

Laboratory of Limnology  
Lake Mendota

# LIMNOLOGY NEWS

University of Wisconsin–Madison  
College of Letters and Science



Trout Lake Station  
circa 1929

Number 7

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## Pioneering the Ecosystem Approach

by Gene Likens, Director, Institute of Ecosystem Studies, Millbrook, New York

It seems like a very long time since I was a graduate student at the University of Wisconsin in Madison. But, many of the lessons that I learned there are still important to me. I did my thesis research with Arthur D. Hasler studying physical and biological transport of chemical elements in meromictic and ice-covered lakes in northern Wisconsin. Stewart's Dark Lake, a meromictic lake in Rusk County, still is a very special place to me! In fact I have a fond attraction for the landscape, and particularly the lakes, throughout all of northern Wisconsin.

Dr. Hasler introduced me to several important ideas and concepts while I was a graduate student, but three have been vital to my career. He introduced me to the power of experimental limnology, to the ecosystem approach and to Aldo Leopold's method of thinking and writing. I am extremely grateful for Art's guidance and inspiration.

My first faculty position was at Dartmouth College in New Hampshire. There I had the opportunity with colleagues F. Herbert Bormann and Noye M. Johnson (Noye also was a graduate of the UW-Madison) to initiate the Hubbard Brook Ecosystem Study (HBES) and to apply the experimental approach.

As part of the Hubbard Brook project, I have been engaged in



multidisciplinary ecological studies of forest, stream, and lake ecosystems in the White Mountains of New Hampshire for almost 30 years. The overall objectives of the study are to evaluate energy flow and biogeochemical fluxes for experimentally manipulated and "undisturbed" northern hardwood forest, stream, and lake ecosystems. Unfortunately, no ecosystem on Earth is now fully undisturbed by human influence. These long-term studies, done in cooperation with students and colleagues from Yale, Syracuse, and Cornell Universities, Dartmouth

*continued on page 2*

## The Biggest Fish Story in America

Based on an article by Mary Ellen Myrene, Eastern Washington University News Bureau, with updated information from Al Scholz

In 1983, Al Scholz [M.S. 1977, Hasler; Ph.D. 1980, Hasler and Magnuson] responded to an ad run in the Spokane paper. The ad was placed by four Indian tribes — the Spokane, Kalispel, Coeur d'Alene and Kootenai — after they were asked by the federal government to participate in setting goals for the Columbia River Basin Fish and Wildlife Program.

The project already had been heralded as the most ambitious wildlife reclamation program ever attempted in the United States, a massive program to restore fish and other animal populations destroyed by construction of Grand Coulee Dam and some 150 other dams that now dot the Columbia River and its tributaries in Washington, Idaho, Oregon and Montana.

For the four tribes, it was an unprecedented opportunity.

But long ignored in earlier reclamation projects — at this point, the Bonneville Power Administration (BPA) had already poured over \$500 million

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## News from the Center

by John Magnuson, Director

My year on sabbatical at the University of Washington was, as expected, great! I had become interested in generalizing our understanding of limnology to larger spatial scales, *i.e.*, regional ecology, and spent the year learning some remote sensing techniques for working at these scales. What I learned should also be useful in analysis of sonar data from lakes. I was at the Long-Term Ecological Research Network Office in the Department of Forest Resources and also had an office in the Fisheries Research Institute.

**Jim Kitchell** thrived at directing the Center for Limnology for 1992. Among the many things he did to keep the Center on course, was to prepare an excellent quality reinvestment report on the Center for the College of Letters & Sciences. These important documents were used to allocate resources among the departments and programs in the College in this critical time of downsizing the University. The Center fared well in this process and remains vigorously at full strength. He also edited and published a book, *Food Web Management — A Case Study of Lake Mendota* (Springer-Verlag, New York), during the year. Thank you, Jim, for all of us interested in the future of the Center for Limnology.

We received an interesting historical note from **Ed Schneberger** about our sketch of the Trout Lake Station in 1935 on our masthead. He points out from first-hand experience that the date should be 1929 (as it now reads), because in 1930 the fourth building, the Fish Lab, was constructed to the left of these three. He adds that, left to right, these three buildings were the Chemistry Laboratory, the Plankton Laboratory, housing Juday's office and a Kohler generator for electricity, and the third building housing Birge and his light measuring equipment. The two outer buildings were originally built as bath houses for those who might want to swim in Trout Lake. Ed had come to Trout Lake in 1929 and studied

benthos collected with an Ekman dredge. The fourth building was built in 1930 to house Ed's future research on fishes as well as that of Ralph Hile from the U.S. Bureau of Fisheries in Ann Arbor. The Fish Lab housed their desks and outboard motors. These four buildings were moved to the laboratory's new location in 1967 and serve as summer housing.

The 78th annual meeting of the Ecological Society of America was held at UW-Madison in August with an attendance of 2,100. **Linda Holthaus, Tom Frost and Steve Carpenter** handled local arrangements. Presentations by 25 CFL staff provided a high profile for Wisconsin limnology at the meetings. The Center for Limnology and the Water Sciences and Engineering Laboratory co-hosted the Aquatic Ecology Section business meeting and mixer attracting 200 scientists who enjoyed tours, the waterfront and the local brew.

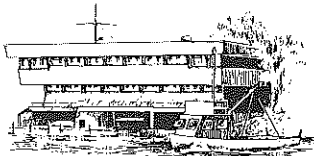
**Tom Frost** has recovered from a serious bicycle accident in July. He was wearing a helmet but was still unconscious for several weeks. He is now back at work and doing great.

**Susan Knight and Tom Frost** are pleased to announce the arrival of Peter Thomas Knight Frost on Dec. 31, 1993. Eliot Knight Frost is pleased with the addition. ☺

### LIMNOLOGY NEWS

University of Wisconsin-Madison  
College of Letters and Science

The University of Wisconsin-Madison Center for Limnology publishes Limnology News for its alumni and friends. Comments on the newsletter, articles and article ideas are welcome. Contact Limnology News, Center for Limnology, 680 N. Park St., University of Wisconsin, Madison, WI 53706.



George Gallepp, editor  
Linda Holthaus, production  
manager

### Pioneering continued from page 1

College, the Universities of Pennsylvania and of Minnesota, the U.S. Forest Service, the U.S. Geological Survey, and others, are designed to quantify biological, physical, and chemical parameters of ecosystems, and to assess the ecological implications of human alterations to these ecosystems (*e.g.* the effects of clearcutting, or acid rain). Limnological investigations have evaluated the effect of air pollution, forest clearing, construction of an interstate highway, and housing developments on the watershed and airshed of Mirror Lake, also within the Hubbard Brook Valley. An historical perspective for these studies is provided by detailed analyses of lacustrine sediment cores. Since 1963, more than 1,150 publications, dissertations and reports have resulted from the Hubbard Brook Ecosystem Study.

Large-scale units of ecological interaction, such as ecosystems, are mind boggling in diversity and complexity. Nevertheless, this complexity provides both the challenge and the excitement of discovery for me in pursuing ecological understanding. The experimental, ecosystem approach that we used in our studies at Hubbard Brook proved to be very powerful in helping to unravel this ecological complexity, especially in elucidating the effect of forest disturbance on biogeochemical flux and cycling.

In 1969 I moved to Cornell University. After 15 enjoyable years at Cornell I left the Charles Alexander Chair of Biological Sciences in 1983 to found and become the Director of the Institute of Ecosystem Studies (IES).

The Institute has become an exciting center for ecological research and education. The primary focus of IES is to do ecological research, but we also have active programs in public, graduate and undergraduate education, and public ecological displays, including theme gardens and an outdoor science center. We have a beautiful perennial garden, but

its *raison d'être* is to display lower maintenance, perennial plants that require relatively little human care in terms of watering, pesticides and fertilizer. Currently, there are about 20 Ph.D.s. on the staff of the IES who supervise the research of some 20 graduate students in association with nearby universities.

The Institute is based at the 834-ha Mary Flagler Cary Arboretum. This large tract of land contains a diversity of natural ecosystems ideal for long-term study. The Mary Flagler Cary Charitable Trust sustains the Institute with independent funding for operating and capital expenses, helps support the salaries of the scientific staff and provides seed money for new research. Additional funding for research and education programs comes from a broad spectrum of federal, state and private agencies, as well as corporations and individuals.

The Institute's primary goal is to promote rigorous and meaningful scientific and educational programs to provide an ecological basis for the wise utilization and management of natural resources. Since major insights into the workings of complex natural systems often come slowly, the Institute's scientists conduct long-term studies following the highest scientific standards. In particular, the IES's research program focuses on the disturbance and recovery of

northern temperate ecosystems, with a staff that strives to view ecological questions holistically and through team effort.

My book, *The Ecosystem Approach: Its Use and Abuse* (1992), provided me with an unusual opportunity to advance some ideas and comments about ecology, environmentalism and the nature of science. I chose the ecosystem approach as the focus of my book because I believe that the ecosystem concept provides a valuable framework for integrating studies about the relationships among individuals, populations, communities and their associated abiotic environments. The book begins with a discussion about the inclusive nature of ecology and proposes a new, overarching definition for this rapidly expanding discipline. This discussion was intended to provide the context for a description of the concepts and approaches that are used in pursuit of ecosystem ecology, as well as to provide a backdrop for comparisons with environmentalism.

A relatively large proportion of this book was devoted to environmental problems and management concerns. I addressed some major environmental problems, some stresses between science and politics, some conflicts between "big science" efforts and investigator-

initiated research, and some fundamental differences between environmentalism and professional ecology. For example, many lay persons think that ecologists spend their time recycling newspapers. We may choose to be active in recycling efforts, but that is not what ecologists do professionally.

Currently, I have had the opportunity to return to Wisconsin on several occasions. I serve on an advisory committee to the Leopold Memorial Reserve near Baraboo and so have had the pleasant, and at times emotional, opportunity to visit and contemplate about restoration ecology and conservation within the environment of Aldo Leopold's prairie farm and "shack." John Magnuson chairs this committee. Also, IES colleagues, Drs. Nina Caraco and Jon Cole, and I are doing a comparative study of the phosphorus dynamics in lakes throughout North America. I chose to be responsible for sampling the lakes in northern Wisconsin! It has been great fun to do research again in the area where I began my research career as a graduate student. ☛

*Editor's note: Gene Likens has been awarded the 1993 Tyler Prize. See People in the News column on page 8 for more information.*

## CFL Keeps Cruising With Help from Mercury Marine

by David Egger, Research Program Manager

Glen Lee did himself and the Center a great favor by hiring David Gussert as a student hourly.

The boat facility at the Center's Madison lab is supported by the College of Letters and Science, providing access to Madison lakes for any University program with teaching or research needs. The equipment includes a fleet of Boston Whalers, the LIMNOS (a 30-foot research vessel with sonar, LORANZ positioning and trawling capabilities) and numerous smaller boats with gasoline or electric outboards and trailers.

Gussert, an engineering student, worked for Lee repairing boats,

motors and other gear and as a LIMNOS driver. Graduating in 1985, Gussert accepted a position as an engineer at Mercury Marine in Fond du Lac working on research and development applications for outboard motors.

Gussert stopped by the Center to say hello to his old boss from time to time. During one of his visits Gussert noted that long-term field testing for Mercury outboards was difficult to obtain. A light bulb blinked on and the two suggested the Center approach Mercury Marine with a proposal to provide long-term field test data on motors in return for motor donation.

This arrangement has been in place since 1988. Mercury provides the equipment and Lee provides precise field data on motor performance. When a motor is worn out or trouble occurs Lee returns the equipment to Mercury along with compiled field data on use.

The agreement has provided the Center with over \$20,000 worth of valuable field equipment and Mercury with field test data otherwise unobtainable. Center faculty, staff and students are grateful to Mercury Marine for its contribution and to Glen Lee and David Gussert for this university-industry partnership. ☛

# Mary Lake Natural Area: Protection for a Meromictic Lake

by Susan Knight, Assistant Researcher, Trout Lake Station

Protection for Mary Lake, one of only 43 meromictic lakes known from North America and one of only two in Wisconsin, is now assured. The Wisconsin Department of Natural Resources has purchased most of the land around Mary Lake with help from the Nature Conservancy and designated it a state natural area.

Located in northwestern Vilas County, Mary Lake particularly interests limnologists. Unlike the region's other lakes, this small, darkly stained lake is meromictic, meaning it rarely, if ever, turns over.

Mary Lake's stratification pattern contrasts with the vast majority of temperate zone lakes, which are dimictic. In dimictic lakes the water mixes, or turns over, completely from surface to bottom in spring and fall. As is characteristic of meromictic lakes, Mary Lake is extraordinarily deep (21.5 m) relative to its surface area (1.2 ha).

The force of the wind, responsible for mixing most lakes, is insufficient to overcome the extreme stratification of meromictic lakes. Dissolved materials, mostly from decaying organisms, accumulate at the bottom of the lake. The lake becomes increasingly stratified with a layer rich in dissolved materials and a dilute layer near the surface, further reducing the likelihood of mixing.

Meromictic lakes are studied not only because of their oddity, but because they offer a unique opportunity to examine important limnological features. For example, because the lake does not mix, its sediments are undisturbed and may provide a precise paleolimnological record of the lake and surrounding area.

Mary Lake has been the subject of considerable research since early in this century. Starting in the 1920s, Birge and Juday and their colleagues and more recently Gene Likens and others have described the chemistry,

physics and biology of Mary Lake. This research has revealed that the lake is remarkably stable. During the past 10 years, Dale Robertson, currently with the U.S. Geological Survey and a former student at CFL, studied aspects of physical limnology in Mary Lake. Tom Frost, associate director of Trout Lake Station, studied the extensive populations of the freshwater sponges that live in the lake. Every fall, students from the University of Wisconsin-Madison limnology class visit Mary Lake and examine its unusual features.

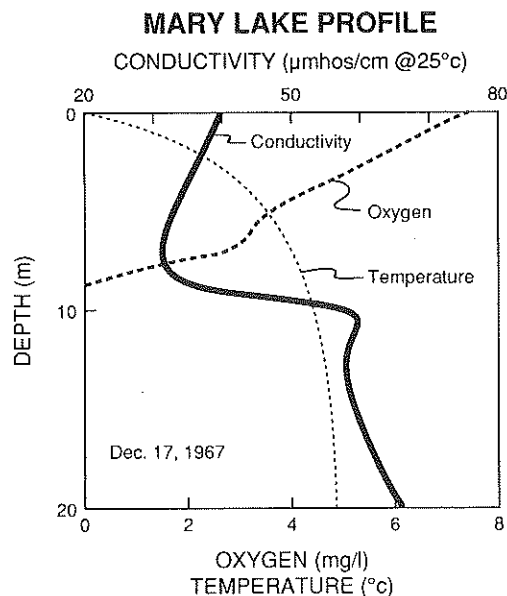
The area surrounding Mary Lake was bought by the Nature Conservancy and then by the Wisconsin Department of Natural Resources with funds from the Natural Areas

Area also includes Lake Rose (13m deep and 1.4ha), a dimictic lake connected to Mary Lake. Research in the past has often incorporated both Mary Lake and Lake Rose as closely associated lakes with different mixing regimes. There is a small, year-round cottage on Lake Rose. The owners have a life lease on the cottage; they can use the cottage while they are alive but the cottage cannot pass on to any descendants. With the termination of this lease, the cottage will probably be removed from the property. A small cottage with some frontage on the southeastern shore of Mary Lake remains the only parcel of shoreline not included in the Mary Lake Natural Area.

In addition to the two lakes on the site, the surrounding terrestrial habitat includes several interesting features. Most of the Mary Lake Natural Area is covered by a wet mesic forest with tremendous cedars bowing into Mary Lake. Pink lady-slippers and nodding trillium are common in this very moist woods. Close by, there is a healthy population of Ram's Head lady-slippers, an orchid very rare in Wisconsin.

Many people helped secure Mary Lake as a Natural Area. John Magnuson, Forest Stearns, an emeritus professor of botany at UW-Milwaukee, and Arthur Brooks, a UW-Milwaukee limnologist, helped to generate the initial interest in establishing protected status. Kim Wright of the Nature

Conservancy was largely responsible for shepherding this project through the labyrinth of procedures involved in establishing Mary Lake as a State Natural Area. Paul Matthiae, Mark Martin, Norm Mesun and Bernie Krueger of the Department of Natural Resources, Brent Haglund, Mary Jean Huston and Peter McKeever of the Nature Conservancy also helped with this project. These folks deserve a round of applause in securing the future of Mary Lake. ♡



Program. In June 1992, the area officially became Mary Lake Natural Area owned and managed by the DNR. The Natural Areas Program will soon appoint a local manager and will develop a management plan for the Mary Lake Natural Area. As with all Wisconsin natural areas, the primary goal for Mary Lake will be to protect the natural system and provide an opportunity for research and education.

The 42-acre Mary Lake Natural

## ***Biggest fish continued from page 1***

into fishery projects below Grand Coulee Dam — the Upper Columbia United Tribes (UCUT) were admittedly ill-prepared for what was happening in 1983.

So they ran a want ad in the newspaper, hoping to find a biologist who could help them set some specific goals with tangible results. Scholz, now director of the Upper Columbia United Tribes Fisheries Center at Eastern Washington University (EWU) answered the ad. The rest, as they say, is history.

With Scholz leading the way, UCUT tribes are now among the best prepared — and most successful — in securing federal funds for reclamation projects under the 1980 Northwest Power Act.

In 1987, they won approval for four projects valued at \$9.1 million, including an ambitious plan to build two kokanee salmon hatcheries to restock both salmon and trout fisheries in Lake Roosevelt.

But their biggest achievement, certainly in the long run, has been establishment of the UCUT Fisheries Center at Eastern Washington University, a pioneering research/teaching lab that has focused national attention on both the university and the UCUT consortium.

The center serves two functions, says Scholz, who first proposed the idea. In addition to conducting applied research, it is the only center in the United States committed to training Indians to take over long-term management of their own fishery and wildlife resources.

Opened in 1984, the center currently employs 28 people including six full-time biologists, nine technicians, eight undergraduate students, three graduate students and two secretaries. Most are Indians from the four tribes comprising UCUT, and many are earning college degrees at EWU.

"My goal is to develop fish and wildlife agencies on each of the reservations, that are staffed solely by Indian people, and that are recognized throughout the Pacific

Northwest as the best stewards of natural resources in the Upper Columbia Basin," says Scholz.

If the idea is ambitious, so is Scholz, whose friendly manner barely conceals an almost unnatural dedication to the work ethic. At 45, he is known as a meticulous scientist with workaholic energy.

Since joining the EWU faculty in 1980, Scholz has directed 17 major research projects, written 77 funded grants, authored 99 scientific publications and presented 54 papers at international, national and regional conferences.

What first attracted him to UCUT, he says, was the tribes' commitment to developing fishery and wildlife projects based on sound biological research in the Upper Columbia.

But now, he says, his motives run deeper.

"When I started, I was relatively neutral in my feelings toward the Indians' loss and what it meant," he says. "We can measure it out in economic terms, and we've done that.

"But gradually I became aware of other, more intangible things. The Indians' life, their religion, was based on their natural environment. The cultural loss for UCUT tribes has been devastating. In the last 100 years, they lost a culture."

The UCUT center staff, in its first major project, spent the summer of 1985 documenting the fisheries losses and resulting economic losses suffered by UCUT tribes as the result of hydroelectric development on the Columbia River.

In the late 1800s, as many as 16 million salmon and steelhead migrated annually up the Columbia. A century later, the number had dwindled to about two million fish, a loss so profound that some runs were considered for classification as endangered species in 1980.

The loss was even greater for UCUT tribes, whose ancestral fishing grounds included the Spokane, Sanpoil, Pend Orielle and Kootenai Rivers. Fish runs to those rivers were blocked forever with construction of Grand Coulee Dam in 1939.

In earlier times, over three million salmon reached the Upper Columbia each year, sustaining tribesmen who harvested about one-third of the bountiful run for food, as well as religious practice.

And the economic cost?

Poring over thousands of references, Scholz and nine EWU students first established the size of historical runs to the Upper Columbia. Then they charted the dockside price of salmon paid to commercial fishermen since 1911.

Through a complex formula based on lost revenues and interest, the UCUT team placed the loss at \$1.45 billion, not including ongoing losses.

"Because of the permanent block at Grand Coulee Dam, the UCUT tribes have lost more than any other tribe in the Columbia Basin," the report concluded. Yet by 1985, no attempt had been made to restore the UCUT fishery.

In December of 1985, UCUT reported its findings to the Northwest Power Planning Council (NPPC), an eight-member regional panel that oversees federal spending for fish and wildlife projects in the Columbia Basin.

The report put UCUT on the map, and laid the foundation for a second pivotal study — a proposal to replace the lost salmon runs by stocking Lake Roosevelt with landlocked kokanee salmon and pen-raised trout.

Drawing on biological data provided by Scholz and his UCUT team, the NPPC approved four projects totaling \$9.1 million for the UCUT tribes. The projects included two salmon hatcheries for Lake Roosevelt, a sturgeon hatchery on the Kootenai Reservation, a baseline stream survey for the Coeur d'Alene Tribe, and a fish survey on the Pend Orielle River adjacent to the Kalispel Reservation.

The UCUT center, working under contract to the tribes, will help implement these projects until enough Indians are trained to take over the work permanently. Says Scholz, "My goal is to be put out of a job."





*Dr. Alan Scholz with UCUT staff (L-R: Milo Thatcher and Tim Peone).*  
Photo by Eric Galey

That goal is being realized. Today, a Spokane tribal member who graduated from EWU in 1992 is directing an EPA-funded water resources inventory for the Spokane Reservation. The Spokane Tribal Kokanee Hatchery is also being managed by one of Scholz's former students, a Spokane tribal member. "The Spokane Tribal Kokanee Hatchery is the only tribal hatchery in the Pacific Northwest run solely by tribal members, from the hatchery superintendent to the least experienced fish culturist," Scholz says. The hatchery, which employs four full-time fish culturists and about eight part-time staff, opened in 1990 and currently produces two million kokanee salmon fry and 500,000 rainbow trout for the Lake Roosevelt fishery.

A third former student and tribal member directs a project to improve rainbow trout spawning and rearing habitat, and enhance passage into Lake Roosevelt tributaries. Yet another of Scholz's students and Spokane tribal member directs the Lake Roosevelt Monitoring Program. The purpose of the program is to assess the effectiveness of Lake Roosevelt fish restoration measures

and how operation of Grand Coulee Dam impacts the lake's biological resources.

These efforts are off to a strong start, Scholz reports. "In 1980-1982, the U.S. Fish and Wildlife Service conducted a creel survey at Lake Roosevelt. They found that kokanee harvest was fewer than 1,000 fish per year and rainbow harvest was fewer than 3,000 fish per year. Based on about 80,000 angler trips per year, the economic value of the fishery was about \$2 million," he says.

"Since our enhancement program began in 1987 (the first year kokanee were stocked) angler trips have increased to about 390,000 in 1991. Kokanee harvest increased to about 32,000 fish and rainbow trout harvest increased to about 78,000 fish in 1991. The economic value of the Lake Roosevelt fishery increased to \$12.8 million in 1991, which provides revenues to both Indian and non-Indian small business in the region," Scholz says.

Food habitat and prey dynamic studies indicate that Lake Roosevelt is still far away from its carrying capacity for planktivorous fish. Based on zooplankton productivity and fish bioenergetics considerations, Scholz

believes that Lake Roosevelt will support a release of eight million kokanee fry and produce a harvest of 300,000 kokanee adults weighing 2.5 to 4 pounds each.

Lake Roosevelt has gained popularity with anglers because it produces large-sized kokanee (2 to 4 pounds is typical) and rainbow trout (1.5 to 3 pounds). In April 1993, a Washington State record 4 pound 13 ounce kokanee was caught in Lake Roosevelt.

Scholz also emphasizes that UCUT tribal fisheries programs are fully coordinated with state fisheries agencies. For example, the Spokane tribe, Colville confederated tribes and Washington Department of Wildlife have signed a memorandum of understanding that outlines the cooperative management of the Lake Roosevelt fishery. A technical steering committee composed of fisheries biologists from each organization oversees the fishery. Decisions about the management of the Lake Roosevelt hatcheries are made by the unanimous consensus of the group. Scholz believes this relationship works smoothly because tribal members trained as biologists make management decisions. "Their ideas and decisions are respected by elected tribal council representatives as well as the state fisheries biologists. As a result, most of the decisions concerning the Lake Roosevelt fishery are based on sound biology instead of politics," Scholz says.

An additional benefit of this cooperation has been enhancement of wildlife resources. While the UCUT Fisheries Center took the lead on the Lake Roosevelt Fisheries Restoration project, the Washington Department of Wildlife took the lead for wildlife projects. Their efforts netted an agreement with the Bonneville Power Administration to spend \$45 million in Washington to mitigate for wildlife losses caused by the construction of hydroelectric dams in the Columbia River Basin. Of this, approximately \$3 million will go to the Spokane tribe for wildlife losses on their reservation caused by

# Gerald Chipman Retires

by Ann McLain, Assistant Researcher, Center for Limnology

What do you do when an instrument you depend on suddenly goes catatonic? When the University vehicle in which you are traveling to your field site is rear-ended by a poultry truck? On a holiday weekend? What do you do when no instrument exists to measure what you absolutely must measure? Or what do you do when you suddenly discover that you really can't pick up a carton of Whirl-Paks at the local hardware? I don't know what researchers at other institutions do in such cases, but for those of us at the Center for Limnology up until July 1992 the answer was obvious: talk to Chip.

Gerald Chipman, otherwise known as Chip, came to the zoology department in 1962, and proceeded to make himself indispensable. He

## *Biggest fish continued*

the Grand Coulee Dam. The tribe plans to use the money to create a wildlife refuge and for selected wildlife enhancement projects. "Both fish and wildlife resources are benefiting from this cooperative partnership between tribal and state agencies," Scholz says.

Scholz is also currently working with the U.S. Fish and Wildlife Service in Colorado and Utah in the recovery of endangered razorback suckers and Colorado squawfish. He is helping to determine if these species use olfactory orientation for homing.

"It's kind of ironic," Scholz says. "Art Hasler was raised in Utah. He first conceived of the olfactory hypothesis for salmon homing on the slopes of Mount Timpanogos during a vacation there many years later. Somehow it is almost poetic that one of his former students returns to the site of Hasler's old haunts and helps to restore populations of relict fish species that are native to the white-water canyons of these slickrock deserts." ☺

started out designing and building electronic devices that couldn't be bought off the shelf: underwater thermometers, lightmeters, and turbidity meters.

When Prof. Hasler and his student H. Francis Henderson needed a way to track fish in Lake Mendota, Chip designed, developed and produced ultrasonic transmitters that they could put in the stomachs of white bass. The 40mm transmitter operated for 14 to 20 hours, and made it possible to follow fish movements around the lake. Similar ultrasonic devices have since become widely used for tracking other animals.

Professor Magnuson and his students needed a way to determine the temperatures fish preferred. Chip designed an aquarium that gave the fish occupants control of the thermostat. This was done with a computerized feedback loop, recording the fish movements between two separate water temperatures, and adjusting those temperatures in response. This device enabled students Bill Neill and Tom Beiting to complete their studies of fish thermal preference and the relationship of those laboratory determined preferences and fish ecology in the lake.

In the past 15 years Chip has turned his attention to larger things; he has been engaged in the development of our physical facilities, both at the Lake Mendota Laboratory and at Trout Lake Station. During his tenure, housing at Trout Lake has expanded from the old cabins to Juday House and the four all-seasons cabins. The laboratory and office space has more than doubled with a new addition.

In Madison, the Center for Limnology has changed and changed again, as the computer room became offices, the library became a computer room, and the aquarium room became a library. A recent big project has been the design and construction of the new aquarium



*Gerald Chipman(left), with one of his transmitters, and Fran Henderson prepare to track a Lake Mendota white bass in this photo from the 1960s.*

facility across the parking lot in the Water Science and Engineering Lab. This facility, with its extensive plumbing, required heroic efforts to bring it on line.

Along with his other duties, Chip acted as purchasing agent for the Center. This involved making major capitol expenditures as well as helping those students who forgot to get Whirl-Paks in advance, or needed 100 meters of nylon line, "by tomorrow, please." And although one might forgive or even expect some impatience with the accident-prone and the short-sighted, bad temper never (well, hardly ever) showed in Chip's demeanor.

Thanks, Chip for 30 years of devotion to duty and cheerful assistance to all of us at the Center for Limnology! ☺

# People in the News

**Steve Bartell** (Ph.D. 1978, Kitchell) has accepted a position as Vice President and Director of SENES Oak Ridge Inc., Center for Risk Analysis, an environmental consulting firm.

**Steve Carpenter** and **Jim Kitchell** are the editors of *The Trophic Cascade in Lakes*, published by Cambridge University Press. The book summarizes whole-lake experiments on trophic cascades conducted near Land O Lakes, Wisconsin, from 1984-1990. An order form is inserted in this newsletter.

After 33 years of service to Wisconsin's trout anglers in the arena of habitat improvement and scientific research, Coldwater Research Team Leader, **Bob Hunt** (M.S. 1959, Hasler), retired from the Wisconsin Department of Natural Resources. He is the author of *Trout Stream Therapy*, University of Wisconsin Press, 1993.

In memory of **Waldo Johnson** (Ph.D. 1954, Hasler) the library of the Pacific Biological Station at Nanaimo has been designated the Waldo Johnson Library.

Richard Kirn and **George LaBar** (visiting scientist 1991-92) have received the award for the most significant paper of those appearing in publications of the American Fisheries Society for 1991.

**Gene Likens** (M.S. 1959, Ph.D. 1962, Hasler) received the 1993 Tyler Prize for Environmental Achievement. Sometimes described as the "Nobel Prize for ecology," the Tyler Prize is widely recognized as the most prestigious environmental award in the world, and includes a cash recognition of \$150,000. Likens shared the Tyler Prize with F. Herbert Bormann. For three decades, the two collaborated on ecosystem research at the Hubbard Brook Experimental Forest in the White Mountains of New Hampshire.

**John Lyons** (M.S. 1981, Ph.D. 1984, Magnuson) has been elected president of the North Central Division of the American Fisheries Society.

**Jay Nelson** (M.S. 1984, Ph.D. 1988, Magnuson) has accepted a position as an assistant professor at Towson State College in Baltimore, Maryland.

**Roy Stein** (Ph.D. 1975, Magnuson) was selected as the 1992 recipient of the American Fisheries Society's Award for Excellence in Fisheries Education.

Center for Limnology William V. Kaeser Visiting Scholar Awards went to **Carol Folt**, Dartmouth, **David Hamilton**, University of Western Australia, **Craig Williamson**, Lehigh University, and **Roy Stein**, Ohio State University. ☞

## Student Awards

**Shelley Arnott**, spring 1994 Dorothy Powers Grant and Eugene Lodewick Grant Scholarship Award.

**Kathy Cottingham**, runner-up for best student paper, and **Pat Soranno**, best student poster award at the 1992 North American Lake Management Society Conference.

**Lisa Eby**, 1993-94 fellowship from the C.S. Mott Foundation and the International Association for Great Lakes Research.

**Janet Fischer**, **Tim Johnson**, **Beth Sanderson** and **Melissa Weaver**, 1993 Anna Grant Birge Memorial Scholarship Awards.

**Tim Johnson**, runner-up for Sally Richardson Award for best student paper at the 1993 Larval Fish Conference.

**David Post**, 1994-96 fellowship from the Electric Power Research Institute.

**Mark Shah**, 1993 Chase Noland Undergraduate Scholarship in Limnology.

**David Thomas** and **Tom Frost**, 1993 Wisconsin/Hilldale Undergraduate/Faculty Research Award. ☞

## Recent Degrees

### • Timothy Asplund

(M.S. 1993, Magnuson) Tim completed a double masters in Water Resources Management and Oceanography and Limnology. His thesis concerned year-to-year variability in winter oxygen depletion

rates of the long-term ecological research lakes. He is now working for the Wisconsin DNR in water quality research while his wife, Barbie, finishes her degree.

### • Kathryn Cottingham

(M.S. 1993, Carpenter)

Kathy completed her thesis work on the effects of food web structure on the resilience and resistance of lake phosphorus cycles. She is continuing on at the Center for her Ph.D. and will study the responses to eutrophication of lakes with contrasting food webs as part of the Trophic Cascade Project.

### • Brett Johnson

(Ph.D. 1993, Kitchell)

Brett worked as a liaison between the Center and the Wisconsin Department of Natural Resources during the Lake Mendota Biomanipulation Project. His thesis focused on fish-angler-management interactions on Lake Mendota. He is an assistant professor in the Department of Fisheries and Wildlife Biology at Colorado State University.

### • Russell Wright

(Ph.D. 1993, Kitchell)

Rusty received a fellowship from the Electric Power Research Institute and worked on the Trophic Cascade Project studying the roles of piscivorous and planktivorous fishes in lake ecosystems. His primary focus was on growth and consumption by juvenile largemouth bass. Rusty is now a postdoctoral fellow at Ohio State University.

### • Randolph Wynne

(M.S. 1993, Lillesand)

Randy has assessed the utility of monitoring phenological changes in lake ice using remote sensing data for his degree in Environmental Remote Sensing. He has been supported by a NASA fellowship and our Long Term Ecological Research Grant. His method, which measures the date of spring breakup on larger lakes over large regions, is an integrative measure of climate change. His advisor, Tom Lillesand, directs the University's Environmental Remote Sensing Center. Randy is continuing in the same area for his doctorate at Madison. ☞



# Art Hasler Honored at SIL; Center Establishes Hasler Limnology Fund

by John Magnuson

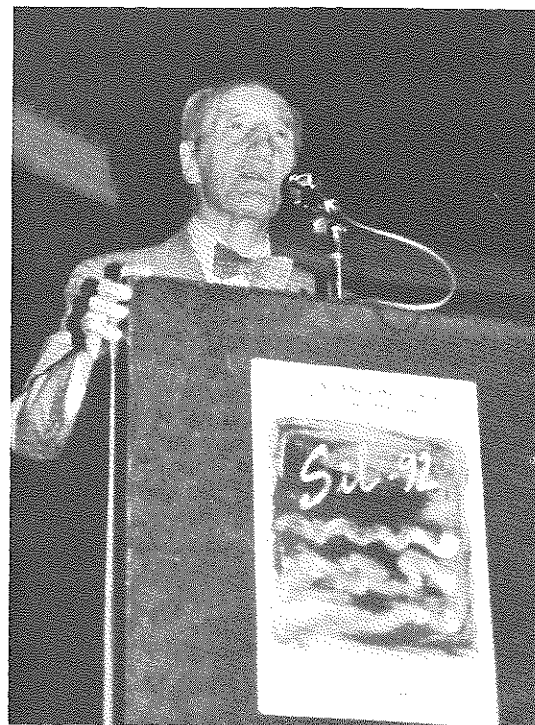
Arthur Hasler received the Naumann-Thienemann Medal from the International Society of Limnology (SIL) at the 25th SIL Conference in Barcelona, Spain in August 1992. The medal, SIL's highest honor, is given for lifetime achievement in limnology. The award recognized Hasler's "... pioneering work in experimental limnology, reversal of cultural eutrophication, and chemical imprinting of homing in salmon."

Art, who continues to urge all young scientists to learn a second language, appreciated especially this honor from the international limnology community. Three generations of Wisconsin limnologists were present in Barcelona. Together we enjoyed celebrating and reminiscing with Art and reminding him of the many ways he has touched our lives.

Art Hasler celebrated his 86th birthday on Jan. 5, and the Limnology Laboratory on Lake Mendota experienced its 30th anniversary in 1993. Art still comes in to the lab every weekday and often on weekends. The students benefit from his wisdom and we all enjoy his participation.

With all these important events going on in Art's life, it is appropriate now to announce that we have established the Arthur Davis Hasler Limnology Fund to honor our colleague and friend of so many years. This fund is a tribute to Art's leadership, which has nurtured and enhanced Wisconsin's international reputation for limnology. Art has fostered in many of us an appreciation for the beauty of lakes in the landscape, a spirit of social responsibility for limnological systems, a respect for the rigor of experimental science when applied to real world problems, and an inclusiveness in our research and our associations that rises above international conflict and prejudice. The Arthur Davis Hasler Limnology Fund will make possible continuing research, teaching and public service in support of these values.

We invite you to join us in honoring Art. If you'd like to participate, please complete and return the form below. ☺



*Art Hasler addressing members of SIL in Barcelona after receiving the organization's Naumann-Thienemann Medal for lifetime achievement in limnology.*

## Arthur Davis Hasler Limnology Fund

I (we) wish to make a contribution to the Arthur Hasler Fund.

Enclosed is my/our check in the amount of \$\_\_\_\_\_

Please send information about the following:

- ☐ Bequests/deferred gifts
- ☐ Memorial gifts
- ☐ The Bascom Hill Society

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Please return this form with your check, payable to the UW Foundation-Hasler Fund. Your contribution is tax deductible to the extent allowed by law.



Arthur Hasler Limnology Fund  
University of Wisconsin Foundation  
150 E. Gilman Street, P.O. Box 8860  
Madison, Wisconsin 53791-9944

# CFLers Attend SIL Conference in Barcelona



*Wisconsin limnologists Tom Frost, Jennifer Morgan, Joan Riera, Steve Carpenter, Art Hasler and Jim Kitchell take a break during the SIL meeting in Barcelona.*

**Center for Limnology**  
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