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Posted 5/12/2003 3:42 PM Updated 5/12/2003 7:36 PM

Researchers to track Hudson River pollution into Atlantic

By Todd B. Bates, Asbury Park (N.J.) Press

Every day, billions of gallons of water contaminated with chemicals and other pollutants flow around Sandy Hook into the Atlantic Ocean.

The so-called Hudson River plume includes toxic metals, nutrients that serve as algae fertilizers, sediment, fecal bacteria and trash from the vast New York-New Jersey Harbor area.

Last week, Rutgers University scientists equipped with high-tech devices began a five-year study to track the plume and learn how nutrients and chemicals accumulate in microscopic plankton. Chemicals in plankton can build up in the marine food chain and wind up on dinner plates.

The plume, which is miles wide and visible in satellite images, tends to hug the Jersey Shore and has been detected off Cape May.

The study, called the "Lagrangian Transport and Transformation Experiment" (LATTE), will involve tracking the plume with a harmless fluorescent red dye and scientific devices. The study's results are expected to figure in New York City's future plans for sewage disposal.

The word Lagrangian comes from the name Joseph-Louis Lagrange, an 18th-century French mathematician who developed formulas to study the motion of fluids while following their flow.

"Essentially, we'll be tagging a piece of the ocean and following it," said Robert J. Chant, professor of physical oceanography at Rutgers' Institute of Marine and Coastal Sciences and the study's principal investigator, in the statement.

LATTE is an apt acronym for the study because caffeine is one of the chemicals to be monitored in the Hudson River plume. Caffeine passes through sewage treatment plants unchanged. The Hudson plume

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includes the flow from the Raritan, Passaic and Hackensack rivers and other tributaries.

Last week's inaugural voyage from Staten Island to about 30 miles south of the tip of Sandy Hook was aimed at surveying the plume and testing systems to be used when dye is first used next May.

The red dye will quickly disperse and become invisible to the eye, but the scientists' equipment is expected to detect it for up to 100 miles.

The testing will allow scientists to produce computer images of the Hudson River plume as they cruise. A comprehensive model of the plume will evolve during testing, and work is expected to be completed by 2008.

Researchers will use a variety of equipment and testing methods to determine how nitrogen, lead, cadmium, mercury and other substances are transported at different depths and under different conditions, Chant said.

"In the end, we'll undoubtedly have the most sophisticated model of what the Hudson River really does as it mixes with the ocean," he said.

Nutrients, such as nitrogen, enter New York-New Jersey Harbor from many sources, including more than 100 sewage treatment plants, 700 combined sewer overflows, thousands of stormwater outfalls, 11 major rivers including the Hudson, Raritan and Connecticut rivers coastal runoff and rainfall, according to a U.S. Environmental Protection Agency Web site.

Nitrogen, a component of all living things, is a fertilizer for algae, or phytoplankton, which are generally one-celled plants.

Phytoplankton are at the base of the marine food chain. Zooplankton, tiny animals, eat phytoplankton, and small fish eat zooplankton, and so on.

Pollutants in tidal waters, sediments, fish and shellfish in the harbor area have decreased dramatically overall since the early 1970s, according to a recent report.

But much remains to be done to reduce pollution and improve conditions in the estuary, which includes Raritan and Sandy Hook bays, and protect human health, according to the 2002 report by the Hudson River Foundation, New York City.

Researchers have not looked at whether limiting the amount of nutrients in the Hudson River plume would result in "basically ... clear water along the coast for bathing," he said.

Rutgers will receive \$2.2 million of a \$4.2 million National Science Foundation grant for the study.

The rest will be distributed among researchers at Columbia University, the University of Massachusetts-Boston, the University of Florida-Gainesville, California Polytechnic Institute and the Florida Environmental Research Institute.



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