**HRECOS Port of Albany Water Quality Metadata**

**Last updated: 03/24/2025**

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**Station Overview**
Location: Port of Albany, Hudson River (42.61954 , -73.75890)

Data collection period: 01/04/2011 – present

Parameters: acidity, chlorophyll*, dissolved oxygen, specific conductance, turbidity, water temperature, water elevation**, and water velocity**.

*Chlorophyll measurements ended 12/12/2011
**Water elevation and velocity are measured by a co-located USGS station

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**Station Description:**
The Port of Albany water quality station is mounted on the concrete piling on the western shoreline of the Hudson River at the Port of Albany, just to the south of the Cargill Grainery. At mean lower-low water (MLLW), the sonde sits ~2 feet from the water surface and ~8 feet below the surface at mean higher-high water (MHHW). The channel depth at this location is 32 feet at MLLW, so the sonde sits ~30 feet from the river bottom.

All parameters were measured using a YSI 6600V2 sonde, which reports the following parameters via a CR1000 datalogger every 15 minutes. On 3/25/2023 site was upgraded with a YSI EXO2 sonde.

Chlorophyll measurements ended 12/12/2011 when it was decided that data from this sensor were not informative.

Water elevation is measured by a co-located USGS station. USGS began water velocity measurements at this site on 9/30/2016. Velocity measurements are collected using a side-looking Sontek SL500 ADCP.

**Special Remarks:**

| Date | Remark |
|---|---|
| **11/28/2011** | Water elevation measurements began on this date when the water depth sensor was surveyed to NAVD88. |
| **12/12/2011** | Chlorophyll measurements ended because it was decided data from this sensor were not informative. |
| **9/22/2013** | Sonde deployed on had a consistent offset of -0.6 deg C for the entirety of the deployment. A correction was applied to the final data for this deployment. |
| **5/23/2016** | Discovered that data were offset by 17 minutes. Possible bad internal battery on server PC. Disabled automated time update in LoggerNet and corrected logger time (1:29 PM EST to 1:46 PM EST). Exact duration of time offset unknown, but likely less than 1 year. |
| **9/30/2016** | USGS assumes responsibility for maintenance of OTT water elevation gage, and flow/current meter is added to the site. |
| **3/25/2023** | YSI 6-series sonde replaced with YSI EXO2 sonde. |
| **7/19/2024** | Strong sewage odor noted during sonde swap. |
| **12/17/2025** | Sonde was removed for winter due to lower than usual water temperatures. |
| **4/10/2025** | Sonde will be re-deployed for 2025 season on this date. |

**Distribution Terms:**
HRECOS requests that attribution be given whenever HRECOS material is reproduced and re-disseminated and the HRECOS Coordinator be notified prior to publications including any part of the data. Example citation: "Hudson River Environmental Conditions Observing System. 2012. Albany Hydrologic Station data. Accessed April 13th, 2016. http://www.hrecos.org/."

**Data Quality Assurance:**
Data collection and verification have been performed on all parameters (except velocity; see below) since the establishment of this station (January 2011) according to the HRECOS Quality Assurance Project Plan, which is available at www.hrecos.org

Remark on velocity: The level gage and velocity meter have been maintained by the U.S. Geological Survey since their adoption/installation by the agency in September 2016. Water elevation is verified by USGS annually, while velocity is only a working dataset and is primarily purposed for short-term operational use. USGS-verified data may have been corrected based on field measurements, sensor calibrations, sensor cleanings, and other observations using standard USGS methodology. Unverified data is provisional and is subject to revision.

**Code Definitions**

*Flag code definitions:*

| | |
|---|---|
| A | Accepted data |
| P | Provisional data |
| S | Suspect data, consult comment codes |
| R | Rejected data, consult comment codes |
| C | Corrected data, consult comment codes |

*Comment code definitions:*

General Errors

| | |
|---|---|
| [GIM] | instrument malfunction |
| [GIT] | instrument recording error, recovered telemetry data |
| [GMC] | no instrument deployed due to maintenance/calibration |
| [GPF] | power failure/low battery |
| [GQR] | rejected due to QAQC checks |
| [GSM] | see metadata |
| [GIC] | no instrument deployed due to ice |
| [GNF] | deployment tube clogged/no flow |
| [GOW] | out of water event |

Sensor Errors

| | |
|---|---|
| [SBO] | blocked optic |
| [STF] | catastrophic temperature sensor failure |
| [SCF] | conductivity sensor failure |
| [SDF] | depth port frozen |
| [SDP] | DO membrane puncture |
| [SDO] | DO suspect |
| [SIC] | incorrect calibration/contaminated standard |
| [SNV] | negative value |
| [SPC] | post calibration out of range |
| [SSD] | sensor drift |
| [SSM] | sensor malfunction |
| [SOW] | sensor out of water |
| [SSR] | sensor removed (not deployed) |
| [STS] | turbidity spike |
| [SWM] | wiper malfunction/loss |

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 < 28 percent saturation |
| (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 |

**YSI EXO2 Sensor Specifications:**
Consult description and remarks for upgrade dates.

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Thermistor
Model#: 599870-01
Range: -5 to 50 C
Accuracy: -5 to 35: +/- 0.01, 35 to 50: +/- .005
Resolution: 0.01 C

Parameter: Conductivity
Units: mS/cm
Sensor Type: 4-electrode cell with autoranging
Model#: 599870-01
Range: 0-200 mS/cm
Accuracy: 0 to 100: +/- 0.5% of reading or 0.001 mS/cm; 100 to 200: +/- 1% of reading
Resolution: 0.001 mS/cm to 0.1 mS/cm

Parameter: Salinity
Units: practical salinity units (psu)/parts per thousand (ppt)
Sensor Type: Calculated from conductivity and temperature
Range: 0 to 70 psu
Accuracy: +/- 1.0% of reading pr 0.1 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: pH

Units: pH units
Sensor Type: Glass combination electrode
Model#: 599701 (guarded) or 599702 (wiped)
Range: 0 to 14 units
Accuracy: +/- 0.01 units within +/- 10° of calibration temperature, +/- 0.02 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, RFU
Sensor Type: Optical probe
Model#: 599102-01
Range: 0 to 400 ug/Liter; 0 to 100 RFU
Accuracy: Dependent on methodology
Resolution: 0.1 ug/L chl a, 0.1% RFU

Parameter: Phycocyanin
Units: micrograms/Liter, RFU
Sensor Type: Optical probe
Model#: 599102-01
Range: 0 to 100 ug/Liter; 0 to 100 RFU
Accuracy: Dependent on methodology
Resolution: 0.1 ug/L PC, 0.1% RFU

**YSI 6600 Sensor Specifications**
Consult description and remarks for upgrade dates.

Parameter: Temperature
Units: Celsius (C)
Sensor Type: Thermistor
Model#: 6560
Range: -5 to 45 C
Accuracy: +/- 0.15 C
Resolution: 0.01 C

Parameter: Conductivity
Units: mS/cm
Sensor Type: nickel electrode
Model#: 6560
Range: 0-100 mS/cm
Accuracy: 0 to 100: +/- 0.5% of reading or 0.001 mS/cm
Resolution: 0.001 mS/cm to 0.1 mS/cm

Parameter: Salinity
Units: parts per thousand (ppt)
Sensor Type: Calculated from conductivity and temperature

Parameter: Dissolved Oxygen % saturation
Sensor Type: Optical probe w/ mechanical cleaning
Model#: 6150 ROX
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: +/- 15% 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#: 6150 ROX
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: pH
Units: pH units
Sensor Type: Glass combination electrode
Model#: 6589
Range: 0 to 14 units
Accuracy: +/- 0.2 units
Resolution: 0.01 units

Parameter: Turbidity
Units: nephelometric turbidity units (NTU)
Sensor Type: Optical
Model#: 6136
Range: 0 to 1000 NTU
Accuracy: +/-2% of reading or 0.3 NTU (whichever is greater
Resolution: 0.1 NTU

Parameter: Chlorophyll
Units: RFU, micrograms/Liter
Sensor Type: Optical probe
Model#: 6025
Range: 0 to 400 ug/Liter; 0 to 100 RFU
Accuracy: Dependent on methodology
Resolution: 0.1 ug/L chl a, 0.1% RFU

**Remarks on Sensor Specifications and Units**

*Conductivity:*

Historically, specific conductivity data from HRECOS sites was reported in millisiemens/cm. However beginning in 2019, reporting switched to microsiemens/cm. All data files available on hrecos.org have been converted to reflect this change.

*Salinity:*

The 6600 series sondes report salinity in parts per thousand (ppt) units, the EXO sondes report practical salinity units (psu).

*Turbidity:*

The 6600 series sondes report turbidity in nephelometric turbidity units (NTU), the EXO sondes use formazin nephelometric units (FNU).

*Chlorophyll and Phycocyanin 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.

**Appendix A:**

**Characterizing cross-channel variability at the Albany HRECOS site.**

**Prepared by:**
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**Transmitted to Alene Onion, HRECOS Coordinator on Jan 8, 2011**

In late November 2010, in accordance with established procedures to determine the representativeness of near shore sites in the HRECOS network, field sampling was conducted in Albany at the location of the proposed new HRECOS site (42 37 10.42;73 45 32.09). On November 30, 2010 a YSI Sonde was deployed on the west shore at the planned HRECOS location and a sampling transect was laid out perpendicular to the shore. The shore sonde recorded every 15 minutes and was left in place for 4 days but only the first few hours are reported here for comparison with observations from the main channel transects. Three locations along the transect (West, Middle and East) were sampled for suspended sediment and chlorophyll four times at approximately hourly intervals with duplicate 1 L samples collected at 1, 5 and 10 m depth. A YSI sonde was attached to the line holding the intake tube for the water samples thus providing a parallel set of water quality observations. Transect sampling took place during an ebbing tide to detect any spatial patterns due to upstream effects.

An ISCO sampler was also deployed at the HRECOS site but samples were contaminated by what we presume was overwash by a large boat wake.

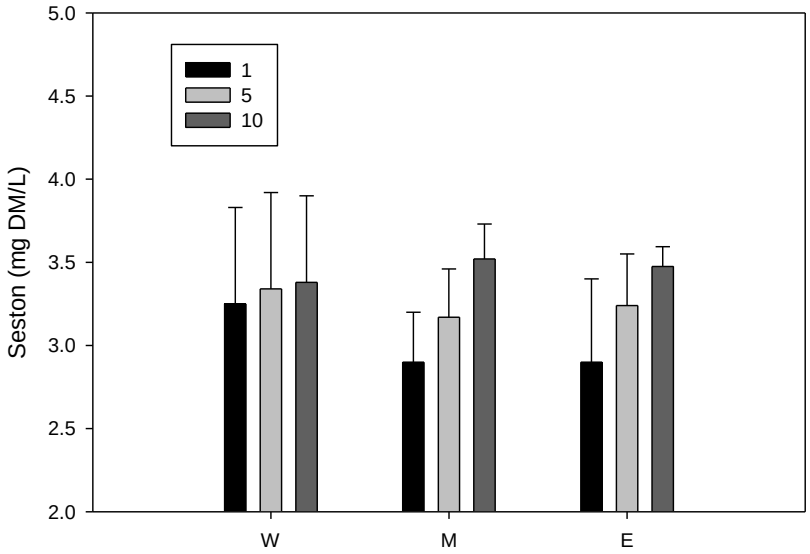

All water samples were analyzed for suspended matter and chlorophyll using established protocols. The YSI sondes were calibrated and checked using established protocols.

RESULTS:

The cross-channel characterization took place during a relatively low flow and low turbidity period but immediately preceding a heavy rain event. Suspended matter showed little variability across the channel with all values less than 4 mg dry mass/L (Fig. 1). These concentrations are low compared to the river-wide mean of 11 mg DM/L but probably not abnormal for this reach. Concentrations were higher at depth for the middle and eastern sites but the actual range of variability was very small. Turbidity measured during the transect sampling showed very little variation either across the channel or with depth and all means were between 2 and 3 NTU (data not shown, full data file appended). Turbidity measured across the transects was very close to the mean value observed during the same time interval at the proposed HRECOS site (Table 1).

Chlorophyll concentrations in water samples collected across the transect showed no horizontal or vertical variability (data not shown) with an overall mean concentration of 0.7 ug Chl/L. Chlorophyll values recorded by the sonde across all transect locations averaged 1.7 ug Chl/L with a range from 1 to 2.8 ug/L (data not shown).

Fig. 1. Mean values for total seston at the western (closest to HRECOS site), middle and eastern transect sampling locations showing variability among sampling depths (1, 5 and 10 m).



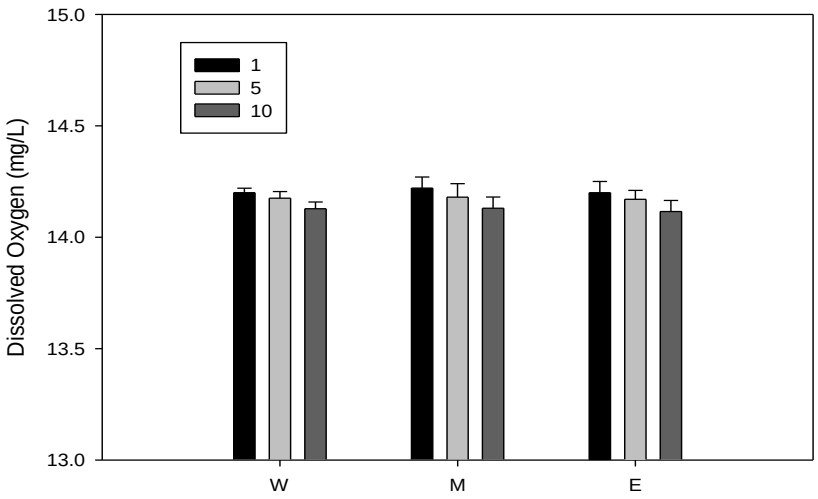

Dissolved oxygen showed little variation across the transect sampling sites but a clear (although tiny) decrease in oxygen at deeper depths (Fig. 2). Values at the shore (HRECOS) site were very close to the mean value found for the transect sites (Table 1). All DO values were slightly above saturation expected for ambient water temperatures (~ 4 C).

Conductivity showed no variation either across the transects or with depth (data not shown) and all values were within a few percentage points. Mean conductivity determined at the Shore site was indistinguishable from the mean of the transect samples (Table 1).

Table 1: Comparison of shore (HRECOS) site and transect sites for DO, turbidity and conductivity. Shore values are the means of readings from 1330 to 1545 to span the same time interval as transect sampling. Transect values are the means of all locations and depths

| | Shore Mean | Shore SD (n) | Transect Mean | Transect SD (n) |
|---|---|---|---|---|
| DO (mg/L) | 13.7 | 0.03 (12) | 14.2 | 0.05 (54) |
| Turbidity (NTU) | 2.32 | 0.04 (12) | 2.44 | 0.65 (54) |
| Conductivity (mS) | 0.206 | 0.002 (12) | 0.202 | 0.003 (54) |

Fig. 2: Mean values for dissolved oxygen at the western (closest to HRECOS site), middle and eastern transect sampling locations showing variability among sampling depths (1, 5 and 10 m).




CONCLUSIONS:

Based on the fall sampling, the proposed western shore location for a HRECOS water quality site will adequately represent conditions in the main channel. Under conditions of this sampling solutes (conductivity and DO) were well-mixed across the channel with only minor variation in DO with depth. Under different conditions when various point sources in the Albany pool might be a greater contribution to loading or when ambient DO is at lower equilibrium values it is not unreasonable to expect different patterns in spatial variability.

Turbidity and suspended matter did not parallel each other which is not unexpected given the very small range observed for both variables. Moreover, there is no particular reason to expect a relationship between light-scattering and total particle mass although across a wide enough range (> 10-fold) there is often a weak pattern. Comparing the turbidity values at the West shore with the other sampled locations shows that the proposed HRECOS site adequately represents the mean turbidity in the channel under these conditions. The direct measurements of chlorophyll are close to values reported by the sondes but it is worth keeping in mind that the levels are quite low and there was no range in either set of observations.