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| **Metadata: Schodack Island Water Quality**  **Location:** Schodack, NY ([42.4996 N, 73.7768 W](https://maps.google.com/maps?q=42.4996+N,+73.7768+W&hl=en&ll=42.499472,-73.776487&spn=0.006399,0.009645&sll=42.49914,-73.776841&sspn=0.012799,0.01929&t=h&z=17))  **Data collection period:** 05/09/2008- present  **Parameters:** acidity, chlorophyll\*, depth, dissolved oxygen, specific conductance, turbidity, water elevation\*, and water temperature.  \*See Location and Equipment section for collection periods | |
| **Disclaimer:** *HRECOS is a research project. No warranty—either express or implied—is made for any information presented by this program.*  Schodack Island hydrological station is located within the Schodack Island State Park, operated by the New York State Office of Parks, Recreation, and Historic Preservation. | |
| **Contacts**:  Brittney Flaten, HRECOS Coordinator  NY State Dept. of Environmental Conservation  256 Norrie Point Way  Staatsburg, NY 12580  Phone: 845-889-4745  Email: brittney.flaten [at] dec.ny.gov | Stuart Findlay, Site 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:**  The hydrologic site for Schodack Island is immediately south of the Schodack Island State Park boat launch and the instrument housing is fixed to the steel bulkhead. Sensors on a YSI 6600V2 report Acidity, Dissolved Oxygen (% saturation and mg/L), Specific Conductance, Turbidity, Water Temperature, Water Level. Water Elevation has been calculated in real-time since it was surveyed in (NAVD88) on 11/25/2012 (Water Elevation = -1.48265 + sonde depth). Because the depth sensor is not vented to the atmosphere, we adjust depth measurements for barometric pressure using the following equation:  *Corrected Depth = Depth + ((1013- Barometric Pressure) \* .0102)*  This correction is performed in real-time on all data since 9/23/2011 00:00:00 EST. Data is recorded by a CR800 logger and transmitted to the HRECOS database via an Airlink Raven Cellular Modem.  Total water depth at mean low water is about 2 m and the instrument is about 0.5 m above the bottom. With the shoreline position of the deployment the data represent the relatively shallow areas of this portion of the Hudson River. Cross-channel sampling shows this part of the River is well-mixed for DO, and dissolved ions (conductivity, pH) but there are tidal increases in turbidity near the shoreline. The site is about 10 miles downstream of Albany.  In August of 2022, site equipment was upgraded from YSI 6600 to YSI EXO2.  \*Chlorophyll measurements ended 12/12/2011 when it was decided that data from this instrument were not informative. | |
| **Summary of cross-channel analyses (see Appendix A for full report):**  Based on summer sampling in 2009, solutes (gases, conductivity) were homogeneous across the channel and so the near-shore continuous record can probably be considered representative of the cross-section. Not surprisingly, turbidity, suspended sediment and chlorophyll varied considerably over space and time with most patterns appearing related to tide stage. At sampling times near low water and early in the flood tide the locations are dramatically different with rapid changes in which portion of the channel shows highest concentrations. At other time the three locations are similar and so a single sampling point would be more representative of the suspended sediment in the cross section. The full report is given as appendix A. | |
| **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. Schodack Island Hydrologic Station data. Accessed April 13th, 2016. <http://www.hrecos.org/>.” | |
| **Data Quality Assurance:**  Data collection and verification have been performed since December 2009 according to the HRECOS Quality Assurance Project Plan, which is available at [www.hrecos.org](http://www.hrecos.org) . Prior to December, 2009, data were collected according to the manufacturer’s instructions only. Deployment dates and post calibration values were seldom recorded and data were not verified. See section on following pages for comment code definitions. | |
| **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 |
| **Chlorophyll** | Micrograms per liter (µg/L) | Optical | YSI 6025 | 0 – 400 µg/L | NA | 0.1 µg/L | Detection limit: 0.1 µg/L |
| **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** | parts per thousand (ppt) | Calculated from conductivity and temperature | | 0 to 70 ppt | +/- 1.0% of reading or 0.1 ppt, whichever is greater | 0.01 ppt | NA |
| **Water level** | Meters (m) | Pressure transducer | YSI 6600 (sonde internal) | 0 to 30 ft (9.1 m) | 0-10 ft: +/- 0.01 ft (0.003 m); 10-30 ft: +/- 0.06 ft (0.018 m) | 0.001 ft (0.001 m) | Not vented to atmosphere |
| **Water temperature** | Celsius (°C) | Thermistor | YSI 6560 | -5 – 45 °C | ±0.15 °C | 0.01 °C | NA |

**Table 1. YSI 6600 specifications. Sonde was replaced with an EXO2 model on 8/2/2022.**

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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 units | T63<3 sec |
| **Conductivity** | milliSiemens per cm (mS/cm) | 4-electrode nickel | 599870-01 | 0 – 200 mS/cm | 0-100 mS/cm: ±0.5% of  reading or 0.001 mS/cm,  whichever is greater;  100-200 mS/cm: ±1% of  reading | 0.0001 to 0.01 mS/cm  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 Units (FNU) | Optical, 90° scatter | 599101-01 | 0 – 4000 FNU | 0-999 FNU: 0.3 FNU or  ±2% of reading, whichever is greater; 1000-4000 FNU: ±5% of reading | 0-999 FNU: 0.01 FNU  1000-4000 FNU: 0.1 FNU | T63<2 sec |
| **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 |
| **Water**  **depth** | Meters (m) | Non-vented (depth auto-corrected) | EXO2, integral | 0 to 100 m | ±0.04% FS (±0.04 m) | 0.001 m  (auto-ranging) | T63<2 sec |

**Table 2. YSI EXO2 model specifications. Equipment was upgraded to EXO2on 8/2/2022.**

**Appendix A**

Final Report – HRECOS Installation at Schodack Island State Park

Stuart Findlay

Cary Institute of Ecosystem Studies

HRF Award # 001/07E

October 30, 2009

The original proposal to the Hudson River Foundation had several major goals and all these have been met and surpassed over the last two years.

1. Installation – A functional, multi-variable water quality and meteorological site has been established at the SISP in collaboration with Gary Wall of the USGS. The site has been operational with very minor gaps since spring of 2008.

2. Field sampling – To determine how well the shore-mounted site captures variability across the channel we collected water samples from the east and west shore over a 24 hr period using ISCO Automatic samplers. During the last ten hours we sampled three points across the channel cross-section with surface, mid-depth and near-bottom samples. Solutes (gases, conductivity) were homogeneous across the channel and so the near-shore continuous record can probably be considered representative of the cross-section. Not surprisingly, turbidity, suspended sediment and chlorophyll varied considerably over space and time with most patterns appearing related to tide stage. The Figure below shows the suspended matter concentrations at the East, Mid and Western channel sites over an ebbing-flooding transition. At sampling times near low water and early in the flood tide the locations are dramatically different with rapid changes in which portion of the channel shows highest concentrations. At other time the three locations are fairly similar and so a single sampling point would be more representative of the suspended sediment in the cross section.



3. Findings – Observations from this site have contributed to new knowledge on several fronts. Firstly, we were able to show that early in the year, turbidity at Schodack is completely controlled by water flow at the head of tide while later in the year turbidity is associated with short-term resuspension events. Additionally, a comparison with the Norrie Point station shows turbidity records were not strongly connected to flow variations but are linked with local conditions (<http://hres.org/currents/cur37-2.pdf>). Recently, Gary Wall has confirmed discrepancies between the predicted and observed tides of as much as two hours using the Schodack water level records. Such information is of use to local fisherman and those using the River for recreation. Information from the HRECOS network has been used in many scientific talks, publications and general assistance for the public.

4. Education – Cornelia Harris of the Cary Institute has developed some teaching modules suitable for High School students using HRECOS data. These modules describe the observational system and then challenge the students to explore the records for potential relationships between precipitation and pH. Students completing the exercise gain familiarity with working with large data sets and can see how different ways of extracting data can lead to differing conclusions (<http://www.hrecos.org/joomla/index.php?option=com_content&view=category&layout=blog&id=36&Itemid=59>).

5. Outreach – The availability and capabilities of the HRECOS system have been broadly disseminated through face-to-face meetings and the media. The Cary Institute, HRNERR and HRF held a pair of workshops to introduce stakeholders to HRECOS and how it might be of interest to them. Overall reaction was positive with suggestions for how to present results, data gaps and additions for the future. A newspaper article appeared in July of 2008 giving details on HRECOS goals and the status to date (<http://www.ecostudies.org/ecofocus_2008-07-20.html>). Staff of the Schodack Island State Park use the observations to answer questions from Park visitors about water temperature and other conditions.