



Laboratory of Limnology
Lake Mendota

LIMNOLOGY NEWS

University of Wisconsin- Madison
College of Letters and Science



Trout Lake Station
circa 1935

Number 18

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Director's Notes



Steve Carpenter

Wisconsin Limnology has grown and changed this year. We doubled the number of students and postdoctoral trainees. The Hasler Laboratory is chock-full of young researchers. More seasoned researchers are also doing pretty well.

John Magnuson's work

on adapting to climate change is highly visible in Wisconsin. 2010 was the warmest year in history for Lake Superior, causing the media spotlight to shine on Jim Kitchell's studies of how temperature affects lamprey predation on lake trout. Jake Vander Zanden, Tim Kratz and I are spinning up a new project to control invasive smelt by manipulating lake water temperatures. I initiated a new project to create alternative scenarios for the future water resources of the Yahara Watershed for 2060, working with colleagues from CALS, Engineering and Zoology. Emily Stanley found that stream restoration does more than improve fish habitat. In addition it can reduce the levels of toxic nitrite in the nitrogen-rich streams of Wisconsin. New faculty member Pete McIntyre started his Wisconsin career with a bang, garnering the cover of *Nature* for his work on status and trends in the world's rivers.

Clearly folks at CFL are not resting on their laurels. World-class research, outstanding training of the next generation of scientists, and

practical problem-solving thrive here. This newsletter covers a selection of the highlights from 2010.

Newsletters by Email?

If you would like to receive your newsletter by email, please send a note to Denise Karns (dkkarns@wisc.edu).

CFL in the News

Occasionally there is a day when a CFL scientist is not in the news, but those days are rare. This year's highlights include a Science Profile of Reinette Biggs, a feature on the CFL fleet featuring Dave Harring, multiple discoveries about aquatic invasive species from Jake Vander Zanden, an interview with Emily Stanley about the toxic mud spill in the Danube River, and extensive coverage of Pete McIntyre's work on condition of the world's rivers. For these and many more news items go to 'CFL in the News' on our web page <http://limnology.wisc.edu/>



Emily Stanley

Emily Stanley Promoted to Full Professor

Dr. Emily Stanley, river ecologist and biogeochemist, was promoted to Professor in the Department of Zoology on the basis of her outstanding research record and

teaching ability. Emily leads the North Temperate Lakes Long-Term Ecological

Research program, as well as studies of how rivers change after dams are removed.

Peter McIntyre Joins UW and CFL

Pete McIntyre brought great new energy to CFL when he joined us as a faculty member in summer 2010. Pete is rapidly building an excellent team of students and postdocs who work on ecology and conservation. He is particularly interested in the ways that fishes affect ecosystem nutrient cycling and productivity. Pete's routine teaching assignment will include Ecology of Fishes. This year he is offering a well-subscribed graduate seminar on Global Freshwater Aquaculture and Fisheries. Pete brings many new strengths to the CFL faculty, and we are delighted that he has joined us.



Peter McIntyre

Jim Kitchell to Emeritus

Jim Kitchell moved from the regular faculty to emeritus status in August 2010. In June, more than 60 people, including many of Jim's former students, celebrated his retirement with a dinner party and light roasting at the ASLO meeting in Santa Fe. At that meeting, Jim received the Alfred C. Redfield award for



Jim Kitchell addresses the group in Santa Fe.

lifetime achievement. The citation reads "*For field-changing contributions in the areas of fish*

ecology and fisheries, trophic dynamics, and understanding the role of fish in aquatic ecosystems".



Jim Kitchell receives ASLO Redfield award from ASLO President Carlos Duarte

In October, more than 150 people celebrated Jim's retirement at a reception on campus. Speakers included L&S Dean Gary Sandefur, Zoology chairman Jeff Hardin, Sea Grant Director Anders Andren, and CFL faculty who served with Jim.



Dean Gary Sandefur presents Jim Kitchell with certificates of recognition from both the UW-Madison and State of Wisconsin.

Jim maintains an active research program supported by several current grants. Since his retirement he has been in the lab most days, except when he is traveling for research. Thus Jim is following in the footsteps of all previous leaders of Wisconsin limnology by maintaining a

high level of professional activity in emeritus status. Nonetheless, Jim's retirement has been a lot of fun for those who attended the celebrations. Many folks at CFL think we should "retire" Jim every year as a reason for a great party.



Friends and family gather at the Pyle Center for Jim Kitchell's retirement party.

Kratz to serve as NSF Rotator

Tim Kratz, Director of the Trout Lake Station, has accepted a position as a rotating Program Officer in the Ecosystems Science Cluster at the National Science Foundation. His one-to-two year term starts in mid-November. Tim says "I'm looking forward to serving the ecological community and helping to shape the future of ecosystem science, while at the same time getting to see a wide diversity of new ideas from some of the top minds in the field." Kratz will stay involved, albeit at a distance, in his ongoing projects such as LTER, GLEON and the Crystal Lake mixing experiment while at NSF.

Science in the Northwoods

The second Science in the Northwoods meeting was held September 30-October 1 at Camp Manito-wish, Boulder Junction, Wisconsin. Chaired by Trout Lake Station Director Tim Kratz, the event brought together 125 people from 23 organizations, schools and agencies, among them students, scientists, educators, managers, artists and others who wanted to learn more about the research activities taking place in the Northern Highlands.

The format, called "scientific speed dating" by co-organizer Jen Hauxwell of WDNR, allowed



Tim Kratz greets participants of the 2nd Science in the Northwoods Conference.

interests in depth.

Science in the Northern Highlands is robust and diverse, embracing topics such as long term limnology, shoreland restoration, hardwood forests, grouse, sea lampreys, invasive species, remote sensing and climate change, and others. In addition, networks are thriving among citizen volunteers and global observatories.

The meeting was not strictly limited to traditional scientific displays of data charts and graphs. Six artists who participated in LTEArts last May – a project supported by the National



Science in the Northwoods participants continue the discussions during a break.

Science Foundation to link science with the humanities – had their work on display during the meeting. Four were on-hand to talk about

speakers just five minutes to present the essential points of their research. As a result, all attendees learned something about a great variety of topics. Long breaks for coffee and meals, and an evening social, gave time for researchers to discuss common

their works of art, and the Friday morning session began with John Bates reading his poem about spring peepers.

As notable as the diversity of research presented was the common thread among the participants: a curiosity about the world around us and a strong desire to understand the past, present, and future of this special place we call the Northwoods.

World's Rivers in Crisis

(excerpted from the original article by Terry Devitt published in UW News)

The world's rivers are in crisis, according to a new study by researchers from the UW-Madison Center for Limnology and the City College of New York (CCNY) that was published in the Sept. 30, 2010 issue of the scientific journal *Nature*. The study, led by UW-Madison limnologist and professor of zoology Peter McIntyre and CCNY modeler Charles Vörösmarty, combines, for the first time, indices of water security and biodiversity for all of the world's rivers, many of which are severely degraded due to issues of pollution, water diversion and introduced species.

Examining the influence of numerous types of threats to water quality and aquatic life across all of the world's river systems, the study is the first to explicitly assess both human water security and biodiversity in parallel. Fresh water is widely regarded as the world's most essential natural resource, underpinning human life and economic development as well as the existence of countless organisms ranging from microscopic life to fish, amphibians, birds and terrestrial animals of all kinds.

Rivers have been altered through damming, irrigation and other agricultural and engineering practices since the advent of civilization. In recent times, chemical pollution and the accidental as well as purposeful global redistribution of plants, fish, and other animal species have had far-reaching effects on rivers and their aquatic inhabitants.

What jumps out, say McIntyre and Vörösmarty, is that rivers in different parts of the world are subject to similar types of stresses, such things as agricultural intensification, industrial development, river habitat modification and other factors. Compounding the problem is that some of the negative influences on rivers arrive in indirect ways. Mercury pollution, for example, is a byproduct of electricity generation at coal-fired power plants and pollutes surface water via the atmosphere.

"What made our jaws drop is that some of the highest threat levels in the world are in the United States and Europe," says McIntyre. "Americans tend to think water pollution problems are pretty well under control, but we still face enormous challenges."

The hard lessons learned by the developed world, says McIntyre, can help governments and planners in other parts of the world avoid making the same mistakes and experiment with new strategies for promoting water security and protecting biodiversity. Instead of investing billions of dollars in expensive remediation technologies, strategies such as protecting watersheds, for example, can reduce the costs of drinking water treatment, preserve floodplains for flood protection and enhance rural livelihoods.

Getting Set for Whole Lake Mixing 2011

A team of researchers led by Jake Vander Zanden from the UW Center for Limnology, are gearing up for a new whole-lake manipulation starting in summer of 2011. The project will mix Crystal Lake (Vilas County) for three consecutive summers. How exactly does one 'mix' a lake? The project will use GELs (Gradual Entrainment Lake Inverters), developed by Jordan Read and Chin Wu from UW-Madison Civil and Environmental Engineering. GELs are basically large trampolines that are moved up and down through the water column using compressed air. The project will test some basic theory about the role of thermal stratification in

regulating lake ecosystems, and has some important implications for understanding climate change impacts on lakes. In addition, the proposed mixing is expected to extirpate rainbow smelt, a harmful invasive species. Because Crystal Lake is a NTL-LTER study lake with a 30 year data record, it provides a unique opportunity to examine whether the lake will revert to its pre-rainbow smelt ecosystem state if smelt are extirpated.

Artists and Scientists Join Forces

In June, six northwoods artists and seven scientists from the Center for Limnology met at Trout Lake to discuss how to use the arts to communicate scientific understanding developed by the North Temperate Lakes LTER project to the public. The focus was on long-term change and alternative scenarios of the future. The artists included three painters (water color and pastels), a wood sculptor, a quilter and a writer. The artwork resulting from this project will be shown at the annual Lakes meeting sponsored by the Wisconsin Association of Lakes in April 2011 as well as other venues. The project, dubbed LTERArts, has sister projects at three other LTER sites: Bonanza Creek in Alaska, Andrews Forest in Oregon, and Harvard Forest in Massachusetts.

Algae Blooms and Booms

A team of scientists and managers from the DNR, City of Madison, Dane County, and the UW-Madison conducted an innovative pilot project during the summer of 2010 to determine whether floating booms can reduce blue-green algae scums and associated toxins along the shorelines of the Yahara lakes. At the Center for Limnology on Lake Mendota, a 100-foot long "interceptor" boom comprised of a floatation collar and a 1-foot hanging curtain was deployed with one end attached to shore and the other end extending into the lake. Three-sided "deflector" boom systems were also deployed around the swimming areas of two beaches on Lake Monona.

An important part of the project included water quality testing by UW scientists and city-county public health personnel. While blue-green algal blooms were not common enough during the summer of 2010 to conclusively prove that the boom systems can reduce the public's exposure risk to algal toxins, the booms were notably effective at keeping floating plant cuttings and other debris away from the swimming beaches. With these encouraging results and very positive public acceptance of the booms deployed at the two beaches, the project team plans to continue the experiment next summer with added emphasis on evaluating ways to safely remove and dispose of the algal scums trapped by the booms.



Seen from the roof of the Hasler lab, a boom extends out into Lake Mendota.

This demonstration project also dovetails well with ongoing research by UW scientists on algal bloom formation in Lake Mendota as well as on wind-induced water circulation dynamics in the Yahara lakes. Modeling work in the first research area will help predict when algal blooms will form; modeling of water circulation patterns especially related to long-shore currents will help determine the most effective locations for boom deployment in the lakes.

Barbara Benson Transitions to Emeritus

After serving for 27 years as the Information Manager for the North Temperate Lakes LTER program, Barbara Benson retired in 2010. The Center for Limnology has been truly fortunate



Barbara Benson.

because of her decision to join us back in the early days of LTER. She has been instrumental in developing perhaps the best data and information management system among the network of 26 LTER sites funded by the US National Science Foundation (NSF). Barbara not only excelled in data and information management, she also has been an accomplished scientist, and a leader in developing our LTER program and the information management network across the LTER sites.

Barbara's trajectory to be a limnologist was not typical. She received degrees in mathematics, first as an undergraduate at the University of Rochester in New York, then as a Master's student at the University of Wisconsin-Madison. She then used her quantitative skills to complete her Ph.D. in botany with professors Orie Loucks and Tim Allen.

Many of us were fortunate to have Barbara as a colleague and collaborator in research and in steering our North Temperate Lakes LTER site in its formative years. If she had not been with us we would be different, likely less vital, less precise, less versatile, and less productive of science. Barbara has been key in crafting our LTER proposals bringing millions of dollars to our research, our students, and our facilities. She has published both in science and in information management in equal measure. Most papers were done collaboratively with colleagues, as is her style. On the information

side are papers on sensor networks, model data systems, biological databases, and information access. On the science side are papers on heterogeneity in fish distributions, parameter coherence as a property of comparative limnology, the biodiversity of fishes, lake ice phenology, and causes of interannual variability. She is a coeditor and lead or coauthor on six chapters of our LTER synthesis book published by Oxford University Press – *Long-term Dynamics of Lakes in the Landscape*.

Her most recent science has been to lead on a paper entitled "Extreme events, trends and variability in Northern Hemisphere lake-ice phenology (1855 - 2005)" with colleagues here and around the Northern Hemisphere. She is especially excited about working with colleagues at the Lake Sunapee Protection Association and the State University of New York at Binghamton, to make high-frequency data from instrumented buoys available to the public in easy to understand formats. Both projects are funded by NSF.

We at limnology are proud to have worked with Barbara Benson and appreciate her contributions to the Center for Limnology and the LTER over a critical time in our history. We wish her well in this new chapter in her life.

Dave Balsiger Retires

David Balsiger has retired after a long, although interrupted, career at the Center for Limnology. Joining the team in 1966 as a student hourly he was field assistant, shop assistant, held various other positions, and eventually became



Dave Balsiger

assistant information manager for the North Temperate Lakes Long Term Ecological Project. Although others here have more consecutive years of service, Dave witnessed the arrival of John Magnuson, Jim Kitchell and the *Limnos*.

During his tenure he helped developed, among other things, the first remote controlled fish feeding catapult, rescued sunken field vehicles, followed tagged lake trout, encoded programs and data into 80-column punch cards, and eventually became instrumental in keeping the data collected for the LTER project in excellent condition, managing databases, servers, backups, websites, and programs.

Corinna Gries, LTER Information Manager, writes “That is when I met Dave, first at our annual LTER Information Manager meetings where at the end of long working days he would bring out his guitar and entertain us with his own ballads on information management, limnology and the CFL staff. He went on extensive hiking trips with fellow IMs before or after the meetings. Dave has many friends in that community as well as at the CFL. Sharing one year with him here at the CFL while learning the ins and outs of the NTL information management system I came to appreciate not only his technical but especially his people skills and generosity with which he helped less computer savvy colleagues archive and access research data.”

Henry C. “Ike” Eichhorn (1920-2010)

Some of you who read this were lucky enough to have known Ike. Others of more recent vintage may have never heard the name; it is time you do. He is in the center of the photograph on page 8 in the front row, fourth from the right.

Ike was born in Baltimore where at an early age he discovered classical music and natural science in the museums of the city. He attended Baltimore City College and in 1939 entered the University of Maryland where he was expelled in 1941 for refusing to participate in the ROTC. When Pearl Harbor was attacked he was a chemist with ARMCO Steel. After trying

unsuccessfully to enlist, Ike was drafted in 1944 and was sent to India to test aviation fuels. On his return to Baltimore he again was employed by ARMCO Steel, and also served as the director of the young people's educational program and curator of invertebrates at Natural History Society of Maryland. Then came the Korean War and he was recalled in 1950 and stationed at Camp McCoy in Wisconsin.

In Wisconsin, Ike completed a B.Sc. degree in Zoology with a minor in biostatistics at UW-Madison. In 1953 he entered graduate school, was a teaching assistant, and then joined the hydrobiology program as a Ph.D. student investigating vitamin B12 in Wisconsin lakes. In about 1958 Ike was hired as a Project Assistant in hydrobiology with Dr. Arthur D. Hasler.

At the old limnology lab at the foot of Park Street, Ike was central to the research, operations, and graduate education in limnology. Today the old lab is only one floor high; it is used by the Hoofers and topped by a Lake Mendota overlook. Limnology also occupied a Quonset hut part way up the hill towards the education building. We think that is where Ike had his office. As the project supervisor in hydrobiology, he played a major role in writing the proposal that funded the construction of the present Arthur D. Hasler Laboratory of Limnology, one block west of Park Street. In the photo he and Art Hasler (standing on the left side) are in front of the new laboratory completed in 1963.

Ike helped plan research projects, prepared budgets, and wrote research proposals to obtain funding for the work of the lab. Ike also offered technical and biostatistical advice bearing on strategy and tactics of research projects. He assisted in editing technical reports and studies for publication in professional journals, advised the students in their research,

and provided research ideas. He continued his own research. He never wrote his thesis, but that did not prevent him from admonishing students in limnology to complete their theses before moving on.



Art Hasler (standing left), Henry Eichhorn (center front row) and students and staff in front of the new Laboratory of Limnology in Fall 1964

Front row left to right. Mitsuo Teriguchi (Ph.D. 1969), Arne J. Salli (Ph.D. 1974), Henry C. Eichhorn (project supervisor), Thomas L. Wirth, Russell C. Dunst (MS 1970), Michael Parker (Ph.D. 1966)

2nd row: Arthur D. Hasler (Professor and Leader), Gary L. Hergenrader (Ph.D. 1967), Jonce Shapkorev (Visiting scientist – Yugoslavia), Francis H. Henderson (Ph.D. 1963), Andrew E. Dizon (Ph.D. 1971)

3rd row: Kenton M. Stewart (Ph.D. 1965), Kenneth W. Malueg (Ph.D. 1966), Gerald Chipman (instrument maker), David A. White (Ph.D. 1967)

4th row: Clyde W. Voitlander (Ph.D. 1971), Al P. Kingsbury (MS. 1966), Donald C. McNaught (Ph.D. 1965), Erich Schwartz (Post Doctorate Germany), John L. Williamson (M.S. 1965), Thomas D. Wright (Ph.D. 1968), Edward Gardella (graduate student), James Bruins (graduate student), Peter Wall, Paul E. Sager (Ph.D. 1967), Philip A. Doepke (Ph.D. 1970), Andrew N. Lenz (M.S. 1969)

In 1966 Ike left limnology and Wisconsin only to return a few years later to work on a Eutrophication Studies Program at the University and as an ecosystem analyst at the Wisconsin Department of Natural Resources. Much of the rest of his professional career was with the Army Environmental Hygiene Agency in Maryland where he retired as Chief of the Aquatic Biology Branch in 1987.

Ike and his wife Susan E. Jordan returned to Wisconsin at his retirement and lived close to the University where Ike continued to take classes and be involved intellectually until he could not. He passed away on January 2, 2010.

Remembrances from Clyde Voitlander (standing top left, Ph.D. 1971):

"Ike was much more than simply Art's administrative officer...he was a great teacher. His command of the limnological and ecological literature was not only masterful...to a fledgling graduate student, it could be downright intimidating. If one asked Ike a question about some facet of research, his answer always started with: 'to really understand this, you have to appreciate it from a historical perspective,' after which he would

start rattling off all of the crucial references, often annotating them with significant findings therein...Ike didn't mean to intimidate...and nothing in his manner ever suggested that he was talking down to you...he simply was enthused about the field and about learning in general. He was a true student."

"In the early days of the new lab, he still talked about finishing his degree and I know that some departmental faculty encouraged (and sometimes nagged) him to get on with it...I do not know why he never did...whether the demands of being Art's right-hand man and being sort of troop leader and father-confessor to a gang of unruly graduate students were too much, or if he just decided he wasn't interested. It is the measure of Ike that the respect he had in the department and other areas of the university would not have been measurably increased by an advanced degree."

New Faces at CFL

We welcome the following new staff to the CFL:
Bryan Althouse, graduate student (Vander Zanden).

Mireia Bartrons, post doc (Vander Zanden)

Evan Childress, graduate student (McIntyre)

John Crawford, graduate student (Stanley)

Grace Hong, Outreach Manager for GLEON

Ben Kraemer, graduate student (McIntyre)

Alex Latzka, graduate student (Vander Zanden)

Zach Lawson, research specialist (Vander Zanden)

Dan Oele, graduate student (McIntyre)

Aaron Stephenson, LTER Database and systems administrator (Stanley)

Colleen Sylvester, LTER/Chem Lab (Stanley)

Jake Walsh, graduate student (Vander Zanden)

Carol Warden, AIS outreach specialist (Kratz)

Recent Degrees and Transitions

Kate Anderson, (research assistant, LTER) is pursuing dual PhDs in Sociology and in the Environment and Resources program of the Nelson Institute.

Ishi Buffam (postdoc, Carpenter) is now a faculty member at the University of Cincinnati, with a joint appointment in the Department of Biological Sciences and the Department of Geography.

Marit Sallstrom, (MS 2010, Vander Zanden) has returned to Östersund, Sweden, where she works as a consultant for Triventus, a multinational Scandinavian wind power company. As many of you know, she and her husband Markus are the happy parents of 2-month old Ellen Madison.

Scott Higgins (post doc, Vander Zanden) began a new position as a Research Scientist with the Canadian Department of Fisheries and Oceans at the Freshwater Institute in Winnipeg, Canada. Scott joins a team of researchers in whole ecosystem manipulations at the Experimental Lakes Area (ELA), a remote field station in Northwestern Ontario (Canada) established by Waldo Johnson (Ph.D. Hasler, 1954)

Erika Nilsson (post doc, Vander Zanden) is currently working as a limnologist at the County Administrative Board in Kalmar, Sweden, with water administration. She is involved in developing action plans on how to increase the ecological status of lakes and streams in the region.

Chris Solomon (PhD, Vander Zanden), thesis "Lake food webs and the benthos: cross-habitat connections, terrestrial subsidies, interaction strengths, and invasive species" After staying at the CFL for postdoc positions modeling fish predation interactions (Kitchell) and working with the Global Lakes Ecological Observatory Network (Kratz, Hanson), Chris started this summer as an assistant professor at McGill University.

Laura Smith (Cascade Project), **James Thoyre** (LTER/Chem Lab), and **Trish Haza** (Center Administrator) have left the CFL for new horizons. We wish them well for the future!

Awards

Roy Stein (Ph.D. 1975, Magnuson) received the 2010 American Fisheries Society Award of Excellence.

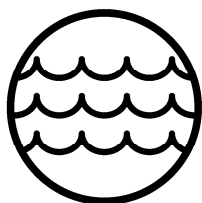
John Lyons was selected by the Mexican Ichthyological Society as this year's honorary member to the society.

Marilyn Larsen was awarded the UW Madison College of Letters and Science 2010 Early Career Award for recognition of outstanding performance in her position.

Kenneth W. Malueg Award was given to Stephen Powers for his work examining how differences in hydrology, geomorphology, and water residence time dictate differences in aquatic nutrient cycling.

Anna Grant Birge Awards were given to Limnology and Marine Science students Jereme Gaeta, Gretchen Hansen, Matthew Kornis, and Jennifer Schmitz; and to Environmental Engineering students Emily Kara, Khurram Khan, and John Reimer.

Juday Awards were given to under-graduate students Nick Heredia and Micheal Caballero.



Center for Limnology

University of Wisconsin–Madison

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