North Inlet – Winyah Bay (NIW) **NERR Water Quality Metadata**
January – December 2024
Latest Update: June 8, 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 –

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Baker Stevens, Research Specialist (2017 – March 2024)

2) Entry verification –

Deployment data are uploaded from the YSI data logger to a personal computer with Windows 7 or newer operating system. Files are exported from EcoWatch in a comma-delimited format (.CDF), EcoWatch Lite in a comma separated file (CSV) or KOR Software in a comma separated file (CSV) and uploaded to the CDMO where they undergo automated primary QAQC; automated Depth/Level corrections for changes in barometric pressure (cDepth or cLevel parameters); and become part of the CDMO's online provisional database. All pre- and post-deployment data are removed from the file prior to upload. During primary QAQC, data are flagged if they are missing or out of sensor range. The edited file is then returned to the reserve for secondary QAQC where it is opened in Microsoft Excel and processed using the CDMO's NERRQAQC Excel macro. The macro inserts station codes, creates metadata worksheets for flagged data and summary statistics, and graphs the data for review. It allows the user to apply QAQC flags and codes to the data, remove any overlapping deployment data, append files, and export the resulting data file for upload to the CDMO. Upload after secondary QAQC results in ingestion into the database as provisional plus data, recalculation of cDepth or cLevel parameters, and finally tertiary QAQC by the CDMO and assimilation into the CDMO's authoritative online database. Where deployment overlap occurs between files, the data produced by the newly calibrated sonde is generally accepted as being the most accurate. For more information on QAQC flags and codes, see Sections 11 and 12.

For January – March 2024, Research Specialist Baker Stevens was responsible for SWMP WQ data management at NIW. Following Stevens departure in March 2024, Robert Dunn was interim data manager and completed 2024 Q1 and Q2 data QA/QC protocols and submission. Research Specialist Dean Wrobel managed and completed QA/QC protocols and submission for data from Sept – October. Dunn completed 2024 WQ data QA/QC and management following Wrobel's departure from NIW.

3) Research objectives –

The principal objective of this study is to quantify short-term variability and long-term changes in the water quality of the North Inlet and Winyah Bay estuaries. Currently, there are five sites established as long-term monitoring sites, which collectively represent a range of locations and conditions within the two estuaries. The Oyster Landing site is located near the western edge of the North Inlet estuary, at the confluence of two first-order creeks that drain undeveloped forest and forested wetlands. As such, the site is considered 'pristine' and classified as containing 'Outstanding Resource Waters (OWR)' of by the state of South Carolina. The Clambank Landing site is located more centrally within the North Inlet basin and also classified as relatively pristine and also has an ORW designation by the state. The Debidue Creek site receives drainage from the one large residential and golf course development in North Inlet's watershed. As such, the site is considered anthropogenically impacted and lies within the region of North Inlet with restricted shellfish harvesting. The Winyah Bay sites are also considered anthropogenically impacted given the extent of development, agriculture and industry in Winyah Bay's extensive watershed. The Winyah Bay Surface and Bottom sites are located in the main central channel of the Bay and capture inputs entering the Bay from the five rivers that join to form Winyah Bay's mainstem. The Thousand Acre site is located at the mouth of a brackish marsh (and former rice impoundment) on the eastern edge of Winyah Bay that drains undeveloped forested wetlands, but receives degraded Winyah Bay water on flood tides and therefore also considered an impacted site.

4) Research methods –

Clambank Landing (CB) and Thousand Acre (TA)

YSI EXO2 sondes are mounted on a dock piling for Clambank Landing, and on a bridge piling for Thousand Acre. The sondes are deployed in a 4-inch diameter PVC pipe with a copper bottom which is strapped to a piling using 19 mm nylon banding. The PVC pipe is offset from the piling by inserting a 2x6 inch piece of PVC trim board coated with anti-fouling paint between the pipe and piling. This offset allows better flow over the sensors at the bottom of the pipe. The end of each pipe rests on the bottom of the creek and has a copper stop bolt through its center 30 cm from the bottom of the pipe, ensuring that the sonde is seated 30 cm from the bottom of the creek. For the copper tubes, four 2x12 inch flow holes are cut around the pipe directly above the stop bolt to allow for water flow over the sonde sensors. Two 2.5-inch holes are drilled perpendicular to each other at 1 foot intervals along the remaining length of the PVC pipe to allow for flushing.

Debidue Creek (DC), Oyster Landing (OL), Winyah Bay (WS, WB)

YSI EXO2 sondes are currently mounted on stand-alone pilings for Debidue Creek, Oyster Landing and Winyah Bay. At the Winyah Bay station, the infrastructure consists of four 12-inch butt pilings spaced approximately 6 feet apart with a platform in the center. Each sonde is deployed in a 4-inch diameter copper pipe (10-15 feet long) topped with a 4-inch PVC pipe (5 feet long) which is strapped to a piling using 19 mm nylon banding. The PVC pipe is offset from the piling by inserting a 2x6 inch piece of PVC trim board coated with anti-fouling paint between the pipe and piling. This offset allows better flow over the sensors at the bottom of the pipe. At Debidue Creek and Oyster Landing, the end of each pipe rests on the bottom of the creek and has a copper stop bolt through its center 30 cm from the bottom of the pipe, ensuring that the sonde is seated 30 cm from the bottom of the creek. At the Winyah Bay station, the pipes are affixed to two of the station's pilings at fixed depths of approximately 0.2 m below the surface at MLW (WS) and approximately 1 m above the sediment surface (WB). For the copper tubes, four 2x12 inch flow holes are cut around the pipe directly above the stop bolt to allow for water flow over the sonde sensors. Above these flow holes, a series of two 2x6 inch holes are located opposite each other and spaced equi-distant along the remaining length of the pipe to allow for tidal flushing. Copper pipes were deployed at Oyster Landing and Debidue Creek in 2015 and at Clambank Landing and Thousand Acre in 2019 to reduce the excessive biofouling that these sites are prone to, and were adopted for the new Winyah Bay station installed in 2016. We currently don't anticipate needing to switch these tubes due to the anti-fouling properties of the copper.

Every 15 minutes measurements of specific conductivity, salinity, percent saturation, dissolved oxygen, water temperature, pH, turbidity, and water level are recorded (with the addition of chlorophyll at Oyster Landing and Winyah Surface). The two-week sampling interval was selected due to biofouling of the individual probes and expected battery life. Prior to deployment, the sondes are calibrated according to the procedures in the YSI

Service Manual and the Standard Operating Procedures V4.1 provided by the NERR CDMO. Calibrations conducted prior to deployment of the instruments include a pH calibration using a two-point method with 7 and 10 unit standards. The turbidity calibration also uses a two-point method using 0 and 124 NTU standards. Specific Conductivity was calibrated using a one-point method with a 10 mS/cm standard that was purchased through YSI, Inc. Depth and dissolved oxygen are calibrated according to the barometric pressure at the time of calibration. Dissolved oxygen is calibrated using the air-saturated water method. The chlorophyll calibration is a four-point method using a 0 standard and a temperature dependent rhodamine dye solution, where both chlorophyll RFU and chlorophyll mg/L are calibrated. The central wiper is thoroughly cleaned of all contaminants before reinstallation. All of the sonde probes' non-measuring surfaces are covered with copper tape to minimize biofouling. At the end of each sampling interval, the sondes are brought back to the laboratory to be downloaded and cleaned. The sondes are allowed to continue recording data for at least 1 hour under lab conditions in a water-saturated air environment. Before the instruments are cleaned, a post calibration reading is taken from each instrument in fresh standard to see if any of the instruments exhibit drift (see Section 13). Post calibration readings of depth and dissolved oxygen are taken once sonde readings have stabilized in a bucket of bubbling (air saturated) tap water. Two sondes are assigned to each of the four monitoring stations to allow the sondes to be switched out the same day, and minimize data loss.

A WaterLOG Storm 3 transmitter replaced the existing Sutron Satlink2 transmitter at the Oyster Landing station on 03/25/21 and transmits data to the NOAA GOES satellite, NESDIS ID #3B031302. A Sutron Sat-Link2 transmitter was installed at the Debidue Creek station on 04/28/09 and transmits data to the NOAA GOES satellite, NESDIS ID #3B049722. Two Sutron Sat-Link2 transmitters were installed at the Winyah Bay station on June 9, 2016, for the surface site (WS NESDIS ID#3B002F44) and for the bottom site (WB NESDIS ID#3B003C32). A WaterLog Storm 3 transmitter replaced the WS Sutron transmitter on 12/6/2022. The transmissions are scheduled hourly and contain four (4) data sets reflecting fifteen-minute data sampling intervals. Upon receipt by the CDMO, the data undergoes the same automated primary QAQC process detailed in Section 2 above. The "real-time" telemetry data become part of the provisional dataset until undergoing secondary and tertiary QAQC and assimilation in the CDMO's authoritative online database. Provisional and authoritative data are available at www.nerrsdata.org.

5) Site location and character –

The North Inlet-Winyah Bay National Estuarine Research Reserve is located on the southeastern coast of the United States on the Atlantic Ocean in two tidal estuaries, North Inlet and Winyah Bay, near Georgetown, South Carolina. The North Inlet estuary is an ocean-dominated bar-built estuary, which contains numerous winding tidal creeks that drain extensive *Spartina alterniflora* marsh. The system is considered a pristine tidal estuary due to minimal anthropogenic impacts. The watershed drains a 24.8 km^2 area of mostly pine forest and a moderately developed residential watershed to the north. The Winyah Bay estuary, on the other hand, is a classic drowned-river valley estuary that has its headwaters in the Blue Ridge Mountains of North Carolina. Its watershed consists of the sub-basins on 6 major rivers, which collectively represent a cumulative area of 47,060 km^2, making it one of the largest watersheds on the Eastern Seaboard. As a result of extensive agriculture, residential development and industry in the watershed, Winyah Bay is considered a relatively impacted salt-wedge estuary. The two estuaries are connected by a pair of subtidal creeks that provide exchange and passage between the two estuaries, although the presence of strong tidal nodes in these creeks largely limits the mixing of each estuary's distinct water mass. Descriptions of the five individual monitoring sites that comprise the NI-WB NERR SWMP are as follows:

Site name	**Clambank Landing (CB)**
Latitude and longitude	33.333908, -79.192896
Tidal range *(meters)*	1.5 m *(calculated from 2013-2023 data)*
Salinity range *(psu)*	1.9 – 37.1 with an average of 31.7 psu *(calculated from 2013-2023 data)*

Type and amount of freshwater input	This site is surrounded by a *Spartina alterniflora* marsh and does not drain a defined sub-basin of the North Inlet estuary (as is the case for Crabhaul and Debidue Creeks). It is predominantly influenced by oceanic waters due to its close proximity to North Inlet, but is occasionally influenced by water entering from Winyah Bay at the creek's southern end.
Water depth (*meters, MLW*)	*NA – site has not been surveyed.* Average creek depth at station relative to bottom is 1.8 m. *(calculated from 2013-2023 data)*
Sonde distance from bottom (*meters*)	0.30 m
Bottom habitat or type	The bottom is mostly comprised of oyster shell hash and some fine sediment.
Pollutants in area	This site is considered relatively pristine and is influenced by its close proximity to the Inlet mouth.
Description of watershed	As noted above, this site is surrounded by *Spartina alterniflora* low marsh, and is ~150 m southeast of Goat Island (an approximately 2.5 km long thin (~5-30 m wide for much of its length) strip of relict upland). The station is attached to the dock located next to the Clambank Landing boat ramp. At this location the creek is 50 m wide and ~0.6 km from the mouth of Clambank Creek. The station is ~3 km from North Inlet by way of the larger Town Creek, from which Clambank Creek splits off.

Site name	**Debidue Creek (DC)**
Latitude and longitude	33.360144, -79.167462
Tidal range *(meters)*	1.8 m *(calculated from 2013-2023 data)*
Salinity range *(psu)*	1.2 – 37.1 with an average of 31.3 psu *(calculated from 2013-2023 data)*
Type and amount of freshwater input	Freshwater input to this station is from the Debordieu Colony community which has a 3 km long canal that runs the length of the developed marshfront, which is fed by smaller canals draining developed areas inland. This larger canal feeds directly into upper Debidue Creek.
Water depth (*meters, MLW*)	*NA – site has not been surveyed.* Average creek depth at station relative to bottom is 2.9 m. *(calculated from 2013-2023 data)*
Sonde distance from bottom (*meters*)	0.30 m
Bottom habitat or type	The bottom is mostly comprised of oyster shell hash with some fine sediment and detritus.
Pollutants in area	The site is approximately 1 km south of the Debordieu Colony, a large development built on man-made canals that drain into the northern portion of Debidue Creek, and as a result, may be considered an impacted site.
Description of watershed	This station is surrounded by *Spartina alterniflora* low marsh with the nearest undeveloped uplands located on Hobcaw Barony 0.5 km northwest of the station. The gated golf community, Debordieu Colony is 0.6 km north on the inland portion of the watershed and 0.9 km east on the coastal ocean portion of the watershed. As noted above the watershed in this community consists of a 3 km long canal

	that runs the length of the developed marshfront, which is fed by smaller canals draining developed areas inland. This larger canal feeds directly into upper Debidue Creek. At this location the creek is 65 m wide and is 3.5 km upstream from the creek mouth (~350 m wide) which originates at North Inlet and the mouth of Town Creek.

Site name	**Oyster Landing (OL)**
Latitude and longitude	33.349345, -79.1888850
Tidal range *(meters)*	1.6 m *(calculated from 2013-2023 data)*
Salinity range *(psu)*	0.3 – 38.2 with an average of 31.7 psu *(calculated from 2013-2023 data)*
Type and amount of freshwater input	This site is located near the western, upland edge of the North Inlet basin, at the confluence of two 1st order tidal creeks: the upper reaches of Crabhaul Creek and a much smaller un-named creek that directly drain pine forested uplands and wetlands. The NIW OL MET station is located adjacent to the station.
Water depth (*meters, MLW*)	*NA – site has not been surveyed.* Average creek depth at station relative to bottom is 2.18 m. *(calculated from 2013-2023 data).* This was also the site of a now decommissioned NOAA/NOS NWLON tide gauge (Station 8662245) which was replaced by a microwave radar sensor. Please contact the reserve Manager in you're interested in this data.
Sonde distance from bottom (*meters*)	0.30 m
Bottom habitat or type	The creek bottom is comprised mostly of oyster shell hash with some fine sediment and detritus.
Pollutants in area	The site is considered to represent relatively pristine conditions due to the absence of significant disturbance in its drainage area.
Description of watershed	Located 230 m at the end of a research pier, the sampling site is approximately 2 km from the head of Crabhaul Creek which is actively eroding into the marsh platform at its terminus. The creek is 40-80 m across at the station which sits at the confluence of two creeks, and the station is located next to a large oyster bed 30 m x 80 m at its widest points. The vegetation of the Crabhaul Creek sub-basin is dominated by *Spartina alterniflora* that transitions into salt pan, *Juncus roemerianus* and mixed vegetation communities along its upland edge, which is 0.4 to 0.5 km to the NW and SW. The station is 3 km from the mouth of its major feeder creek, Old Man Creek which splits off from Town Creek. It's 2.8 km from North Inlet as the crow flies, but 4 km from North Inlet along the length of Old Man Creek and Town Creek.

Site name	**Thousand Acre (TA)**
Latitude and longitude	33.299118, -79.255959
Tidal range *(meters)*	1.2 m *(calculated from 2013-2023 data)*
Salinity range *(psu)*	0 – 31.2 with an average of 6.7 psu *(calculated from 2013-2023 data)*

Type and amount of freshwater input	The station sits near the mouth of a tidal canal that on ebb tides drains a large brackish marsh surrounded by undeveloped forested upland, and on the flood tide receives water from Winyah Bay.
Water depth (*meters, MLW*)	*NA – site has not been surveyed.* Average creek depth at station relative to bottom is 2.8 m. *(calculated from 2013-2023 data)*
Sonde distance from bottom (*meters*)	0.3 m
Bottom habitat or type	The bottom is mostly composed of fine sediments and detritus.
Pollutants in area	While the creek drains marsh and undeveloped uplands on ebb tides, it receives degraded Winyah Bay water on flood tides and is therefore considered an impacted site.
Description of watershed	Located on the northeastern side of the mid-portion of Winyah Bay, the Thousand Acre sampling station is located ~14 m from the head of one of two tidal canals that drain a large brackish marsh (1.5 km x 3 km) surrounded by undeveloped forested uplands on its north, east, and west sides, and bordered on its south side by an old dike that runs the 1.5 km length of the bay side of the marsh. This marsh which was formerly impounded for rice cultivation before the Civil War, is now composed of brackish species including *Spartina cynosuroides*, *Juncus*, bulrushes and patches of *Phragmites australis*. The station is 13.5 km NW from the mouth of Winyah Bay, and 8 km south of the head of Winyah Bay where the Waccamaw, Pee Dee, and Black Rivers converge, with the mouth of the Sampit River just 2 km south of this convergence.

Site name	**Winyah Bay Bottom (WB)**
Latitude and longitude	33.309414, -79.288707
Tidal range *(meters)*	1.2 m *(calculated from 2016-2023 data)*
Salinity range *(psu)*	0 – 34.6 with an average of 9.1 psu *(calculated from 2016-2023 data)*
Type and amount of freshwater input	This monitoring station receives the collective inputs to Winyah Bay from its anthropogenically-impacted watershed through direct runoff from bordering marshes & upland as well as the four rivers (Waccamaw, PeeDee, Black and Sampit) that feed into the headwaters of the Bay. Note that this station exhibits pronounced salinity stratification, especially on flood tides (see comparison of WB vs WS data).
Water depth (*meters, MLW*)	*NA – site has not been surveyed.* Average creek depth at station relative to bottom is 6.2 m. *(calculated from 2013-2023 data)*
Sonde distance from bottom (*meters*)	~1 m
Bottom habitat or type	unknown
Pollutants in area	The City of Georgetown, located at the mouth of the Sampit River, is/has historically been the home to a number of heavy industries, including a steel plant (Liberty Steel - shut down 2020), paper mill (International Paper - shut down Dec. 2024, but slated to become a biomass power plant), chemical plant (3V Sigma), as well as a coal fired power plant (Winyah Generating Station) and a public sewage

	treatment plant. Winyah Bay has also historically seen a lot of boat and barge traffic through shipments to/from the steel mill and paper plant, and as part of the Intracoastal Waterway which includes 12.5 km of the northern portion of Winyah Bay between the mouth of the Waccamaw River down to where the ICW meets the Bay at the northwest corner of South Island.
Description of watershed	The station is 13.5 km NW from the mouth of Winyah Bay, and 6 km south of the head of Winyah Bay where the Waccamaw, Pee Dee, and Black Rivers converge, with the mouth of the Sampit River just 2 km south of this convergence. The station is located ~300 m west of the main channel of the Bay which also acts as part of the Intracoastal Waterway. The station is 500 m east of the nearest upland habitat, and the width of the Bay at this point is 1.5 km. The western edge of the Bay in this immediate area is a mix of undeveloped uplands, brackish marsh and two moderately developed gated communities; while the eastern portion of the Bay is bordered by the undeveloped Hobcaw Barony property. See "pollutants" and "freshwater input" for further detail.

Site name	**Winyah Bay Surface (WS)**
Latitude and longitude	33.309397, -79.288707
Tidal range *(meters)*	1.2 m *(calculated from 2016-2023 data)*
Salinity range *(psu)*	0 – 32.8 with an average of 5.6 psu *(calculated from 2016-2023 data)*
Type and amount of freshwater input	See Winyah Bottom table above
Water depth (*meters, MLW*)	The sonde is at a fixed depth of approximately 0.2 m below the surface at MLW, with a calculated average water depth of 0.82 m above the level of the sensors *(calculated from 2016-2023 data)*.
Sonde distance from bottom (*meters*)	~6 m
Bottom habitat or type	unknown
Pollutants in area	See Winyah Bottom table above.
Description of watershed	See Winyah Bottom table above.

SWMP station timeline:

Station Code	SWMP Status	Station Name	Location	Active Dates	Reason Decommissioned	Notes
CB	P	Clambank Landing	33.333908, -79.192896	08/17/2001 - current	NA	NA
DC	P	Debidue Creek	33.360144, -79.167462	03/05/1998 - current	NA	NA

OL	P	Oyster Landing	33.349345, -79.1888850	01/01/1996 - current	NA	NA
TA	P	Thousand Acre	33.299118, -79.255959	01/01/1995 - current	NA	NA
WS	S	Winyah Bay surface	33.309397, -79.288707	05/11/2016 - current	NA	NA
WB	S	Winyah Bay bottom	33.309414, -79.288707	05/11/2016 - current	NA	NA
CA	P	Caledonia	33.453827, -79.154856	06/01/1995–12/01/1995	Outside of reserve boundary	Initially deployed as part of a short-term project.

6) Data collection period –

Thousand Acre data collection began January 1, 1995. Debidue Creek sampling began March 5, 1998. Oyster Landing data collection began in 1995; however, it was not considered a SWMP site until 1996 when the collection site was switched from Caledonia to Oyster Landing. Sampling at Clambank Landing began in February 1981 and continued through June 1995; however, it was not considered a SWMP site until sampling resumed on August 17, 2001. Winyah Bay surface and Winyah Bay bottom were established as secondary SWMP stations and began sampling on May 11, 2016. All sampling is ongoing.

Deployment dates and times (in Eastern Standard Time) for 2024 follow:

Site: **Clambank Landing**

Deploy Date	Time	Retrieve Date	Time
12/20/2023	15:00	01/11/2024	09:00
01/11/2024	09:15	01/30/2024	12:45
01/30/2024	13:00	02/19/2024	15:30
02/19/2024	15:45	03/10/2024	09:00
03/10/2024	09:15	04/9/2024	09:15
04/09/2024	09:30	05/9/2024	09:00
05/09/2024	09:15	05/28/2024	10:45
05/28/2024	11:00	06/24/2024	09:30
06/24/2024	09:45	07/16/2024	14:00
07/16/2024	14:15	08/12/2024	16:30
08/12/2024	16:45	09/06/2024	09:15
09/06/2024	09:30	09/24/2024	11:45
09/24/2024	12:00	10/16/2024	06:30
10/16/2024	06:45	11/11/2024	13:45
11/11/2024	14:00	12/05/2024	10:45
12/05/2024	11:00	01/07/2025	13:15

Site: **Debidue Creek**

Deploy Date	Time	Retrieve Date	Time
12/20/2023	13:30	01/11/2024	09:15
01/11/2024	09:30	01/30/2024	13:00
01/30/2024	13:15	02/19/2024	15:45
02/19/2024	16:00	03/10/2024	08:45

03/10/2024	09:00	04/9/2024	08:45
04/09/2024	09:00	05/9/2024	08:30
05/09/2024	08:45	05/28/2024	10:30
05/28/2024	10:45	06/24/2024	09:00
06/24/2024	09:15	07/16/2024	14:30
07/16/2024	14:45	08/12/2024	14:00
08/12/2024	14:15	09/06/2024	08:45
09/06/2024	09:00	09/24/2024	11:15
09/24/2024	11:30	10/16/2024	08:00
10/16/2024	08:15	11/11/2024	14:00
11/11/2024	14:15	12/05/2024	10:15
12/05/2024	10:30	01/08/2025	09:45

Site: **Oyster Landing**

Deploy Date	Time	Retrieve Date	Time
12/20/2023	13:15	01/11/2024	09:30
01/11/2024	09:45	01/30/2024	13:15
01/30/2024	13:30	02/19/2024	16:00
02/19/2024	16:15	03/10/2024	10:15
03/10/2024	10:30	Sonde died in field on 3/23/24 at 16:30	
03/28/2024	11:45	05/09/2024	08:00
05/09/2024	08:15	05/28/2024	10:15
05/28/2024	10:30	Sonde died in field on 06/14/2024 at 02:45	
06/18/2024	13:45	07/15/2024	10:15
07/15/2024	10:30	08/12/2024	14:15
08/12/2024	14:30	09/06/2024	08:30
09/06/2024	08:45	09/24/2024	11:00
09/24/2024	11:15	10/16/2024	07:30
10/16/2024	08:00	11/11/2024	11:45
11/11/2024	12:00	12/05/2024	10:00
12/05/2024	10:15	01/07/2025	12:45

Site: **Thousand Acre**

Deploy Date	Time	Retrieve Date	Time
12/20/2023	14:00	01/11/2024	08:45
01/11/2024	09:00	01/30/2024	11:45
01/30/2024	12:00	02/19/2024	15:15
02/19/2024	15:30	03/10/2024	09:30
03/10/2024	09:45	04/09/2024	09:45
04/09/2024	10:00	05/09/2024	09:30
05/09/2024	09:45	05/28/2024	11:15
05/28/2024	11:30	06/24/2024	10:00
06/24/2024	10:15	07/16/2024	15:00
07/16/2024	15:15	08/12/2024	13:00
08/12/2024	13:15	09/06/2024	09:45
09/06/2024	10:00	09/24/2024	12:00
09/24/2024	12:15	10/16/2024	08:30
10/16/2024	08:45	11/11/2024	14:30
11/11/2024	14:45	12/07/2024	11:30
12/07/2024	11:45	01/07/2025	13:45

Site: **Winyah Bay Bottom**

Deploy Date	Time	Retrieve Date	Time
12/20/2023	14:15	01/11/2024	08:30

01/11/2024	08:45	01/30/2024	12:00
01/30/2024	12:15	02/19/2024	15:00
02/19/2024	15:15	03/10/2024	09:45
03/10/2024	10:00	04/09/2024	10:00
04/09/2024	10:15	05/09/2024	10:00
05/09/2024	10:15	05/28/2024	11:45
05/28/2024	12:00	06/24/2024	10:30
06/24/2024	10:45	07/17/2024	10:00
07/17/2024	10:15	08/12/2024	13:15
08/12/2024	13:30	09/06/2024	10:00
09/06/2024	10:15	09/24/2024	12:15
09/24/2024	12:30	10/16/2024	09:00
10/16/2024	09:15	11/11/2024	15:00
11/11/2024	15:15	12/07/2024	12:00
12/07/2024	12:15	01/07/2025	14:15

Site: **Winyah Bay Surface**

Deploy Date	Time	Retrieve Date	Time
12/20/2023	14:15	01/11/2024	08:30
01/11/2024	08:45	01/30/2024	12:00
01/30/2024	12:15	02/19/2024	15:00
02/19/2024	15:15	03/10/2024	09:45
03/10/2024	10:00	04/09/2024	10:00
04/09/2024	10:15	05/09/2024	10:00
05/09/2024	10:15	05/28/2024	11:45
05/28/2024	12:00	06/24/2024	10:15
06/24/2024	10:30	07/17/2024	10:15
07/17/2024	10:30	08/12/2024	13:15
08/12/2024	13:30	09/06/2024	10:00
09/06/2024	10:15	Sonde died in field on 09/09/2024 at 08:00	
09/24/2024	12:30	10/16/2024	09:00
10/16/2024	09:15	11/11/2024	15:00
11/11/2024	15:15	12/07/2024	12:00
12/07/2024	12:15	01/07/2025	14:15

7) 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: http://www.nerrsdata.org/; *accessed* 12 October 2023.

NERR water quality 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 delimited format.

8) Associated researchers and projects –

A water chemistry program is associated with the NIW core-monitoring program. Variables sampled include: chlorophyll, dissolved organic carbon, nitrate-nitrite, orthophosphate, and ammonia. (See documentation on the NIW WWW home page http://www.northinlet.sc.edu/ for further details). Thousand Acre is our permanent monitoring station for the NERR monitoring program, but Oyster Landing and Debidue Creek were also sampled beginning in 1998. Clambank Landing was added as a sampling station in August of 2001. These stations are also included in our NIW core-monitoring program. Julie Krask (Research Specialist) is responsible for the collection and management of this data.

The NERR weather station is also located at the Oyster Landing site. Air temperature and humidity, barometric pressure, solar radiation (total and PAR), wind speed and direction, and precipitation are measured. Robert Dunn (Research Coordinator) is responsible for the collection and management of this data on an interim basis as of March 2024.

A study of the optical characteristics of dissolved organic matter (DOM) is currently being conducted at Oyster Landing in association with the NIW NERR water quality and water chemistry sampling. Absorbance from 250 - 450 nm are quantified on filtered sub-samples of water collected during (ISCO) diel nutrient sampling and used to determine carbon-normalized DOM absorbance and spectral slope. Study objectives include using DOM optical characteristics as a tracer for the input of aromatic-rich DOM from higher plant and terrestrially-derived DOM sources to estuarine waters. Dr. Erik Smith (NIW NERR Manager) is the principal investigator on this project.

II. Physical Structure Descriptors

9) Sensor specifications –

NIW NERR deployed EXO2 dataloggers in 2024.

EXO2 dataloggers were deployed at:
Clambank Landing (CB) – 12/13/2017 - present
Debidue Creek (DC) – 01/01/2015 – present
Oyster Landing (OL) – 01/01/2015 – present
Thousand Acre (TA) – 11/03/2016 – present
Winyah Bay Surface (WS) & Winyah Bay Bottom (WB) – 05/11/2016 - present

Each EXO2 datalogger uses a 599090 central wiper, a 599827 wiped specific conductivity/temperature probe, a 599702 wiped pH sensor, and a 599100 optical dissolved oxygen probe, a 599101 turbidity probe. Oyster Landing and Winyah Bay Surface has the addition of a 599102 BGA PC probe, and a 599104 fDOM probe (data not submitted). Winyah Bay bottom has the addition of a 599104 fDOM probe (data not submitted).

YSI EXO Sonde:

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Wiped probe; Thermistor
Model#: 599827
Range: -5 to 50 C

Accuracy: ±0.2 C
Resolution: 0.001 C

Parameter: Conductivity
Units: milli-Siemens per cm (mS/cm)
Sensor Type: Wiped probe; 4-electrode cell with autoranging
Model#: 599827
Range: 0 to 100 mS/cm
Accuracy: ±1% of the reading or 0.002 mS/cm, whichever is greater
Resolution: 0.0001 to 0.01 mS/cm (range dependent)

Parameter: Salinity
Units: practical salinity units (psu)/parts per thousand (ppt)
Model#: 599827
Sensor Type: Wiped probe; Calculated from conductivity and temperature
Range: 0 to 70 ppt
Accuracy: ±2% of the reading or 0.2 ppt, whichever is greater
Resolution: 0.01 psu

Parameter: Dissolved Oxygen % saturation
Sensor Type: Optical probe w/ mechanical cleaning
Model#: 599100-01
Range: 0 to 500% air saturation
Accuracy: 0-200% air saturation: +/- 1% of the reading or 1% air saturation, whichever is greater 200-500% air saturation: +/- 5% or reading
Resolution: 0.1% air saturation

Parameter: Dissolved Oxygen mg/L (Calculated from % air saturation, temperature, and salinity)
Units: milligrams/Liter (mg/L)
Sensor Type: Optical probe w/ mechanical cleaning
Model#: 599100-01
Range: 0 to 50 mg/L
Accuracy: 0-20 mg/L: +/-0.1 mg/l or 1% of the reading, whichever is greater
20 to 50 mg/L: +/- 5% of the reading
Resolution: 0.01 mg/L

Parameter: Non-vented Level - Shallow (Depth)
Units: feet or meters (ft or m)
Sensor Type: Stainless steel strain gauge
Range: 0 to 33 ft (10 m)
Accuracy: +/- 0.013 ft (0.004 m)
Resolution: 0.001 ft (0.001 m)

Parameter: pH
Units: pH units
Sensor Type: Glass combination electrode
Model#: 599701(guarded) or 599702(wiped)
Range: 0 to 14 units
Accuracy: +/- 0.1 units within +/- 10° of calibration temperature, +/- 0.2 units for entire temperature range
Resolution: 0.01 units

Parameter: Turbidity
Units: formazin nephelometric units (FNU)
Sensor Type: Optical, 90 degree scatter

Model#: 599101-01
Range: 0 to 4000 FNU
Accuracy: 0 to 999 FNU: 0.3 FNU or +/-2% of reading (whichever is greater); 1000 to 4000 FNU +/-5% of reading
Resolution: 0 to 999 FNU: 0.01 FNU, 1000 to 4000 FNU: 0.1 FNU

Parameter: Chlorophyll
Units: micrograms/Liter
Sensor Type: Optical probe
Model#: 599102-01
Range: 0 to 400 ug/Liter
Accuracy: Dependent on methodology
Resolution: 0.01 μg/L chl a, 0.1% FS

Depth qualifier:
The NERR System-Wide Monitoring Program utilizes YSI data sondes that can be equipped with either vented or non-vented depth/level sensors. Readings for both vented and non-vented sensors are automatically compensated for water density change due to variations in temperature and salinity; but for all non-vented depth measurements, changes in atmospheric pressure between calibrations appear as changes in water depth. The error is equal to approximately 1.02 cm for every 1 millibar change in atmospheric pressure, and is eliminated for vented sensors because they are vented to the atmosphere throughout the deployment time interval.

Beginning in 2006, NERR SWMP standard calibration protocol calls for all non-vented depth sensors to read 0 meters at a (local) barometric pressure of 1013.25 mb (760 mm/hg). To achieve this, each site calibrates their depth sensor with a depth offset number, which is calculated using the actual atmospheric pressure at the time of calibration and the equation provided in the SWMP calibration sheet or digital calibration log. This offset procedure standardizes each depth calibration for the entire NERR System. If accurate atmospheric pressure data are available, non-vented sensor depth measurements at any NERR can be corrected.

In 2010, the CDMO began automatically correcting Depth/Level data for changes in barometric pressure as measured by the reserve's associated meteorological station during data ingestion. These corrected Depth/Level data are reported as cDepth and cLevel, and are assigned QAQC flags and codes based on QAQC protocols. Please see sections 11 and 12 for QAQC flag and code definitions.

NOTE: older Depth data cannot be corrected without verifying that the depth offset was in place and whether a vented or non-vented depth sensor was in use. No SWMP data prior to 2006 can be corrected using this method. The following equation is used for corrected Depth/Level data provided by the CDMO beginning in 2010:
((1013-BP)*0.0102)+Depth/Level = cDepth/cLevel.

Salinity units qualifier:
In 2013, EXO sondes were approved for SWMP use and began to be utilized by reserves. While the 6600 series sondes report salinity in parts per thousand (ppt) units, the EXO sondes report practical salinity units (psu). These units are essentially the same and for SWMP purposes are understood to be equivalent, however psu is considered the more appropriate designation. Moving forward the NERR System will assign psu salinity units for all data regardless of sonde type.

Turbidity qualifier:
In 2013, EXO sondes were approved for SWMP use and began to be utilized by reserves. While the 6600 series sondes report turbidity in nephelometric turbidity units (NTU), the EXO sondes use formazin nephelometric units (FNU). These units are essentially the same but indicate a difference in sensor

methodology, for SWMP purposes they will be considered equivalent. Moving forward, the NERR System will use FNU/NTU as the designated units for all turbidity data regardless of sonde type. If turbidity units and sensor methodology are of concern, please see the Sensor Specifications portion of the metadata.

Chlorophyll fluorescence disclaimer:
YSI chlorophyll sensors (6025 or 599102-01) are designed to serve as a proxy for chlorophyll concentrations in the field for monitoring applications and complement traditional lab extraction methods; therefore, there are accuracy limitations associated with the data that are detailed in the YSI manual including interference from other fluorescent species, differences in calibration method, and effects of cell structure, particle size, organism type, temperature, and light on sensor measurements.

10) Coded variable definitions –

Sampling station:	Sampling site code:	Station code:
Clambank Landing	CB	niwcbwq
Debidue Creek	DC	niwdcwq
Oyster Landing	OL	niwolwq
Thousand Acre	TA	niwtawq
Winyah Bay surface	WS	niwwswq
Winyah Bay bottom	WB	niwwbwq

11) 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_). During primary automated QAQC (performed by the CDMO), -5, -4, and -2 flags are applied automatically to indicate data that is missing and above or below sensor range. All remaining data are then flagged 0, passing initial QAQC checks. During secondary and tertiary QAQC 1, -3, and 5 flags may be used to note data as suspect, rejected due to QAQC, or corrected.

-5 Outside High Sensor Range
-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
2 Depth collected from surface or near surface sonde
3 Calculated data: non-vented depth/level sensor correction for changes in barometric pressure
4 Historical Data: Pre-Auto QAQC
5 Corrected Data

12) 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 deployment or YSI datasonde, sensor errors are sensor specific, 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, but some comment codes (marked with an * below) can be applied to the entire record in the F_Record column.

General Errors

GIC	No instrument deployed due to ice
GIM	Instrument malfunction
GIT	Instrument recording error; recovered telemetry data
GMC	No instrument deployed due to maintenance/calibration
GNF	Deployment tube clogged / no flow
GOW	Out of water event
GPF	Power failure / low battery
GQR	Data rejected due to QA/QC checks
GSM	See metadata

Corrected Depth/Level Data Codes

GCC	Calculated with data that were corrected during QA/QC
GCM	Calculated value could not be determined due to missing data
GCR	Calculated value could not be determined due to rejected data
GCS	Calculated value suspect due to questionable data
GCU	Calculated value could not be determined due to unavailable data

Sensor Errors

SBO	Blocked optic
SCF	Conductivity sensor failure
SCS	Chlorophyll spike
SDF	Depth port frozen
SDG	Suspect due to sensor diagnostics
SDO	DO suspect
SDP	DO membrane puncture
SFD	Depth from a surface or near surface sonde deployed from a floating platform, does not reflect the depth of the water column or tidal change
SIC	Incorrect calibration / contaminated standard
SNV	Negative value
SOW	Sensor out of water
SPC	Post calibration out of range
SQR	Data rejected due to QAQC checks
SSD	Sensor drift
SSM	Sensor malfunction
SSR	Sensor removed / not deployed
STF	Catastrophic temperature sensor failure
STS	Turbidity spike
SWM	Wiper malfunction / loss
SXD	Depth from a surface or near surface sonde deployed at a fixed depth, offset to substrate may be applied

Comments

CAB*	Algal bloom
CAF	Acceptable calibration/accuracy error of sensor
CAP	Depth sensor in water, affected by atmospheric pressure
CBF	Biofouling
CCU	Cause unknown
CDA*	DO hypoxia (<3 mg/L)
CDB*	Disturbed bottom
CDF	Data appear to fit conditions
CFK*	Fish kill
CIP*	Surface ice present at sample station
CLT*	Low tide
CMC*	In field maintenance/cleaning

CMD*	Mud in probe guard
CND	New deployment begins
CRE*	Significant rain event
CSM*	See metadata
CTS	Turbidity spike
CVT*	Possible vandalism/tampering
CWD*	Data collected at wrong depth
CWE*	Significant weather event

13) Post deployment information –

Site: **Clambank Landing**

Post Cal Date	Sp.Con. (10 mS/cm)	pH (7)	pH (10)	Depth	Turbidity (0 NTU)	BP (mm Hg)	ODO% (% air sat.)
01/11/2024	9.94	6.95	9.92	0.053	0.06	764.24	101.0
01/30/2024	10.003	7.04	9.87	0.113	0.03	767.91	101.9
02/19/2024	10.07	6.99	9.91	0.136	0.15	770.46	101.7
03/10/2024	10.08	7.05	10.03	0.118	0.00	768.51	101.6
04/09/2024	9.991	7.10	10.06	0.104	0.07	767.46	100.8
5/09/2024	9.32	7.29	10.01	-0.032	22.51	758.38	81.7
5/28/2024	9.990	7.16	10.18	-0.009	-0.01	760.56	100.8
06/24/2024	9.924	7.01	9.99	-0.008	0.03	759.1	102.1
07/16/2024	10.172	7.18	10.15	-0.005	0.17	763.7	102.0
08/12/2024	10.043	7.12	10.05	0.040	0.21	763.5	100.4
09/06/2024	10.018	7.28	9.99	0.108	0.17	764.09	100.0
09/24/2024	10.296	7.24	10.09	0.025	2.08	762.21	99.4
10/16/2024	10.467	7.12	9.49	0.126	0.01	766.94	103.2
11/11/2024	10.05	7.18	10.22	0.006	0.94	764.1	101.5
12/05/2024	10.154	7.01	10.01	0.125	0.19	769.9	106.4
01/07/2025	10.066	7.09	10.11	0.081	3.70	766.26	100.1

Site: **Debidue Creek**

Post Cal Date	Sp.Con. (10 mS/cm)	pH (7)	pH (10)	Depth	Turbidity (0 NTU)	BP (mm Hg)	ODO% (% air sat.)
01/11/2024	9.932	7.04	10.0	0.05	0.19	763.71	102.3
01/30/2024	9.938	7.13	10.11	0.10	0.66	767.91	102.2
02/19/2024	9.972	7.00	10.02	0.151	-0.03	770.46	102.4
03/10/2024	9.938	7.08	10.11	0.09	0.09	757.39	101.3
04/09/2024	9.888	7.07	10.10	0.108	0.07	767.76	101.0
05/09/2024	9.755	7.16	10.09	-0.03	0.15	758.237	98.0
05/28/2024	9.924	7.08	10.00	-0.11	0.15	760.3	101.6
06/24/2024	2.163	7.72	9.14	-0.100	0.57	758.6	97.8
07/16/2024	10.048	7.12	10.07	0.059	0.21	763.6	103.1
08/12/2024	9.888	7.17	10.18	0.048	0.44	763.3	100.0
09/06/2024	4.66	7.37	10.12	0.124	7.13	764.24	48.2
09/24/2024	10.126	7.13	10.04	0.031	0.55	762.06	99.3
10/16/2024	8.938	7.18	10.06	0.178	3.21	766.9	103.8
11/11/2024	9.95	7.18	10.08	0.00	1.17	764.31	99.1
12/05/2024	9.956	7.02	10.07	0.149	0.28	769.6	103.9
01/08/2025	10.097	7.06	9.94	0.088	3.71	766.56	98.2

Site: **Oyster Landing**

Post Cal Date	Sp.Con. (10 mS/cm)	pH (7)	pH (10)	Depth	Turbidity (0 NTU)	BP (mm Hg)	ODO% (% air sat.)	Chl (mg/l)
01/11/2024	9.912	7.11	10.07	0.041	0.00	763.71	101.8	67.8
01/30/2024	9.90	7.07	10.02	0.116	0.03	757.91	106.2	68.6
02/19/2024	9.945	7.1	10.06	0.11	0.00	770.41	102.7	71.91
03/10/2024	9.917	7.12	10.16	0.139	0.15	757.39	101.2	67.52
03/29/2024	No post-deployment readings due to sonde critical failure in field.							
05/09/2024	9.761	7.27	10.19	-0.055	0.02	757.56	96.3	64.47
05/28/2024	9.826	7.18	10.10	0.033	0.59	762.9	101.3	67.22
06/18/2024	No post-deployment readings due to sonde critical failure in field.							
07/15/2024	10.030	7.35	10.05	0.041	0.03	763.0	101.6	65.57
08/12/2024	9.924	7.08	10.05	0.038	0.31	762.9	99.4	66.3
09/06/2024	9.98	7.29	10.01	0.115	0.14	764.09	100.3	70.02
09/24/2024	10.24	7.67	10.05	-0.022	1.03	761.91	100.1	61.26
10/16/2024	10.132	7.30	10.02	0.08	2.49	766.8	102.0	67.53
11/11/2024	9.81	7.45	10.40	-0.115	0.08	764.53	100.2	67.28
12/05/2024	9.57	7.03	10.04	0.08	0.03	769.6	101.8	65.41
01/07/2025	10.219	7.13	10.07	0.09	-0.10	765.6	100.8	67.93

Site: **Thousand Acre**

Post Cal Date	Sp.Con. (10 mS/cm)	pH (7)	pH (10)	Depth	Turbidity (0 NTU)	BP (mm Hg)	ODO% (% air sat.)
01/11/2024	9.92	6.96	9.96	0.051	0.19	763.71	100.3
01/30/2024	9.943	7.09	10.02	0.113	0.12	767.91	102.6
02/19/2024	10.085	7.10	9.99	0.144	0.00	770.41	102.1
03/10/2024	9.949	7.11	10.16	0.102	0.06	768.21	101.1
04/09/2024	9.98	7.15	10.01	0.101	0.16	767.08	100.7
05/09/2024	9.941	7.20	10.14	-0.03	0.25	757.5	99.0
05/28/2024	9.94	7.13	10.03	0.05	0.09	759.96	99.3
06/24/2024	9.97	7.05	9.93	-0.035	0.08	758.9	100.4
07/16/2024	10.201	7.08	10.02	0.06	0.14	763.7	102.2
08/12/2024	10.132	7.14	10.12	0.016	0.37	763.1	101.0
09/06/2024	10.05	7.26	9.97	0.100	0.07	763.49	99.4
09/24/2024	10.23	7.18	10.12	0.030	5.75	762.06	96.0
10/16/2024	10.015	7.10	9.89	0.138	1.26	766.8	102.0
11/11/2024	9.79	7.15	10.03	0.027	0.09	764.23	99.1
12/07/2024	10.036	7.11	10.14	0.106	0.47	764.8	107.1
01/07/2025	10.1	7.13	9.92	0.088	0.37	767.0	100.9

Site: **Winyah Bay Bottom**

Post Cal Date	Sp.Con. (10 mS/cm)	pH (7)	pH (10)	Depth	Turbidity (0 NTU)	BP (mm Hg)	ODO% (% air sat.)
01/11/2024	9.975	6.97	9.96	0.058	0.04	764.24	99.7
01/30/2024	9.924	7.00	9.93	0.094	0.08	767.91	101.7
02/19/2024	10.01	7.02	9.97	0.156	0.15	770.41	101.5
03/10/2024	9.946	7.12	9.99	0.111	0.05	768.51	101.4
04/09/2024	9.945	7.15	10.08	0.123	-0.06	768.21	100.9
05/09/2024	9.945	7.20	10.14	-0.029	0.05	758.09	102.7
05/28/2024	9.904	6.95	9.89	0.046	1.33	762.9	98.4
06/24/2024	9.87	7.12	10.13	-0.022	0.08	758.3	100.5
07/17/2024	9.628	7.10	9.86	0.04	0.21	763.5	99.7
08/12/2024	10.163	7.14	10.16	0.043	0.11	763.1	101.5

09/06/2024	9.87	7.12	10.15	0.100	0.05	763.71	99.5
09/24/2024	10.21	7.01	9.95	0.026	0.86	761.91	99.9
10/16/2024	10.308	7.20	10.25	0.192	4.05	766.8	103.9
11/11/2024	10.096	7.31	10.2	-0.002	0.23	764.53	99.9
12/07/2024	10.199	7.10	10.09	0.085	0.39	764.7	100.5
01/07/2025	10.009	7.11	10.05	0.079	1.43	766.0	97.7

Site: **Winyah Bay Surface**

Post Cal Date	Sp.Con. (10 mS/cm)	pH (7)	pH (10)	Depth	Turbidity (0 NTU)	BP (mm Hg)	ODO% (% air sat.)	Chl (mg/l)
01/11/2024	9.848	6.99	10.00	0.053	0.10	763.71	99.9	66.46
01/30/2024	9.964	7.06	10.01	0.093	0.26	767.91	100.7	68.16
02/19/2024	9.976	7.05	10.01	0.16	0.12	770.41	101.9	70.35
03/10/2024	9.901	7.06	10.10	0.05	-0.01	767.39	104.2	69.33
04/09/2024	9.906	7.18	10.14	0.113	0.19	767.08	102.8	65.15
05/09/2024	9.830	7.24	10.19	-0.039	0.15	757.79	96.7	64.12
05/28/2024	2.651	7.16	10.17	0.04	1.14	762.81	98.6	58.87
06/24/2024	9.80	7.00	9.90	0.025	0.39	761.5	98.2	66.96
07/17/2024	10.191	7.09	10.06	0.045	1.28	763.3	83.3	62.79
08/12/2024	9.926	7.14	10.05	0.030	0.16	762.7	103.6	65.78
09/06/2024	5.026	7.24	10.20	0.107	0.19	764.01	98.9	62.77
09/24/2024	10.103	7.51	9.92	0.052	0.70	763.26	101.3	54.89
10/16/2024	9.727	7.08	10.05	0.155	3.55	766.71	101.7	67.6
11/11/2024	9.855	7.16	9.96	0.016	0.27	764.6	100.5	69.09
12/07/2024	10.176	7.12	10.19	0.089	0.47	764.7	101.1	67.93
01/07/2025	9.924	7.13	9.98	0.082	0.67	765.9	99.4	68.65

14) Other remarks/notes –

<u>All sites</u> -

- Data are missing due to equipment or associated specific probes not being deployed, equipment failure, time of maintenance or calibration of equipment, or repair/replacement of a sampling station platform. Any NANs in the dataset stand for "not a number" and are the result of low power, disconnected wires, or out of range readings. If additional information on missing data is needed, contact the Research Coordinator at the reserve submitting the data.

- In instances where rainfall affected data, the first period where the effects were seen was coded as CRE (significant rain event) for each parameter affected.

- In instances where strong winds or a combination of wind and rain affected data, the first period where the effects were seen was coded as CWE (significant weather event) for each parameter affected.

- Note that depth and dissolved oxygen concentration (mg/l) are dependent on specific conductivity/salinity, so if SpCon/salinity data are suspect or rejected, depth and DO mg/l are also coded as such.

- Oyster Landing, Winyah Surface and Winyah Bottom all have an fDOM sensor installed as well as the standard SWMP parameters. fDOM is quenched by turbidity such that the fDOM readings can be used as a guide to whether turbidity spikes are true measures of high turbidity or just a random object (detritus, crab, etc.) passing in front of the turbidity optics at the time of sampling. Therefore fDOM was used as a QAQC aid for turbidity for these stations.

<u>Clambank Landing</u> –

- On 05/28/24 11:00 the sonde was out of the water during a deployment/retrieval and the 11:00 reading was missed. The replacement sonde was deployed and did not settle all the way to the proper deployment depth (possibly due to biofouling and shell hash in the deployment tube) during its deployment through 06/24/24 09:30. The 06/24/24 replacement sonde also failed to settle to the proper depth and recorded at the wrong depth until 07/05/24 10:30 when it settled down to the stop bolt where it's supposed to sit. All of the data during this period have been coded as suspect due to being deployed at the wrong depth.

- On 11/11//24 14:00 the sonde was deployed at the wrong depth, apparently getting stuck in the tube and not settling to the proper depth at the stop bolt. The sonde experienced an out of water event during low tide at 11/12/24 12:15, after which the sonde settled down to the proper deployment depth.

Debidue Creek -

- On 10/16/24 08:00 the sonde was out the wrong depth while a sonde deployment/retrieval cycle was being done.

- On 12/29/2024 at 12:30, the copper bottom of the sonde deployment tube detached from the PVC top and settled to the bottom of the creek. All data beyond this point are coded suspect for being at the wrong deployment depth/location.

Oyster Landing –

- For the 03/10/24 deployment, the CSVs from three BIN files were combined following the sonde malfunctioning. Therefore, the raw BIN file will not match the raw CSV file. Data are missing from this deployment when the sonde stopped recording on 03/23/24. A new sonde was deployed on 03/29/24.

- For the 05/28/24 deployment, data are missing beginning 06/14/24 because the sonde malfunctioned in the field. A replacement sonde was deployed on 06/18/24. It was found that the telemetry flying lead cable was bad, causing sonde batteries to drain and causing the sondes to stop recording. A new telemetry cable was installed and the issue has resolved.

- From 11/11/24 12:00 (beginning of deployment) through 11/16/24 06:45 specific conductivity and salinity malfunctioned, therefore also affecting depth and DO mg/l. These data have been rejected. Turbidity also appears to malfunction beginning at deployment and readings don't appear to normalize until 11/16/24 18:00. It is unclear what caused this malfunction.

- Specific conductivity and salinity continue to periodically malfunction throughout the remainder of the year into 2025 despite a sonde switch on 12/05/24. Also, Chlorophyll exhibits high spikes beginning on 12/08/24 19:00 and throughout the rest of the deployment. These data and their dependent parameters have been rejected. It is unclear what is causing this issue.

Thousand Acre –

- From 05/09/24 09:45 – 05/28/24 11:15 turbidity was elevated and didn't match pre or post deployment values. Wiper position readings indicate there was no issue with the wiper parking over the optics. For these reasons turbidity data from this deployment have all been coded as suspect.

- From 06/24/24 10:15 – 06/24/24 11:15 the sonde was deployed at the wrong depth. The sonde was deployed at 10:15 so it's believed the sonde didn't settle completely to the bottom of the deployment tube until the 11:30 reading.

- From 07/10/24 10:45 – 07/12/24 20:00 the sonde was deployed at the wrong depth. It is believed that the sonde may have been pulled up in the tube by a fisherman and didn't settle back to deployment depth until

20:15. The tubes have locked caps, so the sondes cannot be completely removed from their deployment tubes.

- From 07/22/24 10:15 – 07/24/20:15 14:00 there are periods of elevated turbidity that occur in conjunction with heavy rainfall. Therefore, it is believed that these elevated turbidity periods correspond to a disturbed bottom and turbid runoff from rain events.

- From 08/17/24 23:00 – 08/18/24 03:00 there are short periods of elevated turbidity. While the Oyster Landing meteorological station doesn't indicate rainfall or heavy winds, this station is almost 9 km from Thousand Acre, so rainfall events may occur at Thousand Acre that don't affect the OL MET station. These data have been coded as suspect, but maybe runoff/disturbed bottom from a summer thunderstorm.

- From 08/19/24 00:00 – 08/19/24 07:00 turbidity is elevated at the same time as OL MET registered heavy winds and 0.5" rainfall. Therefore, these data are likely due to increased turbidity from runoff and disturbed bottom sediments. Readings above the maximum range of the sensor have been coded as rejected.

- From 09/15/24 20:15 – 09/16/24 17:00 there are a couple of short periods of elevated turbidity that occur in conjunction with heavy rainfall and maximum winds of 45 mph recorded at the OL MET station. Therefore, it is believed that these elevated turbidity periods correspond to a disturbed bottom and turbid runoff from rain events.

- From 10/11/24 10:30 – 10/13/24 03:15 there are periods of turbidity spikes that far exceed the maximum range of the sensor. While there were prolonged heavy winds (25-37 mph) on 10/10/24 that could have stirred up bottom sediments, the fact that there are very low readings interspersed between these high spikes indicate that these are likely due to either a blocked optic or something wrong with the sensor. Therefore, these data have been coded as rejected.

- From 11/17/24 01:15 – 11/18/24 09:00 there are two periods of elevated turbidity readings that occur after four days of elevated winds ranging from 20-30 mph and moderate rainfall recorded at the OL MET station. Therefore, it is believed that these elevated turbidity periods correspond to a disturbed bottom and turbid runoff from wind/rain events.

Winyah Bottom –

- From 06/11/24 03:00 through the end of the deployment on 06/24/24 10:30 turbidity readings exhibited large spikes and elevated levels that didn't elicit a corresponding response in fDOM and didn't match the typical tidal pattern in turbidity. For this reason, the large spikes were rejected and the remaining turbidity data were coded as suspect.

Winyah Surface -

- After the 07/10/24 11:00 reading, the sonde was pulled due to heavy fouling evident on telemetry. The wiper had fallen off and the probes were found fouled, so all probes were cleaned and the wiper was reinstalled.

- For the 09/06/24 deployment, data are missing beyond 09/09/24 at 8:00, telemetry flying lead cable was bad, causing sonde batteries to drain and kill the sondes. New cable was installed and issue has resolved.

- For the 09/24/24 deployment, the data file was found to be corrupted and had to be sent to YSI for them to extract the data. They were only able to extract specific conductivity in µS/cm (SWMP reports SpCon in mS/cm), so these data had to be converted to mS/cm by dividing µS/cm by 1000. The data were also found to be bad due to a CT probe failure.

- On 10/03/2024 at 13:00 the sonde was pulled out of the water to change the CT probe which was indicating a failure on the telemetry data. All reading for 13:00 were collected while the sonde was out of the water for maintenance. This however, didn't correct the issue and specific conductivity and salinity data were still obviously bad. This sonde was subsequently sent back to YSI for evaluation and the CT port was found to have corrosion and a loose internal connection.

- On 10/14/2024 this same sonde discussed immediately above, quit recording data internally. It was however still transmitting data via telemetry, so this telemetered data was used to fill the gap between the time of recording failure and its retrieval from the field.

- Beginning on 12/17/2024 at 11:30 turbidity starting exhibiting spikes for which fDOM doesn't respond, indicating that these turbidity values were likely not real. The wiper parking values indicate the wiper was not mis-parking and covering the optics, so I suspect there may have been something stuck to the turbidity probe and periodically wafting in front of the optics, or a small animal living in the sonde's probe guard.

The following are daily rainfall totals > 2.54 mm (0.1") for the year of 2024 recorded at the NIWB-NERR weather station at Oyster Landing. Note that significant rainfall amounts can affect all measured parameters, most noticeably salinity, turbidity and pH. Please note that tropical events are associated with heavy winds that may also affect tidal depth.

Date	Total Daily Precip (mm)
1/7/2024	10.4
1/10/2024	18.5
1/13/2024	2.8
2/1/2024	3.3
2/13/2024	65.5
2/24/2024	5.6
3/3/2024	33.0
3/7/2024	9.9
3/10/2024	24.4
3/22/2024	31.5
3/29/2024	9.7
4/3/2024	19.3
4/11/2024	34.8
4/21/2024	6.4
5/5/2024	7.9
5/6/2024	17.5
5/7/2024	7.4
5/9/2024	3.8
5/14/2024	13.2
5/15/2024	56.4
5/25/2024	22.1
5/28/2024	8.9
6/6/2024	16.0
6/10/2024	16.3
6/27/202	23.9
7/1/2024	91.2
7/2/2024	3.0
7/9/2024	3.8
7/11/2024	12.2

7/12/2024	18.8
7/13/2024	23.6
7/19/2024	22.9
7/20/2024	46.2
7/22/2024	41.4
7/25/2024	49.8
7/26/2024	43.4
7/31/2024	5.1
8/5/2024	16.8
8/6/2024	58.2
8/7/2024	12.4
8/8/2024	30.7
8/9/2024	40.6
8/12/2024	6.1
8/19/2024	25.9
9/7/2024	23.9
9/8/2024	11.2
9/15/2024	40.9
9/16/2024	8.6
9/26/2024	9.1
9/27/2024	21.8
11/05/2024	4.8
11/06/2024	2.5
11/07/2024	8.1
11/08/2024	7.4
11/11/2024	7.6
11/15/2024	8.4
12/11/2024	4.8
12/24/2024	9.9
12/29/2024	27.4