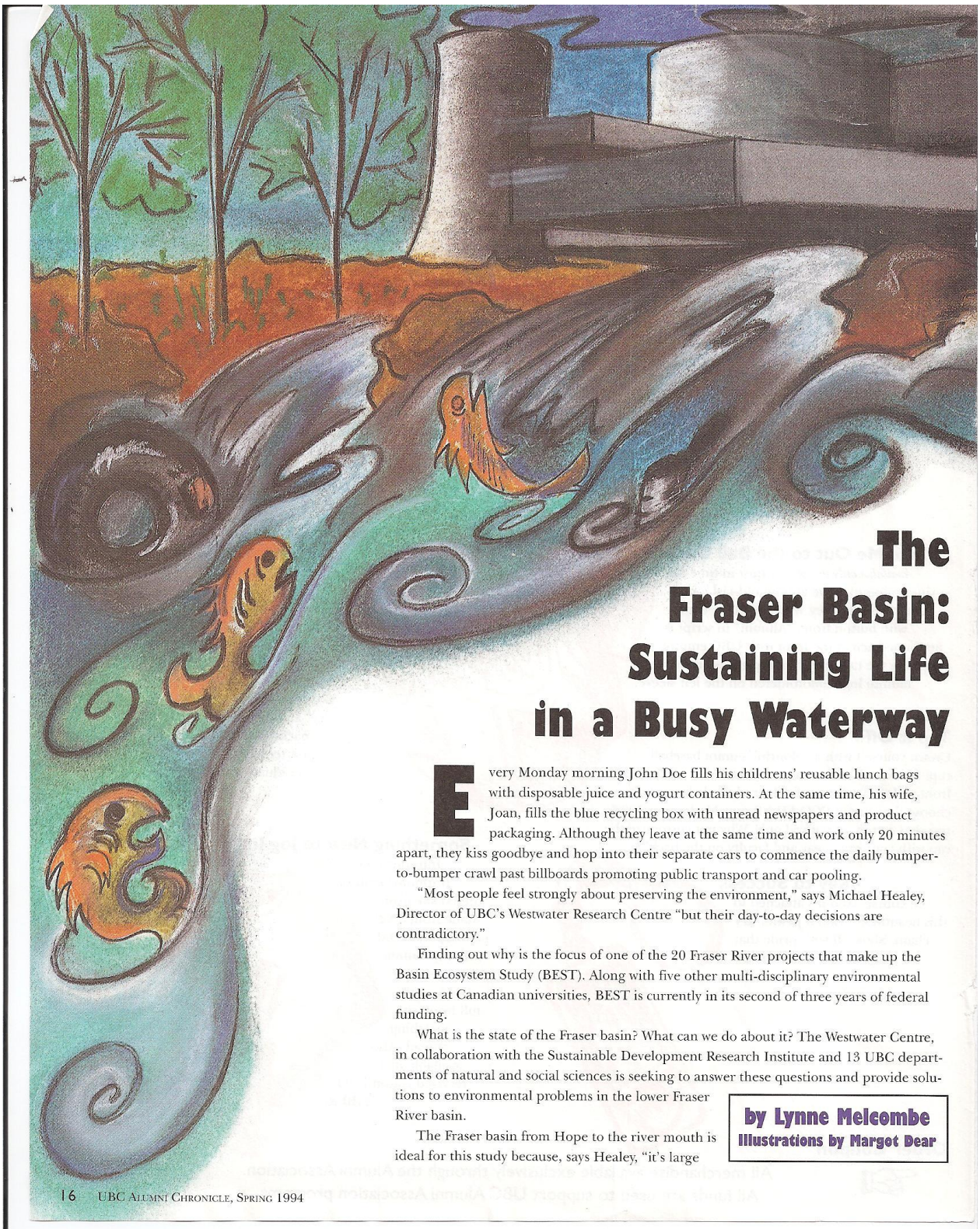


The Fraser Basin: Sustaining Life in a Busy Waterway

Every Monday morning John Doe fills his childrens' reusable lunch bags with disposable juice and yogurt containers. At the same time, his wife, Joan, fills the blue recycling box with unread newspapers and product packaging. Although they leave at the same time and work only 20 minutes apart, they kiss goodbye and hop into their separate cars to commence the daily bumper-to-bumper crawl past billboards promoting public transport and car pooling.

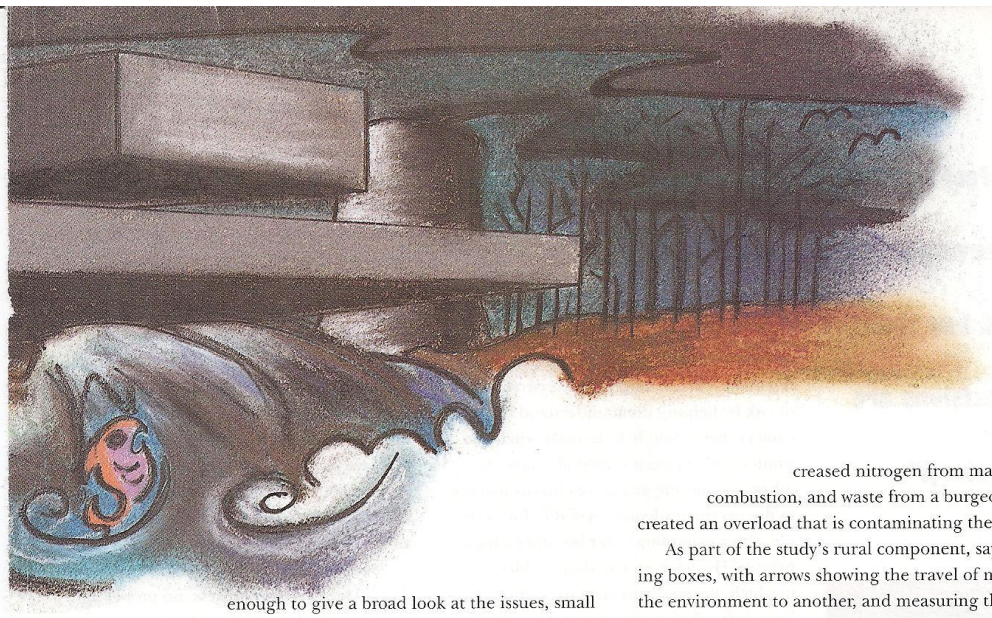
"Most people feel strongly about preserving the environment," says Michael Healey, Director of UBC's Westwater Research Centre "but their day-to-day decisions are contradictory."

Finding out why is the focus of one of the 20 Fraser River projects that make up the Basin Ecosystem Study (BEST). Along with five other multi-disciplinary environmental studies at Canadian universities, BEST is currently in its second of three years of federal funding.

What is the state of the Fraser basin? What can we do about it? The Westwater Centre, in collaboration with the Sustainable Development Research Institute and 13 UBC departments of natural and social sciences is seeking to answer these questions and provide solutions to environmental problems in the lower Fraser River basin.

by Lynne Melcombe
Illustrations by Margot Dear

The Fraser basin from Hope to the river mouth is ideal for this study because, says Healey, "it's large



enough to give a broad look at the issues, small enough to be manageable, and has a growth rate among the fastest in North America." Growth poses a threat to the quality of life along the river, but also lets researchers study major problems in a microcosm and build a widely-applicable model of sustainability.

"The study has four components," says Healey. The first three concern geographic boundaries: urban centres, rural areas, and rivers. The fourth component synthesizes information from the other three. The urban component, aimed at creating a blueprint for a healthy and sustainable community, grew out of an existing task force in Richmond.

"Richmond takes up so many square metres of actual land," says Bob Woollard, urban component leader and acting head of Family Practice, Faculty of Medicine. "But, in fact, it takes much more space to sustain a community like Richmond. For example, oranges eaten in Richmond take up growing space in Florida." The real space required to maintain a community's standard of living is called its ecological footprint.

Richmond's ecological footprint is 27 times larger than the city itself. "If we apply this to the rest of the world," says Woollard, "we'd need two and a half more planets to sustain the earth—food for thought the next time you're in Starbuck's drinking Kenyan coffee."

Understanding the ecological footprint helps people make decisions such as zoning for highrises rather than townhouses, or building superhighways instead of improving public transit. But to be effective, says Woollard, it must be paired with another tool: social caring capacity. Consisting of principles such as equity, diversity and connectedness, this concept helps people understand what makes a community desirable, and then measure a place like Richmond "in terms other than gross domestic product and interest rates."

East of Richmond lie hundreds of square miles of rich farm land. But even there, where the air smells clean and the soil is moist and black, the environment is being degraded by inadequate cycling of substances critical to its ecology. Nitrogen, for example, occurs naturally and is essential to crop cultivation. But in the past century increased nitrogen from manure fertilizer, fossil fuel combustion, and waste from a burgeoning population has created an overload that is contaminating the environment.

As part of the study's rural component, says Healey, "we are drawing boxes, with arrows showing the travel of nitrogen from one part of the environment to another, and measuring the rates of transfer between the boxes." By measuring the amount of nitrogen going into the environment, and evaluating the length of time required for it to cycle through each box and out of the ecosystem, researchers—who are using similar models with carbon and one or two pesticides—hope to determine the level of input the environment can sustain without damage.

Several of the river projects are also examining the sources and fates of environmental contaminants. Some are exploring the consequences of using water as a waste repository, and others are studying the impact of dykes and dams on fish populations.

Most of the river projects focus on tributaries like the Brunette, Sumas and Matsqui Rivers, whose size belies their importance. Says Healey, "because of their coho production, many smaller streams form the mainstay of the sport fishery in Georgia Strait. But some already have been lost to development. This knowledge allows us a choice: to retain our rivers as salmon habitat, or convert them into storm sewers."

There is also room for the social scientist in the study of the Fraser River basin. And while natural scientists working with fish populations or nitrogen dynamics fit easily into the study's geographic structure, social scientists are less tied to place and can see the basin as a whole.

Neil Guppy, a sociology professor and river margins component leader, is involved in two such projects.

The first project, co-coordinated by Guppy and Don Blake, head of political science, is assessing the degree to which environmental ideas, attitudes and behaviours are shared among diverse communities, such as labour, business, government and environmental groups. "Where is the harmony, where is the dissonance?" says Guppy. "This may help us decide which approach is best: the carrot, or the stick when policy is being decided."

For the second project, Guppy and colleagues Brian Elliott and Neil Blake are examining the environmental impact of population size, composition and distribution. This is not only a problem of in-

"Most people feel strongly about preserving the environment, but their day-to-day decisions are contradictory."

creasing numbers, says Guppy, but of diverse cultures perceiving the environment differently.

Cultural perception is central to Michael Kew, Native issues project leader and associate professor of anthropology, and his colleague, Bruce Miller, whose work focuses on the basin's aboriginal population. Although only 6,000 aboriginal people are registered with the area's 29 bands, says Kew, "one can argue logically and morally that, despite their small numbers, their interest is primary. They've been here the longest. They intend to stay. We're the nomads."

With the help of two graduate students (including one First Nations student), Kew and Miller are compiling data on the area's aboriginal populations, reserve histories and land holdings, as well as current resource use. Most important will be an assessment of planned use of the resources and the implications of land claims. Although no one can predict the outcomes of settlements, any planning for the area must take First Nations' interests into account.

While these projects seek answers to what-have-we-got and what-do-we-want questions, others are addressing issues of what-we-can-have and how-we-can-get-it. For one, researchers are scaling people's perceptions of risk by helping them understand the choices they would have to make when confronted with an environmental threat. Another is gathering groups of citizens together to discuss the tradeoffs needed if, for example, clean swimming water becomes a high priority. Healey even envisions a video game in which players "battle environmental problems, instead of giants or monsters, providing a quick way of seeing the consequences of different choices."

But individuals are only part of the problem. In another project, investigators are studying the way public agencies evolve in the face of conflict, to determine the input required to force institutional change. "Do we need to drive a Mac truck through the front door and have a bunch of guerrillas with AK47s jump out," asks Healey, "or is there some process, short of revolution, by which we can persuade social and educational institutions to change?"

One of the things this project is about, says Healey, is providing enough information for people to make informed choices.

But ultimately, he says, "there are no right choices. People make mistakes all the time; we just have to hope they're not irreversible." This study guarantees no positive outcomes, nor is it attempting to change anyone's beliefs.

What it might do is demonstrate that there is no planning process, no proper application of information and techniques that will solve environmental problems. It might help people see the need to make sacrifices, show them that some paths are potentially more disastrous than others. "If we can accomplish that much," says Healey, "then perhaps we'll have made a contribution."

The Forest and the Trees

The Basin Ecosystem Study is bringing together researchers from anthropology to zoology, botany to soil science and social work to community planning. This multidisciplinary mix has advantages and disadvantages. "We spend a lot of time learning to talk to each other without the jargon used among experts who share a discipline," Mike Healey says. But learning new ways to communicate is a good thing.

"To describe this work as challenging would be an understatement," says Neil Guppy. "It forces me to expand my intellectual horizons." It's an experience requiring participants to look beyond those horizons without abandoning them, adds Michael Kew. Ironically, the same situations that pose obstacles sometimes allow researchers to perceive other disciplines more clearly than their own, says Bob Woollard, "letting us see the forest and the trees simultaneously."

This almost poetic enthusiasm for an endeavour that is nothing if not cumbersome is no accident. "If people are going to take on an investment of this size," says Healey, "they need to get something positive out of it." To ensure this, each project has been designed so that every investigator is at the cutting edge of the discipline; each is doing work he or she would be happy to do individually, and may pursue independently after the study is over. In this way, Healey hopes the researchers, particularly grad students, will be eager to do more multidisciplinary work.

Woollard agrees. "The shift towards specialization that happened at the beginning of this century has reached its limits," he says. As we approach the next century, "we have to put things back together. If this project does nothing more than train a new generation of academics to look at complex problems in a less dissective, more constructive way, I think we will have accomplished a great deal." LM