



Laboratory of Limnology  
Lake Mendota

# LIMNOLOGY NEWS

University of Wisconsin- Madison  
College of Letters and Science



Trout Lake Station  
circa 1935

Number 13

Summer 2004

## From the Director's Desk, July 2004

Friends:

The most important news this summer is that Jim Kitchell has returned to the shores of Lake Mendota after a successful sabbatical at the National Center for Ecological Analysis and Synthesis in Santa Barbara, California. Jim's reflections on his time at NCEAS appear elsewhere in this issue. I am personally delighted that Jim is here to retake the reins of the Center for Limnology.

Our featured people, Bill Tonn and Cindy Paszkowski, take us to Edmonton, Alberta, with a lively account of their careers together and recollections of Trout Lake Station from about 25 years ago. This issue also introduces the research activities of our newest faculty member, Jake Vander Zanden. Paul Hanson and Tim Kratz provide an update on a new International LTER project that links CFL with Taiwan. We also review the diverse comings, goings and honors of our staff and students.

We lost George Gallepp, a loyal alumnus and former editor of this newsletter, this year. We are grateful for George's many contributions to CFL. He is sorely missed. We also honor the passing of Jean Becker Juday.

Some outstanding new people have joined our staff, and some key people are leaving us. We are delighted to welcome Denise Karns back to our staff after an absence of a couple of years. Mark Lochner, Patrick Marjolet and Jeff Maxted have brought outstanding technical skills to CFL during the past year. We regret the departure of Sarah Carter (for WI-DNR) and Liz Levitt (for graduate school).

Many faculty and students were recognized for their accomplishments this year. Emily Stanley was promoted to Associate Professor with tenure by the Department of Zoology. Darren Bade won the first Kenneth W. Malueg award, as well as the Best Student Paper award from the American Geophysical Union. Pieter Johnson received a Dissertation Improvement Grant from NSF. I was honored by a WARF named professorship (as Stephen Alfred Forbes Professor of Zoology), election to the Royal Swedish Academy of Sciences as a foreign member, and the Sustainability Science Award of the Ecological Society of America, shared with four friends.

Like many academic institutions, CFL is feeling the effects of state budget cutbacks. While our grant programs continue to flourish, there are many indications that funding agencies are entering a period of flat (or even declining) budgets. Therefore the endowment will become more important for sustaining CFL through challenging times. I deeply appreciate the support that so many of you have shown for CFL over the years, and I encourage you to continue your generous support of our endowment.

Sincerely,

Stephen R. Carpenter, Acting Director, Center for Limnology



# “We’ve lived for limnology, we’ve lived for love.”\*

\* with apologies to Florian Tosca

By Bill Tonn and Cindy Paszkowski

It was a flattering surprise when Steve Carpenter asked us to contribute to the “Featured Alumni” series. We suspect that Steve asked us because in so many ways, we *are* an “us.” The historians will have to say whether we are the first professorial pair produced through the Center for Limnology, but we suspect that opportunities before us would have been limited. So, whether it was good karma or just good timing, we do know that we have been extremely fortunate to share not only our lives but also our careers.

A brief excursion into prehistoric times will set the stage. We are both children of the 50’s who grew up in the middle-class suburban Midwest. We were both biology graduates of small, liberal-arts colleges and both enjoyed undergraduate field-station experiences. Still, it was accident rather than plan that brought each of us to Madison in the mid 1970s. Similarly, we independently made our ways to Trout Lake in 1977, where we first met.

Studying thrushes and warblers, Cindy was a rare bird in that limnological realm: a terrestrial ecologist! But John Magnuson’s open-mindedness and generosity had encouraged her supervisor, a young Tim Moermond, to send a couple of his few budding MacArthurs from Birge Hall to Vilas Co. to fill the Birge-Juday cabins at the pre-LTER (i.e., quiet & sparsely populated) station. Meanwhile, at the “Lake Lab,” Bill had developed the crazy notion (or so he was told at his first “informal seminar”) that lake fish had a community-level ecology. Undaunted, he went north to test his prediction. After sharing weekly station meetings with Dr. Bill Schmitz (the 1st of 4 station directors we experienced) and his black walnuts, and Friday fish fries with the entire Trout Lake research force ( $n < 10$ ) at Bosacki’s Boat House, our fates were sealed.



In addition to our own growing relationship, our years in Wisconsin were marked by that special combination of intellectual stimulation and carefree lifestyle experienced by generations of graduate students. Perhaps it was the “insular” environments of Trout Lake and the Lake Lab, in the midst of a large Zoology Department and even larger university, that made this period special for us. Perhaps it was a stable cohort of very compatible fellow students (the “Miller-Time Committee” of the early 80s). Most certainly, the leadership of the CFL (Drs. Magnuson, Kitchell, and Frost) and support staff contributed. Whatever the cause, our appreciation of the wonderful education we received at the CFL continually grows as we try to mentor our own students.

Too soon, it seemed, we were each writing up our dissertations (on various aspects of the inscrutable central mudminnow) and defending them during the same week in 1983. Taking the individual opportunities that came our way led us, by default, to part for a year (still unmarried). Cindy took up a post-doc at Oregon State’s Marine Science Center, while Bill spent the fall term in Finland as an adopted member of the Magnuson family, before returning to Madison to teach Ecology of Fishes. Eventually, we started thinking seriously about *real* jobs. Joint positions were quite rare at the time, so although we often applied for the same positions, we pragmatically hoped that at least one of us would find employment. Good news came early in 1984 when Bill was offered a tenure-track position in fish ecology at the University of Alberta, *and* Cindy was invited to teach introductory zoology as a sessional lecturer. Immigration Canada had certain standards so, 7 years after meeting at Trout Lake, we got married and then headed out of our Mills St. driveway, laden with jars of blueberry jam, preserved mudminnows, and other badger memorabilia, for a new life in the prairie provinces.

We had no students, no grants, no on-going field projects, and no connections (back then, the CFL

network largely stopped at the border). But we mined old data together and turned our attention to Joensuu, Finland in search of collaboration. While in Finland, Bill had met Ismo Holopainen, who had just begun re-researching crucian carp, the Nordic analogue of our beloved *Umbra*. Furthermore, Ismo had access to small lakes appropriate for whole-system manipulations. Thus began our first research program. With summertime excursions to Suomi, it proved rewarding both personally and professionally, and lasted over 6 years.

Meanwhile, during the long Edmonton winter, Cindy continued to toil as a lecturer and Bill earned tenure and a sabbatical in 1990. An opportunity arose to extend our Nordic experiences by spending a year at the Limnology Institute of the University of Lund investigating Swedish fish communities. There we encountered another Trout Lake alumnus, Christer Brönmark, and aquavit. We returned to Alberta in 1991 not only with a new language (Swenglish), but with a new untenured professor in the family. While we were in Lund, our department split a faculty opening between Cindy and the (male) spouse of another faculty member; 2 years later, both were upgraded to full-time.

It was strongly suggested to her that Cindy needed to establish her research as something distinct from that of Bill. The always versatile Dr. P recognized that there were aquatic vertebrates other than fishes, and so established a program on aquatic birds that eventually expanded to amphibians. The department's Meanook Biological Research Station (150 km north of campus) proved a perfect site for Cindy to watch loons (or tadpoles) and for Bill to raise fathead minnows in experimental ponds. It reminds us a tiny bit of Trout Lake.

In the last 10 years our research and our students have ranged widely and become more applied. Canadian granting agencies began to emphasize "the forestry bandwagon" as the largely unharvested boreal mixedwood forest was transformed into Indiana-sized fiefdoms for companies that converted aspen into playing cards and glossy magazines. Our most notable experience was the TROLS (Terrestrial and Riparian Organisms, Lakes and & Streams) project that examined the efficacy of buffer strips in conserving aquatic and terrestrial habitats. At its peak, TROLS involved 12 lakes, 10+ PIs, 20+ grad students, and 30+ undergrad assistants. But, along with its big scope and big budget, TROLS also brought us big headaches. So after 5 years, we bid our "adieu" to big science. Since then, and on smaller scales, Bill has investigated such exotica as endangered whooping cranes (indirectly), the unknown inconnu, and arctic diamond mines. Cindy has been involved in projects on restored wetlands with Ducks Unlimited, oilsands tailings ponds with Syncrude, and amphibian monitoring with Parks Canada.

Now, we're both past 50 and the field work is largely reduced to a few day-trips here and there (followed by days of recovery). We managed to squeeze in a nostalgia-packed trip to Trout Lake on our last sabbatical (at off-season rates). More recently, we have boldly entered the real-world arena of administration. Cindy is in the midst of a stint as Associate Chair, no small task in a Biology Department of 75 faculty members and 230 grad students. Bill is in his 5th year as administrator of the Ecology Research Group, where he rides herd (very Alberta) on 30-something wild and wooly ecologists. We fill our idle hours with opera, gardening, and brewing. Perhaps not the most dynamic duo in academia, but definitely a happy pair. We are most appreciative of our personal and professional beginnings at the Center for Limnology that allowed this all to happen.

## Support the Center

Private support from alumni and friends of the University of Wisconsin-Madison plays a crucial role in helping the University achieve continued excellence in teaching, research, and public service. Gifts to the Center for Limnology provide important support for graduate and undergraduate students, visiting scholars, faculty research and facilities development. If you would like to make a donation to the Center, please contact Linda Holthaus at 608-262-3304, or via e-mail at [holthaus@wisc.edu](mailto:holthaus@wisc.edu). You can also find more information about the Center for Limnology endowment by visiting our website, <http://limnology.wisc.edu>, and clicking on the Friends/Support link.

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Christopher Glueck, University of Wisconsin Foundation at 608-265-9952, or via email at: [chris.glueck@uwfoundation.wisc.edu](mailto:chris.glueck@uwfoundation.wisc.edu)

# Jake Vander Zanden

rock, water, papers

By Christine Mlot

Excerpted with permission from *Nature Conservancy Magazine*

Drop in at Jake Vander Zanden's office, with its mobile of tropical fish and a picture of his wife posing with a lake trout, and you may find him with shoes off and overhead lights out. He's comfortable working by the natural light that filters in from the tree-lined path outside his window, within skipping stone's distance of Lake Mendota in Madison, Wisconsin. He's comfortable working under the stage lights, too. In high school he once visited Madison with his rock band, Turbodactyl, when they opened at a small club for a then-little-known group called the Smashing Pumpkins. "There were more people to see us" than the headliners, he recalls.

Though he still picks up his guitar at times, Vander Zanden's days doing "the rock-star thing" are fading, along with the calluses on his fingertips. But by all accounts, his science star is rising. At age 28, his research into lake ecology had already been published in one of the world's top two scientific journals. Five years later, he has his name on a thick stack of well-regarded scientific papers and now plies his science as a newly minted assistant professor at the University of Wisconsin Center for Limnology. "He's National Academy [of Sciences] material," says Charles Goldman, a limnologist at the University of California at Davis who was Vander Zanden's postdoctoral adviser.

Both in manner and in mission, this aquatic ecologist is far from academic. Vander Zanden is motivated by a question that, for him, "really gets at the heart of how we can best conserve real ecosystems in a human-dominated world." For Vander Zanden, that means attacking invading species, one of the biggest threats to native fish.

Like rock 'n' roll, lakes 'n' fish have been in Vander Zanden's life from a young age. He grew up on the largest inland lake in Wisconsin, Lake Winnebago, where he took to canoeing and fishing. Later, while a geography major at McGill University, in Montreal, his summer "job" was to head out to Ontario with rod and reel to catch samples for a study of industrial toxins in fish. Impressed with the beauty of Ontario's crystalline lakes, Vander Zanden decided to pursue graduate

work in lake ecology.

His Ph.D. study of that work appeared in a now-well-cited 1999 paper in the prestigious journal *Nature*. Vander Zanden documented the effects on native lake trout in Ontario when smallmouth bass are introduced: The bass, a voracious Great Lakes-area fish that anglers have carried far beyond its original range, hogs the minnows that the trout also feed on. "I found the food web changed dramatically when bass got in," says Vander Zanden. The minnow consumption of trout plummeted, with zooplankton making up the rest. Eventually, the trout diminished, both in size and number. What impressed people was how Vander Zanden analyzed the bass's effect.

Instead of the more typical practice of looking inside the fish's innards, he took fingernail-size samples of muscle—much less traumatic for both fish and researcher—and measured the proportions of naturally occurring carbon and nitrogen tracers. The tracers revealed that where bass had invaded, trout were eating lower—and more poorly—on the food chain. Says limnologist John Magnuson of the University of Wisconsin at Madison: He "made extremely good use of new technology ... to come up with a novel finding": Invading species can significantly alter who gets to eat what.

When Vander Zanden wasn't in the lab or canoeing in the Canadian wilderness, he was living his boyhood dream. He played bass guitar and toured with a popular Montreal band, the Snitches. "It's something I had always wanted to do, to play on another level," he says. The band's latest pop-punk CD was reviewed on National Public Radio in the States. Vander Zanden co-wrote one tune, which aired in a TV commercial for Molson beer and pays him a modest royalty.

*continues on page 5*

## E for me, please

**Consider e-newsletter ...** If you would prefer to receive this publication electronically in the future, please email Denise Karns at [dkkarns@wisc.edu](mailto:dkkarns@wisc.edu) and simply indicate "e-newsletter please."

In 1999, Vander Zanden left the band and boreal lakes for his Smith fellowship at the University of California at Davis. His studies of Western aquatic systems affected by invasive species—from bullfrogs in ponds of the Conservancy's Lassen Foothills project to nonnative trout and bass in Lake Tahoe—clinched his commitment to going beyond simply documenting the effects of invasive species. "I realized as I started interacting with Conservancy people that the descriptive work isn't enough," he says. "I gained an appreciation for the need of management tools. How can [land managers] deal with the issue in a preventive way?"

That querying led Vander Zanden intellectually back to the north country, to try to devise a way to conserve the Ontario lakes that so far had avoided a biological invasion. In a paper published this year in the journal *Ecological Applications*, he and his colleagues analyzed massive government databases and came up with a way to predict which of the 3,000 lakes were most at risk of invasion by smallmouth bass, based on such features as whether anglers had access by road.

The analysis, which Vander Zanden calls

"smart prevention," was a bit of good news for managers: It singled out the 50 most vulnerable lakes among the thousands. "That gives a focus for our priorities," Vander Zanden says, and creates a more manageable target for public education and prevention efforts. His approach has received some "unfortunate validation": A few of the 50 lakes identified in the analysis have since been invaded.

Vander Zanden's life is now a rich stew of projects, from helping federal biologists restore Lahontan cutthroat trout to the Lake Tahoe region, to sustaining the world's largest species of trout in Mongolia, to lecturing on basic limnology to 170 students at the University of Wisconsin. Despite all his work on the water, he and his wife still vacation there, paddling or kayaking on northern lakes and rivers.

Even at the end of an office day, the once and maybe future rock star is likely to pull on his shoes and bike home in time to catch the sunset—from a canoe, on the water.

Source: Mlot, Christine. "Jake Vander Zanden: Rock, Water, Papers." *Nature Conservancy Spring* (2004): 32-33.

### *Limnology News*

*The University of Wisconsin-Madison Center for Limnology publishes Limnology News for its alumni and friends. Comments on the newsletter and future article ideas are welcome. On the Web at <http://limnology.wisc.edu>.*

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## First Malueg Award



*Darren Bade*

**Darren Bade** (MS 2002, PhD 2004, Carpenter) is the winner of the first Kenneth W. Malueg Limnology Scholarship.

**Ken Malueg** was a graduate student of Arthur Hasler's (M.S. 1963, Ph.D. 1966), and he and his wife, Sara Malueg, established this award to support

outstanding graduate students studying limnology of lakes with preference being given to students studying in the field away from the Madison area. Both Ken and Darren spent part of their graduate studies working on *Chaoborus* in Paul Lake. Darren used the award for travel to present his work at a scientific meeting.



*Ken Malueg*

## Dissertator Research: A Sampler of Work in Progress

**Mara (Finkelstein) Alexander** (Limnology and Marine Science, Sara Hotchkiss) is using spatial and temporal dynamics of aquatic macrophyte communities to aid in understanding the complex effects of human activity on lake ecosystems ranging in landscape position. Her 60 study lakes are located in Vilas County, Wisconsin, and were chosen due to their placement on both human development and landscape position gradients. Her work so far revealed that macrophyte communities in lakes high in the landscape are dominated by isoetids while lakes low in the landscape are dominated by elodeids due to the difference in bicarbonate concentrations. The degree of human development is not correlated with macrophyte community presence, but the presence of the introduced *Orconectes rusticus* does correlate with the absence of macrophytes. Mara is currently examining surface sediments from the deep point of each of her study lakes for cladoceran remains. She is investigating whether or not there is a correlation between the length of *Bosmina* antennules and the trophic structure of a lake. Her goal is to study a subset of her 60 study lakes temporally from pre-European settlement to the present and examine the lake sediments for evidence of changes in macrophyte cover and trophic structure.



**Cailin Huyck Orr** (Limnology and Marine Science, Emily Stanley) became a dissertator at the Center for Limnology in early January 2004. She has been evaluating the ecologic and geomorphic responses of streams to physical manipulations that were implemented as part of ecosystem restoration efforts. This includes measuring changes in denitrification following the reintroduction of flooding to a Baraboo River floodplain and changes in nutrient transport and uptake following a pair of small dam removals in Boulder Creek near Baraboo, Wisconsin. With her eye on a May, 2005 graduation date Cailin has had a busy summer finishing data collection for the nutrient transformation projects and repeating vegetation surveys for an offshoot project of her Master's work. When not in the field or processing samples in the lab, Cailin enjoys spending time with her husband David and their African pygmy hedgehog.

**Greg Sass** (Zoology, Jim Kitchell) achieved Ph.D. dissertator status in zoology as of April, 2003. His dissertation research focused on fish community responses to a whole-lake removal of littoral zone coarse woody habitat (CWH) in Little Rock Lake. As a consequence of CWH removal, largemouth bass growth rates decreased, the yellow perch population is nearly extirpated with a very low probability of recovery, and the food web of Little Rock Lake was increasingly subsidized by exogenous (terrestrial) energy sources. His results revealed that human lakeshore development, which tends to remove CWH from lake littoral zones, has profound influences on fish growth and production in oligotrophic lakes.



**Anthony Yannarell's** (Limnology and Marine Science, Eric Triplett) dissertation work focused on the spatial and temporal dynamics of bacterial communities in Wisconsin lakes. He used a genetic fingerprinting approach to characterize the makeup of lake bacterial communities, and employed a variety of multivariate data analysis techniques to examine patterns in the behavior of the whole community and to explore factors that potentially account for the variation in community composition. This research has helped to show that bacterial community composition is quite variable in lakes. Regular physical and biological events, such as water column mixing and the population dynamics of planktonic grazers, can trigger dramatic changes in bacterial communities. In addition, nutrient loading, lake productivity, and pH help to structure bacterial communities both within individual lake districts and across the state of Wisconsin. Tony hopes that learning about these very dynamic organisms can help us better understand how biological systems respond to various types of change.



**Pieter Johnson's** (Zoology, Steve Carpenter) research focuses on the interface between ecology and epidemiology. He is interested in the ecosystem-scale causes and consequences of diseases in aquatic environments. To study these issues, he employs two model systems: limb deformities in amphibians and microparasitic diseases in zooplankton. Amphibian deformities, which have generated considerable controversy in recent years, are largely caused by a parasitic flatworm that burrows into the tissue of developing tadpoles. Using a combination of field, laboratory, and experimental studies in Wisconsin and Minnesota, Pieter is investigating the ecosystem changes that may account for the recent increase in infection and the consequences of parasitism and deformities for amphibian populations. His results suggest that excess nutrient runoff into pond systems (eutrophication) is an important driver of infection through its effects on the parasite's snail hosts. In zooplankton systems, Pieter is exploring the importance of a newly described chytrid parasite that attacks *Daphnia* populations. He found that this parasite, which is wide-

spread in northern Wisconsin lakes, causes profound changes in the reproduction, mortality and behavior of infected animals. Long-term data indicate that epidemics are driven by host population density and climatological factors, and that they can have important consequences for *Daphnia* population dynamics. Experimental and field work has demonstrated that parasitism and predation interact on several dimensions, emphasizing the importance of examining the influence of disease in ecological studies. Considering the "keystone" role of *Daphnia* in aquatic food webs, the deleterious effects of these parasites on their hosts are expected to have wide ranging consequences on community composition and ecosystem processes.

**Eunsoo Kim** (Botany, Linda Graham and Tom Sharkey) is interested in the early evolution of Viridiplantae (green algae + land plants). She is studying protists from oligotrophic *Sphagnum* bogs as a part of the Microbial Observatory project directed by Professor Trina McMahon. So far she has isolated and molecularly-characterized several promising protists. She has determined sequences from several evolutionarily important organisms, which will help in inferring better eukaryotic trees by increasing taxon density. In addition, Eunsoo has discovered a few previously unknown plastid-less chrysophytes. A new enrichment and culture method, which is now under development, may help in identifying protists that are closely related to Viridiplantae as well as help in identifying other ecologically and evolutionarily important organisms.



# Developing an intercontinental wireless sensor network for studying lake metabolism

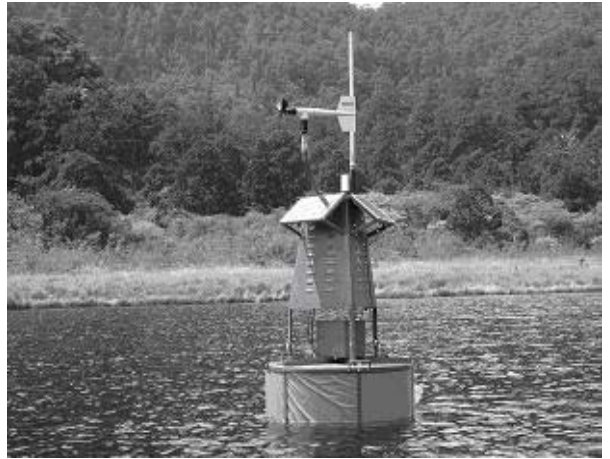
By Paul Hanson and Tim Kratz

Researchers at the Center for Limnology have started an international collaboration to study lake metabolism using instrumented buoys on lakes in Wisconsin and Taiwan. Tim Kratz, Paul Hanson, Tim Meinke, Barbara Benson, and Dave Balsiger of CFL have joined forces with researchers at the University of California San Diego, the San Diego Supercomputer Center, the Taiwan Forestry Research Institute, the Taiwan National Center for High-Performance Computing, and Academia Sinica to instrument several lakes near Trout Lake in Wisconsin and Yuan-Yang Lake in Taiwan with sensors enabling measurements of gross primary production, respiration, and net ecosystem production. Wireless communication with the buoys from anywhere in the world with internet access is a prominent part of the project.

Lake metabolism is a fundamental process in lakes that can be measured using high frequency (~ every 10 minutes) observations of dissolved oxygen in the surface waters of lakes. After accounting for movement of oxygen across the lake-atmosphere boundary, decrease in  $O_2$  at night can be used to calculate respiration, and oxygen increase during the day is used to calculate the difference between gross primary production and respiration.



*At the gate leading to Yuan-Yang Lake in Taiwan (21 April 2004): Front row l to r: Sheng Shan Lu, Tim Kratz, Stephen Chen, Grace Hong, Alan Lai. Back row l to r: Yao-Tsung Wang, Julian Chen, Hsui-Mei Chou, Paul Hanson, Tim Meinke*



*Lake metabolism buoy on Yuan-Yang Lake, Taiwan*

In October 2003 Tim Kratz visited Yuan Yang Lake to assess its suitability for the project. Yuan Yang Lake is particularly interesting because it is a sub-tropical lake subject to several typhoons each year. A single typhoon can drop as much as several meters of precipitation on the 4.5 meter deep lake, causing rapid flushing of the lake. This contrasts with the Wisconsin lakes which have much longer water retention times.

In February 2004, five Taiwanese scientists, accompanied by Peter Arzberger of the San Diego Supercomputer Center traveled to the Trout Lake Station in Wisconsin to observe the metabolism buoys deployed on the Wisconsin lakes. In April 2004, Kratz, Meinke, and Hanson visited Yuan Yang Lake to install the instrumented buoy. The buoy is now operational and reporting data wirelessly to a base station in Taiwan. From there, the data are made available in near real time on the internet. See <http://lakemetabolism.org> to view the raw data and to see more details on the project.

The project is supported jointly by a supplemental grant from the National Science Foundation's Office of International Science and Engineering (OISE), and by funds from its counterpart agency, National Science Council of Taiwan and the Taiwan Forest Research Institute.



# The View from NCEAS in Santa Barbara

By Jim Kitchell

I've been asked to offer some lines summarizing my recent sabbatical time at the National Center for Ecological Analysis and Synthesis (NCEAS) in Santa Barbara CA. I spent much of this past academic year based there while supported by a combination of UW resources and those from NCEAS. It was a wonderful and productive time.

First, a bit about the weather in sunny California—it isn't always that! Many mornings were dominated by something southern Californians politely refer to as "the marine layer." In Wisconsin, we call that fog. However, by mid-day it was usually burned off and the much-advertised golden state was actually that.

My sabbatical goals included three major areas of effort. First was to organize a workshop on behalf of the USGS Grand Canyon Monitoring and Research Center which I serve as a member of their Science Advisory Board. This workshop was focused on methods for estimating abundance of the endangered humpback chub (*Gila cypha* or HBC) in the Colorado River. One population lives in the Grand Canyon and there are five smaller populations spread among the upper Colorado, Yampa and Green Rivers. The simple question "How many are there?" is made more difficult and important in the case of a rare, endangered fish such as this one because they live in intensively managed rivers located in a part of the world where water is scarce and becoming more so. During early November 2003, a group of seven Colorado River basin fishery scientists, four "external" experts in fish population estimation, and four "observers" including those from agencies involved in managing the Glen Canyon Dam assembled at NCEAS for a two-day meeting. We reviewed existing data and the methods employed in analyses. Our report from the experts was submitted in December to the Adaptive Management Work Group which stewards the activities of the Glen Canyon Dam Adaptive Management Program. In short, a member of the USGS GCMRC SAB prepared a report to AMWG of the GCDAMP regarding the HBC populations above and below the GCD. That took the better part of several months.

My second general goal involved a synthesis effort. Bob Francis (U. Washington) and I

serve as leaders for a working group effort sponsored by NCEAS. This one started three years ago and was built around teams of scientists who developed a common modeling framework (Ecosim) for analysis of "Interactions of Climate and Fisheries in North Pacific Ecosystems." We developed models for the Central North Pacific, the Eastern Tropical Pacific, the Gulf of Alaska, the Eastern Bering Sea, and the North California Current. My job was to pull together the parts and create a summary or synthesis document suitable for publication. January through March were spent in that pursuit and a draft of the resulting, large manuscript is now moving among the 13 co-authors who participated in the working group. Yes, fisheries are very powerful ecological forces, and yes, climate and fisheries do interact. One of our goals was to develop visualization methods for presenting the complex dynamics of food web interactions as fisheries develop. There's an excellent example of that in a paper by Hinke et al. in the on-line journal *Ecology and Society* found at [www.ecologyandsociety.org/Journal/vol9/iss1/art10](http://www.ecologyandsociety.org/Journal/vol9/iss1/art10).

My third goal was to develop an analysis and synthesis of bioenergetics modeling efforts. We've been doing this kind of thing for a long time. In fact, our work is often referred to as the "Wisconsin model." The most recent version of the manual was published in 1997. It contains the parameter tables for 24 species of fishes and invertebrates. Since then, as nearly as I can tell, there have been similar models developed for another 25 species. It's time to put all this together. I worked on that while at NCEAS, continue to do so now (as time allows!) and will be giving a talk about that at the national meeting of the American Fisheries Society which is here in Madison during late August.

I hope that many of you can make the AFS meeting. We can guarantee two things—it'll be warm in August so there won't be any "marine layer" effects and you're invited to join CFL alumni and their friends for beer and cheese in the Laboratory of Limnology slip on Tuesday evening, 6-8 PM, 24 August. You should probably plan that this get together might run a little over the allotted time! It's great to be back home and I hope to see you at AFS because we've some catching up to do.

# Noteworthy/ Awards

## New Book from CFL

Steve Carpenter's book *Regime Shifts in Lake Ecosystems* was published in November 2003 by the Institute of Ecology in Oldendorf/Luhe, Germany. The book is about big changes that sometimes occur in lakes, such as outbreaks of toxic algae, collapses of fish populations, and trophic cascades. Regime shifts, thresholds, tipping points and related phenomena are attracting more attention in ecology and other sciences. Some of the best-studied examples come from lakes. Using long-term data sets, whole-lake experiments and models, the book shows that it is extremely difficult to predict regime shifts in advance. However, there are precursors of regime shifts that create "accidents waiting to happen." The book suggests that researchers and lake managers can make progress by focusing on these risk factors that make ecosystems vulnerable to regime shifts. The book can be ordered for 40 Euros from <http://www.int-res.com/eebooks/index.html>. PDF files of the near-final draft can be downloaded from <http://limnology.wisc.edu/regime>.

## Elected

**Steve Carpenter** was elected to the Royal Swedish Academy of Sciences on April 20, 2004. He is also a member of the National Academy of Sciences.

## ESA Sustainability Award

The **Ecological Society of America** has given the **2004 Sustainability Science Award to Steve Carpenter**, Jon Foley, Marten Scheffer, Carl Folke and Brian Walker for their paper "Catastrophic shifts in ecosystems" published in *Nature* in 2001. This award is given annually to the author(s) of a peer-reviewed paper published in the last 5 years that has made a great contribution to the emerging science of ecosystem and regional sustainability through the integration of ecological and social sciences.

## WARF Professorship to Carpenter

The U.W. Board of Regents named **Steve Carpenter** to a WARF professorship, the **Stephen Alfred Forbes Professor of Zoology**. Stephen Alfred Forbes (1844 – 1930) was a founder of aquatic ecosystem science as well as a dominant figure in the rise of American ecology. His publications are

striking for their merger of extensive field observations with conceptual insights. While already famous as an economic entomologist, Forbes undertook studies of massive fish mortality in Lake Mendota, WI. He connected algae blooms and lake physics to fish kills, and embarked on a research program into the lake and river ecology. Many of his insights on lake ecology were collected in an influential 1887 paper "The lake as a microcosm." Forbes was elected to the National Academy of Sciences in 1918 and Ecological Society of America President in 1921.

## Student Awards

**Darren Bade** (Limnology and Marine Sciences, Carpenter) won the Outstanding Student Paper award for his presentation at the Fall 2003 Annual Meeting of the American Geophysical Union.

**Pieter Johnson** (Zoology, Carpenter) received a **National Science Foundation** Dissertation Improvement Grant for his research on eutrophication and amphibian disease.

**Chris Solomon** (Zoology, Vander Zanden) received a **National Science Foundation** pre-doctoral fellowship for three years starting in 2004.

**Greg Sass** (Zoology, Kitchell) received the Best Student Paper Award from the Wisconsin Chapter of the American Fisheries Society.

**Chase Noland Undergraduate Award** recipient for summer 2004 was **Adrienne Tandberg**. Adrienne, working under the guidance of Professor Anthony Ives, studied "Correlating Group Cohesion with Environmental Quality of North Temperate Lakes."

The **Anna Grant Birge Award** recipients for 2004 include graduate students **Pieter Johnson** (Zoology, Carpenter), **Cailin Orr** (Limnology and Marine Science, Stanley), **Brian Roth** (Limnology and Marine Science, Kitchell), and **Chris Solomon** (Zoology, Vander Zanden).

**E.T. and Jean Juday Undergraduate Fellowship in Limnology** recipients for 2004 were **Laura Kessler** and **Jonathan Popper**. Laura, working under the guidance of Vander Zanden, will be carrying on with the whole-lake rusty crayfish removal experiment in Sparkling Lake. Jonathon, working with Kratz and Hanson, will be developing, deploying, and maintaining instrumented buoys designed to measure lake metabolism.

The following received **National Science Foundation Research Experience for Undergraduate Awards** for summer 2004 were **Michelle Nault** (Kitchell), **James Morrison** (Hotchkiss), **Katie Pofahl** (Kitchell), **Amanda Schiller** (Carpenter), and **Jake Tetzlaff** (Kitchell).

## Graduations

**Darren Bade** (PhD 2004, Carpenter)  
Thesis: "Ecosystem carbon cycles: whole-lake fluxes estimated with multiple isotopes."

**Patrick Gorski** (PhD 2004, Armstrong)  
Thesis: "An Assessment of Bioavailability and Bioaccumulation of Mercury Species in Freshwater Food Chains."

**Catherine Hein** (MS 2004, Vander Zanden)  
Thesis: "Rusty Crayfish (*Oronectes rusticus*) Population Dynamics During Three Years of Intensive Removal in Sparkling Lake Wisconsin."

**Theodore Willis** (PhD 2003, Magnuson)  
Thesis: "Dynamics of Fish Communities and Populations in Five Northern Wisconsin Lakes."

**Anthony Yannarell** (PhD 2004, Triplett)  
Thesis: "Accounting for Spatial and Temporal Variation in Bacterial Communities in Wisconsin Lakes."

## Migrations

**Gretchen Anderson** (former undergrad with Vander Zanden) is starting graduate studies with Mike Jones at Michigan State University fall of 2004 in cooperation with the Great Lakes Fishery Commission on sea lamprey control.

**Darren Bade** (MS 2002, PhD 2004, Carpenter) will be a postdoc with Gene Likens (PhD, Hasler.) Darren will work on long-term biogeochemical data from Gene's records at Hubbard Brook, New Hampshire.

**Katie Hein** (MS 2004, Vander Zanden) will be starting PhD work at Utah State with research work in Puerto Rico.

**Greg Sass** (PhD 2004, Kitchell) will start postdoc work at the CFL in the fall under Kitchell and Carpenter. Greg will study woody habitat effects on fishes in small lakes during summers, and model the Lake Superior food web during winters.

**Theo Willis** (MS, PhD 2004, Magnuson) has a postdoc position at the University of Toronto.

**Tony Yannarell** (PhD 2004, Triplett) has a post-doctoral position at the University of North Carolina, Institute of Marine Sciences in Morehead City, NC.

## In Memoriam

### George Gallepp (1958- 2004)

George had a long history with Limnology at Wisconsin before he became an editor and senior writer for the College of Agriculture and Life Sciences on the Madison campus. George did his MS degree (1970) on fish swimming with John Magnuson and his PhD (1974) on trichopteran ecology with Art Hasler. George was responsible for the Trout Lake Station as part of the Lake Biology Program from July 1977 until August 1980 after Bill Schmitz returned to full time at the University of Wisconsin-Marathon Campus. George was with us before the Center for Limnology became an entity. George also helped us begin this newsletter for the center as a volunteer; we learned much from him. George is survived by his wife Mariel, his parents, and sister Carol. A memorial celebration was held for George at Olbrich Gardens in May.



### Jean Becker Juday

We regret the loss of Jean Becker Juday in May 2004. For a number of years, Jean and her husband Tug have generously funded scholarships for undergraduate researchers based at Trout Lake Station. The fellowships are an important element of our training program and have contributed to the education of many students.

# Kites on Ice

*Below are a few pictures from the 2004 Madison Area Winter Festival "Kites on Ice" held on Lake Mendota off of the Memorial Union where John Magnuson conducted demonstrations on winter limnology.*



***This newsletter was printed through gift funds administered by the UW Foundation.***

