**HRECOS Poughkeepsie Water Quality Metadata**

**Last updated: 08/20/2024**

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Station Overview

Location: Marist College, Poughkeepsie ([41.7206, -73.9388](https://maps.google.com/maps?q=41.7206+N,73.9388+W&hl=en&sll=41.721001,-73.938573&sspn=0.003239,0.004823&t=m&z=17) )

Data collection period: 01/10/2014

Parameters:pH, dissolved oxygen, specific conductance, turbidity, salinity, and water temperature.

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Station Description:

A YSI 6600 Sonde was housed in a steel tube (replaced with stainless on 10/26/16) affixed to the south side of the concrete dock at the Marist boathouse. The sonde is approximately 1 m off the bottom in ~ 4 m of water. The sonde records the following variables every 15\* minutes: All data are recorded by a CR1000 datalogger.

There used to be a co-located sonde measuring water that was continuously pumped from further offshore. This system failed in 2019, but data are still available at <hrecos.org>

\*The sampling rate for this station was 6 minutes until it was changed to 15 minutes on 2014-03-28 07:15:00. The lower rate was determined to be sufficient for this station.

On 5/29/2019 the YSI 6600-series sonde was replaced with a YSI EXO2 series sonde.

Special Remarks:

|  |  |
| --- | --- |
| **Date** | **Remark** |
| **3/28/2014** | Sampling rate changed from 6 minutes to 15 minutes |
| **10/26/2016** | Sonde deployment tube replaced with a stainless steel model |
| **5/29/2019** | 6600 sonde was replaced with a YSI EXO2 sonde |

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](https://nysemail-my.sharepoint.com/personal/brittney_flaten_dec_ny_gov/Documents/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 Station variability at the Marist College HRECOS site.**

**Prepared by:**

**Stuart Findlay**

**Cary Institute of Ecosystem Studies**

**Millbrook, NY**

**Transmitted to Alene Onion, HRECOS Coordinator on June 18, 2013**

Station Characterization: In late April, 2013, field sampling was conducted offshore from the HRECOS Pump Station adjacent to Marist College. The primary goal was to describe the horizontal and vertical variability near the pump inlet. There was concern that the dissolved oxygen readings reported in the tank in the pump house were not representative of the main channel. A series of vertical profiles were made with a YSI sonde tethered to a heavy weight to capture DO, temperature, conductivity and turbidity in surface and near-bottom waters.

Sampling was conducted between 10AM and 1 PM on a flood tide to capture any effects of the downstream Poughkeepsie wastewater discharge.

RESULTS

 Dissolved oxygen showed only slight variation across depths although there is a small downward trend with depth (Fig. 1). All values were within a few percent of expected saturation and the overall range was only about 0.25 mg/L. As reported previously the water column off Marist appears to be well-mixed. Similarly, conductivity showed trivial variation (data not shown).

**Fig. 1: Dissolved oxygen (mg/L) observed during a flood tide at multiple depths off-shore of the Marist pump station at the approximate location of the water intake.**

During this sampling interval the Sonde in the tank reported a mean DO of 7.24 mg/L which is only about 2/3rd saturation confirming the underestimation by the pump station.

During this sampling, turbidity showed a strong and consistent pattern of increasing values nearer the bottom with an overall difference of around 50% (Fig. 2). The sonde in the tank was discovered to have a bad wiper on retrieval making it impossible to compare main channel with tank values.

**Fig. 2: Turbidity observations during a flood tide at multiple depths off-shore of the Marist pump station at the approximate location of the water intake.**