

FIELD NOTES

FALL 2006

FRIENDS OF THE UNIVERSITY OF OKLAHOMA BIOLOGICAL STATION

Director's Message

Greetings from the shores of Lake Texoma! Another very active year has passed since my last message to you. I trust that everyone has had another successful and productive year. This past year, 2006, has been one of our busiest years to date.

On April 22nd, we held a new event for the Friends of the UOBS (FUOBS) by hosting an open house reception in the Pleistocene Plaza of the Sam Noble Oklahoma Museum of Natural History (SNOMNH) with between 50-60 persons in attendance. I gave a brief update on the Station and we heard a research update on the golden algae project from Dr. James Easton (see the article later in this issue), a postdoc in Dr. Dave Hambright's lab. Light refreshments and finger-food made for a very relaxing evening.

As for other station news...Gail Barnes joined the UOBS staff in December 2005 as the new Norman-based UOBS secretary, while Janet Isaac settled into her position as the Texoma-based administrative secretary. Welcome aboard to both Gail and Janet! Also, Dr. Chad Hargrave, UOBS postdoctoral fellow, has taken up a tenure-track Assistant Professor position at Sam Houston State University effective August 2006. We wish Chad well in his new position. A national/international search was conducted for Chad's successor and I'm pleased to announce that James Larson (Ph.D., 2006, U. of Notre Dame) will be joining the scientific research staff at the Station in November 2006. James will be collaborating with Dave Hambright and other station researchers on studying the interactions between toxin production by the golden algae, *Prymnesium parvum*, and nutrient recycling in Lake Texoma.

Other news includes Dave Hambright receiving additional funding (approx. \$500,000) for 2.5-years from the Oklahoma Department of Wildlife Conservation (ODWC) to establish "A Long-term Monitoring Program for *Prymnesium parvum* in Lake Texoma". This award will fund a research technician, as well as new doctoral student, Rich Zamor. Congratulations Dave! In addition, the Weider Lab at the Station will be welcoming Dr. Dagmar Frisch (Donana Biological Station, Spain) as a European Union (EU) Marie Curie Postdoctoral

Fellow starting in early 2007 for a 2-year research stay at UOBS. Dr. Frisch and I will be working together in studying the ecology and genetics of the exotic sub-tropical invasive zooplankter, *Daphnia lumholzi*, which has been established in Lake Texoma since approx. 1990 and has spread across the U.S. from California to Florida and as far north as the Great Lakes.

Further, the Station continues to host educational and professional conferences, including the Oklahoma Environthon this past spring, the "Multidisciplinary Field Academy in

Zoology and Botany" headed by Dr. Bruce Smith, Upward Bound groups from Tahlequah and Durant, along with two very successful Summer Sessions (total enrollment in May and August was 138 students in 10 courses). We also hosted this fall, a secondary-school science teachers' workshop on "Teaching Evolution". Finally, I want to thank the dedicated UOBS staff for their hard work in making 2006 such a successful year!

Best wishes to all!

Larry Weider-Director,

The University of Oklahoma Biological Station (UOBS)



Greetings from the Executive Committee and Board of Directors of FUOBS! A lot is happening with our beloved Biological Station as you can see from the contents of this newsletter. Your Board remains committed to advancing the endeavors of the Station through support of Dr. Weider and his fantastic staff at the station and to the students and faculty that use the facilities. Our focus this year is scholarship support for students at the station and we are soliciting funds for this most noble of goals. As you are aware, many of our students are supported by a scholarship that helps defray some of the costs of their education during the summer at the station. The summer programs are unique in that they occur during a time that many of the students use to earn money for their college education. Many of our students would have a hard time attending without the scholarship assistance provided through the Biological Station. Our goal this year is to raise \$10,000 or more to provide added funds for students attending the Station. The first \$5000 donated will be matched by an anonymous donor.

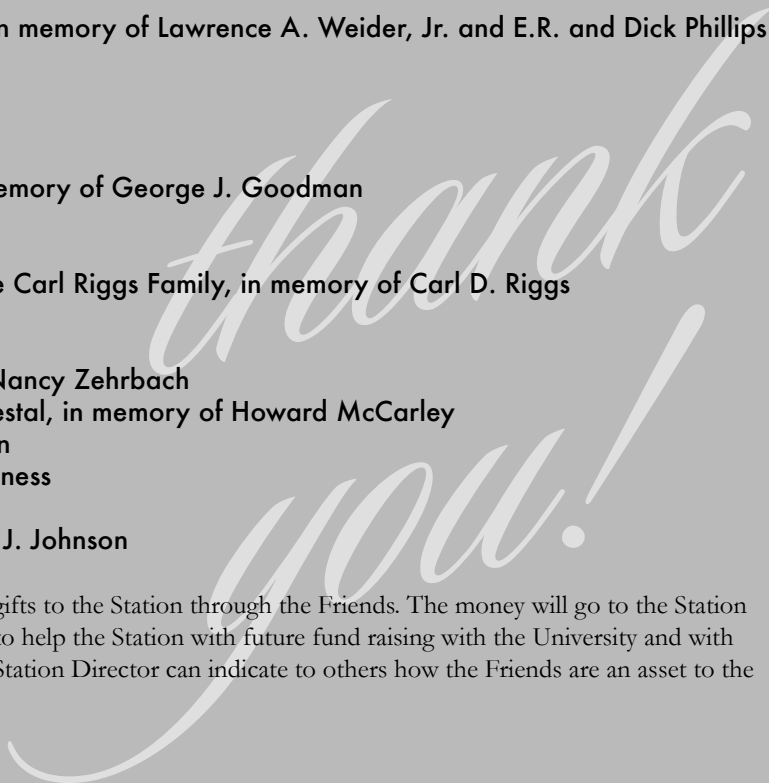
Many of you will want to help us meet our goals. I will ask you to consider the following. Please get involved with our FUOBS group. Spread the word around about our group and the fun we have at our functions. Be sure to attend the reunion that will be held in October 2007. Donate goods for the auction that will be held at the reunion. Contribute to the scholarship fund through donations through the University of Oklahoma Foundation. Please do not hesitate in contacting me for comments and suggestions that would be of benefit for our organization.

Kim R. Hauger
Chairman-FUOBS

DONORS 2006

Through August 31 there have been \$3037.60 in direct donations and \$317.90 earned from purchases of donated items.

Jane and Dick Phillips, in memory of Lawrence A. Weider, Jr. and E.R. and Dick Phillips
Pamela Genova
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Kim and Nancy Hauger
James Pickens
Lawrence Weider and Nancy Zehrbach
Bedford and Carolyn Vestal, in memory of Howard McCarley
Gary and Geri Wellborn
Joseph D. and Suzy Maness
Chet Bynum
William R. and Dorothy J. Johnson



We urge you to consider giving your gifts to the Station through the Friends. The money will go to the Station and will allow the Friends to gain in influence to help the Station with future fund raising with the University and with other individual and institutional donors. The Station Director can indicate to others how the Friends are an asset to the Station.

Golden Algae in Lake Texoma

Contributed by James Easton and Dave Hambright

Lake Texoma, an impoundment of the Red River straddling the Oklahoma-Texas border, provides a recreational resource and a major source of income for the local population from services supplied to the visiting tourists. Nearly two million visitors come to the lake every year supplying an annual income of around \$900m to the area. Since the appearance of the exotic toxic algal species *Prymnesium parvum* (golden algae) in 2004, Lake Texoma has been threatened with reoccurring large-scale fish kills associated with golden algal toxins. The first major fish kill occurred during the winter of 2004, affecting only Lebanon Pool (a 150-ha off-channel lake in upper Lake Texoma) on the Oklahoma side of the lake, but extended downstream on the Texas side to Big Mineral. In 2005, golden algae were observed in various localities on the Red River arm of the lake, but there were no reported fish kills. This year (2006) marked the third year of golden algae in Lake Texoma, but only Lebanon Pool experienced fish kills.

Golden algae toxins indiscriminately poison fish and thus directly affect the sport and recreational fishing industry. General ecological effects of golden algal blooms and toxins are still poorly understood, though preliminary research indicates that not only are other algal species displaced during blooms, golden algae may also be toxic to herbivorous zooplankton, the primary food resources for many fish species and most juvenile fishes. Moreover the appearance of masses of dead and rotting fish, not to mention the smell, is not too attractive for holiday makers! Thus the overall impact of golden algal blooms on the lake ecosystem, the fishing industry, and local tourism warrants considerable concern.

Prymnesium parvum originally described as a marine phytoplankter (microalgae; ~8µm diameter), have also been found in various fresh water systems in western Europe, the Middle East and the southern US. It is believed that because of their marine origins they are exceptionally adaptable, tolerating and exploiting broad ranges of salinity and temperature, and thrive particularly well in low saline and brackish environments. Golden algae are capable of both autotrophic (via photosynthesis) and heterotrophic growth (via consumption of bacteria). Heterotrophy enables golden algae to continue to grow in low light and nutrient conditions, thus potentially out competing other, strictly autotrophic, algae. The transfer of golden algae from marine to freshwater systems and the spread across freshwater systems is thought to have been aided by bird migrations and human activities, such as boating and fishing. Once golden algae arrive in a new system, as with other exotic species that find a niche in a new environment, they quickly become established members of the community.

Massive algal blooms, regardless of species, are not common in natural, pristine conditions, but typically arise as a result of anthropogenically-induced increases in plant nutrients, primarily phosphorous and nitrogen. Although there are natural sources of nutrients, such as leeching of phosphates from soil and rocks, dust deposition, excess nutrients are introduced to lakes from sewage, industrial effluents, and agricultural runoff. When a bloom is near

or at its peak growth, further growth becomes nutrient (most often phosphorous) limited. At this stage any algae which can successfully overcome such nutrient-limiting conditions will have the competitive edge. The strategy of golden algae is to produce toxins to kill other competing algae, thus making the nutrients in the dead algae available for itself. Such toxins also induce changes in the plankton community structure, not only by inhibiting and killing other members of the phytoplankton, but also by inhibiting potential grazers by interfering with their reproduction and life cycles. Moreover, algal toxins can be poisonous to animals higher in the food web as well. This has been well documented by numerous cases of blue-green algal poisoning in livestock and humans. In the case of golden algae, toxicity appears to be limited to gill-breathing organisms like fish and mollusks. However, fish are apparently not the only victims of golden algae poisoning—as was evident by the large number of dead turtles accompanying fish kills in some areas of the lake—suggesting that that there may be more far-reaching damage to the ecosystem through transfer, and possibly bioaccumulation, of the toxins in the food web.

The aims of our Oklahoma Department of Wildlife Conservation funded research are to understand the environmental conditions in the lake that lead to blooms of golden algae, to determine the concentrations of golden algae in the lake that are toxic to fish and how toxicity varies across fish species, and to explore possible negative interactions between golden algae and herbivorous zooplankton. We have developed a two-prong approach consisting of routine environmental monitoring and laboratory experimentation. Since March 2006, we have accumulated physical, chemical, and biological data from near- and offshore stations around Lake Texoma. These data will be fundamental for our research as they can be used for examination across seasons and years of specific environmental conditions in the lake that may be conducive or deleterious to golden algae blooms. Our laboratory studies are designed to measure acute (immediate) toxicity of golden algae using fish and zooplankton bioassays and laboratory-reared golden algae cultured under various nutrient conditions. For example, we have determined that golden algae grown under nitrogen-limiting conditions readily develop strong toxicity to fish. Such results will enable us to relate the toxicity of golden algae with their abundance and nutrient status.

Our overarching goal of our research is, by understanding the environmental conditions in the lake that promote golden algae blooms, and the ecological interactions between golden algae and other members of the aquatic community, to develop the means to predict, and possibly in the long term by lake management, to control blooms of this invasive toxic algal species.

Sam Noble Reception, Spring 2006

Sixty Friends of the Biological Station visited, grazed, and listened under the gaze of the Mammoth in the lobby of the Sam Noble Oklahoma Museum of Natural History during the evening of April 23, 2006. This reception was aimed to reconnect Friends from the central Oklahoma area who have not been able to attend meetings at the Station. The elegant setting at the Museum provided a great opportunity for hearing about what is going on at the Station and what lies in store for the Friends.

Executive Committee Chair Kim Hauger welcomed the



group and explained that, in the years when we do not have meetings at the Station we plan to have

receptions in other parts of the State, allowing us to increase the reach of the Friends. He introduced Director Larry Weider, who provided the gathering with a summary of what is going on at the Station. Among his remarks, Larry noted the full

summer classes, indicating a strong demand among students for field experience. During the wildfires of early 2006 parts of the Station grounds were burned, but no buildings were lost due to the efforts of staff and local volunteer firefighters. See the Director's Remarks in this issue for a more complete description of Station accomplishments.

Director Weider introduced the scientific speaker of the evening, James Easton, who is a post-doctoral fellow at the Station, working with Dave Hambright. James discussed their recent research on golden algae in Lake Texoma (see article with more complete description elsewhere in Fieldnotes).

Organizing the reception was Edie Marsh-Matthews, new executive committee member and museum curator. Chair-elect Jane Barrett organized a silent auction of a George Sutton print and a weekend at the Station. Early reservations for the David Sibley bird walk in October, 2007, were also available. Thanks to both of them for putting together a very enjoyable evening.



Celebration of the Station - October 2007

No more sweltering in July heat at the 2007 gathering of the Friends to celebrate the Station! In an attempt to allow more Friends to fit the celebration into their schedules (and with a nod to the lowered heat tolerance of many Friends) we will meet at the Station October 19-21, 2007.

Genius. Thoughtful. Scholarly. Creative. Pleasant and engaging. All describe David Allen Sibley, and then some. A neighbor and birding colleague of Executive Committee member Julia Yoshida, David will present a lecture and lead two bird walks at the Celebration. A Saturday AM field trip off-campus (location and fee to be announced). Late Saturday, David will present a talk ("Birds and Bird Guides") before dinner. Early on Sunday AM, an on-campus bird walk (\$100/person, limited to 12 people with a limited number of spots

remaining) is planned. All proceeds will directly benefit the Station.

President Kim Hauger plans to have a fishing expedition with the children attending. If your child is at all interested in fishing, this is an excellent opportunity for them. In past gatherings, all participants took home their fishing equipment provided courtesy of Zebco.

There will be a live auction, silent auction, and the early bird's 5 & 10 sales as before. To date, we have Audubon prints, a Sibley print of an

Bald Eagle, a 24 X 20 inch peregrine print by Chris Forest, antique animal prints, water color of a hooded merganser and some Sutton prints. Selected books for adults and children will be available, as well as jewelry, Hawaiian shirts, small antiques.

If you've wondered what happened around the Station at times of year other than summer, this will be a chance for you to see. We hope you will attend, and bring a friend!



Congratulations!

Molly Steen from Grove High School was the \$100 award winner from the FUOBS at the OJAS banquet this past spring.

Memories from Janet Ehrlich Kelly who was at the station with her mother, Audrey Ehrlich, in the summer of 1958 are below. Janet was eight years old that summer when her mother and Barbara Shirley took classes together. Janet went on to get a PH.D. and has been teaching at TCU for eleven years in Science Education as an Associate Professor and Director of the Institute of Mathematics, Science, and Technology. As Barbara said, "Thanks for the memories:"

- There were lots of young children at the station during the summer months. In our infinite wisdom, we (the children) decided that everyone could use a little entertainment, so a group of us set out to do the play Hansel and Gretel. We made props and practiced for several weeks. When it came time to do our performance, we made flyers and invited everyone we knew. We charged 5-cents for admission. Folks filled the cafeteria for this main attraction. There were lots of laughs that night—no performer was older than third grade.

- I remember the professors' kids—most of them were older except for Dr. McCarley's kids. I think one of his son's names was Murray—I babysat him a couple of times. The one I'm thinking of was about 3 or 4 years old at the time. One day I was holding him over the big snapping turtle tank and he fell in—oh, my!! I was terrified and crying. Someone was right there and got him out.

- The high school boys that worked in the kitchen (Rex Pugmire, Jim Boggs and Brett Giezantanner) gave me the nickname of "Pudge". They were always playing practical jokes on each other and even the professors. One night we had hotdogs and I remember someone got the rubber padding off a crutch (it looked like a hotdog) and told the boys to give the "dog" to Dr. Goodman (George) when he came through the serving line. Dr. Goodman didn't notice until he bit into his hotdog.

- On another field trip escapade, I drove my mother's 1957 Chevrolet while she and Barbara Shirley sat on the fenders with their collecting nets. I don't think they caught much that night (it might have been my braking that was the problem, but I had a great time driving.



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Years attended/taught/worked (circle one) at UOBS _____

____ Check payable to OU Foundation is enclosed.

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Dr. Julia Yoshida
Dr. Edie Marsh-Matthews
Dr. Barbara Shirley
Dr. James Pickens
Dr. Larry Weider (ex-officio)

The Friends of the University of Oklahoma Biological Station (FUOBS) was established under the umbrella of the University of Oklahoma Alumni Association. The purpose of this organization is to promote and support the Biological Station and to promote connection with its friends and alumni. Any person who is a current or former student, faculty, or staff member or friend of the Biological Station may become a member of the club.



David Sibley - Guest Speaker, field trip leader
Oct. 19-21, 2007

JOBS 2007 SUMMER SESSION SCHEDULE

SESSION I-May 20-June 2

Vascular Aquatic Plants-Bot 4990/5990-Sec. 050

Ronald Tyrl-Oklahoma State University

Wildlife Conservation-Zoo 4970/5970-Sec. 050

Richard Kazmaier-West Texas A & M University

Experimental Herpetology-Zoo 4970/5970-Sec. 051

William Lutterschmidt-Sam Houston State University

Experimental Design In Ecology-Zoo 4990/5990-Sec. 052

Daniel Spooner-The University of Oklahoma

Molecular Techniques for Field Biology-Zoo 4970/5970-Sec. 100

James Thompson-The University of Oklahoma

Ron Woodruff-Bowling Green State University

SESSION II-July 29-August 10

Field Botany-Bot 4990/5990-Sec. 051

Bruce Smith-The University of Oklahoma

Adam Ryburn-State Univ. of New York at Oneonta

Reservoir Fish Ecology-Zoo 4970/5970-Sec. 053

Tim Patton-Southeastern Oklahoma State University

Chad Hargrave-Sam Houston State University

Field Mammalogy-Zoo 4970/5970-Sec. 054

Michael Kennedy-University of Memphis

Invasion Biology-Zoo 4970/5970-Sec. 055

James Larson-The University of Oklahoma

Capstone- Close to Home: Human Alterations of the Oklahoma Landscape- Zoo 4983-Sec. 200

(Senior Capstone Course for OU Zoology Students Only)

Edie Marsh-Matthews-The University of Oklahoma



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