

# ELA UPDATE

Newsletter of the Experimental Lakes Area

Volume XIII(1), May 2006

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Research to Protect Fish Habitat  
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**New Accommodations  
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# ELA Update

May 2006

As part of our ongoing efforts to keep the interested public informed about our research projects and related activities at the Experimental Lakes Area, we present this newsletter. Also available electronically, this is the thirteenth year in which one or more such newsletters has been produced and distributed.

The **cover photo**, by John Shearer, shows Pidlubney Lake in July 2006. While 58 small lakes are designated for possible ELA experimental research, there are hundreds of other lakes, like Pidlubney, in the immediate area.

Of the 58 designated lakes, only a small selection, perhaps ten to fifteen, are being studied at any given time, and only a few of these will be undergoing an experimental manipulation. Once an experimental study is completed, we monitor the recovery of the lake to a healthy natural condition, often learning a great deal from these recovery observations. Once recovered, the lake may be used for a new experiment, or it may remain in a natural condition indefinitely.

**ELA Update** is produced by John Shearer, with support from other ELA researchers in the Environmental Science Division of Fisheries and Oceans Canada, Winnipeg. Its production is mandated under the terms of the Canada-Ontario agreement for the ELA.

## "Friends of the ELA"

### Working to Enhance Support for Research and Education at the ELA

The Government of Canada, through its Department of Fisheries and Oceans (DFO), provides the core team of researchers and most of the funding to maintain and operate the ELA field station. However, both federal funding and DFO's mandate have limits. With its unique facilities, the ELA can serve as a valuable platform for conducting a broad variety of environmental research and for educating young people to take up careers in environmental science, but other funding sources must be found to provide support for these activities.

To address this issue, a non-profit, charitable foundation, called the **Friends of the ELA Inc.**, has been created. The Friends of the ELA will benefit freshwater research at the Experimental Lakes Area by raising money to supplement and complement the research conducted by DFO at the Experimental Lakes Area. The focus will be on high-quality, long-term research and monitoring on environmental problems in Canada's fresh waters. This will include support for exceptional students to work at the ELA in pursuit of careers in aquatic science.

Friends of the ELA is managed by a volunteer Board of Directors, and research projects are approved by a Scientific Advisory Committee and by DFO. As a charitable organization, it will have access to funding from foundations and other private sources. The Friends of the ELA will benefit DFO by raising the profile of the ELA and its research. Your participation, in whatever form you may choose, is most welcome.

#### Want to support the Friends of the ELA?

Support for the Friends of the ELA is welcome from all individuals, groups and corporations who support the overall goals of conservation and protection of freshwater ecosystems. There are four categories of support; namely,

Bronze	\$20 to \$99	Silver	\$100 to \$499
Gold	\$500 to \$999	Platinum	\$1000 or more

#### Want to make a tax-deductible donation?

Donations can be sent to

**Friends of the ELA Inc.**  
**1504 – 201 Portage Avenue**  
**Winnipeg, MB R3B 3K6**

A receipt for income tax purposes will be provided.

Gifts may also be pledged for up to five years.

Supporters donating gifts of \$1,000 or more may also join our Visionary Circle.

# Major Upgrades to the ELA Field Station for 2006 Field Season

When the Experimental Lakes Area was established, an uninhabited site was selected to minimize external human influences that could complicate interpretation of experimental results. Therefore, a field station provides suitable on-site accommodations, food services, and other support facilities for the researchers, who must travel from distant locations.

The field station had its beginnings in the winter of 1968-69 when 8 km of new bush road were bulldozed from an existing forestry road to the shores of Lakes 239 and 240 (Boundary Lake). Over the next few months, three laboratory trailers, a kitchen-dining trailer, and four residential trailers were hauled to the site and set in place. Several small frame buildings provided workshop, storage and powerhouse capabilities for the research facility. By 1976, several more trailers were on site. Two kitchen additions, five small cabins, a wood-frame laboratory, and two other wood-frame residential facilities had been built. A large, metal-framed laboratory building, completed in 1972, was the most permanent building on site. With research support capacity at 40 to 50 persons, the field station facilities remained relatively static for the next 15 years. However, by the early 1990s, some of these original facilities were no longer adequate to support the ongoing research. A new powerhouse was constructed. Water and sewage facilities were upgraded. Some of the older buildings were

repaired. In 1995, a new kitchen /dining building was constructed. In 1998, the original station manager's residence was replaced by an energy-efficient, three-bedroom bungalow. A large workshop building, heated by otherwise wasted heat from the diesel-powered generators, replaced the original, frame building built in 1969. The following year, the first phase of a large, new laboratory building was constructed, replacing some of the old laboratory trailers. In 2001, the second phase of this new building was completed, and the former main laboratory building was converted to a dormitory. This program of renewal has continued at the ELA, and the original field station facility has largely been replaced. During the past few months, a major reconstruction program has been underway to replace most of the original sleeping accommodations. Four older buildings are

being demolished and two new, energy-efficient dormitories, containing a total of 19 bedrooms, are being constructed. Of the original on-site living accommodations, only the five cabins remain. Even these aging buildings were given new metal roofs in 2005 to keep them dry and improve forest fire resistance.

In addition to the new buildings, we are also upgrading both the capability to communicate with the "outside world" and our two-way VHF radio system for communication between field parties and the field station. Once completed in late May, a direct microwave link will provide eight phone lines, as well as high-speed internet service and data transmission between the ELA and our headquarters in Winnipeg.

This field station renewal will improve both safety and comfort for the researchers, allowing them to focus better on their research.



*One of the two new dormitory buildings under construction in April 2006. These buildings are replacing several original trailers and frame buildings.*

# Hardy Tour Participants make ELA Open House a Success

The morning of Saturday, September 17, 2005, dawned cold and wet - very wet. As I drove toward Dryden, I wondered whether anyone would be waiting at the Recreation Centre to board the two buses that we had rented for the day. Over 70 people had reserved seats for the Open House tour to the Experimental Lakes Area, but the weather was definitely not cooperating.

Over the years, we have provided tours of the ELA to hundreds of people through schools and community groups. Without exception, these people have left with a new appreciation for the scale of ELA science and the unique nature of the experimental studies. Nothing else can equal the understanding afforded by actually visiting the site and seeing things first-hand.

However, there are many people living in the Kenora - Dryden region who have never heard of the ELA. Among those who do know about us, many still have inaccurate perceptions, based on rumours or incomplete information. We want our northwestern Ontario neighbours to know why the ELA is located in their back yard, and to take pride, as we do, in the research achievements that lead to progressive environmental legislation and policies. Since 2002, we have offered these annual "open house" guided tours to the citizens of local communities.

Pulling in to the parking lot in Dryden, I noted that a number



*Open House tour participants from Dryden check out the bright sunshine recorder at the ELA Met Site, or weather station, one of the tour stops. Approximately 250 local residents have visited the ELA during these Open House events over the past four years. We plan to continue the event as long as public interest justifies it. Kenora area residents will be offered the tour this fall.*

of hardy souls had already gathered. By the time the buses arrived a few minutes later, more than 50 folks, both young and old were ready to climb aboard for what promised to be an adventure. Some seven hours later, as they reboarded their buses for the return to Dryden, there was widespread agreement that the day had been well worthwhile, the wet weather notwithstanding. During the visit, they had toured the field station, observed a demonstration of live-trapping and tagging fish, plus

demonstrations of various laboratory activities, toured the ELA weather station, and visited the lake where an experimental study of cage aquaculture is underway. Their understanding of the ELA had grown immeasurably, and the ELA staff members who assisted with the tour had gained from knowing that our work was better appreciated by members of the local public.

If all goes well, we will be offering a similar open house event to people from the Kenora and Sioux Narrows area this fall.



*Drew Bodaly assisting with clean-up of the FLUDEX reservoirs in October 2003. After five years of flooding, the experimental study was discontinued and the extensive infrastructure removed from all three study sites. The ELA operating agreement calls for experimental sites to be rehabilitated when the research is completed.*

## Dr. Drew Bodaly Retires

This spring, we are saying farewell to Dr. Drew Bodaly, who has been an integral part of the ELA team for the past 15 years.

Drew grew up in Vancouver and came to Winnipeg in the 1970s to obtain his Ph.D. at the University of Manitoba. After joining the Department of Fisheries and Oceans, Drew worked with a group studying the impacts of the Churchill River hydro diversion in northern Manitoba. He was instrumental in discovering that flooding resulted in dramatic increases in the methyl mercury contamination of fish in the flooded systems.

When the Churchill diversion project wound down, Drew became involved at the ELA in a new research project to investigate the mechanisms of methylmercury and greenhouse gas production in flooded reservoirs. He headed the dramatic FLUDEX project, in which three artificial reservoirs were constructed in upland forest and experimentally flooded for five seasons.

From 2001 to 2003, Drew served as Scientist-in-charge of the ELA, and has worked closely with Mike Paterson to establish the Friends of the ELA and promote the ELA more widely.

Drew is taking early retirement from DFO. In June, Drew and his wife, Gale, will be moving to Maine, where Drew will be leading a project to address mercury pollution in the Penobscot River.

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## Mike Paterson Succeeds Ken Mills as Scientist-in-charge of the ELA

Dr. Michael Paterson has succeeded Dr. Ken Mills as the Scientist-in-charge of the ELA.

Mike joined the ELA team in 1992, as a research scientist. He has focused his research on zooplankton populations and their interactions within lake food webs. Currently Mike is involved in both the METAALICUS and the Aquaculture projects, as well as in several other studies. He also oversees the ELA Graduate and Undergraduate fellowships, and has been instrumental in the

establishment of the Friends of the ELA foundation.

Ken Mills had served as ELA leader since 2003. This change at the ELA helm is part of a larger reorganization of the Environmental Science Division, of which the ELA is a key component. Ken has moved to a sister section within the division, but will continue to conduct fish population studies at the ELA and analyze his long-term data sets in advance of his planned retirement in 2008.

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## Did you Know?

*The Experimental Lakes Area was established in 1968 to conduct research into problems of excess algal growth in Lakes Erie and Ontario. Over the years, more than 50 ELA experimental studies have investigated eutrophication, lake acidification, reservoir impacts, greenhouse gas production, mercury contamination, habitat disruption, cage aquaculture, and other aquatic environmental issues. More than 1000 publications now document the results of these research activities.*

# Research '05 Review

Ecosystem-scale, experimental research is the speciality of the ELA. In 2005, two major experimental studies continued. Several smaller studies were also underway, and monitoring continued on a number of lake systems.

## METAALICUS

The **Mercury Experiment To Assess Atmospheric Loading In Canada and the United States** is one of the largest studies, and certainly the most costly, ever conducted at the ELA. Dozens of investigators from across North America are involved. Since 2001, these researchers have been adding minute amounts of unique, traceable mercury to tiny Lake 658 and its small drainage basin. Their goal is to simulate the atmospheric fallout of mercury that is occurring in parts of Eastern North America, and to determine whether this newly deposited mercury becomes the toxic methyl mercury contaminating fish in thousands of lakes.

After five years, data clearly show that mercury falling directly on lake surfaces was converted rapidly to methyl mercury and moved into the food web. Within the first year, mercury added directly to the lake was detectable in fish. Most of the mercury falling on the terrestrial portions of the lake's drainage area does not reach the lake as quickly. It will take much longer to become a contaminant of fish.

The experimental mercury additions to Lake 658 are expected to wrap up this year, but the researchers will continue to monitor the lake ecosystem for sev-

eral more years until they have a complete picture of how mercury moves within the ecosystem. The results of this unique study are expected to provide the evidence needed to support appropriate regulation of mercury releases to the atmosphere by coal burning power plants and other human activities.

## Cage Aquaculture

With wild fish populations in decline over much of the world, humans are increasingly turning to fish farming, or aquaculture, as a source of fish for food. Much of this farming is conducted in large cages suspended in deep water. However, these open water fish farms have been associated with various environmental problems, and little independent research has been conducted to quantify the nature and magnitude of these

impacts.

To address this deficiency, ELA researchers have established a small-scale, fish farm in Lake 375. Since 2003, some 10,000 rainbow trout fingerlings have been placed in a cage each spring, fed commercially-produced feed pellets for 5 to 6 months, then harvested each fall. While this farm is operating, we have been closely monitoring the Lake 375 ecosystem to detect any farm-related changes in the lake and to the native species including lake trout.

During the first two years, changes observed in the lake ecosystem were minimal, except for conditions immediately below the cage. However, during 2005, more obvious changes occurred. Phosphorus and other plant nutrients introduced to the lake in the fish food, and re-



*Rainbow trout fingerlings are transferred from the special delivery truck to coolers for transport via ATV and boat to the cage in Lake 375, 30 May 2005.*



*Kilogram-size rainbow trout are netted from the cage for transport to a truck and shipment to a processing plant in southern Ontario, 30 October 2005.*



Technician Lori Tate and Dr. Paul Blanchfield conduct a lakeside operation to implant a transmitter into the abdomen of a live fish. This transmitter will enable the researchers to track the fish's movements electronically for up to several years.

leased to the water from the fish faeces, appear to be stimulating algal growth, thereby increasing the overall productivity of the lake. Minnow populations seem to be increasing and native lake trout are well fed, but lake trout behaviour does not seem to have been significantly affected by the presence of the cage containing thousands of distant relatives. This fish behaviour is monitored using a sophisticated electronic system by which the horizontal and vertical movements of implanted trout and white suckers can be tracked continuously.

The experimental farm will be operated again in 2006, and possibly in future years if funding is available. Two additional years of monitoring will occur after the farm operation is discontinued. The results will be used to assist in developing scientifically-based guidelines for regulation of the freshwater aquaculture industry.

### Estrogen Study

From 2001 to 2003, we added small quantities of a synthetic estrogen to ELA Lake 260 to maintain a minute concentration (about 6 parts per trillion) of this

would be affected by exposure to tiny amounts of the chemical. In particular, would there be an impact on fish populations? While the chemical has not been added to Lake 260 since 2003, researchers continue to monitor the lake and its species to detect any lingering effects. While the estrogen produced various physiological changes in the fish, the most dramatic effect was a near collapse of the fathead minnow population. Feminization of male fish apparently caused their inability to successfully fertilize eggs, resulting in year class failures during the years of estrogen addition. Fathead minnows normally live only 3 to 4 years, so three years of reproductive failure resulted in a major population crash. We are continuing to monitor the lake trout and other longer-lived fish species to determine whether they also suffered year-class failures during the estrogen addition years.

### Other Studies

Two other experimental studies were underway during 2005, although both were conducted in enclosures, rather than at a full ecosystem scale.

hormone mimic in the lake water. Many common chemicals have hormonal properties similar to synthetic estrogen. The purpose was to investigate whether fish and other organisms

One of these studies investigated interactions between mercury and selenium, with a view to examining the possible use of selenium as an inhibitor of toxic methyl mercury uptake in fish. Can non-toxic concentrations of selenium produce the desired effect? Data are being analyzed and results will be forthcoming.

The second study is investigating the possible effects of iron and ultraviolet radiation on the growth of cyanobacteria, often called blue-green algae. In particular, how might these agents affect production of toxins by these organisms? This work is continuing in 2006, and results are still preliminary.

While experimental studies are our focus, the ELA continues to conduct long-term ecological monitoring in a suite of five lakes. This information serves as a reference for the experimental studies. It also provides a long-term record of natural variability in these small lake systems. The data record now encompasses up to 37 consecutive years for some variables in one lake. In addition, we continue to operate the ELA weather station and conduct hydrological monitoring in the lakes and small streams.

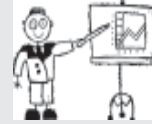
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### Did you Know?

*Over the years, much of the research at the ELA has been conducted by graduate students in partial fulfilment of their doctoral and Masters theses. Well over 100 such theses have been completed at the ELA. These students have come from more than a dozen different universities in at least four different countries.*



# Community Outreach



Visit the ELA on the Web: <http://umanitoba.ca/institutes/fisheries>

In addition to the annual open house tour in September (see page 4), ELA staff participated in a number of public information and outreach events again in 2005 and early 2006.

## Display Booths

In early May of last year, the ELA hosted a booth at the annual Dryden Home and Sports Show. A few days later, a smaller booth was staffed at the Annual General Meeting of the Lake of the Woods District Property Owners association, held each year in Winnipeg. On both occasions, we were able to meet dozens of persons who stopped by the booths to ask questions and discuss our research findings. These events enable us to meet interested members of the public, many of whom are learning of the ELA for the first time. For those who are already aware of the ELA, we can help to expand their knowledge of our research findings.

This year, we will be at the Kenora Home and Leisure Show and the LOWDPOA AGM once again. We hope to see you there.

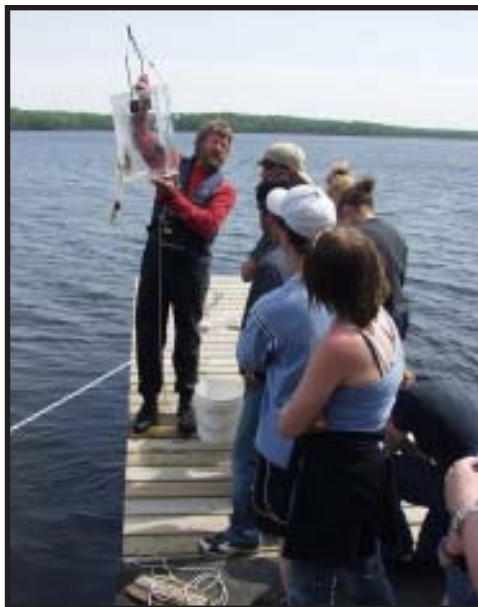
## Northwestern Ontario Tourism Association

Also last spring, John Shearer made a presentation on ELA to a fish and wildlife symposium in Emo, hosted by the Northwestern Ontario Tourism Association. This workshop was attended by a number of tourism

operators, as well as by representatives of the Ontario Ministry of Natural Resources and others interested in fish and wildlife issues.

## Dryden Conservation Course

Doug Allan and John Shearer participated as instructors at the



*Doug Allan demonstrates a Schindler-Patalas zooplankton trap to Grade X students at the Dryden Conservation Course in Aaron Park.*

49th annual Dryden Conservation Course for high school students in June, 2005. John has been involved in this event for the past 25 years, and always finds it a rewarding experience. Both Doug and John are looking forward to the landmark 50th annual event this year.

## ELA Site Tours

Several groups visited the ELA for guided tours during the summer and fall of 2005. Among

these were a group of Stewardship Rangers from Kenora and Red Lake, and a bus load of Grade XII biology students from Dryden High School. Teacher Kathy Boone of Dryden HS has been bringing students to the ELA for more than a decade.

During these group tours, the participants were shown the aquaculture experiment and given tours of the field station and meteorological site. The Dryden students also were given a demonstration of the live capture, mark, and release fishing technique that permits ELA fish researchers to study fish populations in our small lakes for many years without depleting the small populations of larger species.

## Maintaining the Lines of Communication

We remain open to communicating with the public in many ways. As public servants, we recognize the importance of making our work known to the people whose taxes support our research. Without your interest and support, we cannot succeed in our scientific quest.

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*Anyone wishing to learn more about the ELA is invited to contact John Shearer, ELA Operations Manager, 501 University Crescent, Winnipeg, MB R3T 2N6. Phone: 204-983-5206. Fax: 204-984-2404*

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