FLATHEAD LAKE JOURNAL

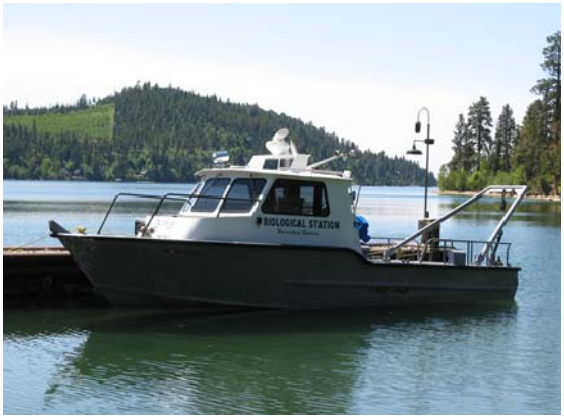
(Formerly the Yellow Bay Journal)

A publication of the Flathead Lake Biological Station
UNIVERSITY OF MONTANA

REJUVENATING THE *JESSIE B*

Jessie B, the Biological Station's primary Flathead Lake research vessel, has served us well for 25 years providing a safe and effective platform from which to conduct our Flathead Lake Research and Monitoring Programs. Our appreciation for her service is boundless.

While she is a valued part of our team and has become a symbol of the Biological Station, maintenance efforts for safe and reliable operations, particularly related to aging engines and hydraulics, have been consuming an inordinate amount of resources. It is time to replace or overhaul the vessel for the safety of passengers and for optimizing current technologies.



The *Jessie B's* design still fulfills research requirements and the hull is in excellent condition, but the powertrain (engines, outdrives, propellers) and instrumentation need replacing and the hydraulic systems need rebuilding. It is also time for new windows, paint, trailer tires, etc.

Research into options clearly indicates that an overhaul is feasible and the most practical and economical option in comparison to purchasing a new vessel. We expect the revitalized vessel to provide another 25 or more years of service.

We sought funding from philanthropic foundations and families, and have been delighted with the response. Gifts from several generous contributors are allowing us to move forward with the overhaul. Our plan is to have the work done during *Jessie B's* "slower" season. If all goes well, our trusty workhorse will be returned to service on the lake this spring. ¡

DR. JESSIE BIERMAN'S LEGACY

Our research vessel is named after one of the Biological Station's most distinguished alums and generous benefactors, Dr. Jessie Bierman. A Flathead native, Dr. Bierman studied at the Bio Station in 1921 with our founder, Dr. Morton Elrod. That summer changed her life, as Dr. Elrod inspired young Jessie to study nature and human responses to natural phenomenon.

Jessie Bierman went on to have an important career as a pediatrician and teacher. Dr. Bierman pioneered health care for infants, children and their mothers and was a medical professor at the University of California, Berkeley. Her work resulted in a model of well-baby clinics and early childhood intervention programs, which she traveled the world to promote.

Dr. Bierman christening the *Jessie B*

Throughout, this remarkable woman remained an ardent supporter of Flathead Lake and the Biological Station. Dr. Bierman's generosity resulted in the FLBS Director's endowed Jessie M. Bierman Professorship and the Bierman Scholars and Research Endowment.

With great insight in 1982, Dr. Bierman said, "Most of us fail to appreciate that Flathead Lake is not going to stay clean and clear unless great efforts are made." We at FLBS heed Dr. Bierman's words and are doing everything we can to gather and disseminate the information needed to protect and conserve our great lake. ¡

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ADVENTURES IN THE HYPORHEIC ZONE

Amelia (left) and Amanda (right) collecting emergent insects from a well trap

Amanda DelVecchia, a PhD student mentored by Dr. Jack Stanford, is investigating the Nyack Flood Plain hyporheic zone on the Middle Fork of the Flathead River. FLBS and other researchers have studied this site extensively after the discovery nearby of stoneflies in groundwater miles from the Flathead River. FLBS scientists showed that river-aquifer interaction extends across expansive flood plains, leading to conceptualization of the whole flood plain as a hyporheic zone.

Amanda explains, "The hyporheic zone of alluvial flood plains is a dynamic ecological interface between surface and groundwater and can house a diverse and productive aquatic macroinvertebrate community including organisms that spend their entire lives underground and organisms that spend time both above and below ground like hyporheic stoneflies."

Amanda's research entails collecting thousands of macroinvertebrates plus water samples, gas samples, and hydrologic data from 30 groundwater monitoring wells in Kalispell and on the Nyack Flood Plain, but that is just the beginning of the story. She is doing exciting work to advance the understanding of the role of methane in the aquifer food web.

Amanda has discovered unusually high methane concentrations in monitoring wells. The well sample analyses also indicate stonefly biomass is almost completely provided by methane-derived carbon! Last May, Amanda communicated these early findings in her oral presentation titled "Methane: elusive source of carbon for the hyporheic food web" at the Joint Aquatic Sciences Meeting, Portland, OR. In July, she provided a poster presentation at the North American Congress for Conservation Biology in Missoula.

Amanda is now investigating the source of this methane in the Nyack wells and the biogeochemical processes by which it is incorporated into the hyporheic food web.

To collect the volumes of samples needed for this research, Amanda relies heavily on volunteers and research assistants. This field season, Amanda's team included research assistant Hannah Coe from St. Mary's College of Maryland, and volunteer Amelia Schirmer hailing from University of North Carolina–Chapel Hill. Many others provided short-term help including Clinton Begley, University of New Hampshire; Chad Reynolds, Salish Kootenai College; Cailey Philmon, Flathead Valley Community College; Michael Rubiaco and Jose Urrutia, Montana Conservation Corps; and friend Zach Rutt who offered to carry gear and pump wells. Amanda greatly appreciates her assistants as the project would not be possible without their help.

Hannah and Zach pumping wells

Amanda's research will advance the understanding of pristine ecosystems and the services they provide in the form of their function. She notes, "For the Nyack, the value is extremely clear: quantity, quality, and temporal dynamics of pristine water supplies and the cycling of a potent greenhouse gas (methane) are all maintained by the flood plain. An improved understanding and management of systems like these is crucial to their conservation."

To learn more about the field work, check out Amanda's blog at http://adelvecchia.tumblr.com/. Amanda's research continues, but she could use a little help if you are philanthropically minded, or if you want to volunteer.

If you are interested in volunteering, contact Amanda at 406-982-3301 Ext. 226, or call Tom Bansak at Ext. 229 if you are interested in helping fund Amanda's work. i

AIS COMING—WE'D BETTER BE READY!

Without increased and immediate action in early detection of aquatic invasive species (AIS), very costly, irreparable damage will be done to western waters from quagga and zebra mussels. In 1988, zebra mussels invaded the Great Lakes; they now are in all but five states. Make no mistake, we have only a small window to prepare for and prevent further spread through early detection and eradication.

FLBS faculty Dr. Gordon Luikart is PI on a project to improve tools and DNA-based technologies to ensure early AIS detection in remaining waters needing protection and to develop site selection models. These tools will help find hot-spot sampling sites for early detection of zebra/quagga invasions.

A new video capturing the breadth of this issue and potential impacts to Flathead Lake can be accessed on the FLBS website at http://flbs.umt.edu/. i

MARK POTTER RETIRES

We congratulate and give our best wishes to Mark Potter on his retirement. Mark has taken great care of the Biological Station facilities and grounds for 30 years. He looked after all aspects of maintenance including vehicles and boats, interacted daily with the academic and support staff, manufactured and maintained research equipment and enabled an efficient and safe working environment for all. Mark passed the baton to **Eric Anderson** who was promoted after working as the Caretaker at FLBS for fifteen years, and new employee **Reggie Heiser** accepted the Maintenance Tech position. i

WE SALUTE SUMMER VOLUNTEERS!

The Biological Station is a desirable location for life science students wishing to mix some practical field experience with academic studies. This summer, numerous volunteers assisted Bonnie Ellis, Gordon Luikart, Tom Bansak and Amanda DelVecchia.

Jeff Strait volunteered for field work on Luikart's project on hybridization between native cutthroat trout and introduced rainbow trout. Later when the need arose, he was hired as a crew leader for trapping, capturing and measuring/tagging cutthroat trout.

For this project, researchers are using new genomic approaches to study hybridization with the primary goal of understanding how genetic and evolutionary processes influence hybridization within and among populations.

Jeff is now a graduate student in the Wildlife Biology Program at UM and landed a teaching assistant position. Drs. Gordon Luikart and Lisa Eby are his coadvisors.

Tim Freerksen from University of North Texas returned for another summer to test new methods for early detection of aquatic invasive species (e.g., Eurasian milfoil, zebra mussels and brook trout). He collected plankton tow net samples of different net mesh size (10 micros to 64 microns) and water filter samples (0.45 microns) to test which approach provides greatest sensitivity for detection of DNA in sloughed cells floating in the water.

An exciting preliminary result is that larger mesh sized nets can provide greater sensitivity (by allowing filtering of larger volumes [1000s of liters] of water). This could help us prevent colonization of our lakes from the devastating effects of invasive species.

Jonathan Olson-Hartley, a biology major at Northern Arizona University in Flagstaff, spent the summer at his family home on Flathead Lake and volunteered at the Biological Station to gain some professional experience.

A quick study with a keen sense of observation, Jonathan soon became involved in many aspects of FLBS operations and research. He assisted in the Freshwater Research Lab and with logistics for meteorological stations maintenance. He also sampled Flathead Lake tributaries, helped with mass mailings, and jumped in to help Tom with summer events.

We thank Jonathan for his bountiful enthusiasm and capable handling of any task assigned. i

FLBS ALUMNI FROM 1949, 1952 & 1953

Dr. Helen R. Hughes (Rigg), a native of New Zealand, visited the Biological Station a while back. As Helen signed the guest log, she reminisced about attending summer session at the Bio Station in 1953 to augment her studies at Vassar College in the U.S. She also revealed a bit about her notable career. Her experience gained at the Station propelled Helen toward a lifetime of work preserving water quality, natural resources and ecosystems through land use management.

Helen was honored during the 65th Anniversary Celebration of the New Zealand Fulbright Program, a program promoting educational and cultural exchange between the U.S. and New Zealand. She was quoted as saying, "My U.S. experience set me on my career path. The subjects I took and the research that I did resulted in my appointment as a scientist in a newly established freshwater research unit and ultimately to my appointment as the first Parliamentary Commissioner for the Environment [New Zealand 1987–1997]."

Not long after Dr. Hughes stopped by, we were visited by yet another 1950s alumna. This was the vigorous and engaging **Lucia Durand** and son Steve. Steve made the journey with Lucia to see where she had studied over sixty years ago.

Lucia studied plant ecology during her time here at the Station and had ambitions to work as a field biologist. However, field positions were not readily offered to women back then. She settled for a position as a chemist in a lab to provide for her three sons.

Lucia did not linger long on these challenges and soon conversation drifted to lifelong friendships forged in these early years. She was quick to mention Helen Rigg (Hughes) as one of the great people from her time at the Station. *Suddenly, the world got smaller*.

We came to know Lucia's upbeat persona and joie de vivre in the few hours she was here. She sent us a digital photo album of her studies here in 1952–1953, including pictures of Helen for our archives. Lucia currently lives in Corvallis, OR, and is also an accomplished artist.

Henry Becker, a few years shy of centenarian status, and his son Kurt dropped in to visit the Station on August 4, the day before Open House this summer. An alumnus of the 1949 summer session, he wrote in our guestbook, "Most memorable experience of my teaching career." After serving in the armed forces, Henry attended college on the GI bill, which enabled him to study botany at the Station. The experience motivated him to lead a productive lifelong career teaching high school biology. Henry thanked us for the courtesy we extended to he and his son on their sojourn to reconnect with the Bio Station, which for many is a conduit to a meaningful life. i

Flathead Lake Biological Station
University of Montana
32125 Bio Station Lane
Polson, MT 59860-6815 USA
flbs@flbs.umt.edu
http://flbs.umt.edu/
http://flbs.umt.edu/AudioVideo/FLBSWebcams.aspx
(406) 982-3301

Mailing Address Goes Here

The Biological Station is located 17.5 miles north of Polson or 14 miles south of Bigfork. Visitors are welcome year round Monday–Friday to take a self-guided walking tour. For more information, send an email to flbs@flbs.umt.edu, call 406-982-3301 or see the FLBS website at http://flbs.umt.edu/.

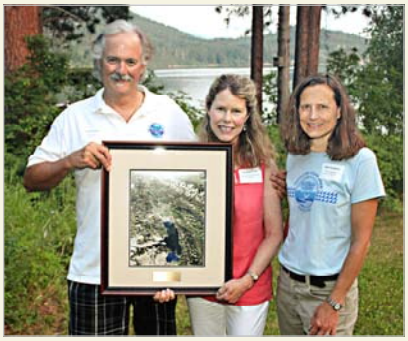
Dr. Gordon Luikart — One of the World's Most Influential Scientific Minds

Dr. Gordon Luikart, Flathead Lake Biological Station and Division of Biological Sciences Professor of Conservation Ecology, was honored recently when named one of "The World's Most Influential Scientific Minds in 2014" by Thomson Reuters, a multinational media and information firm. The scientists chosen were the most highly cited researchers who had published the highest impact scientific papers from 2002–2013.

Specializing in and pioneering new genetic tools to conserve a wide range of fish and wildlife species, Gordon has collaborated with leading scientists around the nation and the world. Gordon also teaches Conservation Ecology and Conservation Genetics at the Biological Station. Like most of the FLBS faculty, the vast majority of Gordon's funding comes from competitive research grants from outside UM.

Gordon lives in Polson with his wife, two kids and 3.5 horses. i

Dr. Bonnie Ellis Receives Flathead Lakers 2014 Lake Stewardship Award



Flathead Lakers President Greg McCormick (left) and Executive Director Robin Steinkraus (right) presented the 2014 Stewardship Award to freshwater ecologist Dr. Bonnie Ellis (center) at the annual Flathead Lakers meeting in July. Dr. Ellis has worked most of her professional career at the Biological Station doing research to protect water quality on Flathead Lake.

The award is given annually to an individual or organization that has made a significant contribution to protecting the quality and beauty of Flathead Lake. i

The Flathead Lake Journal is a publication of the Flathead Lake Biological Station (FLBS). This issue was coedited by Marie Kohler, Sue Gillespie, and Tom Bansak. Unless otherwise noted, all photos courtesy of FLBS employees or students. Views expressed in the Flathead Lake Journal do not necessarily represent the official position of the Flathead Lake Biological Station, University of Montana. Editors and publishers disclaim any responsibility or liability for such material.