate concentration equals the (nitrate + nitrite) concentration minus the nitrite concentration.*
Preservation Method: *Samples filtered and stored frozen at –20 °C up to 14 days.*

d) **Parameter: SiO4F**

VIMS Laboratory Method: *3004*

EPA or other Reference Method: *366.0*
Method Reference: *US.EPA 1983. USEPA-600/R-97/072. Method 366.0*
Method Descriptor: *This automated procedure for the determination of soluble silicates is based on the reduction of a silicomolybdate in acidic solution to "molybedenum blue" by ascorbic acid. Oxalic acid is introduced to the sample stream before the addition of ascorbic acid to eliminate interference from phosphates.*
Preservation Method: *Samples filtered and stored frozen at –20 °C up to 14 days.*

e) **Parameter: CHLA_N**

KAC NERR Laboratory Method: *2024*
EPA or other Reference Method: *445.0*
Method Reference: *US.EPA 1997. USEPA-600/R-97-072. Method 445.0*
Method Descriptor: *Chlorophyll-containing phytoplankton in a measured volume of sample water are concentrated by filtration at low vacuum through a glass fiber filter. The pigments are extracted from the phytoplankton in 90% acetone with the aid of a mechanical tissue grinder and are allowed to steep 2-24 hours. The resulting slurry is centrifuged to clarify the solution, and the fluorescence of the supernatant liquid is measured before and after acidification. Sensitivity calibration factors, previously determined on solutions of pure chlorophyll a of known concentration are used to calculate the concentration of chlorophyll a and pheophytin a in the sample extract.*
Preservation Method: *For each sample, a known volume (200 mL) is filtered through a 25 mm-diameter 0.7 μm glass fiber filter and stored frozen at –20 °C up to 30 days.*

14) Field and Laboratory QAQC programs –

a) **Precision**
i) **Field variability** – There are two true replicates per grab sample, and one replicate per diel sample
ii) **Laboratory variability**
(1) NH4F, NO23F, PO4F, SiO4F – VIMS replicates 10% of samples
(2) CHLA – KAC calculates two laboratory replicates (10%) per collection batch
iii) **Inter-organizational splits** – n/a

b) **Accuracy**
i) **Sample spikes** –VIMS spike 10% of samples; recovery approximately 100% for all parameters
ii) **Standard reference material analysis –** VIMS runs a standard reference each batch run using VELAP certified standard methods 4500-NH3 H-2011, 4500-NO3 F-2011, 4500-P F-2011, and 4500-SIO2 F-2011
iii) **Cross calibration exercises** – n/a

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 NERR 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.

Sample hold times for 2024: Samples are held at -20°C. NERRS SOP allows nutrient samples to be held for up to 28 days (CHLA for 30) at -20°C, plus allows for up to 5 days for collecting, processing, and shipping samples. Samples held beyond that time period are flagged suspect <1>and coded (CHB). If measured values were below MDL, this resulted in <-4> [SBL] (CHB) flagging/coding.

	Date of analysis				
Sample Descriptor	**NH4F**	**NO23F**	**PO4F**	**SiO4F**	**CHLA_N**
01/03/2024, Homer grabs	01/11/2024	01/11/2024	01/11/2024	01/11/2024	01/09/2024
02/12/2024, Homer grabs	02/26/2024	02/26/2024	02/26/2024	02/26/2024	02/21/2024
03/05/2024, Homer grabs	03/20/2024	03/20/2024	03/20/2024	03/20/2024	03/08/2024
04/01/2024, Homer grabs	04/16/2024	04/16/2024	04/16/2024	04/16/2024	04/04/2024
05/06/2024, Homer grabs	05/31/2024	05/31/2024	05/31/2024	05/31/2024	05/07/2024
05/27/2024, Homer grabs	06/13/2024	06/13/2024	06/13/2024	06/13/2024	05/30/2024
07/02/2024, Homer grabs	07/23/2024	07/23/2024	07/23/2024	07/23/2024	07/04/2024
08/01/2024, Homer grabs	08/13/2024	08/13/2024	08/13/2024	08/13/2024	08/03/2024
09/02/2024, Homer grabs	09/10/2024	09/10/2024	09/10/2024	09/10/2024	09/06/2024
10/01/2024, Homer grabs	10/11/2024	10/11/2024	10/11/2024	10/11/2024	10/04/2024
11/04/2024, Homer grabs	11/15/2024	11/15/2024	11/15/2024	11/15/2024	11/06/2024
12/04/2024, Homer grabs	12/17/2024	12/17/2024	12/17/2024	12/17/2024	12/05/2024
01/03 - 01/04/2024, all diels	01/11/2024	01/11/2024	01/11/2024	01/11/2024	01/09/2024
02/06 - 02/07/2024, all diels	02/26/2024	02/26/2024	02/26/2024	02/26/2024	02/21/2024
03/05 - 03/06/2024, all diels	03/20/2024	03/20/2024	03/20/2024	03/20/2024	03/08/2024
04/01 - 04/02/2024, all diels	04/16/2024	04/16/2024	04/16/2024	04/16/2024	04/04/2024
05/01 - 05/02/2024, all diels	05/31/2024	05/31/2024	05/31/2024	05/31/2024	05/07/2024
05/27 - 05/28/2024, all diels	06/13/2024	06/13/2024	06/13/2024	06/13/2024	05/30/2024
07/02 - 07/03/2024, all diels	07/23/2024	07/23/2024	07/23/2024	07/23/2024	07/04/2024
08/01 - 08/02/2024, all diels	08/13/2024	08/13/2024	08/13/2024	08/13/2024	08/03/2024
09/02 - 09/03/2024, all diels	09/10/2024	09/10/2024	09/10/2024	09/10/2024	09/06/2024
10/01 - 10/02/2024, all diels	10/11/2024	10/11/2024	10/11/2024	10/11/2024	10/04/2024
11/04 - 11/04/2024, all diels	11/15/2024	11/15/2024	11/15/2024	11/15/2024	11/06/2024
12/02 - 12/03/2024, all diels	12/17/2024	12/17/2024	12/17/2024	12/17/2024	12/05/2024
01/05/2024, Seldovia grabs	01/11/2024	01/11/2024	01/11/2024	01/11/2024	01/09/2024
02/02/2024, Seldovia grabs	02/26/2024	02/26/2024	02/26/2024	02/26/2024	02/21/2024
03/06/2024, Seldovia grabs	03/20/2024	03/20/2024	03/20/2024	03/20/2024	03/08/2024
04/03/2024, Seldovia grabs	04/16/2024	04/16/2024	04/16/2024	04/16/2024	04/04/2024
05/03/2024, Seldovia grabs	05/31/2024	05/31/2024	05/31/2024	05/31/2024	05/07/2024
05/29/2024, Seldovia grabs	06/13/2024	06/13/2024	06/13/2024	06/13/2024	05/30/2024
07/02/2024, Seldovia grabs	07/23/2024	07/23/2024	07/23/2024	07/23/2024	07/04/2024
08/01/2024, Seldovia grabs	08/13/2024	08/13/2024	08/13/2024	08/13/2024	08/03/2024
09/04/2024, Seldovia grabs	09/10/2024	09/10/2024	09/10/2024	09/10/2024	09/06/2024
10/02/2024, Seldovia grabs	10/11/2024	10/11/2024	10/11/2024	10/11/2024	10/04/2024
11/01/2024, Seldovia grabs	11/15/2024	11/15/2024	11/15/2024	11/15/2024	11/06/2024
12/03/2024, Seldovia grabs	12/17/2024	12/17/2024	12/17/2024	12/17/2024	12/05/2024

* sample held longer than allowed by NERRS protocols