



Ecologists, Educators, and Schools:  
Partners in GK-12 Education



## Spring Newsletter

ECOS (406) 243-6016

[www.bioed.org/ecos](http://www.bioed.org/ecos)

Spring Newsletter May 2005

### No Child Left Indoors!

ECOS is a partnership program for enhancing science education in K-12 schools in western Montana by using the schoolyard and adjacent open areas as outdoor laboratories for learning about the environment.

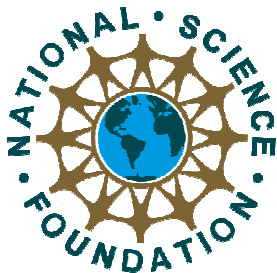
### Inside:

- Debut of ECOS plant guide
- Springing into your schoolyard
- ECOS Earth Day
- News from Schoolyards

### Upcoming Events

- Writing workshop: May 23<sup>rd</sup>-26<sup>th</sup>
- ECOS training seminar: June 5-8
- Institute 1: July 18<sup>th</sup>-22<sup>nd</sup>
- Institute 2: August 15<sup>th</sup>-19<sup>th</sup>

The ECOS program is sponsored by the University of Montana's Division of Biological Sciences & the College of Forestry and Conservation.



ECOS is supported by the GK-12 Program of the National Science Foundation. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the National Science Foundation.

## From the Director: ECOS and the NSF GK-12 Program

In January 2004, five schools in the Missoula Curriculum Consortium joined hands with University of Montana scientist partners to create outdoor laboratories for learning about the environment. As the first year of the UM "Ecologists in Residence" GK-12 Program draws to a close, we are already planning for our new cohort of fellows and schools.

This UM ECOS partnership has been made possible by generous funding from the National Science Foundation's GRADUATE TEACHING FELLOWS IN K-12 EDUCATION (GK-12) Program. What is the GK-12 program? According to the NSF, the mission of the program is to "invest in people, programs, and research to prepare tomorrow's leaders in science and engineering." This terrific program supports fellowships and associated

training that enable graduate students in science, technology, engineering, and mathematics disciplines to acquire additional skills that will broadly prepare them for professional and scientific careers in the 21st century. Through their participation in a GK-12 program, Fellows improve their communication and teaching skills while, at the same time, enriching science, technology and engineering and mathematics instruction in K-12 schools. Expected outcomes include improved communication, teaching and team building skills **for the Fellows**; professional development opportunities **for K-12 teachers**; enriched learning **for K-12 students**; and strengthened partnerships **between institutions of higher education and local school districts**. Currently, the NSF is funding nearly 120 programs

across the USA. You can learn more about the current NSF GK-12 programs by linking to: [http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5472&org=DGE&from=home](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5472&org=DGE&from=home)

By all accounts, this first year has been a tremendous success! We have fostered the creation of new outdoor research laboratories at all of our partner schools, developed dozens of ecology lessons to use these outdoor laboratories for guided and independent explorations, and set in motion plans to sustain their development and use in to the future. Congratulations to all the ECOS fellows, teachers, and students for your enthusiasm and hard work this year!!

Carol Brewer, ECOS Director

## ECOS Guide to the Ecology of the Northern Rockies: Teaching and Learning with the ECOS Plant Guide

At last the hard work of ECOS undergrad fellows, Co-Director Paul Alaback and Webmaster Josh Burnham has come to fruition! ECOS undergraduate fellows collected plant specimens during the summer of 2004. They also conducted literature searches for information on 122 common species in our area, focusing on those found at local schoolyards. Many of the species they described are common and found throughout the Northern Rockies. Paul edited, indexed, and formatted the information, and Josh created the online guide. The ECOS plant guide is online at <http://www.bioed.org/NHGuide>

The ECOS guide allows you to search by flower color, lifeform, common name, medicinal uses, habitat type and more. You'll also

find original photos to help identify species.

### Teaching and Learning with the Plant Guide

As spring arrives, you can use the ECOS field guide to identify plants at your schoolyard.

First, students need a short tutorial on the different parts of a plant. The level of detail will depend on the background knowledge of your students. In the schoolyard, ask the students to pick one plant and either draw and/or write about it. Once students are back in the classroom, students can go online and use the plant guide to identify the plant species they found in their schoolyard. You might want to have students keep a plant

journal where they can write about, draw and identify all the plants they see at school, home and on vacation.

And remember this is a work in progress, so any additions or comments are welcome!



Oregon Fleabane photo P.Alaback

"I believe that ECOS experiences, beyond just changing the ways I can work, have changed the ways I want to work" - ECOS PhD fellow

## Springing into your schoolyard – Teaching about Beneficial Insects

Often, when people think of insects they just think about pests – those that sting, bite or damage crops. But in fact, insects provide benefits that far outweigh the damage they cause. Believe it or not, fewer than 5% of insects are harmful to humans. Insects are pollinators, without which we'd have fewer flowers, fruits, and vegetables. Insects are a major food item for fish, birds, and other animals (including humans). Insects help keep pest species under control. The best way for students to learn about the benefits of insects is to take them outside for an exploration!

In the spring and summer,

gardens and flower patches become a haven for many creatures.

Start your exploration by discussing all the ways your students think insects are valuable. Insects can be pollinators, pest predators, agents of biocontrol for noxious weeds; producers of honey, wax and silk; providers of food for other animals; decomposers of dung, wood, and dead animals; soil aerators; and tools for scientific research. Some are beautiful and all of them are fascinating!

Next, show pictures of some insects that are in your

schoolyard, pointing out the service they provide, and where you might find them. Lady beetle and lacewing adults and larvae are predators along with ground beetles, earwigs, some stinkbugs, spiders and centipedes. Paper wasps and yellowjackets serve as pest control agents by feeding their young live insects. Pollinators include bees, moths, flies, wasps, butterflies, and even some beetles.

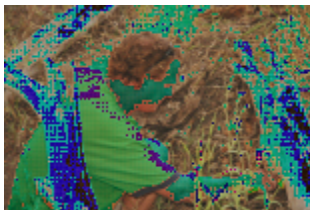
Now it's time to go for an insect scavenger hunt! Provide students with a list of the insects you discussed in class and ask them to tally how many they find. Have them spend some time

observing one of the insects and ask them to record where it was found and what it was doing. Have students report back to the group. After presentations discuss and ask them to reflect on what they learned about beneficial insects.

Adapted from Citybugs, University of California, Berkeley

## In Memory of David Nicholas

**David Nicholas  
1969 - 2005**



### Remembering Our Colleague and Friend

In March 2005, the ECOS community was profoundly saddened by the loss of our colleague and friend, David Nicholas. David was a gifted

teacher. He had a vision of how wonderful it could be for a child to be at a school where an important part of learning involved turning over rocks and looking for salamanders, lying in cool wet grass and looking at birds, climbing trees, or contemplating the path of the stars and planets. David was PASSIONATE about these things. He told us many times that working with the other ECOS fellows, and the children and teachers at Florence Carlton School, brought him joy and inspiration. David also made us laugh; he was very funny and knew how to tell a good story and good joke. David was very smart; he loved philosophy, debate, reading, and challenging his

colleagues to look at old ideas through new eyes. At the same time, David often had grass stains on his knees; he was always chasing some creature, or digging up some thing or another, and bringing it to show someone, anyone, who would look and listen to the story. David was well loved and made an impact in his short life. He left an imprint on us...we miss him and we will remember him.

ECOS is working with Florence Carlton School to create a memorial for David in the Outdoor Classroom. We envision some new trees and interpretative signs about the ecology of the site.

If you would like to make a donation, please make your check payable to "Carol Brewer for Nicholas Memorial" and send it to:

ECOS Program  
Division of Biological Sciences The  
University of Montana Missoula  
MT 59812

We plan to have a dedication at the school in September.

## Earth Day: a time to recognize environmental concerns and celebrate the natural world

**Florence Carlton** inaugurated their outdoor classroom, which recently received recognition by the National Wildlife Federation as an Official Schoolyard Habitat site. Parents and children explored the site with a nature checklist to complete as they found different treasures including a woodpecker hole, beetle trails in logs and a cottonwood snag.

**Lewis and Clark** conducted a school wide restoration of Bancroft Pond. The students of Lewis and Clark began restoration of the area by clearing rocks and reseeding. They also

made signs to remind the community to use the pond area responsibly.

**Target Range** took an entire month to celebrate Earth Day! Students created committees to work on different issues. Topics included compost, planting a garden, recycling, conserving energy and a river clean-up. Each committee defined goals, made a plan to meet their goals, and some had begun implementing them by Earth Day.



Florence Carlton's outdoor classroom is recognized by the NWF

"Perhaps the most valuable part of our lessons is that the kids take part in making a change to something they really care about"- ECOS PhD fellow

## News from ECOS Schoolyards

### Up in Flames at Big Sky High School



DNRC fires up the Big Sky Demo project

The demonstration project for **Big Sky High School** was fired up on March 31<sup>st</sup>. The purpose of their demo project is to introduce students to the scientific method in a hands-on manner, using a locally relevant subject – fire. Several plots were burned at varying levels of intensity and temperature sticks were used to determine the heat of the fire. Students sampled soil characteristics, and plant and insect abundance and diversity before and after the burn. ECOS fellows will analyze the data and present it to the students for them to interpret.

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### Schoolyard Habitat Certification at Florence Carlton

Big things have happened at the **Florence Carlton** outdoor classroom! This special part of their schoolyard has been designated as an official National Wildlife Federation (NWF) schoolyard habitat. A schoolyard habitat site not only provides inspiration for learning among students, teachers and the community, but will be an important part of the local ecosystem by providing essential habitat for wildlife. Certified schools receive resources, training and curriculum support

from NWF. Florence Carlton School is the second ECOS school and the fifth school in Montana to receive this certification.

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### The Worms have Arrived at Lewis and Clark!

Lewis and Clark Elementary has constructed a school-wide vermicomposting system to reduce lunch wastes and provide their outdoor classroom with nutrient rich compost. After exhaustive research by the student-led ECOS committee on worm types and composting systems, ten pounds of worms arrived hungry for school waste. The steering committee developed a system for collecting waste and explained to the whole school how compost bins work. Two indoor compost bins have been set up and students help sort and mix food scraps for the worms. ECOS fellows have been leading inquiries on worm biology, ecology and nutrient recycling. An outdoor composting system will be set up this spring.



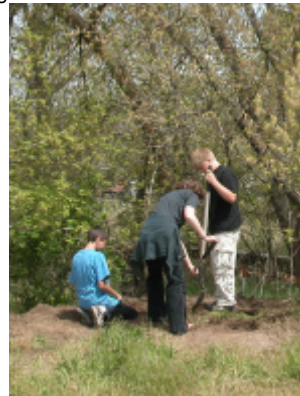
PhD Fellow Jeff Piotrowski leads a worm ecology inquiry at Lewis & Clark Elementary

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### Sussex Eco-Blitz

Every year, **Sussex** picks a topic for the entire school to focus on for a week. This year they chose ecology! The first week of May involved ecology field trips, guest speakers, and stations which included games, simulations,

crafts, and experiments. In addition to spreading the wonder of ecology to the whole school, it was a great opportunity to work on the demonstration project. Kindergarteners and 1<sup>st</sup> graders cleaned around a pond, 2<sup>nd</sup> and 3<sup>rd</sup> graders built butterfly shelters, 4<sup>th</sup> and 5<sup>th</sup> graders designed bird houses and planted bird-friendly shrubs and plants, 6<sup>th</sup> graders improved irrigation ditches, 7<sup>th</sup> graders planted a butterfly garden and 8<sup>th</sup> graders constructed a greenhouse.



Sussex students dig ecological education as they work on building a greenhouse.

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### Passels of Pests

ECOS and the Missoula County Weed District have joined together to build an insectary at **Target Range School**. The purpose of the insectary is to rear *Cyphocleonus achates*, the knapweed root boring weevil, and to assess the effect the weevil has on spotted knapweed and native plant populations. Students have already collected baseline data, including insect, plant and soil information. Weevils will be introduced in August and students will continue to monitor the site and collect data over the next few years. The insectary not only provides important scientific data about the efficacy of biocontrol but also provides a wonderful context in which to explore community ecology, entomology, resource management, restoration, and plant ecology.

## MEET THE ECOS FELLOWS AND SCHOOLS FOR 2005-2006

### Schools & Teachers

**Hellgate Elementary School**  
Jo Fix & Mike Plautz

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**Florence Carlton K-12 School**  
Brent Heist & Byron Weber

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**Lewis and Clark Elementary School**  
Julie Greil & Carol Reeves

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**Target Range K-8 School**  
Debbie Caron & Peggy Purdy

### PhD Fellows

T.J. Fontaine  
Katie Hailer  
Michael Machura  
John MacLean  
Brooke McBride  
Alison Perkins  
Sam Stier  
Bruce Threlkeld

### At-Large PhD Fellows

Rachel Loehman  
Carl Rosier

### Special Projects, PhD fellow

Jeff Piotrowski

### Undergraduate Fellows

Corissa Crowder  
Hannah Elliott  
Allison Greene  
Andrew Hoye  
Melissa Maggio

## Where are the 2004-2005 Fellows Going?

**Dianna Fairchild** hopes to begin a Master's in Education in 2005 while she simultaneously completes requirements for a secondary teacher certificate and a B.A. in biology. She'd like to spend summers working in the field of wildlife biology.

**Frank Janes** will be attending the University of Colorado School of Medicine on an Air Force

Scholarship. He anticipates doing his residency in internal medicine.

**Sarah Keller** will attend a tropical ecology class in Peru this summer. In the fall she'll take on the title of free-lance biologist and plans on savoring life as a non-student before going to graduate school.

**Lauren Priestman** will be working for the Rocky Mountain Research Station in Missoula as a biological technician doing botanical surveys.

**Hollie Sexton** plans on applying to medical school and take a much needed rest in the fall. In the spring she'd like to go abroad to do humanitarian aid work.

**Andrew Whiteley**, our only graduating PhD fellow, has accepted a Post-Doctoral Fellowship with Louis Bernatchez at Laval University in Quebec City. He will be examining gene expression differences in reproductively isolated trophic morphs of the lake whitefish (*Coregonus clupeaformis*).

## ECOS Staff

**Dr. Carol Brewer, Director**  
Carol has a PhD in Botany and directs research programs in both plant ecology and ecological education. She serves as the VP of the Ecological Society of America and is an Associate Editor for the journal Conservation Biology (Education).

**Dr. Paul Alaback, Co-Director**  
Paul has a PhD in Forest Ecology. His research centers on

disturbance ecology and plant biodiversity patterns. His skills have allowed ECOS to develop a fantastic local plant guide.

**Josh Burnham, Webmaster**  
Josh is responsible for the design, management, and maintenance of the ECOS website. He also provides much appreciated technology support to ECOS staff, fellows, and teachers.

**Jennifer Marangelo, Program Coordinator**

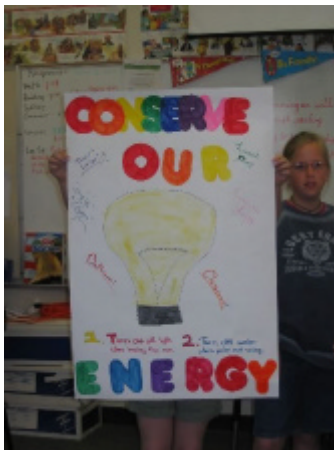
Jen is the newest member of our ECOS team. She has ten years of experience in three labs in DBS. Jen is responsible for ECOS recruiting, web content development, and tracking progress at the school sites.

**Kim Notin, Administrative Assistant**

Kim is responsible for all the odds

and ends of the ECOS project. She is a first year Masters student in the College of Forestry and Conservation.

**Alison Perkins, Communications and Media.**  
Alison is responsible for getting our messages out clearly and helping with ECOS outreach. She is starting a PhD in the College of Forestry and Conservation.



The Target Range Energy Conservation committee presents to fellow students on earth day.

**ECOS PROGRAM**  
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TO: