

There's plenty of water close to home

By: **ROBERT J. CHANT**

As you might imagine, oceanographers are always a bit amused by the search for traces of water on Mars. Now don't get us wrong, we absolutely respect the sheer 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 looking at somewhat greater quantity of H₂O -- 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, thousands of industrial facilities, countless animals and plants all sweeping past the Statue of Liberty, flowing under the Verrazano Narrows 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? 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 was trying to answer as it kicked into high gear the first week of May. Spearheaded by scientists from the Institute of Marine and Coastal Sciences (IMCS) at Rutgers, the State University of New Jersey, LaTTE is short for "Lagrangian Transport and Transformation Experiment".

"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 crawling around Mars, consider some of the tools LaTTE is using to gather information about the Hudson River Plume. Some of them are part of the New Jersey

Shelf Observing System (NJSOS), an ocean observatory managed by IMCS. Other tools are unique to the LaTTE project.

For example, small-unmanned submarines silently crisscross the plume along the Jersey Coast for weeks at a time, monitoring plume conditions. Coastal radar tracks current (and ship movements for that matter) up to 120 miles offshore. Satellites with optical and thermal sensors monitor the plume from high above. A highly computerized device that looks like a bat and dives behind a towboat will be gathering massive amounts of information at high speed. Sensors anchored to the ocean floor have already detected the plume

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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.

All during the study 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 also 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.

That's one of the reasons that National Science Foundation (NSF) saw fit to award IMCS more than \$4.2 million to undertake the give-year LaTTE project. As the center for many other ocean- and coastal-related projects, IMCS is the premiere ocean-research institution in the nation's largest population center, and it now ranks among the top 10 recipients of NSF funding for oceanography in the United States.

All told, federal government spends about \$9.7 billion of our tax dollars per year on ocean and coastal science, shared by such department as agriculture, commerce, defense, energy, environmental protection agency, homeland security, interior, state and transportation, as well as the NSF. In contrast, NASA's budget alone is about \$15.5 billion.

So if you happen to take an evening stroll along the beach this summer under a canopy of plants 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 there too long -- you might get knocked over by the thundering surf.

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