



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.

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Important Dates:

- *Mid-year Reports Due from Fellows January 26th, 2007*
- *ECOS In-Service February 5th, 2007*

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From the Director: ECOS and Traditional Ecological Knowledge

Winter is upon us in western Montana. There is a lot of evidence too - the last of the leaves have fallen from the trees in my yard, the summer birds have headed south, and snow covers the higher peaks on the local mountains. This is a great time of year to go outside to explore winter adaptations in plants and animals.

As we think about how to promote science literacy and make ecological science relevant, there are many challenges and opportunities on the horizon. One topic that presents both challenges and opportunities, and that is on all of our minds in Montana is how to address *Indian Education for All*. ECOS has an answer! Ecology is an ideal subject area for connecting

science with *Indian Education for All* through the field of "traditional ecological knowledge (TEK)". In fact, the *Ecological Society of America*, the professional society for ecologists, has an emphasis area in TEK (see http://www.esa.org/teaching_learning/diversity.php for more information). To explore connections between ECOS, ecology and TEK, the Arlee team hosted an inspirational workshop on traditional ecological knowledge. You can learn about the highlights of this workshop in this newsletter.

In ECOS this year we have new schools (Clinton, Arlee) and returning schools (Target Range,

Lewis and Clark, Hellgate Elementary). Principals Erick McBride (Clinton) and Karen Allen (Lewis and Clark) share their thoughts on what it means to be an ECOS school. We also have loads of new schoolyard investigations and a nature calendar you can download from our enhanced website (www.bioed.org/ecos). We hope you will use these tools to make sure no child is left indoors, even in winter!

Reflections on Inquiry Learning *By David Oberbillig, Hellgate High School Teacher*

I tease my students at Hellgate High school that we get on the academic treadmill at the start of the week, then run as fast as we can so we don't fall off and crash. Friday afternoon we get to step off - maybe - so we can recharge over the weekend. For teachers and students, this sentiment is all too real. Maybe, as teachers, we attempt to enrich the lives of our students so much that we inadvertently wind the spring a little too tight. From my perspective, our profession and our students need more time for reflection.

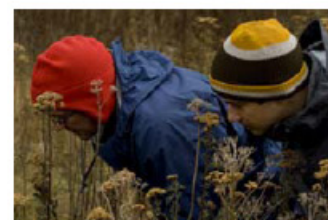
My principal at Hellgate high, Jane Bennett, addressed reflection in an interesting way. She recently talked of the Emperor's New Clothes - the well known story of people convinced to applaud for something that wasn't there. This happens in all education, and certainly in science education. Since most teachers were good students, we find that continuing this system is a worthwhile and valuable endeavor. Unfortunately, many students do not learn optimally while sitting at desks enclosed within four walls. What deeper reflection and observation provides insight into how all students can better connect with the academic experience?

Outdoor ecological inquiry is a

way to engage students on a different level. They get to move, explore, question, and process information in the rich and stimulating environment of the natural world while incorporating the many content lessons we would otherwise teach inside. On a recent outdoor aquatic insect sampling adventure on the Clark Fork River, an otherwise average student was the most enthusiastic and involved student on the day. He was in the water collecting insects, delivering samples to shore, asking what each new creature was and how it behaved. He proclaimed this day the best science day he ever had. No sets of paperwork could have matched this event for this student. If we add student reflection about the aquatic sampling experience, then the new knowledge of place, biological diversity, and healthy watersheds begins to connect more deeply with personal experience.

As I reflect upon the way my students engage in their studies, I endeavor to link their personal experience with relevant science. I have come to appreciate the richness of a well-crafted outdoor investigation. As students match outdoor experience with ecological concepts they begin to ask questions from a place of

enlightened curiosity. Ultimately, this sets them on a path of caring about natural resources and understanding the importance of conservative and ethical use of the land.



David Oberbillig is the Co-Director of ECOS program and leads a weekly seminar for ECOS fellows. He is pictured practicing observation skills during an ECOS workshop day



ECOS Fellows and Teachers pictured during a saunter led by Deborah Oberbillig.

Native American Educators Talk about Traditional Ecological Knowledge *By Rhonda Hewlett, Arlee School*

During the ECOS August Institute, a day was dedicated to helping fellows and teachers investigate *Indian Education For All* through the lens of Traditional Ecological Knowledge (TEK). Participants met on Arlee School's campus and were greeted by the Arlee's ECOS team: Flo Gardipe, Matt Corsi, Bonnie Barger, and Ronda Howlett. We were introduced to six esteemed guest speakers representing the several Salish, Pend d'Oreille and Kootenai communities on the Flathead Reservation.

Joyce Silverthorne (see accompanying article) was joined by five native educators in a panel discussion designed to immerse ECOS partners into the world view innately held by individuals within the continuum of Indian identity and experience.

UM Professor George Price demonstrated high passion as he talked about the value of native thought. He stated that conservationists made great gains by returning to native thought as a model for land ethic and stewardship. Ask the question: What is living? It's remarkable how much discussion this can generate. The question can be best answered by asking, "What isn't living?" When everything is considered to be alive, value is immediately increased.

George noted that spirituality and TEK cannot and should not be separated. Within a native world view, this interdependence is essential. While within disciplines of thought, interrelationships are cultivated and connections are encouraged; having a high regard for economic concepts for Indigenous people is highly reliant on generational knowledge. George said to consider a world without money. "How would you receive and give back to the natural world?" It is difficult to reconcile this with an economic system where more is better. George suggested we preserve and conserve what is already good, keeping excess in balance. As a teacher himself he understands the need to digest TEK so that it can be applied into the school systems.

Vernon Finley, a Kootenai Language Specialist, humbly followed George with his description of traditional worldview. He stated that spirituality is lived everyday, all day. His stories related how as a young boy his grandparents taught him that everything is connected. He recognized these teachings as a precursor to his understanding Newton's law of relativity. Vernon related that the ability to listen to your elders and suspend your disbelief when what you observe or are told is not predictable or connected to a perceived reality. This is the a partial account of what Vine Deloria Junior described as Indian Metaphysics.

Tribal Ethnobotanist Joanne BigCrane shared how traditional knowledge came for her through the cultural uses of plants. She also prompted us to use our imaginations. "When you are on a field walk, stop, turn around and look. What would you do if you had no food, shoes, or clothes? Knowing how to survive like this is not so far in the past." She talked of the importance of considering the continuum of traditional knowledge in our classrooms. Validate those who already have it, translate it, and make it real for those who don't.

Joanne's previous work within the tribes' preservation office offered insight for understanding that one of the biggest messages in the native world view reveals how the world is our garden. While everything we needed was provided for us, violent changes in the weather or sickness can indicate we are in areas where we didn't belong.

Julie Cajune, an Educator and Consultant for Indian Education For All, spoke of the importance for attachment to place. She can look back on how her mother bought land and know now that this demonstrated traditional ecological knowledge, even though it wasn't explained that way. "It was just a part of who we are. Having generational roots to this place." She was encouraged by the commitment ECOS has to get kids outside. "We make things too complicated; we've forgotten who to be in a place." Julie described this as a spiritual poverty.

Frances Vanderburg was our final panelist. She is a Salish tribal elder who teaches the Salish language in the Arlee schools. Frances offered a beautifully poetic word picture that expressed the winds of change spreading seeds to new ground allowing plants and people to grow in their own season. The message emphasized the importance of being who you are and being glad of who you are.

Although the ECOS' staff asked Frances to write this story down for the newsletter, having the experience of hearing her speak can never be duplicated. This entire panel offered an immersion experience that will be remembered forever as we consider ways to integrate Traditional Ecological Knowledge into our ECOS projects.



"Moonrise Watching" submitted by an ECOS Student as part of the 2005-2006 ECOS art contest.



"Bison" submitted by an ECOS student as part of the 2005-2006 ECOS art contest.

Indian Education for All in Montana *By Rhonda Hewlett, Arlee School*

The state of Montana is breaking new ground in the area of Indian Education. Other states are looking to Montana as a model for teaching about our state's tribes and designing effective strategies for teaching American Indian students in response to our new *Indian Education For All* law. Each school district and state agency in Montana is now required to implement this new law. The ECOS program wasted no time to insure its participants understood the law and determined ways to link it to our ECOS projects.

The state legislative funding for *Indian Education For All* did not include dollars for the purpose of professional development of concepts and essential understandings in Indian Education. The ECOS staff was very insightful when they decided to provide professional development to help its participants understand the ecological concepts of traditional knowledge as they relate to this law. ECOS' fellow Flo Gardipe and teacher Ronda Howlett helped to facilitate this process during the 2006 summer institute.

Joyce Silverthorne, Tribal Education Department Director, briefed us on the *Indian Education For All* Act. Joyce has represented the tribes for many years in various educational platforms across the state and nation. She was one of the educators to testify before the state legislators as part of the lawsuit filed for *Under Funded Schools*. This hearing highlighted the issues associated with the noncompliance of the state in upholding their responsibility for Indian Education as detailed in our state's constitution. Testimonies by supporters of Indian education, like Joyce, ultimately led to the passage of the *Indian Education For All* Act.

Joyce's staff works with teachers across the state as they strive to teach about our Montana tribes. She pointed out that our first attempts to develop curriculum to use in our classrooms must take into account the complexity of issues and the diversity among tribal groups. Educators from all parts of the state are beginning to understand the importance for contextually competent curriculum that represents traditional knowledge. ECOS is committed to create a collegial atmosphere where educators can socially construct the concepts that comprise TEK and *Indian Education For All*.

The Montana Office of Public Instruction has a dedicated staff who consult with Joyce and other Indian educators across the state as they work to meet the goals and priorities set forth to fulfill the intent to the law. OPI's web site contains resources and lessons hot off the press from the cumulative work of educators from across the state (www.opi.mt.gov/indianed).

Project TED: Teaching About Ecological Diversity at Arlee School *Contributed by Flo Gardipee*

Project TED will provide a permanent outdoor classroom for studying ecological diversity throughout all seasons of the school year at Arlee School. It will serve as a laboratory for investigations related to exploring the role of ecological relationships in maintaining biodiversity at multiple scales. Students and teachers will be able to monitor seasonal shifts in the biological community, such as variation in bird and insect species with changes in vegetation.

The garden was planted with native plants chosen for their importance as tribal resources and their potential to attract diverse insect, birds, and animals. Dawn Thomas, a tribal Ethnobotanist at Salish Kootenai College, assisted with landscaping the demonstration project garden. She advised the ECOS team on native plants, planting locations, and provided us with plants, trees, and shrubs at very low costs from her greenhouse. The interpretive infrastructure of the garden will be focused towards promoting ecological and cultural literacy.

The placement of cement casts of common local animal tracks will be installed in the spring along the primary path of the garden. All plants and animal track castings will have an associated placard that will include the traditional Salish name of the organism, common names, and the Latin names as well.



Follow this trail in the Project TED outdoor classroom to ecological discovery



Working at the Arlee outdoor classroom

Principals Talk about ECOS at Clinton and Lewis and Clark Schools

Two ECOS Principals were asked to profile their experience at ECOS Schools. Principal Eric McBride of Clinton Elementary writes about Clinton's first year with ECOS. Principle Karen Allen of Lewis and Clark Elementary School reflects on three years with ECOS.

ECOS AT CLINTON *By Eric McBride*

When two of my teachers asked if I would write a support letter as part of their ECOS application, a smile immediately came to my face. I was already planning to suggest the ECOS program to them, but to my surprise, they had come to me first! We immediately started brainstorming about potential demonstration projects and inquiry ideas. I had heard from other administrators about the program's positive impact on their students and schools, and had even seen photographs of finished projects. I immediately knew that such a project at our small rural school could be of benefit to everyone in the community.

Once we were accepted as an ECOS school, I was anxious to see whether the ECOS fellows would be a good match for our students and teachers. There was no doubt in my mind that they would know their material. My only concern was: "How are a couple of scientists going to teach our 4th- and 5th-grade students?" However, when I first observed them teaching, I couldn't believe how comfortable they were with the students. Their friendly personalities and engaging inquiries captured the interest of every student. When I asked one class of students what they thought about ECOS this year, here were some of their responses:

"It's fun to go outside, find stuff, and compare it to the findings of other classmates."

"I love the games, observations, and there are new and creative ideas every time." "They teach us a lot about the earth." "They make sense, when they teach I am not confused." "They take the time to explain things." "They are really understanding." "It's fun to get outside and do something. I also like getting to know them and my classmates." "Brilliant!"

I saved "brilliant" for last, not only because I was surprised to hear such a bold expression from this particular 4th-grader, but because I think it sums up the ECOS program very well. Our ECOS teachers have learned new and creative ways to teach, and are sharing their excitement about our schoolyard as a teaching resource with the other teachers. Above all, this program has sparked the imagination and curiosity for science in our students, and that is what matters most.



ECOS Fellow Joss McKinnon works with students at Clinton School

ECOS AT LEWIS AND CLARK *By Karen Allen*

The outcomes we are experiencing at Lewis and Clark are tangible and intangible. Lasting change in teaching for increased student understanding in science does not come with a bang but, slowly, in small steps. We are seeing changes throughout our school as a result of our ECOS collaboration. The energy and expertise of our teacher-learners, supported by ECOS fellows, is influencing science thinking and discussion—to help kids learn important science concepts—rather than having science be simply a part of the school day where we teach isolated curriculum. Inquiry is a term heard more often than in the past.

Through the two previous demonstration projects supported by ECOS we started a recycling program and developed a plant guide in English and Salish. During these project years the greatest benefit of ECOS went to the participating teachers—from personal professional development and work

with the ECOS fellows. Connection with the rest of the school was tangential—learning about ECOS, the fellows, and the demonstration projects. This is all part of being the science "buzz."

This year, our demonstration project is planned around activities specifically designed to give all teachers opportunities to increase their knowledge, skill and comfort for teaching science in the "real" world—outside the classroom—in our Outdoor Discovery Core and beyond. This is a huge step. When most teachers went to school, science had right and wrong answers; the fact that "real scientists" dealt with the unknown was not clearly understood. Helping all Lewis and Clark teachers feel more comfortable and confident in actually participating in science inquiry is an important, tangible benefit of ECOS. —Karen Allen

Readings on Traditional Ecological Knowledge

Education for All, Montana Leads the Way. Feature Articles. 2006, Phi Delta Kappan. p. 184-222.

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Traditional ecological knowledge, ecosystem science, and environmental management. By Ford, J., and D. Martinez. Ecological Applications, 2000 v. 10 p.1249-1250.

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ECOS Staff

Carol Brewer, PhD. Director

Carol has a PhD in Botany and directs research programs in both plant ecology and ecological education. She serves on many national ecology research boards and is an Associate Editor for the journal *Conservation Biology* (Education).

Paul Alaback, PhD. 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.

Dave Oberbillig, Co-Director

Dave is in his 9th year teaching high school science. He serves on the Ecological Society of America's education advisory board. Dave leads the Conservation Education seminar for all ECOS fellows, while mentoring teams in many aspects of science education and teamwork.



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.

Noah Jackson, Program Assistant

Noah deals with the day to day operation of the ECOS Program. He provides administrative support for ECOS while working on his masters in Forestry.



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TO:



Matt Davis of Clinton samples soils during the "So many soils inquiry." See the ECOS website for a complete listing of inquiries.