vol. 3, no. 8 UVic knowlEDGE
Research and discovery at the University of Victoria

Getting the strait goods

A research team is using creative ways to measure what's going on in the Strait of Georgia

by Valerie Shore

Darren Stone photo

Dower and a new underwater instrument that automatically counts and sizes plankton.

Cross the Strait of Georgia by ferry over the next few years and there's a good chance you'll be conducting oceanographic research.

Well, not you personally. Below you, deep in the bowels of the ferry, sophisticated instruments will be measuring water conditions as the vessel plies back and forth across the strait. What those instruments reveal may one day help fisheries managers predict changes in fish abundance.

"Our goal is to find out what it is that makes the Strait of Georgia a particularly good environment for fish in some years, but bad in other years," says Dr. John Dower, a fisheries oceanographer in UVic's department of biology and school of earth and ocean sciences. He's part of a new research initiative known as STRATOGEM—the Strait of Georgia Ecosystem Modelling project—which seeks to understand the complex physical and biological dynamics at work in the strait.

"The Strait of Georgia is one of the most productive areas on the B.C. coast, yet we know surprisingly little about how it works," says Dower. To get some answers, he and STRATOGEM partners at the University of British Columbia and the Department of Fisheries and Oceans are focusing on three key physical processes: the Fraser River outflow, which carries vital nutrients; windstorms, which mix the water; and inflow from the open ocean, also a rich source of nutrients.

These processes combine to make conditions ideal or poor for the growth of plankton, the microscopic plants and animals that form the base of the marine food chain. "We want to untangle how these processes condition the water column to be good or bad for plankton growth," says Dower. "Then we'll use ecosystem modelling to come up with rules about what makes a good or bad year for fish."

But first they need the data. A major problem with marine field work is getting out on the water often enough. The team has come up with two creative solutions. One involves B.C. Ferries. By this spring, a ferry on each of the three main routes crossing the strait will be equipped to measure water temperature, clarity, salinity, and nutrient and plant-life content. "We'll get snapshots of what's happening in the surface waters several times each day," says Dower.

To get the deeper picture, the STRATOGEM team goes out monthly to nine test sites around the strait, where plankton and water samples are taken from surface to seafloor.

"The strait is such an active place, with tides, currents and the Fraser River plume, that we need to work as quickly as possible," explains Dower. A traditional ship would do the circuit in two days. But a Coast Guard hovercraft, whisking along at about 80 kph, does the job in eight hours.

By the end of the four-year project, the team hopes to have enough data for predicting trends in productivity in the strait. Fisheries managers can then incorporate these factors into their models for such things as predicting salmon returns.

The STRATOGEM project is funded by the Natural Sciences and Engineering Research Council.

EDGEwise

Not all plankton are created equal. And this is what makes John Dower's part in the STRATOGEM research so challenging.

Dower wants to know how physical processes in the Strait of Georgia affect the amount and distribution of plankton in the water. More plankton can mean more food for fish.

"My lab is looking at how plankton distribution changes through the seasons across the sites we're measuring in the strait, and how we can link those changes back to the physical measurements that my colleagues at UBC are interested in," says Dower.

For years, it was believed that the classic marine food chain goes in a linear fashion from large phytoplankton (plant plankton) known as diatoms, to zooplankton (animal plankton). They in turn get gobbled by small fish, which become dinner for larger fish, and so on.

But it's not always that simple. In years with fewer windstorms, smaller phytoplankton known as flagellates predominate. They aren't big enough to interest the zooplankton that fish feed on. So another step is added to the food chain to produce things big enough for the fish to eat. And that's not a good thing. "The more steps in the food chain, the less energy there is at the top for the fish," says Dower.

That's why precise measurements of phytoplankton species and abundance are so critical. "In some years, conditions combine to create the right phytoplankton at the right time, which can lead to good fish food. That's the argument we're trying to make."

sharpen your knowlEDGE

- The STRATOGEM Web site provides a detailed description of the project, as well as raw data and satellite imagery from the Strait of Georgia. It also includes links to other agencies and organizations involved in ecological research or advocacy related to the Strait of Georgia. **www.stratogem.ubc.ca/**