

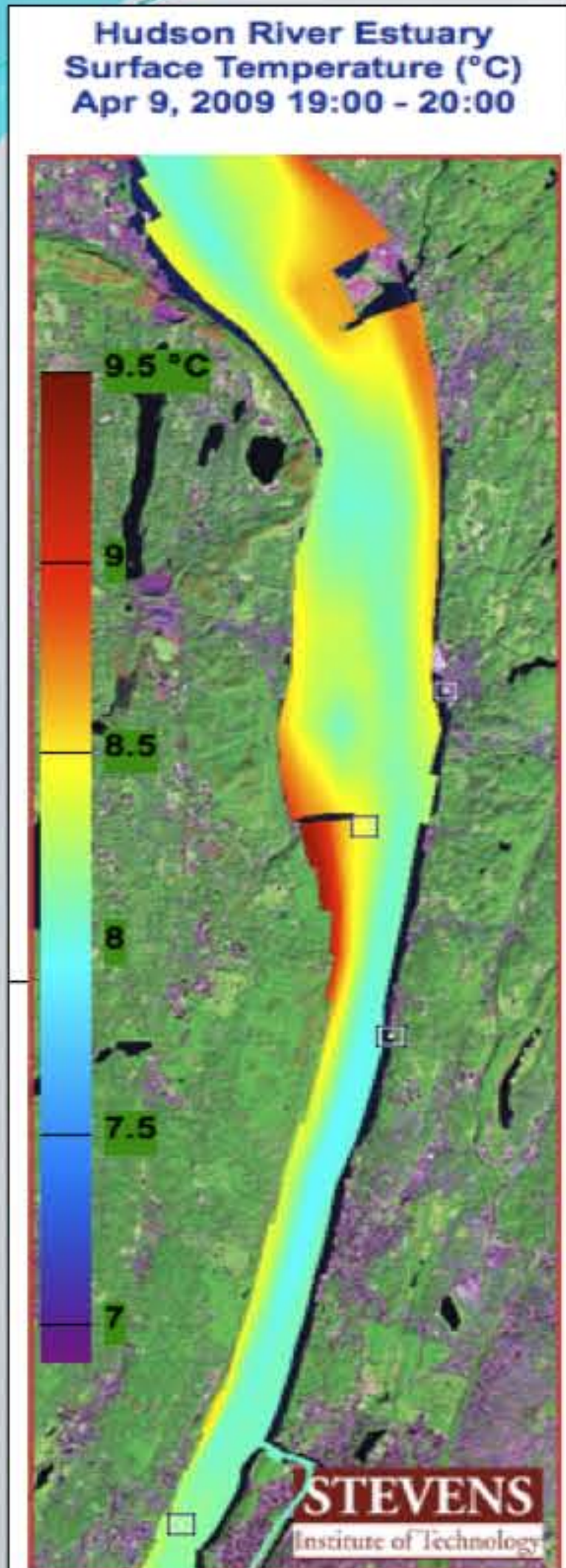
# Hudson River Environmental Conditions Observing System

## Monitoring the Hudson: A Local Approach to Monitoring Global Climate Change

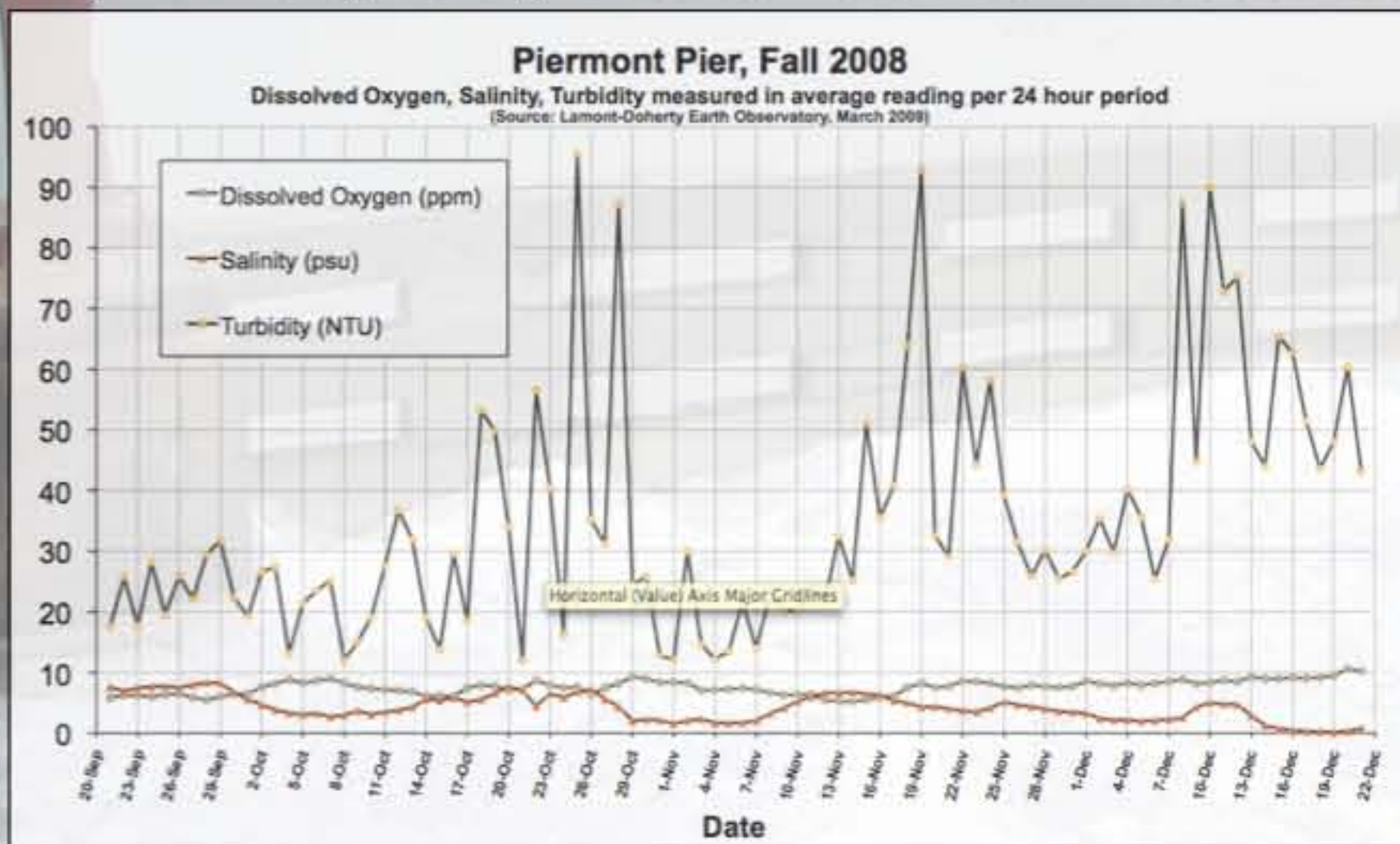
**Introduction:** The Hudson River Estuary provides habitat for hundreds of animals, plants and fish species. Over the past 400 years, as the human population has increased dramatically, the biodiversity of the estuary continues to decline partially due to contamination and reduction of important breeding and feeding grounds. These changes are a result of a multitude of factors including short-term changes in land and water use surrounding the estuary as well as alterations to the riverbed itself. The long-term issue of climate change is another force with critical impact on the estuary, the details of which require careful data collection over time.

Given that environmental changes have occurred faster than the development of monitoring technologies, we are fortunate today to have the ability to routinely monitor several key indicators of water and environmental quality along the Hudson River Estuary. Real-time monitoring was made possible in 2008 when the Hudson River Environmental Conditions Observing System (HRECOS) initiated the collaborative real-time monitoring program. This program has brought together several partners including the Lamont Doherty Earth Observatory at Columbia University, the Stevens Institute, several government agencies and others, each with a common goal to coordinate and share important data collected from the observation stations along the river.

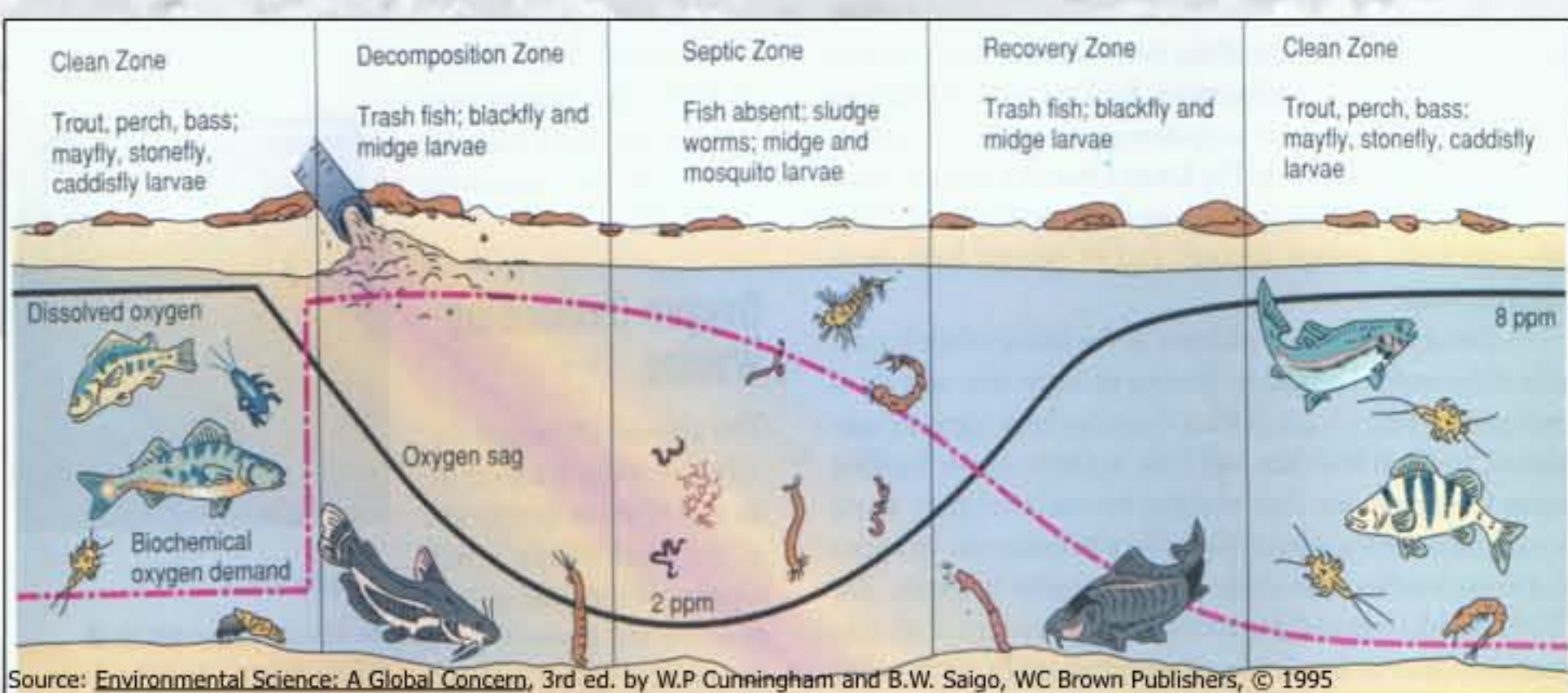
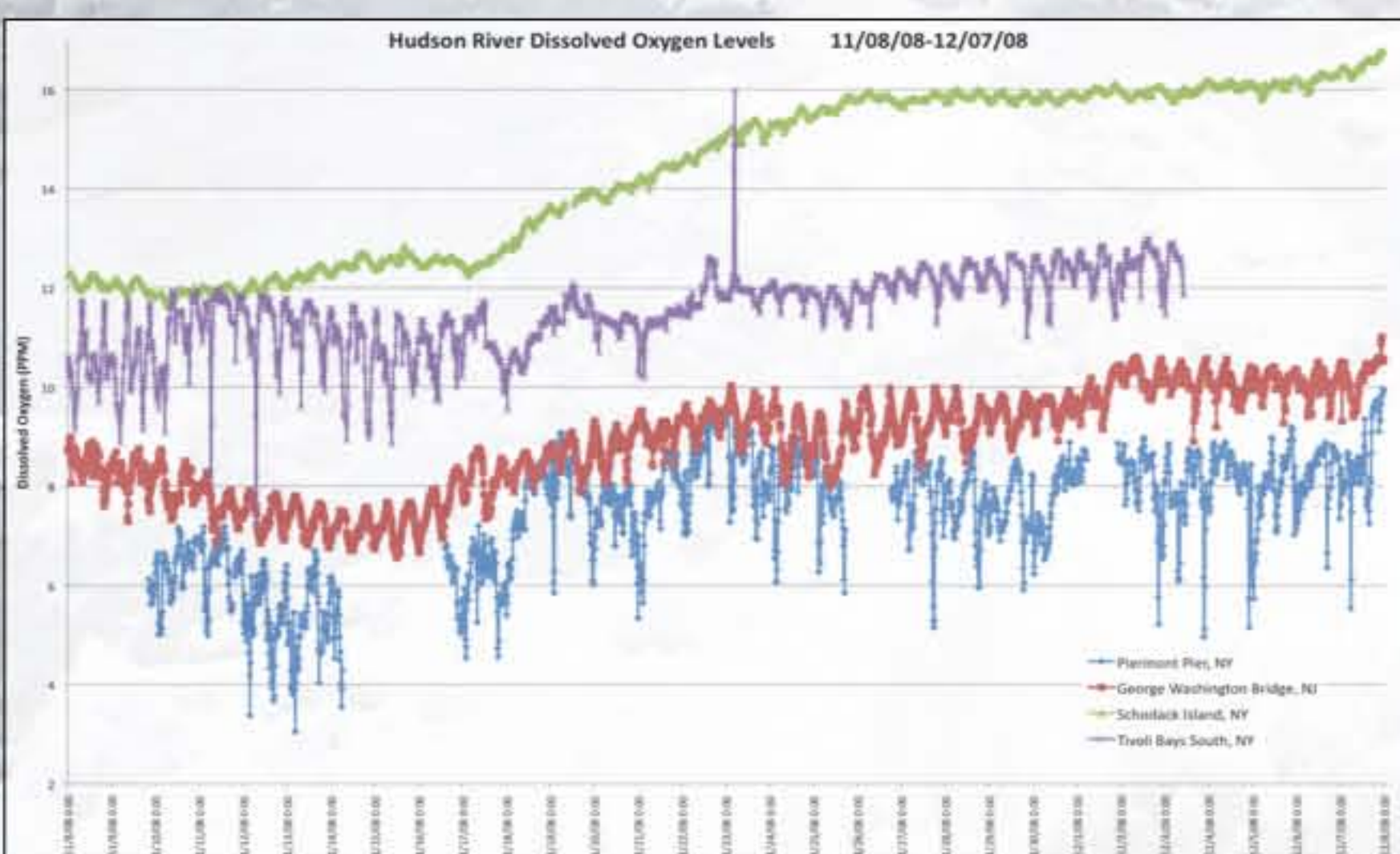
**Methods:** Twenty-four hours a day, seven days a week data are collected from 7 locations along nearly 150 miles of the estuary from Troy, NY to the New York/New Jersey Harbor. Each station measures several indices which include chlorophyll, dissolved oxygen (ppm), salinity (psu), turbidity (ntu), water level (ft), water temperature (°F), and many stations also measure absolute pressure (psia), radiation (W/m<sup>2</sup>), relative humidity (%), air temperature (°F), solar radiation (W/m<sup>2</sup>), relative humidity (%), wind direction (°), and wind speed (mph). Data is sampled and logged every quarter hour (15 minutes) and then sent to an online site via telemetry. Current conditions can be found on this website: <http://hudson.dl.stevens-tech.edu/hrecos>.



**Findings:** The HRECOS monitoring project allows for close measurement of data in order to identify patterns in seasonal and weather variations, changes in water quality, and the detailed measurement of daily water levels. The monitoring project has also proven to be a useful tool to monitor changes in water quality related to the urban environment of greater New York City. As the largest metropolitan area in the U.S., New York City is virtually covered with impervious surfaces such as rooftops, parking lots and highways. Because much of the city is located within the Hudson River watershed these impervious surfaces can prevent the natural processing of wastewater in the soil and thus have a direct influence on the water quality of the estuary. Following a storm with high precipitation, impervious surfaces create an express path for pollutants to the river system especially when water runoff exceeds the processing capacity of the municipal wastewater treatment plants (an event known as a combined sewer overflow or CSO). CSOs and additional urban runoff may be one of the greatest sources of harmful pathogens and pollutants in the New York Harbor and Hudson River Estuary despite major efforts by the city to reduce the number of these CSO events each year.



**Project Goals:** The purpose HRECOS is to help recreate a healthy ecosystem with improved water quality in the Hudson River Estuary. In order to reach this goal, data collected from the monitoring stations along the river facilitate research, improved capacity for governmental programs, new scientific modeling, and may serve to inform future modeling and planning within the entire water system. As a model of collaborative real-time monitoring, the project benefits could extend to individuals beyond the Hudson Valley, with the potential to help guide similar projects measuring the intersection of climate change, land use, and environmental impact in river systems.



Source: Environmental Science: A Global Concern, 3rd ed. by W.P. Cunningham and B.W. Saigo, WC Brown Publishers, © 1995

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