

# Prof zeros in on frogs as early warning system

By Anita Weier

The Capital Times

Wildlife ecology Professor Bill Karasov's family is more than his wife and two daughters, and even more than the collegial family of students and former students who are now fellow scientists.

It also includes the family of man and the animals that serve as harbingers of what might happen to those human beings.

His steps toward helping this family began when he was a boy living near the Mississippi River in St. Paul, Minn., roaming along the river, exploring the cliffs.

"I lived one block from the river," recalled Karasov, 47, a professor at the University of Wisconsin-Madison. "My parents always told me not to go down there, that I might drown. (But) I had an affinity for nature."

Teachers in high school and college encouraged him, though his parents had some doubts.

"His mother used to say, 'Be a doctor,' and he would say, 'No, I want to live in a fire tower in the forest,'" said his wife, Corliss, who has known Bill since they were ninth-grade lab partners.

A family friend who was a biochemist influenced Karasov's choice of a career.

"I saw what his life was like and thought that looked fine. Spending life in an academic environment appealed to me," said Karasov, a graying, curly-haired man with bright blue eyes and an impish smile peeping from under a large mustache. "That's how you wake up one day and are a professor at a university."

Karasov obtained a bachelor of science degree, *magna cum laude*, from the University of Minnesota and earned his Ph.D. at UCLA. After he came to UW-Madison in 1985, he continued his study of the physiology of wild animals, especially their nutrition and digestion processes. But Karasov also developed a parallel emphasis on ecotoxicology.

"This was partly in response to the problems in our state," he explained, referring mostly to contamination of sediments in the Fox River and Green Bay, much of it caused by paper mills. "We've been studying the im-

## Is amphibian health a harbinger for humans?

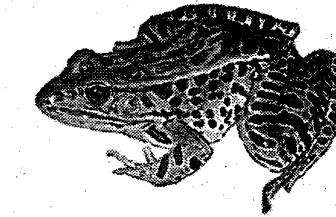
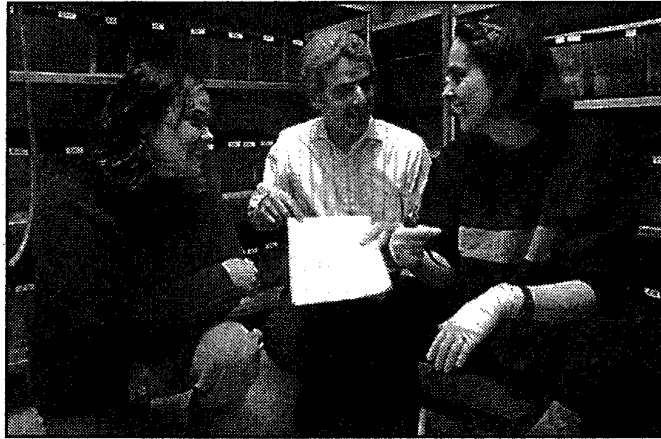
pact of PCBs (polychlorinated biphenyls) and dioxin on fish-eating birds."

In the early 1990s, he added frogs to his focus. Annual Wisconsin frog surveys conducted from 1984 to 1994 showed that 10 of Wisconsin's 11 frog species declined in that time.

In addition to PCBs — a poisonous pollutant that collects in animal tissues — and the

tion we can't easily study in human beings," said Karasov, gently holding a tiny spotted frog in a closet-like lab lined with small aquariums, as crickets that would become frog food chirped in the background.

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At left: UW-Madison Professor Bill Karasov discusses data with researchers Tara Edblom and Kate LeVering. Above: A leopard frog shows his spots.

toxic dioxin created when chlorine is used to bleach paper and pulp, runoff from agriculture is another potential problem for amphibians, because nitrogen compounds create high ammonia levels.

**Research:** Karasov set out to determine whether the state of Wisconsin had strict enough standards for protecting amphibians, and whether frogs were more sensitive to contaminants than fish and birds. Since frog eggs, tadpoles and frogs are eaten by fish, birds and people, amphibians can be regarded as an early warning marker for other species.

"One reason humans study wildlife is we sometimes use them as an early warning system. Sometimes we can study the mechanisms of ac-

tion we can't easily study in human beings," said Karasov, gently holding a tiny spotted frog in a closet-like lab lined with small aquariums, as crickets that would become frog food chirped in the background.

Working alongside his graduate students and scientists at UW and other universities, Karasov finds eggs in the wild in various locations and studies their growth to determine whether those

from contaminated locations develop differently than those from cleaner areas. Additionally, researchers expose one group of amphibians to a toxin, and compare the effect to a control group.

He and his students found that frogs are tough and toads are even tougher.

In one study, the scientists collected eggs and exposed them in the laboratory to different concentrations of ammonia. The green frog was most affected, in the environment and in the lab, but "the American toad seems invulnerable," he said.

PCBs had no effect on hatching of leopard and green frog eggs, up to concentrations as high as 10 times the levels found in the wild. But tadpoles did die, had slower growth and had

some deformities, mainly edema.

At one site contaminated with PCBs and metals, Karasov and his colleagues found an effect that could be substantial. The leopard frog tadpoles and froglets raised in outdoor enclosures at the site were about 65 percent male and 35 percent female, whereas at two comparison sites where contamination was lower, the ratio was a more normal 50-50.

Studies will continue this spring in his lab, when leopard frogs contaminated with PCBs will be bred with each other, and a non-contaminated control group also will be bred. The offspring of each will be studied.

Corliss Karasov, a science writer, says it took some courage for her husband to stick to such findings. "He goes after the truth, no matter what the grant. There is never exaggeration," she said.

His personal integrity and love of the environment drew Corliss to Bill, as they grew to know each other hiking, working as naturalists at Minnesota state parks and attending college together in similar fields. They married in 1980 when they were both 27.

**Impact on others:** Tara Edblom, one of Karasov's graduate students, was drawn into the field of wildlife ecology because of him.

She had majored in that field as an undergraduate, but started graduate school in 1997 in the land resources program at the UW. "I took a course with Bill in ecotoxicology. He asked me if I had a project and funding. I said no. He asked me to take a look at it," she said.

Edblom switched her major, and has conducted research which indicated that ultraviolet B radiation had no effects on frog hatching and did not cause deformities.

Karasov has been a great help to Edblom's professional development, she said.

"He is great to work with. I feel strongly I couldn't have asked for a better adviser."

"He is good at what he does because he cares about what he's doing. He thinks what we find could have important implications."

Scott Craven, chair of the department of wildlife ecology, described Karasov as "a

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good guy and a fine faculty member."

"He has a wonderful work ethic and is meticulous in working with his students to be the best they can possibly be," Craven said. "I see him lots of times on one side of his desk with a student going over whatever needs to be gone over, seeing that things are done correctly and thoroughly,

whether the person is a graduate student working with research results or an undergraduate."

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**Family ties:** Both of Karasov's daughters are interested in ecology.

Ariela, a senior at Memorial High School, has done volunteer work with the International Crane Foundation and the Aldo Leopold Foundation. She has also helped with Arctic research, doing counts of Canada and snow geese.

Talia, a ninth-grader, also enjoys hiking and camping, her parents say.

Yue-wern Huang, now an as-

sistant professor in the field of zoology at the University of Missouri-Rolla, regards Karasov as a mentor as well as a teacher and scientist.

"Dr. Karasov trains his students with scientific justifications and rationales. When students present him with experimental data, he listens carefully and quickly translates, in his mind, data into figures," Huang said. "Then he starts to ask questions. For each given answer, he already has another question waiting for the students. Gradually students in his lab pick up this type of approach and it becomes a useful asset in their scientific careers."

On the personal side, Huang said that, although Karasov is very busy, he is also "a caring family man."

"My wife and I were impressed by him when we first met him in a departmental party. In the party he saw many kids wandering around. Then he said that whoever wanted to hear stories should go with him to a study room. Kids just swarmed into the study room with him," Huang said.

"Dr. Karasov has been very influential and inspirational in many aspects of my life. I still remember when my father died, he handed me a book of inspiration. After reading that book, I walked out the shadow of distress, no longer asking why those bad things happened to me, but knowing how to face life difficulties with faith. This is just one of the examples that he cares for his students. He is a person with leadership and servanthood."

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