



Monitoring the Hudson and Beyond with HRECOS: The Hudson River Environmental Conditions Observing System

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A New Lens for the Hudson and Beyond

The Hudson River Environmental Conditions Observing System (HRECOS) is a robust environmental monitoring network operated and managed by a consortium of governmental, academic, and private institutions with shared interest in high-frequency monitoring in the Hudson River watershed. HRECOS monitoring stations are geographically distributed along the Hudson and Mohawk Rivers (see map below), and are equipped with sensors that continuously record a suite of water quality and weather parameters every 15 minutes, with most stations operating year-round. Remote telemetry at each

station transmits real-time data for the public to freely view and download using an easily-accessible interface at www.hrecos.org. HRECOS works to improve the capacity of regional river and estuary stakeholders to: understand the ecosystem and manage water resources, provide baseline monitoring data necessary for applied research and modeling, support the use of real-time data in educational settings, provide policy makers and emergency managers with data products to guide decision making, and provide information for safe and efficient commercial use and recreational activities.

The HRECOS monitoring network brings together and develops upon long-standing monitoring programs of its partners, including (but not limited to):

- National Oceanic and Atmospheric Administration's Hudson River Research Reserve (NOAA - HRNERR)
- NY State Dept. of Environmental Conservation's Rotating Integrated Basin Studies (NYS DEC - RIBS)
- Stevens Institute of Technology's New York Harbor Observing and Prediction System (NYHOPS)
- U.S. Geological Survey monitoring programs
- Cary Institute of Ecosystem Studies monitoring programs

All HRECOS data collection and review procedures are subject to several levels of quality control as required by a Quality Assurance Project Plan, which is regularly renewed and approved by NYS DEC.



Parameters measured

Water Quality:

- Dissolved oxygen
- Salinity/conductivity
- pH
- Turbidity
- Water temperature
- Water depth/elevation

Weather (at select sites*):

- Air temperature
- Dew point
- Relative humidity
- Barometric pressure
- Solar radiation (PAR)
- Rainfall
- Soil temperature
- Wind speed/dir, deviation, max. gusts



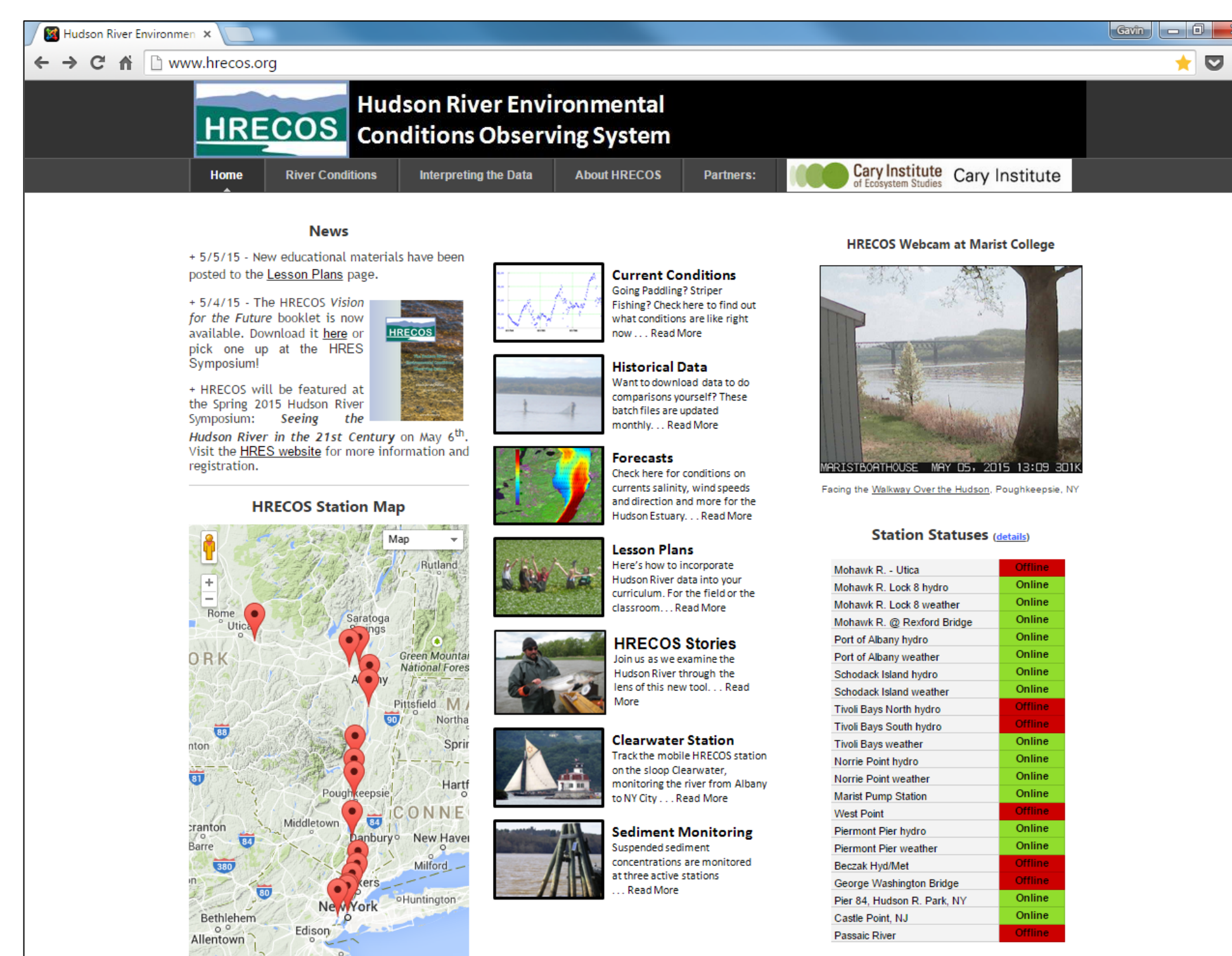
YSI Water Quality sondes Port of Albany weather station

HRECOS Applications

- **Researchers** use the data to investigate how the river ecosystem functions, assess recovery from disturbance, map sensitive plant and animal communities, track the fate of pollutants, and research the impacts of climate change on wetland communities.
- **Resource managers** use the data to monitor water quality and manage ecosystem resources.
- **Educators** engage students in place-based chemistry, biology, physics, and math lessons.
- **Mariners** rely on depth measurements to aid in commercial and recreational navigation, as well as dew point measurements to monitor for unsafe fog conditions.
- **Emergency responders** use on-the-ground conditions derived from HRECOS data to guide rescue and recovery efforts.
- **The general public** uses HRECOS for planning recreational activities such as kayaking and fishing.



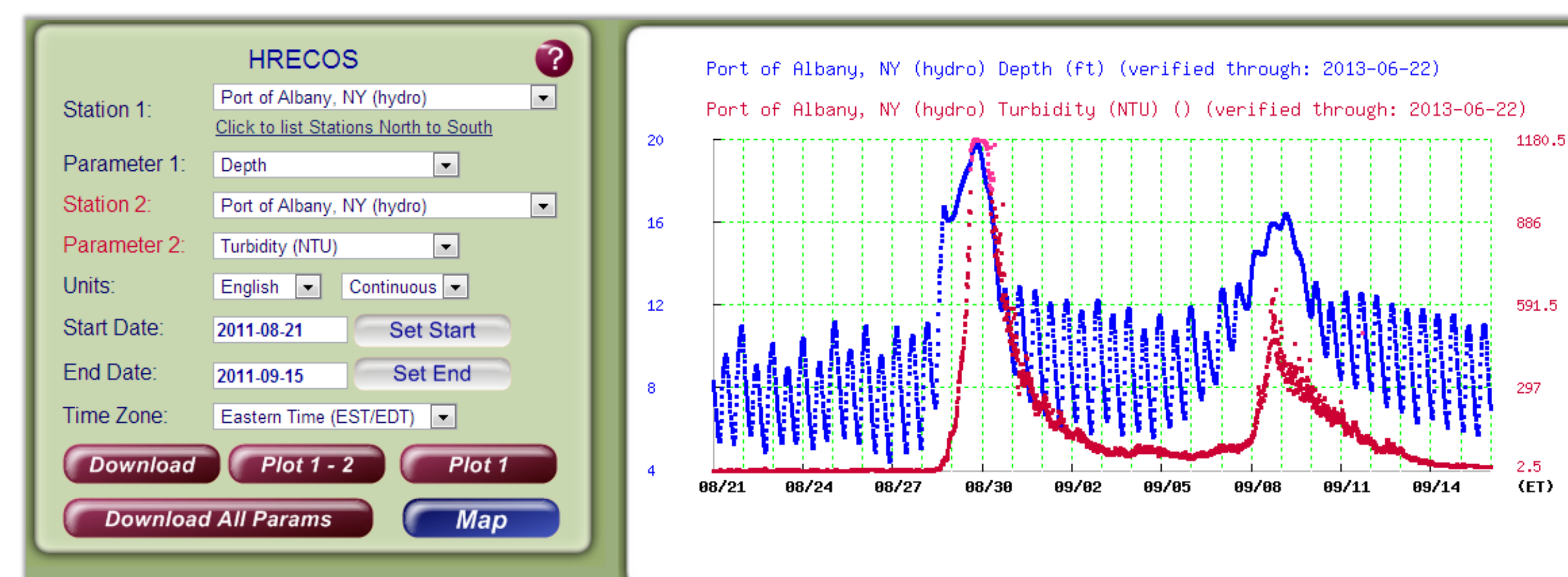
Website: www.hrecos.org



The goal of the HRECOS website is to facilitate the use of real-time water quality and weather data for a diverse audience. The homepage offers links to current conditions (see below), historical data

files, 3 day forecasts provided by NYHOPS (New York Harbor Observing and Prediction System, Stevens Institute of Technology), as well as lesson plans and interpretive stories.

Current Conditions in real-time



HRECOS data are available in near real-time through our Current Conditions page, where both current and historical data can be graphed and downloaded. The example above shows water

depth (blue) plotted against turbidity (red) at the Port of Albany HRECOS station during Hurricane Irene and Tropical Storm Lee.

Quality Assurance

All HRECOS instrumentation, procedures, and data formats are subject to multiple levels of quality assurance/quality control, as outlined by the HRECOS Quality Assurance Project Plan, which is regularly approved by the NY State Dept. of Environmental Conservation.

- ✓ 3-tiered data review process:
 1. Automatic flagging of raw data in real-time (flatlines, spikes, out of instrument range),
 2. Quarterly data review and flagging by HRECOS station managers, and
 3. Tertiary and final review by HRECOS staff
- ✓ All stations use the same robust water quality monitoring instrumentation, as selected by the HRECOS management team
- ✓ Strict calibration, maintenance, and rotational schedules for all instrumentation
- ✓ Studies conducted annually or as funding permits assess the representativeness of each station relative to main channel conditions.

Featured Special Projects

Monitoring Wastewater Releases

Stormwater runoff often overwhelms aging city wastewater management systems, triggering combined sewer overflows (CSOs) that result in high amounts of organic material being released into natural waterways. HRECOS maintains a water quality monitoring station in the Mohawk River downstream of the city of Utica to monitor for such events. It monitors for environmental responses that are indicative of CSO activation, such as marked decreases in dissolved oxygen and spikes in conductivity. These data are being used by regional DEC engineers in combination with CSO activation records to develop a model for release detection, and ultimately to monitor the progress of improvements to Utica's aging wastewater infrastructure.

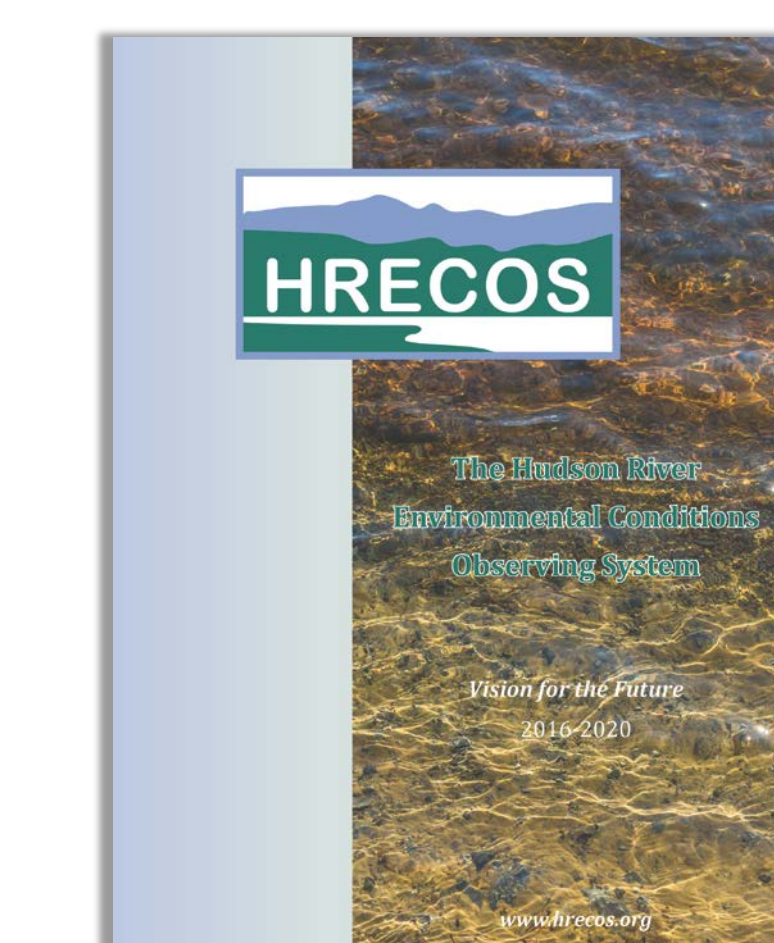


Pumped Monitoring Station

The pumped sampling and monitoring station at Marist College in Poughkeepsie is configured to automatically collect physical water samples for investigating issues related to toxic chemicals and microbiology, etc. Water is pumped from the river (9 m from bottom, 91 m from center channel) into a tank where a sonde measures water quality parameters every 15 minutes. Sample collection can be remotely triggered via computer, automatically by pre-defining parameter thresholds, or manually. A separate sonde outside the pump house records surface water quality parameters and water elevation at the site. [This resource is available for use by external researchers, educators, or students for independent projects \(contact HRECOS Coordinator, \[gavin.lemley@dec.ny.gov\]\(mailto:gavin.lemley@dec.ny.gov\)\).](#)



HRECOS Vision



We envision HRECOS as a fully integrated, reliable, and accessible network of monitoring stations that characterizes the Hudson River and surrounding water bodies for the purpose of supporting informed research, decision-making, education, and promotion of watershed health and safety. Grounded in a growing network of productive, mutually beneficial partnerships and an expanding number of stations, HRECOS will be a nexus for high frequency Hudson River Watershed monitoring efforts and the acknowledged user-focused platform providing data and information valued by a broad range of community stakeholders within the Hudson River region.

The HRECOS Vision is detailed in its *Vision for the Future* document (left), which is available at the registration table, or from Gavin Lemley, HRECOS Coordinator.



HRECOS is operated by a consortium of the above organizations