

Annual Report
Education & Outreach Committee
2013-2014

Education & Outreach Committee (EOC) Annual Meeting—The EOC met August 22-24, 2013 at CDR for an annual meeting. Eighteen of 25 sites were represented with an additional two skyping in for votes and selected presentations. At this meeting, we said thank you to Steve McGee for two terms of Education Committee leadership and voted in Mary Spivey to co-chair the committee alongside Nick Oehm. Scott Simon was elected to chair the Professional Development sub-committee.

Monthly EOC Conference Calls—EOC meets on the first Wednesday of each month for an hour. During each call sites rotate in taking turns to highlight success from their Education & Outreach programs. This provides the opportunity for sharing best practices and developing new cross-site initiatives.

Please JOIN US on our monthly calls

- Who:** Education & Outreach Committee (EOC)
What: EOC Best Practices & Program Highlights
When: 3:00-4:00 pm EST on 1st Wednesday of every month
Where: Usually phone call, occasionally webinar, or Google+ Hangout
Why: To share our successes and develop cross site initiatives
How: RSVP by email to EOC Co-chairs Mary Spivey (CDR) and Nicholas Oehm (FCE) at spive007@umn.edu and oehtm@fiu.edu

Subcommittee Reports for 2013

I. Professional Development, Scott Simon

a. *KBS K-12 Partnership*

- i. In 2014, sLTER funds will support a total of 5 workshop days; events providing professional development, pedagogy, and science education for the teachers, and communication and outreach opportunities for our graduate fellows.
- ii. 57 teachers from the KBS K-12 partnership attended the spring 2014 workshop, titled STEM: Environmental Engineering for Sustainability. Two plenary speakers from Michigan State University (one each from the colleges of natural science and engineering) introduced current research in ecological and biosystems engineering. Nine KBS/MSU graduate fellows led concurrent sessions demonstrating inquiry-based lessons for the classroom.

- b. **CAP Online Urban Ecology**—CAP is offering an on-line urban ecology open entry/open exit course for teachers through ASU's Teacher's College's new Professional Learning Library. CAP has begun to pilot the program with teachers.
- c. **JRN Biodiversity Workshop** – JRN scientists and educators hosted a workshop for 12 middle and high school teachers in summer 2013. Teachers participated in field trips with JRN scientists to learn about dryland biodiversity research, designed and implemented their own research projects, and took part in a one-day Desert Data Jam (using data from JRN on EcoTrends to create products such as animations, children's books, and physical models to convey data trends to non-scientist audiences).

II. **Digital Repository. Beth Simmons (PAL)**

- a. ***LTER Education Digital Library (PAL, CDR, & FCE)***—Palmer E/O coordinator Beth Simmons was the lead primary investigator in a cross-site working group project called the LTER Educational Digital Library (LEDL). Joined by co-investigators Nicholas Oehm from the FCE LTER and Mary Spivey from CDR LTER, the first phase of the project began in March 2013. It involved customizing a review process that rigorously evaluates LTER educational learning activities. The proposal joined [CLEAN Pathways Project](#) organizers Anne Gold, Marian Grogan and Tamara Ledley to utilize an existing online review tool and host a resource review camp. The camp consisted of an online virtual session that brought together fifteen educational developers, teachers, scientists and technicians. The evening centered upon a peer-review process that assessed twenty-one LTER educational learning activities from six different LTER sites, across four categories: scientific accuracy, pedagogical effectiveness, technical quality and ease of use. The goal of the camp was not only to provide constructive feedback to LTER educational developers but also ultimately result in a small collection of LTER resources that will serve as a benchmark for future submissions. The resources maximize the integration of broad-scale long-term research of environmental phenomenon, and showcased strong pedagogical structure. Over time the library could expand to include modules, curriculums, LTER data sets, multimedia, citizen science protocols, and visualizations. The LTER network office has generously collaborated in the design and customization of a website that will showcase the library for the LTER community. The beta site was LIVE in August 2013 and be geared toward educators for the next school year. The library will incorporate metadata that also allows the LTER collection to be harvested by other digital libraries to broaden the collective efforts of the LTER Educational and Outreach program.
- b. LEDL is currently collecting resources in preparation for a second review camp, pending funding availability.

- c. LTER Educational Digital library lessons dealing with climate are not only cross-posted on the CLEAN (Climate Literacy Energy Awareness Network) but also now on the Climate.gov/teaching website that just one several (3) webby awards. CLEAN joined forces with NOAA on funding the library and now cross-posts the entire library for them.

III. **Graduate Education, Clarisse Hart (HFR)**

- a. Led conference calls in May and October 2013 [see meeting notes on intranet]
- b. Introduced opportunities for LTER graduate student cross-site networking at annual meetings (in collaboration with Grad Student committee)
- c. ***VCR & HFR Hosting Grad Student Socials***—Hosted informal socials at national meetings: VCR hosted at ESA and CERF in 2013; HFR will host at ESA in 2014 (meetings chosen based on LTER grad student poll of most-attended meetings)
- d. Developed & advertised schedule of LTER talks at ESA in 2013
- e. ***Cross Site ASM Visits between VCR, GCE, & FCE***—Organized to make travel funds available to coastal LTER sites VCR, GCE, FCE, to pilot grad student ‘exchange’ for annual site science meetings
- f. Collaborated with Diversity working group and LTER leadership to promote LTER research opportunities at SEEDS & SACNAS student meetings in 2013

In the coming year, we plan to:

- g. Continue to provide opportunities for graduate students to connect at annual meetings.
- h. Work with the grad student committee to identify new needs and opportunities for this cohort.
- i. Pursue new collaborations (across sites and with SEEDS, SACNAS, AISES) to fuel recruitment and site-based support of diverse students.
- j. Seek to characterize the ways in which sites and faculty incorporate LTER field sites and data into higher ed curricula, and discuss new opportunities/best practices for supporting these pathways.
- k. Collate the data from individual sites’ surveys of summer research program alumni, to create an LTER-wide accounting of the impact of LTER summer research programs on STEM career/edu outcomes. If collation is not possible, explore collaboration for assessments moving forward.
- l. Begin to coordinate for ASM 2015.

IV. **Undergraduate Education, Art Schwartzchild (VCR)**

- a. Explored cross-site collaboration and development of best practices for undergraduate research programs

- b. Coordinated with Diversity working group to circulate a survey of summer undergraduate research program participants from LTER sites, to assess student experience and develop recommendations for best practices. 147 students responded from 14 sites across 9 program years; results and recommendations – which include points on 1) mentorship by graduate students, 2) the benefits of the presence of program coordination staff on students’ ability to link program to career goals, and 3) sexual harassment/assault protocols – to be posted on intranet by May 9.
- c. **HFR Cross Site REUs**—Discussed possibilities for cross-site collaboration, in sharing of student applicants (piloted by HFR this year) and recommendations for 2nd summer of research, especially for students traditionally underrepresented in the sciences.

In the coming year we plan to:

- d. Develop resources for sites to implement recommendations from the undergraduate research survey.

V. **Citizen Science, Elena Sparrow (BNZ)**

a. ***The Konza Environmental Education Program (KEEP)***

- i. **Description:** KEEP provides site-based activities utilizing the skills of trained docent volunteers.
- ii. **Participants:** KEEP maintains an active Citizen Science program documenting the phenological activity of the 600 plants found on Konza as well as the comings and goings of the mammals, birds, reptiles, amphibians, and various insect species of the tallgrass prairie.

In 2013 we began a new program for KEEP - we began training Master Naturalists as part of the Kansas Master Naturalists program. New docents going through training were given the option to train as Master Naturalists as well as Konza Docents. By becoming a Master Naturalist, our volunteers could offer their time to many other groups and organizations around the state besides Konza Prairie. All trainings were video-taped and available to the public on Youtube at the Konza Prairie Channel -

<https://www.youtube.com/user/TheKonzaPrairie>.

b. ***Coweeta LTER Citizen Science Lichen Bioblitz and Workshop***

- i. **Description:** This event had two primary purposes: 1) to educate the public about lichen ecology and diversity, and 2) to compile a preliminary list of lichens for Coweeta Hydrologic Lab.
- ii. **Participants:** We enlisted the help of two well-known field lichenologists to serve as instructors for this event. Voucher specimens will be sent to the New York Botanical Garden for verification and curation. The workshop filled up quickly with 30 participants, including several professional botanists from

the USFS, NC Natural Heritage Program, and Virginia Tech. Approximately 80 specimens were identified and it is expected that we will have between 200 and 300 species at Coweeta.

c. **[CAST—Coastal Angler Science Team, FCE LTER](#)**

- i. **Description:** The Coastal Angler Science Team is a group of individuals who are passionate about recreational fishing and want to see the preservation of fisheries for the future. CAST grew out of a relationship between a group of dedicated anglers and fisheries researchers. The long term insight gained from their angling experience and their willingness to apply their fishing effort to help answer important research questions started the partnership for CAST. From this, angler involvement now plays a crucial role in recreational fisheries research in the Coastal Everglades.
- ii. **Participants:** Currently, CAST research focuses on the backcountry area of Everglades National Park and the anglers involved spend some portion of their time targeting this region. Time spent fishing the study area varies among members from afternoons, to entire weekends. CAST is also composed of a wide range of participants including long time fishermen, out of town visitors, locals, fishing guides, families, and many more. If you will be fishing in this area you are encouraged to partner with us!
- iii. **Researchers:** CAST is part of a fish ecology research program based out of [Dr. Jennifer Rehage's](#) laboratory at Florida International University. This research is affiliated with the [Florida Coastal Everglades](#) Long-term Ecological Research program and the [Comprehensive Everglades Restoration Plan](#)

d. **[Predator Tracker, FCE LTER](#)**

- i. **Description:** Learn how researchers at FCE LTER and Florida International University track and study big predators in the Shark River Estuary in Everglades National Park and explore their predator tracking data.
- ii. **Participants:** Predator Tracker is a stand alone application based on [a kiosk](#) at the [Museum of Discovery and Science in Ft. Lauderdale](#) which features:
 1. Videos—Watch videos about how researchers study the movements, behavior, and feeding habits of large predators (such as bull sharks, alligators, and snook) in Shark River.
 2. Explore the Data—View predator movements on a map of Shark River and see how they vary over time, season, salinity and temperature.
 3. Test Your Knowledge—A quiz to test your knowledge after you've watched the videos and explored the data.

e. ***Melibee Citizen Science Project, BNZ LTER***

- i. **Description:** The Melibee Citizen Science Project seeks to determine whether invasive plants such as white sweetclover overlap in flowering time with native *Vaccinium* sp. plants in different parts of Alaska. With this phenological data models can be created to help predict which area might be most vulnerable to changes in pollination of native berry plants. Repeat observations of the same individual plants over a summer, and documenting any phenological changes or pollinator visitors of invasive sweetclover (*Melilotus albus*) and native blueberry (*Vaccinium uliginosum*) and cranberry (*Vaccinium vitis-idaea*) are needed. This citizen science project is part of the Melibee Research Project with an over all goal of determining what the overall impact of sweetclover is on the production of blueberry and cranberry fruits and seeds, and why. A project website (<https://sites.google.com/a/alaska.edu/melibee-project/home>) is provided that includes instructions for how to participate in the citizen science: protocols for site selection and observations as well as for recording and entering data. The Melibee project is providing rich opportunities for learning from scientific research to public participation and outreach.
- ii. **Participants:** Over 240 volunteers from many parts of Alaska, (teachers, students and community members) are participating in the project. Results of Likert-scale paper and web-based surveys, indicate that volunteers who monitored phenology in the Melibee Project Citizen Science Program have learned about key ecological concepts and science process skills and changed their behaviors as a result of their learning.
- iii. **Researchers:** The Melibee Citizen Science Project is being led by University of Alaska Fairbanks and BNZ LTER ecologists Dr. Christa Mulder and Katie V. Spellman.

VI. **K12 Student Research Opportunities, Jason Love (CWT)**

- a. ***Connecting with K-16 and More: A Partnership between Niwot Ridge LTER and ScienceLIVE***—Graduate students and researchers at Niwot Ridge LTER are working with ScienceLIVE (www.science-live.org) to reach new audiences using a model that could work for many LTER sites. To serve the K-16 audience, ScienceLIVE partners with the University of Colorado-Boulder (CU) Biological Science Initiative and CU Museum of Natural History to create cutting-edge curriculum based on NWT's publicly available data on climate, hydrology and ecology. Designed around *Next Generation Science Standards*, lesson plans help teachers make use of real datasets and encourage students to interact with active research projects through live research updates and interactive web resources. As students work through these exercises, they can interact directly with PIs and

their field assistants via webinars. Evaluation and assessment tools are being developed to monitor curriculum success. To serve a broader public, ScienceLIVE also features NWT researchers in public seminars and links citizen scientists with NWT research opportunities. This partnership streamlines researcher involvement in outreach, increases the reach and impact of outreach activities, and stretches funding dollars earmarked for broader impacts. Currently, ScienceLIVE is developing and distributing custom lesson plans for as little as \$1750 each. To sustain this partnership, ScienceLIVE works with researchers to build web-based outreach into grant proposals. Funded proposals serve the ScienceLIVE mission to broaden public perception of who scientists are, and to engage the public in place-based research. Contact Peter Erb (erb.peter@gmail.com) for more information.

- b. ***CDR Assessment of Field Experiences***—In the short term, a PhD student is working with Cedar Creek on assessment of short-term ecology field experiences as it relates to ecosystem knowledge. We have yet to pilot it, will start with the spring K-12 groups coming to Cedar Creek
- c. ***The Bosque Ecosystem Monitoring Program (BEMP) at SEV***—combines long-term ecological research with community outreach by involving K-12 teachers and their students in monitoring key indicators of structural and functional change in the Middle Rio Grande riparian forest, or “bosque.” In 1997, BEMP began as a collaboration between the Department of Biology and Bosque School in Albuquerque, with fewer than 200 participants. BEMP is the official schoolyard program for the Sevilleta Long-Term Ecological Research site. There are 27 BEMP sites spanning over 300 miles of the Rio Grande. Since BEMP was founded in 1996, there have been more than 40,745 participants involved with the program. Last year, 5736 community members (students, teachers, etc.) participated in science-related outreach activities. There were 1235 K-12 students in the field each month of the school year collecting long-term data about ecosystem variables and the ecological drivers of flood, fire, climate change and land management. The experiences of these students support science education reform efforts and help to increase each person’s understanding and appreciation of science in general and the Rio Grande riparian ecosystem in particular. BEMP findings derived from K-12 student-gathered data are used by government agencies to inform multi-million dollar river and riparian management decisions.
- d. ***Virtual Fieldtrips: Promoting Ecological Research from the McMurdo Dry Valleys (MCM) LTER***—PhD student Alex Mass with MCM has been introducing middle school students to the ecological concepts and research programs in the McMurdo Dry Valleys by Skype videoconferencing classrooms from the field in Antarctica and maintaining an educational blog and videos describing the life of a

graduate student field scientist. Many of these classroom interactions have been tailored to address concepts from the LTER Schoolyard Book Series book 'The Lost Seal' written about the MCM site, and a series of lesson plans addressing ecological concepts from the book have been test-piloted by participating teachers and will be available for free distribution. Students can also access real-time hydrologic data on the ephemeral streams in the Dry Valleys for class projects. We are also expanding outreach to include science activities in bilingual/tribal immersion schools with in-person visits to US-Spanish, Hawaiian, Blackfoot, and Crow bilingual communities, as well as Maori immersion schools in New Zealand in cooperation with the New Zealand Antarctic Program. This year skype videoconferencing and in-person classroom visits directly reached over 500 students in the US and Australia, while fieldwork blog 'The Last Degrees' (www.thelastdegrees.wordpress.com) reached over 380,000 visitors after being featured on ViralNova and Rocky Mountain PBS. After promotion during the National Science Teacher's Association annual conference, 328 schools have asked to participate in 'skype field visits' to the Dry Valleys during the 2014-15 Antarctic field season, and participating classrooms will be chosen based on ability to coordinate with Antarctic field dates.

- e. **Data Jam** – Data Jam is a competition that challenges high school students to find nontraditional formats to communicate the trends in long-term datasets to nonscientist audiences. Since Data Jam was created by the JRN education team in 2011, students have used ecological and social data from EcoTrends (www.ecotrends.info) to create songs, dances, physical models, infographics, games, and animated videos. Because EcoTrends contains datasets from all LTER sites, Data Jam is being replicated at other sites using their own, local datasets. In 2013, the education team from FCE visited JRN to talk about Data Jam with JRN educators and local teachers. They are piloting the project at their site in spring 2014. The JRN education team, led by Stephanie Bestelmeyer, has also provided materials and guidance to education teams at BES and the Cary Institute of Ecosystem Studies. Both sites are hosting Data Jams in spring 2014.