vol. 2, no. 12 UVic knowlEDGE
Research and discovery at the University of Victoria

The biology of clean water

By Margaret Milne

What would you do if you wanted a clean drink of water? Would you take a polluted source, then add still more chemicals and perform expensive filtration to make it drinkable? Or would you start with water that was already clean and healthy?

The answer is obvious, yet the ecology of source water ecosystems has been largely ignored says UVic biologist Dr. Asit Mazumder, "because government and water utilities tend to concentrate on treatment and distribution."

Mazumder is an expert in the field of aquatic ecology. Two years ago, he was awarded the Natural Sciences and Engineering Research Council (NSERC) Industrial Research Chair in the Environmental Management of Drinking Water.

The chair — unique in Canada — is the focal point of a major research program on the ecological processes that contribute to safe, clean and reliable sources of drinking water.

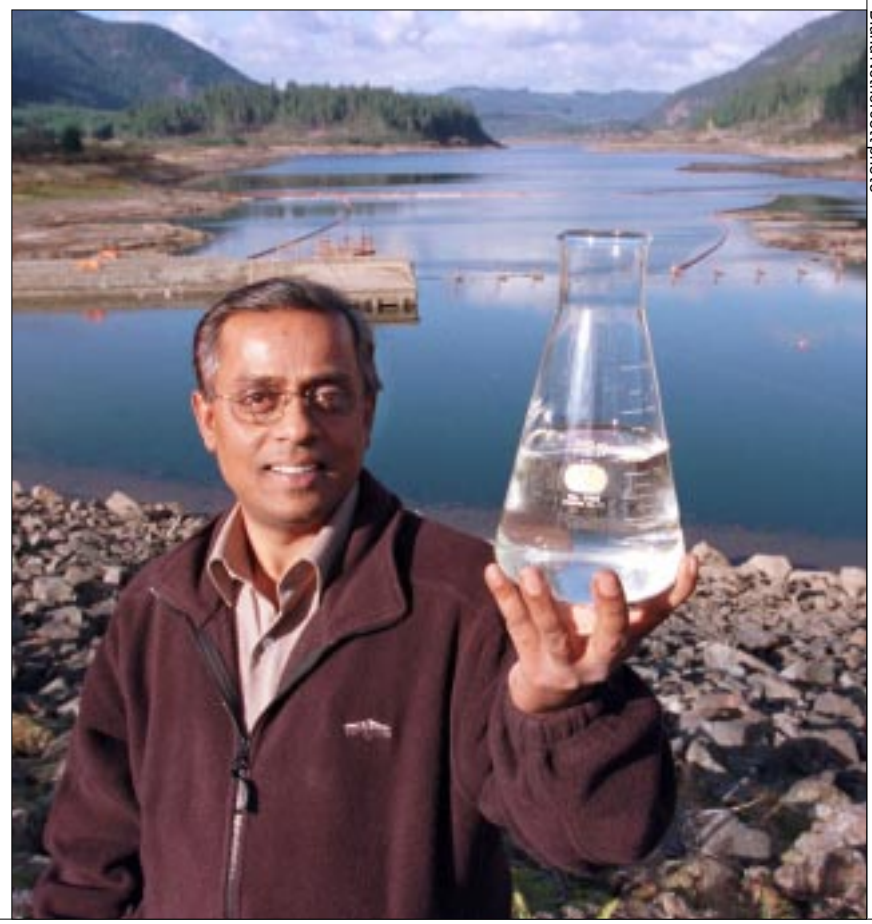
Two years into the project, "we are developing predictive models of water quality," Mazumder explains. These models will take proposed land and water uses and make predictions about the resulting water quality. "Once government and utilities have this tool," says Mazumder, "they can make science-based decisions."

A model needs a lot of data to make accurate predictions. Mazumder and his team are collecting data on water and land use, climate, fish communities, and populations of such organisms as zooplankton, algae and bacteria. Their research sites include many Vancouver Island reservoirs, lakes and watersheds and similar locations on the mainland.

This summer's water shortage gave Mazumder's team a unique opportunity to look at the Sooke Lake reservoir. "We were going to study it regardless," stresses Mazumder, but the lowest water level in many years provided an opportunity to study the impact of drawdowns on source water quality.

Another phase of data gathering will begin the first week of November. With the support of the Ministry of Water, Land and Air Protection, 24 sediment cores will be drawn from various watersheds on the island. Each 1–2 mm slice of core represents about one year, so analysing the cores can give data on water quality in the past. "The cores will give us samples for more than 100 years," explains Mazumder. "Based on past patterns, we can plan for future watershed management."

What's next for the project? "In the past two years, I've come to appreciate the serious need for interdisciplinary research," reflects Mazumder. He hopes to form a national research network that will look at watershed management from environmental, economic, health, tourism and policy perspectives. "That's what I want to develop," says Mazumder, "an opportunity for integrated watershed study. That will allow us to look at the complex relationships affecting our drinking water."



Diana Nethercott photo

Mazumder at the Sooke Lake Reservoir

facts from the EDGE

- Three post-doctoral fellows, six graduate students and several professionals are currently part of Mazumder's research team. With the recent addition of Dr. Réal Roy as junior research chair, they have started large-scale experiments on the impact of dam raising and forest harvesting on nutrient cycling and water quality.
- Research at the Sooke Lake reservoir is carried out largely by Mazumder's graduate students and research associates. PhD student John-Mark Davies looks at how the concentrations and types of nutrients affect the types of algae at different times of the year. These algae can change the disinfection byproducts and the taste or odour in drinking water. Weston Nowlin, another PhD student, is modeling how nutrients in the aquatic food chain affect water quality under contrasting drawdowns. Paula Furey, an MSc student, is looking at the impact of drawdowns on sediment algae and bacteria. Dr. Yan Liang is modeling the relationship between source water quality and the types of chemicals produced by disinfection.
- In addition to NSERC support, the project receives cash and in-kind support from many partners: the University of Victoria; the Capital Region District Water Department; Galloway Lumber; Crestbrook Forest Industries; Forest Renewal BC; Focal Technologies Inc.; Isomass Scientific Inc.; and the B.C. Ministry of Water, Land and Air Protection.

sharpen your knowlEDGE

- The Environmental Management of Drinking Water Web site provides a description of the research, links to the project partners, a photo gallery, and much more. **web.uvic.ca/water**

Margaret Milne wrote this as a participant in the SPARK program (Students Promoting Awareness of Research Knowledge), funded by UVic, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Research Council.

EDGEwise Does B.C. have a mercury problem?

Are B.C. residents at risk of mercury poisoning? That's the question Mazumder and a group of researchers at UVic and UBC hope to answer. They have recently received NSERC funding to investigate mercury in coastal and interior lakes and reservoirs as part of the Collaborative Mercury Research Network.

Mercury poisoning "is a huge problem worldwide," says Mazumder. Mercury builds up in the bodies of fish that feed on mercury-contaminated zooplankton. When people eat the fish, the concentrated mercury levels can cause problems with coordination and concentration.

The project is a natural spin-off from research conducted under the Environmental Management of Drinking Water chair. "We're using the same watersheds," explains Mazumder. "We already have excellent baseline data and don't need to redo a lot of work".

Samples of water sediment, plankton and fish will be taken from a number of sites, including Elk, Beaver and Shawnigan Lakes, and the Sooke, Nanaimo and Saltspring reservoirs. These samples will be analyzed for their mercury content. Research will also be done to understand how mercury arrives in aquatic systems, and how it moves through the food web. The team hopes to identify any potential risk zones in B.C.