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April 30, 2004

  


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## Ocean research pays off for coast

As you might imagine, oceanographers are always a bit amused by the current search for traces of water on Mars. Now don't get us wrong. We absolutely respect the sheer ingenuity of landing rovers on a desert planet 10 million miles away. And we understand that this endeavor will no doubt lead to new knowledge and technologies that we can use here on Earth.

It's just that oceanographers in the tri-state region are currently looking at a somewhat greater quantity of H<sub>2</sub>O - the 500 billion gallons that come down the Hudson River every day and enter the coastal waters of New York and New Jersey.

Imagine it. The collected output of the Hudson Valley's, New Jersey's and New York City's 20 million people, of thousands of industrial facilities, of countless animals and plants all sweeping past the Statue of Liberty, flowing under the Verrazano Bridge, swirling around Sandy Hook.

Where does all this stuff go? What happens to it? What effect does it have on the people, animals, plants and economies of the region and ultimately the health of the ocean? And what will it mean to the engineers, politicians and taxpayers of New York and New Jersey as we consider future plans for sewage disposal?

Those are some of the questions the five-year LaTTE project is trying to answer as it kicks into high gear the first week of May. Spearheaded by scientists from the Institute of Marine and Coastal Sciences at Rutgers, The State University of New Jersey, LaTTE is short for "Lagrangian Transport and Transformation Experiment."

If you really must know, "Lagrangian" refers to a French scientist who developed ways to study fluids as they flow. The flowing water we're studying is known as the Hudson River Plume. We're studying how the Hudson River Plume is transported and transformed as it flows out into the Atlantic and along the coasts of New Jersey and Long Island.

For those captivated by the gizmos currently crawling around Mars, consider some of the tools LaTTE is using to gather information about the Hudson River Plume.

Small unmanned submarines silently criss-cross the plume along the Jersey coast for weeks at a time, monitoring plume conditions. Coastal radar tracks currents up to 120 miles off shore. Satellites with optical and thermal sensors monitor the plume from high above. A computerized device that looks like a bat and dives behind a towboat will be gathering massive amounts of



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information at high speed. Sensors on the ocean floor have already detected the plume roaming as far south as Cape May.

Probably the most visible LaTTE activity will occur next week when IMCS oceanographers release about 100 gallons of a harmless red tracer dye into the plume somewhere off the New Jersey coast. The scientists will literally tag a piece of the ocean and follow and measure it by boat for about five days until it's no longer detectable by instruments. Pilots of traffic helicopters and other aircraft, take note - that big red blotch in the ocean in early May is not a whale with a nosebleed.

The point of all this work? Ultimately it's about prediction. Ocean researchers around the world have theories about the interaction of river plumes and the ocean. When the LaTTE project concludes about 2008, IMCS will be able to share solid knowledge about plume and ocean interaction in one of the most urbanized areas in the world.

We will use our findings to fine-tune computer models that will help us predict where and when there may be oxygen problems that can kill fish and close beaches. We'll know where the mercury and other metals go, and what part of the food chain they affect first. We'll know what wind, tides, temperature and storms do to the water that's just off our coasts. By the end of this decade, we should be able to make predictions about the river and ocean behavior that begin to approach today's weather forecasting abilities.

That's important because, like weather, the condition of the ocean not only contributes to health and safety, but to the economy. When you total up all the fishing, recreation and tourism, New Jersey's coastal economy is said to generate more than \$100 billion in economic benefits per year.

So if you happen to take an evening stroll along the beach this summer under a canopy of planets and stars, take a long look up at one of those bright dots and remember the current search for water 10 million lonely miles away. But don't look up there too long - you might get knocked over by the thundering surf.

*(Robert J. Chant is an assistant professor of oceanography at the Rutgers Institute of Marine and Coastal Sciences.)*

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