

Water Quality Metadata

Last updated: 12/8/2025

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Station Overview

Location: Piermont Pier ([41.043, -73.896](#))

Data collection period: 04/22/2008-10/29/2012; 8/28/2013 – present

Parameters: pH, dissolved oxygen, specific conductance, turbidity, salinity, water temperature, chlorophyll*, and water depth above sonde

*Chlorophyll measurements ceased 12/12/2011

Contacts

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Station Description

The Piermont Pier sampling station is situated on the end of a mile long pier stretching into the Hudson River. The pier is open to the public and regularly used for recreational purposes. It is located just north of the NERRS Piermont Marsh, a tidal salt marsh dominated by the invasive reed *Phragmites australis*, where approximately 30 MGD of secondarily treated sewage is discharged from Orangetown and Rockland County. The local tidal range varies between 3 and 5 feet and the river bottom is characterized by thick mud and rocks. A YSI 6600 multi-probe sonde was deployed in a perforated PVC tube encasing mounted to the pier until August 2023. The sensors sit ~3 feet below low tide. A USGS station is located 10 feet to the north and records water elevation.

Historic depth above sonde data is also available at this site. Because the depth sensor is non-vented to the atmosphere, we adjust depth measurements for barometric pressure using the following equation: $\text{Corrected Depth} = \text{Depth} + ((1013 - \text{Barometric Pressure}) * .0102)$. This correction is performed on all data since EST 9/23/2011 00:00:00. These corrections were made retroactively once per quarter until 4/18/2015 12:00 EST, when the correction was implemented as an automated calculation on the real-time data.

Equipment was upgraded to a YSI EXO2 sonde on 8/10/2023.

Summary of Cross Channel Analysis:

Based on sampling on December 1, 2011, the river cross-section at this location showed greater variability in turbidity and conductivity across both distance and time than other HRECOS sites examined. Due to a dysfunctional sonde at the station, a comparison of long-term patterns was not possible. On the day of sampling there was a strong West to East gradient in turbidity which (if

general) means the fixed HRECOS site will overestimate turbidity of the main channel at this location. There was no conclusive evidence of an effect of the wastewater outfall or Sparkill Creek on conditions observed at the fixed HRECOS site. The full report of this analysis is given as appendix A.

Special Remarks

1/06/2011-2/07/2011	Sonde failure. Data lost.
2/07/2011-2/12/2011	Dissolved oxygen probe failure.
7/14/2011-10/23/2011	Sonde failure. Data lost.
9/23/2011	Depth corrections using barometric pressure begin.
11/08/2011 – 12/11/2011	Barometric pressure sensor failure.
10/30/2012	Sonde lost during Hurricane Sandy
8/28/2013	Station rebuilt after Hurricane Sandy
4/18/2015	Automated depth corrections begin
1/1/2015-5/2/2015	Sonde deployment surpassed 3 months. All data flagged as suspicious.
8/2/2015-10/13/2015	Sonde deployment surpassed 3 months. All data flagged as suspicious.
1/27/2016	Time lag observed in data stream. Data were post-corrected with internally logged data.
9/1/2016	Logging and telemetry issues are fixed
3/6/2017	Extreme rain even led to large flush of freshwater and low temperatures.
3/23/2017	Heavy sedimentation may have impacted sensor readings
8/10/2023	6600 sonde replaced with YSI EXO2 sonde
12/9/2024	Telemetry restored to site.

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 since the establishment of this station according to the HRECOS Quality Assurance Project Plan(s), which are available at www.hrecos.org

Code Definitions

Parameters

WTMP	Water temperature	Degrees Celsius
SPCO	Specific conductance	uS/cm
SALT	Salinity	See remarks below
PH	pH	
TURB	Turbidity	See remarks below
DOPC	Dissolved oxygen saturation	Percent (%)
DOCONC	Dissolved oxygen concentration	mg/L
DEPTH	Depth above instrument	m
CHLA	Chlorophyll	RFU
PHYCO	Phycocyanin	RFU

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 or calibration
GPF	Power failure
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 or 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 for deployment
STS	Turbidity spike
SWM	Wiper malfunction or loss
<u>Other comments</u>	
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
CDB	Disturbed bottom
CDF	Data appear to fit conditions
CFK	Fish fill
CIP	Surface ice present
CLT	Low tide
CMC	In field cleaning and maintenance
CMD	Mud in probe guard
CND	New deployment
CRE	Significant rain event
CSM	See metadata
CTS	Turbidity spike
CVT	Possible vandalism
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: Specific conductance

Units: mS/cm or uS/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 or 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% of 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

Remarks on Sensor Specifications and Units

Consult description and remarks for upgrade dates.

Specific conductance:

Historically, specific conductance data from HRECOS sites was reported in millisiemens/cm (mS/cm). However, beginning in 2019, reporting switched to microsiemens/cm (uS/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.

Remarks on Data Correction

From May 2019 to March 2026, data were collected and reviewed by the United States Geological Survey, according to their standard operating procedure which is outlined in the following document:

Wagner, R.J., Boulger, R.W., Jr., Oblinger, C.J., and Smith, B.A., 2006, Guidelines and standard procedures for continuous water-quality monitors—Station operation, record computation, and data reporting: U.S. Geological Survey Techniques and Methods 1–D3, 51 p.

<https://pubs.usgs.gov/publication/tm1D3>

Part of data review includes correcting for sensor drift if it occurred during deployment. Per USGS protocol, provisional data are flagged as P and once reviewed they are flagged as A, even if data correction occurred.

Appendix A

Final Report

Characterizing cross-channel variability at the Piermont HRECOS site.

Prepared by:

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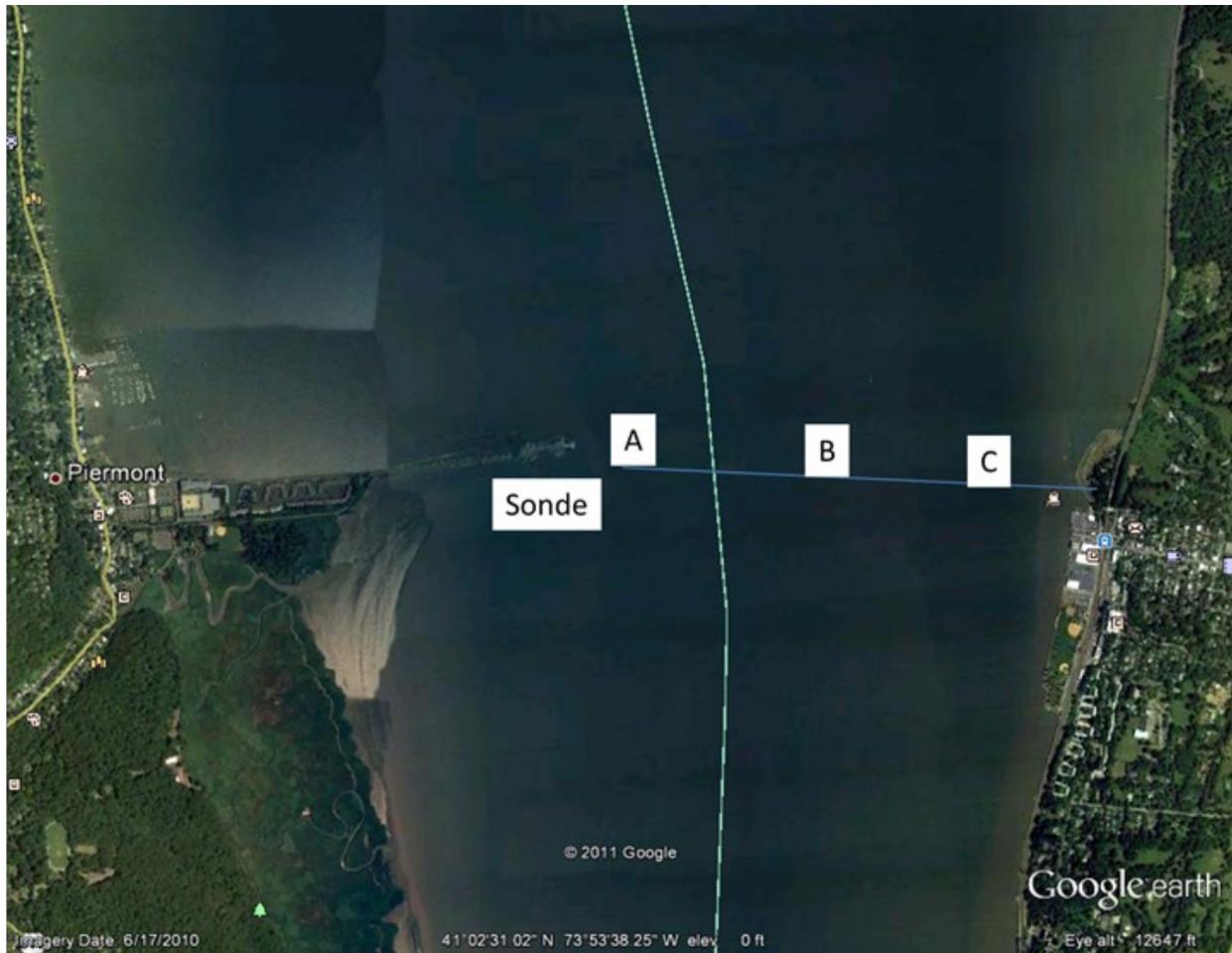
Millbrook, NY

Transmitted to Alene Onion, HRECOS Coordinator on December 30, 2011

On December 1, 2011 we conducted a survey of cross-channel variability adjacent to the Piermont Pier HRECOS deployment. The HRECOS sonde is located in a pipe on the southern side of the pier in approximately 4 m water depth. Due to concern about the condition of the existing HRECOS sonde we attached a newly-calibrated sonde at the same location as the existing sonde. This sonde was programmed to log every 5 minutes for the interval of our field sampling. To assess how well this location represents conditions across the channel we conducted two sampling transects each including three locations (Fig. 1) where we conducted vertical sampling. Following established procedures we towed a YSI Water Quality sonde approximately 1 m sub-surface across the transect with logging set for 30 sec intervals. Due to the width of the Hudson at this location it required nearly an hour to traverse the channel. Sampling occurred between Noon and 3 PM (EST) during a flooding tide since the main concern at this site was the possible influence of a wastewater outfall and the Sparkill Creek both located south of the Pier. At Locations A,B,C along the transect the sonde and a sampling tube connected to a peristaltic pump were lowered to 1 and 5 m (and 10 m in the navigation channel (Site C)) to collect observations and an actual water sample from these depths.

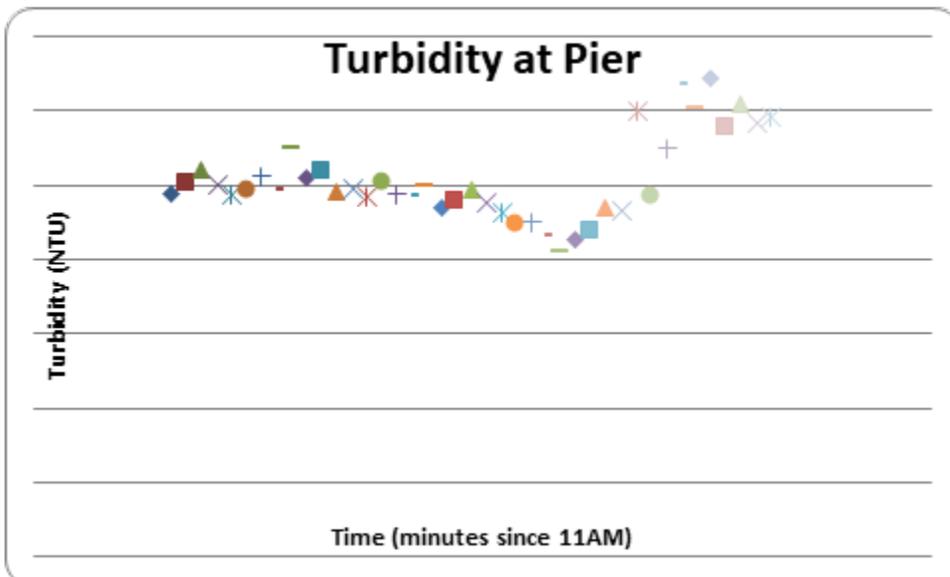
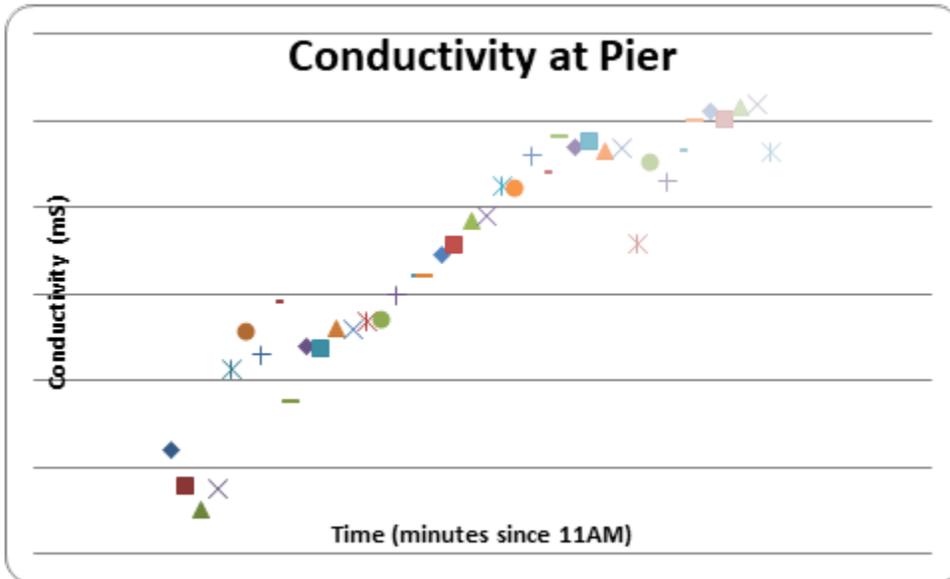
All sonde calibration and suspended matter determinations followed established procedures.

Fig. 1: Google Earth image of Piermont reach of the Hudson River showing approximate locations of the fixed sonde, sampling transect and sites A-C.



Both conductivity and turbidity records at the Pier showed increases during the three hour period of flooding tide. Conductivity is likely simply due to an upriver flow of higher salinity water. The turbidity increase could be due to either local resuspension or upriver movement of a water mass with higher turbidity.

Fig. 2: Changes in conductivity and turbidity recorded by the temporary sonde attached to the pier during the 3 hour transect sampling interval.



Sampling across the channel revealed large and distinct differences in turbidity with highest values on the west side of the channel, decreasing towards the east during both traverses (Fig. 3). Higher values occurring at ~ 80 and 120 minutes represent times the sonde was lowered for vertical profiles (see below). Samples of suspended matter showed distinct differences among locations with values at Location "A" nearly two-fold higher than Location "C" in the navigation channel (Fig. 4).

Fig. 3: Cross-channel variation in turbidity as recorded by the towed YSI Sonde. The X-axis is in minutes since 11 AM for ease of comparison with the fixed (pier) sonde. Two traverses were carried out, the first lasting from roughly 70 to 130 minutes past 11AM and the second from 140 to 210 minutes and each was from West to East.

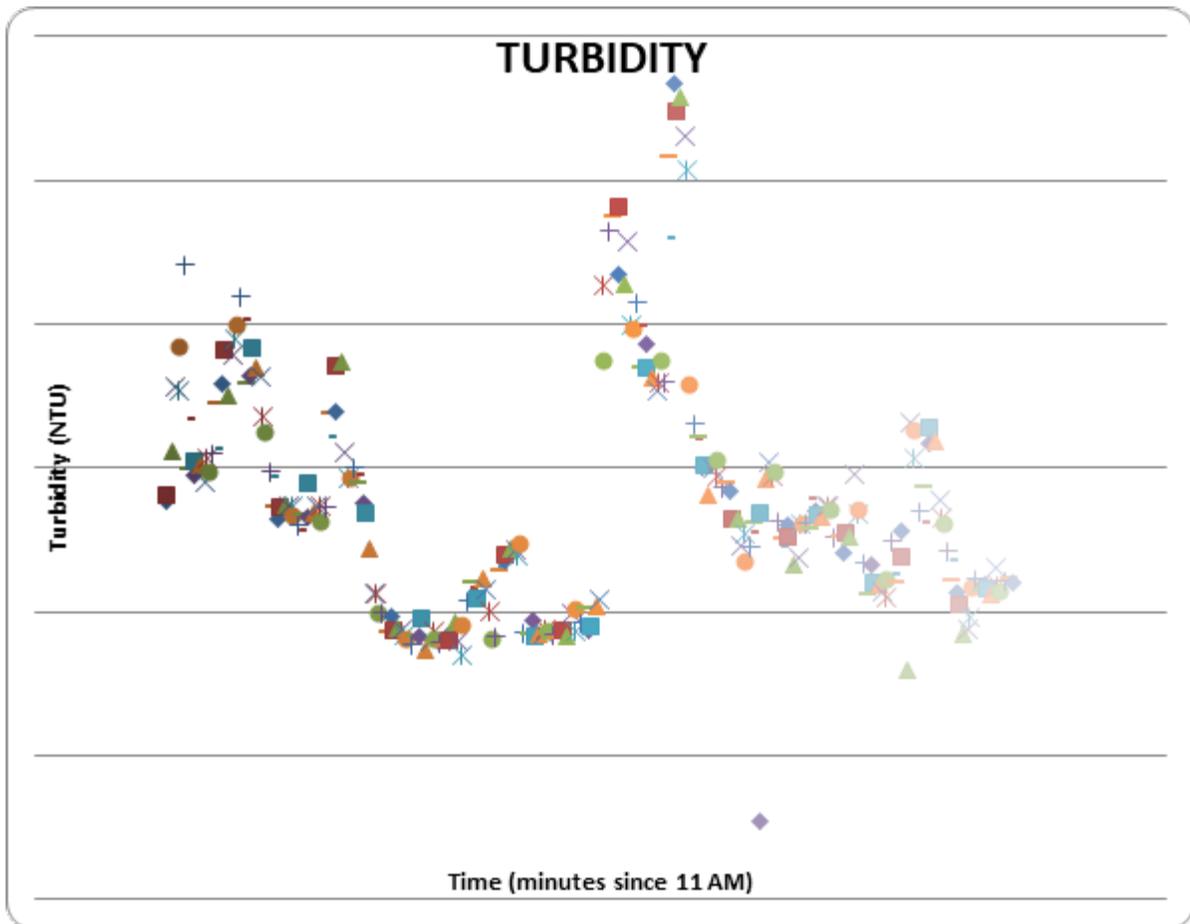
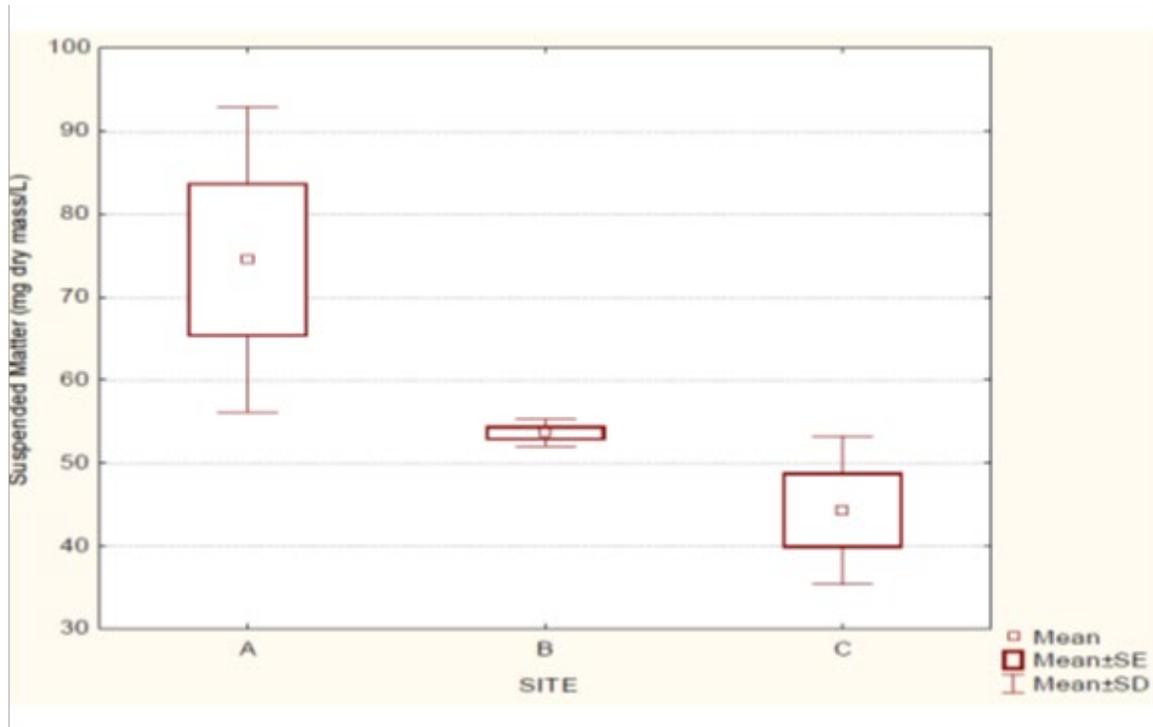
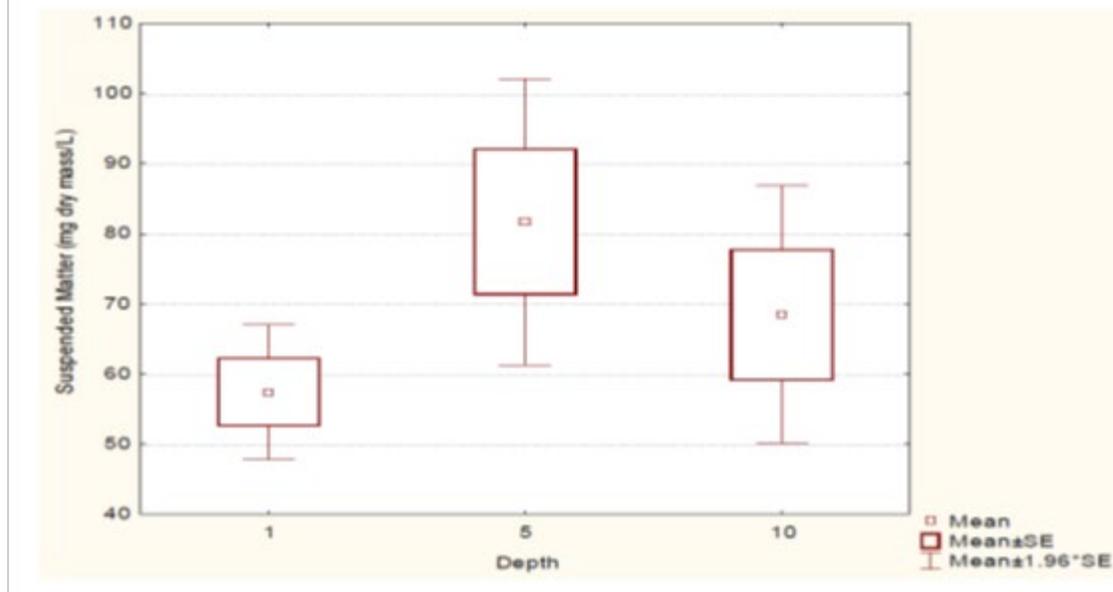


Fig. 4: Variation in suspended matter in shallow water (depth = 1 m) samples collected at locations A-C (West to East) across the transect.



Samples for suspended matter collected along vertical profiles showed higher values at depths 5 and 10 (Fig. 5) although statistical analysis was equivocal since only “Location “C” was deep enough to allow sampling at 10 m.

Fig. 5: Depth variation in suspended matter. Locations “A & B” were sampled at 1 and 5 m while Location “C” was sampled at 1,5 and 10 m.



There were slight West to East gradients in conductivity with a range of less than 0.1 mS (not shown) but little evidence of strong vertical variation in conductivity. Dissolved oxygen and pH showed no variation across the transects. The average dissolved oxygen was 11.2 mg/L with a standard deviation of only 0.1 mg/L. Mean pH was 7.9 pH units.

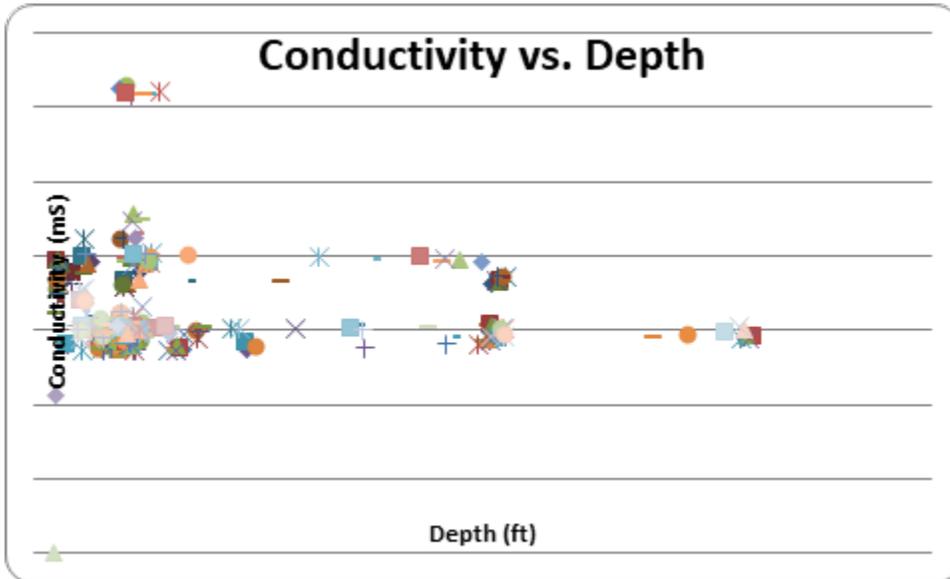


Fig. 6: Variation in conductivity across sampling depth showing no consistent stratification (higher conductivity at depth) during this three hour period.

Conclusions

1. On the date of sampling the Piermont cross-section showed greater variability in turbidity and conductivity across both distance and time than other HRECOS sites examined.
2. Lack of a functional fixed sonde makes comparison of the particular sampling dates to longer term patterns impossible.
3. On the day of sampling there was a strong West to East gradient in turbidity which (if general) means the fixed HRECOS site will overestimate turbidity of the main channel at this location.
4. There was no conclusive evidence of an effect of the wastewater outfall or Sparkill Creek on conditions observed at the fixed HRECOS site.