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| **Metadata: Marist College Surface Water Quality Station**  **C:\HRECOS\HRECOS_logo.small.TIF**  **Location:** Marist College, Poughkeepsie, NY ([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:** January 10th, 2014 – present  **Parameters:** acidity, dissolved oxygen, specific conductance, turbidity, salinity, and water temperature. | |
| **Disclaimer:** HRECOS is a research project. No warranty—either express or implied—is made for any information presented by this program.  Researchers interested in accessing the pump station to co-locate monitoring equipment or to use the pump facility to collect samples must contact the HRECOS Coordinator (see contact info below). | |
| **Contacts**:  Brittney Flaten, HRECOS Coordinator  NY State Dept. of Environmental Conservation  256 Norrie Point Way  Staatsburg, NY 12580  Phone: 845-889-4745 x117  Email: brittney.flaten [at] dec.ny.gov  Gary Wall, Marist Pump Station Manager  USGS  425 Jordon Road, Troy, NY 12180  Phone: 518-256-3016  Email: grwall [at] usgs.gov | Stuart Findlay, Marist Pump Station Manager  Cary Institute of Ecosystem Studies  2801 Sharon Turnpike, Millbrook NY 12545-0129  Phone: (845) 677-7600 Ext. 138  Email: findlays [at] caryinstitute.org |
| **Station Details:**  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 which houses the pump station. The sonde is approximately 1 m off the bottom in ~ 4 m of water. The sonde records the following variables every 15\* minutes: acidity, dissolved oxygen, specific conductance, turbidity, and water temperature. All data are recorded by a CR1000 datalogger and transmitted to the HRECOS database via cellular modem.  \*The sampling rate for this station (including the Marist tank sonde (bottom); see metadata) 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 / notes:**   * 2014-03-28 07:15:00: Sampling rate changed from 6 to 15 minutes. * Steel sonde pipe replaced with stainless on 10/26/16. * Equipment was upgraded to YSI EXO2 sonde on 5/29/2019. | |
| **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. Marist Pump Station data. Accessed April 13th, 2016. <http://www.hrecos.org/>.” | |
| **Data Quality Assurance:**  Data collection and verification have been performed since the establishment of this station according to the HRECOS Quality Assurance Project Plan, which is available at [www.hrecos.org](http://www.hrecos.org) | |
| **QAQC 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 | |

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| Parameter | Units | Sensor type | Model | Range | Accuracy | Resolution | Other |
| **Acidity** | Hydrogen ion concentration (pH) | Glass combination electrode | YSI 6589 Fast-response pH Sensor | 0 – 14 units | ±0.2 units | 0.01 units | NA |
| **Conductivity** | Microsiemens per cm (µS/cm) | Nickel electrode | YSI 6560 | 0 – 100 µS/cm | ±-0.5% + 0.001 µS/cm | 0.001 – 0.1 µS/cm (range dependent) | NA |
| **Dissolved oxygen** | Air saturation (%)  ¾¾¾¾  mg/L | Optical  ¾¾¾¾  Calculated | YSI 6150 ROX | 0 – 500%  ¾¾¾¾  0 – 50 mg/L | 0 – 200%: ±1%  200 – 500%: ±15%  ¾¾¾¾  0 – 20 mg/L: ±-0.1 mg/L or 1% (whichever is greater);  20 – 50 mg/L: ±-15% | 0.1%  ¾¾¾¾  0.01 mg/L | NA |
| **Turbidity** | Nephelometric Turbidity Units (NTU) | Optical | YSI 6136 | 0 – 1000 NTU | ±2% or 0.3 NTU (whichever is greater) | 0.1 NTU | NA |
| **Salinity** | Practical salinity units (PSU) | Calculated from conductivity and temperature | YSI 6560 |  |  |  |  |
| **Water temperature** | Celsius (°C) | Thermistor | YSI 6560 | -5 – 45 °C | ±0.15 °C | 0.01 °C | NA |

**Table 1. YSI 6600-series sonde sensor specifications. Equipment was upgraded to YSI EXO2 on 5/29/2019.**

**Table 2. YSI EXO2 sensor specifications. Beginning 5/29/2019.**

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| Parameter | Units | Sensor type | Model | Range | Accuracy | Resolution | Response |
| **Acidity** | Hydrogen ion concentration (pH) | Glass combination electrode | 599702 | 0 – 14 units | ±0.1 pH units within ±10°C  of calibration temperature;  ±0.2 pH units for entire temp range | 0.01 | T63<3 sec |
| **Specific Conductivity** | milliSiemens per cm (mS/cm) | 4-electrode nickel | 599870-01 | 0 – 200 mS/cm | 0-100: ±0.5% of reading or 0.001, w.i.g.; 100-200: ±1% of reading | 0.0001 to 0.01, range-dependent | T63<2 sec |
| **Dissolved oxygen** | Air saturation (%)  ¾¾¾¾  mg/L | Optical, luminescence lifetime ¾¾¾¾  Calculated | 599100-01 | 0 – 500%  ¾¾¾¾  0 – 50 mg/L | 0 – 200%: ±1%  200 – 500%: ±5%  ¾¾¾¾  0 – 20 mg/L: ±0.1 mg/L or 1% (whichever is greater);  20 – 50 mg/L: ±-5% | 0.1%  ¾¾¾¾  0.01 mg/L | T63<5 sec |
| **Turbidity** | Formazin Nephelometric Unit (FNU) | Optical, 90° scatter | 599101-01 | 0 – 4000 FNU | 0-999: 0.3 or  ±2% of reading, whichever is greater; 1000-4000: ±5% of reading | 0.01 FNU | T63<2 sec |
| **Salinity** | Practical salinity units (PSU) | Calculated from conductivity and temperature | 599870-01 |  |  |  |  |
| **Water temperature** | Celsius (°C) | Thermistor | 599870-01 | -5 to +50°C | -5 to 35°C: ±0.01°C  35 to 50°C: ±0.05°C | 0.001°C | T63<1 sec |

**Characterizing Station variability at the Marist College HRECOS site.**

**Prepared by:**

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**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.**