

Connections

Volume 32 Number 2 Winter 2011

*We Are Water:
Collaborative art
project by Jasper Place
High School students,
depicting the
connection between
water and life. Created
for the Ignite Change
Now! Global Youth
Assembly 2011 hosted
by the John Humphrey
Centre, in Edmonton.*

The journal of the Global,
Environmental & Outdoor
Education Council



Global, Environmental & Outdoor Education Council

To promote involvement in
quality environmental and
outdoor education



What GEOEC Does

The Global, Environmental & Outdoor Education Council (GEOEC) is an interdisciplinary specialist council of the Alberta Teachers' Association. Our mission is to provide resources and venues for dialogue and networking, as well as to promote quality professional development for Alberta teachers in the area of global, environmental and outdoor education. Members receive current news items, teaching ideas, information about our workshop series, and food for thought through our quarterly journal *Connections*. We are also active on Facebook (www.facebook.com/geoecalberta) and Twitter (@GEOEC), with up-to-date information on PD opportunities and initiatives in Alberta.

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Message from the Editor

Hi, folks! Welcome to an issue of *Connections* that focuses on water. Interestingly, when water is the focus, a common theme in our submissions is the tar sands, where environmental and social justice concerns are paramount.

I recently went to Fort McMurray and visited the Oil Sands Discovery Centre. Water is an extremely important element in all cycles of the oil production process. Oil companies rely on water from the Athabasca River, because it takes two barrels of water to produce one barrel of synthetic crude oil. Water is also part of the by-product of the process, along with other chemicals; dirty water remains in tailings ponds near the extraction site. Other processes also rely on water, like transporting sludge (bitumen mixed with water to decrease viscosity and increase ease of flow) to Edmonton through a pipeline that parallels Highway 63. All of these processes imply environmental and social justice issues that are addressed in this issue.



The University of Alberta hosted youth from Fort McMurray and the State of Louisiana to talk about water. In a piece written by Aminollah Sabzevari, student perspectives are outlined in debates about industry use of water and water as a basic human right. Amy Lambe furthers these points in her write-up on the Global Youth Assembly, hosted by the John Humphrey Centre for Peace and Human Rights, which was recently held in Edmonton. She makes clear the implications for communities living downstream of tailings ponds and illuminates the causal relationship between access to safe drinking water and education and health. Also included in this issue are reflections from a first-year teacher on her first canoe expedition with her outdoor education class and important information about the planning and management of the North Saskatchewan River basin. Karen Virag outlines environmental issues concerning water that are particular to Canadians and how these issues can be incorporated into school curriculum and engaging student discussion. Finally, pieces of interest include the “undamming” of America, a recent phenomenon whereby rivers that have been dammed for decades are flowing freely, and an interview with David Schindler, renowned for his discovery of the effects of phosphates on lakes and his thoughts on the connection between climate change and water.

I hope this issue engages you in environmental and social justice issues and helps you incorporate some of these ideas into the classroom.

Lara Fenton

Schedule for Submissions

Connections seeks articles on the following topic:

Theme: Connecting the silos of environmental justice and social justice

Deadline for submissions: May 15, 2012

The topic for our next issue will be connecting the silos. We encourage submissions from many topical angles of justice that explicitly make clear connections between environmental justice and social justice by exposing, exploring and making clear the unequal social impacts of environmental problems (for example, an industrial environmental footprint that unequally affects the health and education of citizens and so on). We are particularly interested in articles that use classroom curriculum and school-based projects to illustrate these connections and in which student participation is a central focus.

How to Make a Submission

Sending submissions to the editor by e-mail is ideal, but you may also submit articles, artwork and photographs by regular mail (on thumb drive or hard copy). Please include a short biography and your mailing address. Parental permission is required in order to print student work or photographs of children (see the form at the end of this issue). Send submissions to Lara Fenton, 58, 5615 105 Street, Edmonton, AB T6H 2N2 or lfenton@ualberta.ca.

GEOEC Business and News

President's Message

Welcome to the latest issue of *Connections*! In this issue we explore water, the substance that binds all of us together as residents of the blue planet. At once simple and complex, water supply is one of the most pressing issues facing the world today. While we enjoy its abundance in Canada, many parts of the world struggle to access this fundamental necessity of life. Indeed even in our own nation, some communities suffer from the lack of it.

Water gives life and affirms it. It is the resource that ties together the grand narratives of history and sits at the heart of creation. As humans we search for it on distant planets, yet curse it when it enters our homes uninvited. At the sight of water we can be either mesmerized or terrified, and its soothing sounds send many of us to dreamland every night. Water has become a commodity that is bought and sold despite being something we cannot live without, and it has been predicted many times that our next great global conflicts will be not for oil, but for water.

As educators and community members who believe in the power and importance of global, environmental and outdoor education, we believe that water is the thread that binds these disciplines together. The preservation of local water sources has global implications when biodiversity is threatened or when these sources come under the control of foreign interests so that local communities can no longer access it. Water is a powerful tool for exploring the universal concepts of human rights and equity as students explore concerns about access (or lack thereof) to this precious resource.

We are all stakeholders in the politics of water. Whether it concerns the protection of local aquifers and habitats or standing in solidarity with others in protest, we all have an interest in the preservation of global water sources.

Enjoy this issue of *Connections*!

Jessica Scalzo



Join the GEOEC Executive and Make a Difference

All positions except past president and president are open for election annually. If you are interested in seeking one of these positions, please contact Rita Poruchny at reporuchny@cbe.ab.ca.

Elections are held at the annual general meeting (AGM) during the conference. The PEC liaison and ATA staff advisor positions are appointed by the ATA's Provincial Executive Council.

President-elect is vacant and needs to be filled as soon as possible.

Past President (position not available)

- Act as advisor to the president and the executive board in general.
- Ensure that the executive operates in accordance with the constitution.
- Act as keeper of the historical records as the council historian.
- Solicit nominations from membership for each of the table officer positions.
- Coordinate the GEOEC's recognition of individuals and organizations, and solicit recommendations and nominations for awards at least two months prior to the AGM.

- Report annually and maintain a registry of awards presented by the GEOEC.

President (position not available)

- Maintain liaison with ATA personnel, PEC representative and executive staff officer assigned to the GEOEC.
- Call, set agenda for and chair all meetings of the table officers and executive board.
- Arrange for the old and new executive board to meet near the end of term of office to pass on information and receive files.
- Submit an annual written report about GEOEC activities to the ATA.
- Attend the annual seminar for presidents of specialist councils.
- Submit written reports at executive meetings as required.
- Keep executive informed of developments.

President-Elect

- Assist the president as required and act in the absence of the president.
- Maintain liaison with committee chairs and report to table officers.
- Become president on July 1, 2013.

Secretary

- Take minutes of all table officer and executive board meetings.
- Send minutes and action plans to executive, ATA staff advisor, PEC representative and GEOEC community liaisons.
- Have copies of previous year's AGM minutes available at the current AGM.
- Handle correspondence and communication in conjunction with the president.

Treasurer

- Take charge of all money received and/or collected by the council, and disburse funds as authorized by the table officers.
- Keep accurate records of the financial affairs of the council for both the account held at Barnett House and the current account.
- Provide a statement of account to each meeting of the table officers.
- Have books ready for audit by Barnett House at the end of each fiscal year (June 30).
- Attend the annual seminar for treasurers of specialist councils.
- Present audited financial statement to the AGM.
- Provide consultative services to the conference director.

Professional Development Director

- Assess needs, make recommendations and provide inservice opportunities to GEOEC members in addition to the annual conference.
- Establish, maintain and recommend a list of resource people.
- Submit a report of PD activities to the AGM.

Public Relations/ Membership Director

- Deal with issues relating to the image of GEOEC and environmental education focusing specifically on outside groups.
- Actively promote membership among interested members of the public.
- Work with the conference committee to ensure that they have an up-to-date membership list and that the conference is promoted to nonmembers.
- Coordinate the development, interpretation and

implementation of public relations policies.

- Submit a report on PR/membership activities to the AGM.

Publications

- Coordinate and act as editor for any publications that pertain to the goals and objectives of GEOEC.
- Attend the annual seminar for specialist council editors.
- Submit a report of publications activities to the AGM.

Conference Chair (2012)

- In consultation with the table officers, plan and carry out an annual conference program that is to be outlined in the fall and published at least two months prior to the conference.
- Keep a conference file. Pass this file on to the conference chair-elect.
- Attend annual seminar for conference directors of specialist councils.
- Submit an audited financial statement to the table officers

within two months following the conference. Present this statement to the executive board at the first fall meeting.

- Submit all financial records to Barnett House on or before June 30 for auditing.

Conference Chair-Elect (2013)

- Serve as a member of the conference steering committee in preparation for the following year.
- Assist the conference chair as required.

Note: It is not essential that this person attend executive meetings.

Community Liaison (two positions)

- This is a nonvoting, appointed position, created to facilitate sharing of experience and knowledge between community (nonformal) and school-based (formal) educators. It acknowledges the significant contribution of nonformal educators to global, environmental and outdoor education.

Your GEOEC Executive 2011/12



*(l-r) Christina Pickles, Robert Twerdoelib, Lara Fenton, Jessica Scalzo, Shashi Shergill, Erin Couillard, Sharon Vogrinetz, Peter Lenton, Karen Whitehead, Don McLaughlin, Chenoa Marcotte
Missing: Tanya Stogre, Rita Poruchny, Patricia Hamlin*

Articles and Features

Water Panel Discussion

Aminollah Sabzevari

On October 13, 2011, the University of Alberta hosted a youth forum entitled Water: A Global Crisis. Selected high school students across Canada and the United States chatted with each other through a video conference. I was part of an expert panel that guided the discussion and provided feedback on student comments. The other two panel members were Laura Rose, a PhD candidate in the Department of Biomedical Engineering, and Mohamed El Daly, a PhD candidate in the Department of Civil and Environmental Engineering.

Three main questions were debated and discussed:

1. What are the pressures on and threats to water availability and sustainability?
2. Is water a fundamental personal right or a basic economic good?
3. What, if any, responsibility do you as an individual and Canada as a country bear for the present state of the world's water crisis? What is your recommended course of action?

Question 1

The students identified population growth, agricultural processes, industrial expansion and increased urbanization as key strains on the world's fresh water supply. Directly relevant to the main industry in their hometown, students from Fort McMurray noted the large amount of water used in the extraction and processing of Alberta's oil sands. Students in Louisiana were particularly aware of potential water shortages because their city was facing a drought at that time and water conservation methods were in action. Students talked about the importance of water sustainability and discussed steps each person could take to conserve water.

Question 2

The majority of students thought that water should be a fundamental personal right, arguing that water is a necessity, not a luxury. One student noted that access to a bare minimum of clean water is required

to live a dignified life. Another student made a comment worthy of John Rawls, noting that "you do not get to choose where you are born or what economic class you are born into" and arguing that water was a basic human right that should be provided for all.

A minority of students argued that water should be viewed as a basic economic good. Some students compared it to oil and other natural resources that Canada sells to other countries. Others wondered what good having a right to water would be if a country did not have the resources to provide citizens with water. Several students saw water as a fundamental human right and a basic economic good. They argued that all people have a right to a basic amount of clean water. However, industry access to a large amount of water is an economic rather than human rights issue.

Question 3

Students argued that Canada has a duty to share its water with other

nations in need. Several students referred to the golden rule. If Canada were experiencing serious water shortages, we would want nations to help us. Students highlighted the difference between water for individual use and water for industrial use. They supported providing “water aid” to the former and selling to the latter.

Others thought that the current model of selling water was working well, and said that if Canada has a duty to provide water, this duty

extends only to Canadians. Both groups thought that Canada could help with the global water crisis in other ways; for example, by providing technical support for water treatment systems, dams and so on. The expert panel highlighted the possibility of Canada acting as a neutral arbitrator in the many water disputes that are currently brewing worldwide.

The students emphasized the importance of personal conservation of water, which is in

our own individual best interests and in the best interest of Canada. As the global water crisis threatens to worsen through the 21st century, the students agreed that it makes economic sense to develop conservative and sustainable water practices in Canada.

A short question-and-answer period followed the discussion. The video conference concluded with the promise of future youth forums and video conferences in other areas of interest.

The Making of a Movement: Youth Engagement and the Global Youth Assembly

Amy Lambe

Four hundred and forty-three million school days are lost around the world every year because of water-related illnesses. Making the link between access to water and water's impact on health and education is simple when we talk about the developing world. Making that same link here in North America is an entirely different matter, but a no less of an important one.

This past July 27–30, 300 youth, most from Canada, met at the University of Alberta for the John Humphrey Centre for Peace and

Human Rights' third biennial Ignite Change Now! Global Youth Assembly (GYA). The theme of the 2011 event was "Our World, Our Water," and as delegates explored the breadth of human impact on the world's water and examined strategies to value and protect this precious resource, they also learned, and were shocked, by the disparity of access to water in their own backyard.

The objective of the assembly was to create space where people and ideas are heard; where, in the company of similarly motivated

youth from all backgrounds, we can find our commonalities, break down barriers and start to think creatively about change. By framing issues of access to water, health, education and in the language of human rights and by linking the protection of our natural resources to our right to life, the John Humphrey Centre and the GYA look at social justice holistically.

Concerns about tailings ponds and oil spills are all too common issues for discussion, especially in Alberta, but what we don't hear about are the towns where "boil





water advisories,” designed to be temporary solutions to unsafe water, are permanent fixtures in citizens’ lives. What we don’t hear is that more than 100 Aboriginal communities in Canada have to boil their water and that eight in ten people living in rural communities lack access to clean water. This is the case for the small Lubicon Cree community of Little Buffalo, an hour northeast of Peace River where 225 people live without running water or sanitation system.

At the GYA, youth don’t just talk about problems—they explore the possibilities of solutions, action and creativity, and organizers were pleased to welcome two students from Little Buffalo, along with their

mentor, Jaro Malanowski, an Edmonton filmmaker, to the event. They spoke frankly about the experience of living dependent on an undependable water delivery system, about the cost to their education and what they decided to do about it.

As Amnesty International Canada launched its “Justice for the Lubicon Cree” campaign, a group of students decided to tell their story in a short documentary with the help of Jaro and his team from Avatar Media, who were in town delivering a video training workshop. Their film, *Our Water*, takes the viewer on a tour of Little Buffalo in the middle of winter. We see where they get water for their

everyday need, and we visit the school, which is the only building in the community with running water, supplied with less than pristine water by a truck that isn’t always on time. When there’s no water, the school is closed. More than 40 school days have recently been lost that way.

The film has now been seen by people worldwide, and the reaction is the same as that of the youth at the GYA, “That happens here?” It is vital that the voice of youth be heard, and that their concerns and ideas are given the attention they deserve. After all, they are the leaders, not only of tomorrow, but also of today. They are acting now to make a change in their community and they are being heard. The United Nations High Commissioner for Human Rights pointed to the Lubicon in her statement on the International Day of the World’s Indigenous Peoples.

By pushing the issue, making themselves heard and sharing their experience with their peers, these young people are agents of change in our province, and through the GYA they are propelling a movement of youth dedicated to engaged citizenship.

Amy Lambe is the Ignite Change Now! program coordinator at the John Humphrey Centre for Peace and Human Rights, in Edmonton, Alberta.

The History of What? Some Thoughts on Personal Habits and Global Citizenship

Karen Virag

This article first appeared in Just in Time, Spring 2005, Volume 3, Issue 2, a publication of the Alberta Teachers' Association.

Recently, some colleagues and I had a good chortle over an exhibit at the Calgary Science Centre entitled "Sitting Pretty: The History of the Toilet." However, when later doing some research on water usage in Canada, I realized that the Science Centre was actually engaging in an act of responsible citizenship with this quirkily named exhibit.

Per capita water use in Canada is 1,600 cubic metres per year, more than twice the rate in France and more than eight times the rate in Denmark (Boyd 2001). Of the 29 most water-hungry nations of the Organisation for Economic Co-operation and Development (OECD), Canada is second in per capita water consumption (the US is first). Since 1980, water use in Canada has increased by 25.7 per cent. Every day we heedless Canadians blithely take half-hour showers and flush away vast amounts of water without thinking once, let alone twice, about either

the provenance or the destination of all that water. This devil-may-care attitude is compounded by the fact that this throwaway society continues to invent more and more disposable items (check out the International Jock website for information on disposable underwear that "you simply wear and toss!"). In a dual-pronged assault against both the land and the air, the province of Ontario trucks 3.25 million tonnes of garbage to Michigan each year. Out of sight, out of mind. This is an especially prevalent attitude among urbanites, who now make up 82 per cent of Canada's population (United Nations 2005) and who tend to be disconnected from the ebb and flow of natural cycles. A disconnect from nature leads to disrespect for nature and a deplorable increase in ignorance (food comes from stores, doesn't it?). This lethal combination means that we degrade the environment, ruin the habitat of other species and befoul the very things that keep us alive: air and water. Therefore, although jokes about Thomas Crapper, royal sanitary engineer to Victorian royals, make us giggle, being aware

of how we use water is vital to the health of society and the planet, and practising water conservation is good global citizenship. If the flap of a butterfly's wings in Brazil might cause a tornado in Texas, imagine what the flushing of millions of toilets causes.

Eat Your Peas

But there is hope. You see, the toilet exhibition at the Calgary Science Centre was part of a youth program meant to complement the Grade 2 "Exploring Liquids" unit, the Grade 4 "Water and Our World" unit and the Grade 8 "Interaction and Environments" unit. This is a good start in getting our children to recognize that, like a stone dropping in water, every one of their actions causes a ripple. Children must learn that sensible environmental practices are vital to everyone's future. And to impart this message, we need to teach children both to think creatively and to consider themselves part of a greater whole. Sadly, in these days of assaults on the public good and the lionization of the free market as an impartial, Darwinist sorting

mechanism, it sometimes seems that we are teaching children to be docile and easily managed consumers rather than active and engaged citizens. In her 2001 Massey Lecture, Janice Gross Stein discusses how the word *efficiency*, be it in reference to health care or education, is used to mask the reality of many destructive practices (How could anyone be against efficiency? For that matter, how could anyone be against a free market?) and suggests that we have created a factory system of education, a stinging accusation that bears more than a little semblance of truth. Surely we can do better. At the risk of sounding like some dreamy-eyed flower child, a good starting point would be to teach our children that we have a mutual responsibility for each other. As Virag (2000) writes:

Do you remember when you were a kid and your mother told you to eat everything on your plate because there were starving children all over the world, and you were truly baffled about the connection between your leftover pork chop and some kid in Africa? Then, once you became an older and infinitely wise teenager, do you remember your clever rejoinder “Well, give me their address and I’ll mail it to them”? Oh, the callowness and shallowness of well-fed North American youth; oh, the wisdom of mothers who know that a fed child is a happy child, that there is an unconscionable gap between the haves and have nots in this world and that even the

simple act of cleaning off our plate symbolizes both a sense of responsibility for each other, no matter how distant, and a heightened consciousness of our own good fortune.

Nationality: Earthling

So what do we do? Instead of individual national passports, how about global passports that signify world citizenship? One’s country of birth is, after all, a matter of accident, not choice. On the other hand, choosing to be a citizen of the world implies a greater stake in the future of the planet and a realization of our interconnectedness. If we think of global citizenship as a matter of justice, both social and environmental, we can create curricula informed by this definition. The following list of skills for global citizenship, developed by Professors Julie Andrzejewski and John Alessio (1999) and colleagues at the St Cloud State University in Minnesota, is a good working guide for developing students’ global citizenship skills.

Skills for Teaching Students to Become Global Citizens

Understand a citizen’s responsibilities to others, to society and to the environment: To do this, students should be able to

- examine the meaning of democracy and citizenship from differing points of view;

- explore the rights and obligations that citizens may be said to have in their communities, nations and in the world;
- understand and reflect on their own lives, careers and interests in relation to participatory democracy, and the general welfare of the global society; and
- explore the relationship between global citizenship and responsibility to the environment.

Understand ethical behaviour in personal, professional and public life: To do this, students should be

- familiar with fundamental national and international laws, documents and legal issues pertaining to citizenship, democracy and human rights;
- able to identify the civic and ethical responsibilities of people in specific fields/careers;
- able to compare and evaluate the policies of an institution, community, state or nation in the context of its stated philosophical and cultural values;
- able to examine various social policies and institutions (educational, economic, political, legal, media, military, etc) in relation to fostering citizenship, democracy, respect for diversity, human rights and the impact on the environment; and
- aware of how their decisions and actions relate to and affect society and the environment.

Develop the knowledge and skills for involved responsible citizenship at the local, provincial, national and global level. To do this, students should

- have knowledge of an increasingly pluralistic world where the requirements of citizenship are open to important debates between citizens of different nationalities, races, colours, creeds, genders, religions, abilities and disabilities, and sexual orientations;
- research a variety of sources, identify underlying values and investigate the veracity of information;
- be able to identify and investigate problems, examine underlying assumptions, synthesize information, formulate solutions, identify constituencies, compose arguments and identify appropriate forums for taking actions;
- understand and practise such citizenship skills as self-empowerment/assertiveness, media analysis, letter writing, evaluation of candidates, lobbying, organizing and so on;
- be encouraged to participate in democracy by completing community service, citizen participation or a social action project.

Cool, Clear Water

So, back to that toilet display and its relationship to global citizenship.

In 2002, the United Nations declared that water is a human right, which committed the 145 countries that ratified the International Covenant on Economic, Social and Cultural Rights to ensuring fair access to safe drinking water. However, according to the World Health Organization, about 1.7 billion people have no access to clean water, and 2.3 billion people suffer from water-borne diseases each year. And, as with everything else, it seems, contentious issues of privatization have arisen, with companies vying to control water supply, especially in places where supply is limited. In many poor countries, private water companies install prepaid water meters and cut off service if citizens fall behind on their payments. And lest we think that water privatization issues affect only Third World countries, consider the many proposals over the years to sell water from Newfoundland's Gisborne Lake to the US, which could lead to large-scale water exporting under the terms of NAFTA. And in 1998, the California-based Sun Belt Water, Inc, proposed to ship water from British Columbia to international markets using supertankers. Eventually, the Canadian government revoked Sun Belt's licence and was sued for \$600 million. Despite all this, Canada, which has about 20 per cent of the world's fresh water, was the only country to vote against the UN resolution making water a human right (Barlow 2005).

Global citizens realize that we have to share and conserve. Children educated from a global citizenship perspective will ensure that we do.

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Watershed Management Planning in the North Saskatchewan River Basin

Melissa Logan and Billie Milholland

In Alberta, watershed management planning is a tool that emerged from the Alberta government's 2003 Water for Life strategy (www.waterforlife.alberta.ca). It is a method of assessing and managing human impact on the environment in a way that considers how interrelated human activities affect aquatic ecosystem health and function.

The North Saskatchewan River watershed in Alberta is a diverse landscape, with many different land uses and a variety of ecological regions. Over 1.2 million people live in this watershed, creating diverse challenges with respect to watershed management.

Because human impact on aquatic ecosystems originates from many activities in different jurisdictions,

a "shared governance" approach is used for watershed planning. In the North Saskatchewan River watershed in Alberta, shared governance involves discussion with municipalities, industry, community groups and individuals. These discussions are designed to provide opportunities for stakeholders to work together toward a common vision of watershed protection.

This common vision will be expressed as advice to the provincial government and other stakeholders in the form of a watershed management plan.

What goes into a watershed management plan is also guided by legislation; for example, the *Water Act*, the *Environmental Protection and Enhancement Act*, the *Fisheries Act* and the *Alberta Land Stewardship Act*.

Since its inception in 2000, the North Saskatchewan Watershed Alliance (NSWA) has completed a variety of

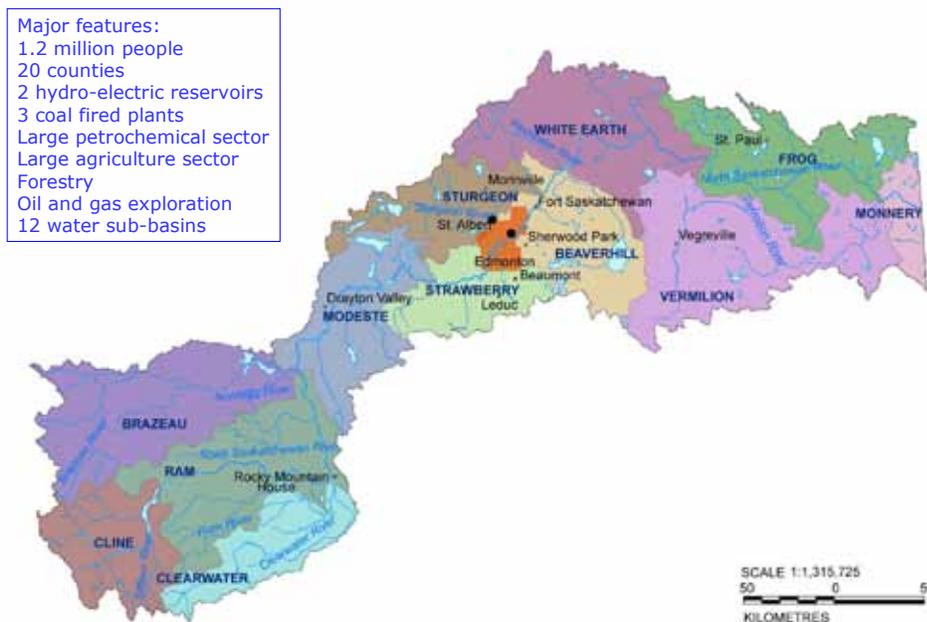


Figure 1: Subwatersheds of the North Saskatchewan River watershed, along with some of the major industrial features (NSWA 2010).

technical studies on the river and has dedicated countless hours to education and outreach aimed at industry, municipalities and the general public, trying to increase understanding of the importance of watershed management. In 2005, the NSWA developed terms of reference for an integrated watershed management plan for the river. Under *Water for Life*, the plan must balance environmental, social and economic needs of watershed

stakeholders, while at the same time provide strategies for sustainable use of land and water resources.

In 2010, the NSWA produced two documents, the Discussion Paper for the Development of an Integrated Watershed Management Plan for the North Saskatchewan River in Alberta (<http://nswa.ab.ca/iwmpdiscussion>) and the Integrated Watershed Management Plan Workbook Survey. The discussion paper outlines five overarching

watershed management goals, along with associated actions and directions. From late 2010 into the fall of 2011, the NSWA travelled extensively throughout the watershed, giving presentations, hosting workshops and attending tradeshow to spread the information in the discussion paper and encourage stakeholders to complete the workbook survey.

From this effort, the NSWA received over 100 detailed workbook responses from municipalities, special interest groups, industry associations and individuals.

The NSWA is now analyzing workbook responses and plans to have a draft Integrated Watershed Management Plan (IWMP) prepared by early 2012. Once the draft plan is complete, it will be submitted to all stakeholders for final comment.

The NSWA will support implementation of the IWMP by continuing to provide information, by completing further technical studies and by encouraging sub-watershed plan preparation. Recently the NSWA completed a State of the Watershed Report for Mayatan Lake and a subwatershed management plan is under development for the Vermilion River.

For further information on the NSWA or the IWMP, please see the NSWA website at www.nswa.ab.ca.

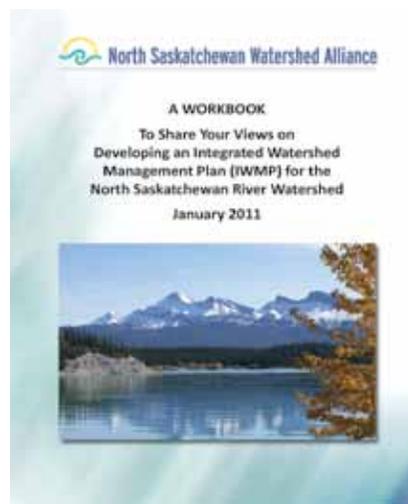
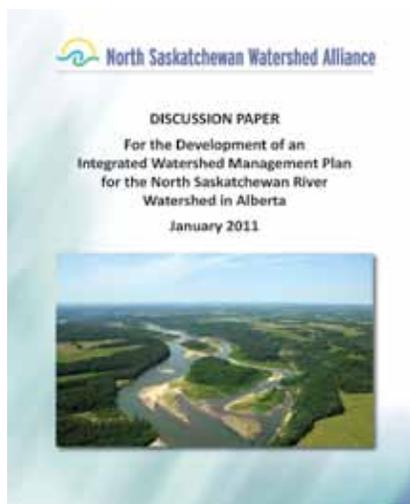


Figure 2: NSWA IWMP workbook and discussion paper documents (NSWA 2011).



Figure 3: Aerial photo of the North Saskatchewan River near Drayton Valley (www.nswa.ab.ca).

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Melissa Logan is basin planner and Billie Milholland is communications manager at the North Saskatchewan Watershed Alliance (NSWA).

Learning on the Water: My First Canoe Trip as an Outdoor Education Teacher

Leah Copeland

I never thought I would take an overnight field trip as a first-year teacher, but I did after I learned that the Physical Education 30 curriculum includes a two-day, one-night canoe trip. As I absorbed this knowledge I knew it would be both a lot of fun and a lot of work.

I spent many hours putting every detail in place because I was responsible for the students' safety and success. I drew heavily from what I learned at my university outdoor education class. By reflecting on the structure of my own personal trip, I modified those details to fit this canoe trip.

On reflection I now know that the wheel does not need to be reinvented. This lesson is true in all intimidating or challenging situations for first-year teachers. Ask questions, ask for help and

understand that this is not the first time the event has taken place.

People are willing to help if you are willing to ask.

As I planned I realized that every detail was critical for a successful trip. The things we take for granted every day are the important details we must share with students. To create a list, I went over what we would use on a typical day and what would be altered on the trip.

Through this process, I composed a list of basic yet necessary items; for example, toilet paper, water for drinking and for cleaning, and oven mitts. Making this list ensured that we were all prepared.

My personal activity gave me experience to help me plan this trip. Students can also benefit from experience-based learning settings and more responsibility.

For this first-year teacher, the trip was much like the water and the weather that we encountered—unknown. Yet, the unknown created memories that we hold today. We triumphed individually and as a group over the adversity and challenges that at first we doubted we could accomplish. Those accomplishments built the trust within the group that is critical to the success in learning for students, not only on the trip but also in the weeks and months ahead.

This experience was a journey for the students and the teacher. Witnessing how the students battled the elements and bravely they persevered made me proud.

Leah Copeland teaches Physical Education 30 at Lloydminster Comprehensive High School, Lloydminster, Alberta.

An Unlikely Partnership: Space Industry and the Water Crisis

A Summary of Tigris-Euphrates River Basin

Based on Tigris Euphrates and the Global Water Crisis by the H₂OPE from the Space Studies Program at the International Space University, Graz, Austria, 2011.

Laura Rose

Water is critical for the survival of all life on earth. Only 0.009 per cent of water on earth is fresh and accessible surface water for human use. In the classical water cycle, the sun evaporates surface water and sublimates ice and snow. Water vapour forms droplets, which fall back to earth as snow, rain or hail. Human activity, however, greatly affects the hydrological cycle and is frequently not considered in this classical model. Urbanization leads to increased water use, which stresses resources. Agriculture and industry both consume huge amounts of water and contribute major amounts of contaminants to the environment. Increased demand for water and decreased availability because of contamination result in serious health problems that put more pressure on already strained health care systems. Human activity can alter the water cycle and irreversibly change the local environment.

Without changes to the way we use water, the entire planet is at risk. River basins throughout the

world already show elements of these problems. The Tigris-Euphrates river basin in the Middle East spans Turkey, Syria and Iraq, and an escalation in the water crisis could further destabilize this volatile region. Water from mountains in east Turkey collects in the Tigris and Euphrates Rivers, which then flow through Syria. The rivers converge in Iraq before emptying into the Persian Gulf. Increased urbanization, agriculture and industrial activities increase the demand for water, while contaminants limit the available fresh water and force people to increasingly rely on groundwater.

Increasing populations add to the burden placed on fresh water sources, and without an accurate and convenient way to forecast future water needs, water-management systems will be unable to cope with demand. Agriculture and industrial activities together account for about 90 per cent of fresh water use. Inefficient irrigation practices use up large amounts of readily available surface water and cause farmers to use more

groundwater, which is rapidly being depleted. Furthermore, agricultural runoff contains high levels of contaminants such as nitrogen and phosphate, which concentrate in groundwater. Industrial practices do not consume as much water as agriculture but pollute groundwater with oils, heavy metals, organic pollutants, solvents and others. In addition to chemical contaminants, diarrheal disease and parasitic infections are a serious public health concern for this region.

The space industry can offer unique solutions to many of the problems encountered not only in the Tigris-Euphrates, but other water basins throughout the world. There are a number of space assets already in place that can monitor water use and availability. Urbanization can be monitored with remote sensing satellites, allowing city officials and urban planners to predict future water use. Cities, and paved areas in particular, absorb more near-infrared (NIR) radiation, whereas plants reflect the majority of NIR wavelengths. Based on this

property, a normalized difference vegetation index (NDVI) can be used to determine land use. Water levels in reservoirs and lakes can be monitored remotely to estimate use and ensure that sufficient water is stored in dams for future use.

Agriculture, which uses the largest amount of water, must become more efficient. Monitoring plant stress and irrigating only when necessary can prevent overwatering. Similar to monitoring urbanization with NDVI, healthy plants reflect more NIR than stressed plants, which is currently monitored by remote sensing satellites. Similarly, soil moisture and precipitation can be measured by microwave sensors to more accurately forecast floods and droughts.

Spinoff technologies from space allow easy detection and removal of contaminants. Testing is necessary to prevent humans from drinking contaminated water and to efficiently mobilize supplies when contamination is detected. Real-time data collection at multiple sites can be time-consuming and expensive using conventional on-the-ground approaches. The Water Canary uses space technology to inexpensively collect and transmit GPS-tagged

data and aids in the detection and location of specific contaminants; this information is then transmitted to a central location. Human space flight on the International Space Station (ISS) required the development of water purification systems, which have now been modified for use on earth. Spinoff technology including the Discovery System, Vortex Voyager and NASA's Seldon WaterStick are used in many countries. The Discovery System, which requires no electricity, is already in place in Iraq.

The water crisis must also involve water-management strategies for the entire basin. Water does not recognize international boundaries, and as such, it is imperative for countries to cooperate for effective water management. One difficulty in the Tigris-Euphrates river basin is the lack of agreement among the three countries in this region on crucial water cycle and use. To develop a regional strategy instead of individual national strategies for the Tigris-Euphrates, enhanced data sharing and communication among the three countries is imperative. Space can offer a unique perspective on international relations—despite a frosty political relationship, the US

and USSR were able to cooperate on space technology and science. Exchange of satellite weather and geomagnetic data encouraged an increasingly warm rapport, and led to partnership and the historic space handshake between the two previously competitive countries. An international water station is proposed for the space station to provide a forum for water scientists in each of the countries to share data on developing a regional water model using downlink stations and a Geographic Information System (GIS). Finally, a physical building would be constructed at the nexus of the three countries. This centre would formally act as a monitoring station, which is appropriate given its location in the middle of the Tigris River. Informally, however, it would provide a location for coordinated water management for long-term sustainability. Such space-based solutions provide a solid foundation to provide effective means to ameliorate the water crisis not only in the Tigris-Euphrates region, but in river basins throughout the world.

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A While in the Wild: How a Place-Based Environmental Program with Extended Outdoor Experiences Influences Kindergarten Students' Empathy Toward the Environment

Jonas A Cox, Charles V Salina and Fay C Mascher

Abstract

When an environmental initiative at an elementary school appeared to fall short of its specific vision to shape students toward lifelong leadership in environmental stewardship, a plan was developed to explore how a place-based environmental program with extended outdoor experiences would influence kindergarten students' empathy toward the environment. Research focused on experiential learning of environmental curriculum aligned with district standards. Results indicated that five- and six-year-old students showed an expanding awareness of the natural environment as well as increased empathy and respect for the natural world around them.

On a visit to the coulee, a startled owl exploded off of a

nest that we thought was empty. On the bus ride back to school, one boy reached for my hand, "Feel my heart," he said. "It's still going really fast."

—From the Coulee School action research project

In spring of 2005, the people of Coulee School* formed a vision. Situated in a rural hamlet about one hour south of Calgary, Alberta, the teachers, parents, community members and students of this small school (150 students in kindergarten to Grade 8) met with the Stewardship Centre of Canada to explore what their school could do to foster care of the natural environment.

The Youth Environmental Stewardship Program (YES) came into being and sparked much activity at Coulee School. The school installed 10 photovoltaic units and

a small wind turbine to provide three kilowatts of power to the grid. Students and staff instituted a thorough recycling program. An environment club formed and began to meet weekly. Classroom instruction began to pursue cross-curricular inquiry into many environmental issues. Recognized in the media and given multiple awards for environmental projects, Coulee School has laid strong groundwork for meeting the goals of the YES project.

However, in a meeting of YES stakeholders in the fall of 2007, consensus emerged that the specific vision of the program—shaping students toward lifelong leadership in environmental stewardship—was not being realized. Students did not display a general ethic of stewardship, nor were they eager to fill leadership roles in the YES program (SWOT analysis, 2007).

Thorough environmental instruction combined with exciting schoolwide environmental projects had failed to translate into genuine environmental stewardship.

Fay Mascher, a kindergarten teacher at Coulee School and a candidate for a master's in education at Gonzaga University began looking for educational approaches that would translate into genuine environmental stewardship. A review of the literature inspired her to design lessons that often took the children outside into nearby natural environments, allowing them to come to know—and perhaps bond with—a particular place in nature. She collaborated with Gonzaga professors Jonas Cox and Charles Salina to undertake a research project. The project sought to understand how the incorporation of a place-based environmental program with extended outdoor experiences influences kindergarten students' awareness of and empathy toward the environment.

Review of Literature

Since the 1980s, researchers in the field of environmental education have been exploring this basic question: Why do some people care about the natural environment and take action to protect it, while others do not? Tanner (1980) read the biographies of conservationists looking for patterns in their early experiences that might explain their lifelong care of the environment. In these biographies, and in a subsequent survey, he discovered that conservationists consistently

report having spent a significant amount of time as children in wild or semi-wild places.

Subsequent studies (Peterson 1982; Palmer 1993; Chawla 1998; Wells and Lekies 2006) had similar findings: time spent in wild or “domesticated” nature correlates significantly with subsequent environmentally responsible behaviour. Wells and Lekies (2006) investigated the optimal age for these experiences and concluded that, “participation with ‘wild’ nature before age 11 is a particularly potent pathway toward shaping both environmental attitudes and behaviours in adulthood” (p 13).

Many of these studies discovered that when these nature experiences are shared with an important adult—a family member or a teacher—positive environmental behaviours are formed (Sivek 2002). During shared experiences in nature, a child becomes aware of the environment by attending to the bird, leaf or rock that has captured the attention of the adult companion. Chawla (2006) calls this the power of joint attention. The child turns his or her attention to things pointed out by an adult, and then begins to do the same, pointing at things and calling out their names. An adult noticing nature helps a child take the first steps toward becoming environmentally aware (Chawla 2006).

Shared adult/child experiences in wild nature moves a child into a process by which stewardship behaviour develops. The stages of that development can be compared with the evolution of a loving

relationship between two people. In both cases there is a five-step process: awareness, knowledge gathering, coming to appreciate, coming to love and acting to protect.

Once the child has become aware of the natural environment, through the power of joint attention, she begins to gain knowledge about nature by interacting with it, by experimenting first-hand (Lindemann-Matthies 2005; Cornell 1979). The theory of ecological psychology (Jones 2003; Chawla 2006) describes how the natural world provides opportunities for interactive learning. For example, a low tree branch allows a child to climb; rough ground affords the opportunity to establish balance. Nature offers a rich environment for these interactions and provides immediate and often powerful feedback to all the senses. Free play in nature, then, begins a relationship between the child and the natural world (Cornell 1979).

Environmental education in the schools provides knowledge building activities. Students learn facts about the local environment from books and teachers. The more this learning serves to explain, support and deepen the students' hands-on outdoor experiences, the more meaningful it is to students (Lindemann-Matthies 2005; Sobel 2004).

The more children learn about a place, the more they appreciate it (Lindemann-Matthies 2005). Going forward, they maintain interest in it and show simple, environmentally responsible behaviour when they are there. Lindemann and Matthies

(2005) found that the more plants and animals children could identify in the field, the more appreciation they would show for all kinds of plants and animals. Increased knowledge of nature leads to increased appreciation of nature. Increased appreciation sparks more frequent visits to the natural world and increases the length of each visit (Kals, Shumacher and Montada 1999).

Appreciation deepens to a feeling of love as the child begins to identify and empathize with the natural world (Basile and White 2000). Once that attachment is formed, the child consistently exhibits environmentally responsible behaviour in that place (Vaske and Kobrin 2001). Attachment to one special place will often generalize to changed behaviour in other settings (Basile and White 2000; Vaske and Kobrin 2001).

Unfortunately, most children today have little, if any, experience in wild nature, with or without a significant adult. In his 15 years of interviewing families across the United States, Louv (2006, 54) found:

With few exceptions, even in rural areas, parents say the same thing: Most children aren't playing outside anymore, not in the woods or fields or canyons. A fifth-grader in San Diego described his world succinctly: "I like to play indoors better 'cause that's where all the electrical outlets are."

As outdoor experience becomes less common, environmental education gains importance. It is here that children can be

reconnected with "the restorative, challenging, primal qualities of nature" (Louv p 54) and guided through hands-on, personally meaningful activities that construct an empathetic knowledge of the natural world.

Effective Environmental Education

Experiences in wild nature shared with an important adult are vital components of successful environmental education. Further studies insist, however, that they are not the only considerations when designing experiences aimed at forming an ethic of stewardship.

Effective environmental education programs share several common features. They are experiential and personally meaningful (Chawla 2006; Wilson 1996; Sobel 2004). They are developmentally appropriate (Sobel 1996; Wilson 1996). They provide opportunity both for deeper understanding and for the application of new insights (Bogeholz 2006; Hungerford and Volk 1990; Coyle 2004).

Experiential and Personally Meaningful

John Dewey, in 1891, articulated the importance of building connections between school and personal life:

From the standpoint of the child, the great waste in the school comes from his inability to utilize

the experiences he gets outside the school in any complete and free way within the school itself; while, on the other hand, he is unable to apply in daily life what he is learning at school. That is the isolation of the school, its isolation from life. (cited in Smith 2002, 586)

Duffin (2004) and Gostev and Weiss (2007) show that environmental education programs that succeed in increasing environmentally responsible behaviour provide students with hands-on learning and abundant opportunities to make personal connections.

Developmentally Appropriate

Research investigating children's relationship with the natural world shows three clear stages of development (Sobel 1996). From age four to six a child connects with the immediate world through his empathy for living things, particularly animals. From age seven to eleven the child's desire to explore becomes stronger—exploration activities become appropriate. It is not until the age of twelve that students typically can begin to deal with tragedies, so at this age social action can become a focus.

Environmental education that is developmentally insensitive can do more harm than good. Sobel (1996) especially cautions against introducing ecological problems to a child who has not developed the power of abstract thinking. Such

premature calls to action will distance the child from the natural environment.

Developmentally appropriate curriculum, on the other hand, nurtures a strong connection to the natural environment in stages. First a child connects with her immediate environment, then to an expanding local landscape, and finally to the global environment. Formed in those experiences, she takes action when she is ready (Wilson 1996; Smith 2002; Gruenewald 2003).

Building Deeper Understanding

Environmental education explores situations where the “correct” answer can be ambiguous. Students become equipped to respond to such complexity when, in the context of nature, they are coached through a process of assessment and judgment (Bogeholz 2006). Educators begin by teaching knowledge variables. Students are given increasing ownership of the problem as they become capable of action (Hungerford and Volk 1990; Coyle 2004). Students feel empowered and confident as they apply knowledge to action. Students who have been coached in this way—prepared to think critically when faced with complex problems—are more likely to exhibit complex, environmentally responsible behaviour (Hungerford and Volk 1990; Coyle 2004).

Coulee School-Demographics

Armed with research and eager to realize Coulee School’s vision to foster environmental stewardship, Mascher, with the collaboration of Salina, Cox and others, designed a five-month environmental experience for the kindergarten class as part of her master’s thesis. From October 2007 to March 2008 14 five- and six-year-olds (8 boys and 6 girls) of mixed socioeconomic circumstances and academic and social ability participated in a place-based environmental education model aimed at building environmental empathy and responsibility.

Methodology

The literature points out several precursors to environmentally responsible behaviour. Three instruments were designed incorporating those precursors as they would be expressed by young children.

An attitude questionnaire probed for changes in attitude toward the natural world. A student who expressed concern for animals and plants and who reported that they participated in dramatic play with animal games was seen as expressing empathy with the natural world. A student showed emotional affinity with nature if they expressed a love of nature, or reported feelings of freedom in nature, feelings of safety in nature, and feelings of oneness with nature. Students answered questionnaire items with yes or no,

and were then given an opportunity to explain why or why not.

A 16-item animal identification test measured student knowledge of native animal species. Students were shown a picture of a local animal and asked to name it.

Finally, interest in the natural world was measured in a three-question interest interview where the child was asked what he or she is interested in learning more about, and why, and to describe a favourite place and a favourite activity. The interviewer looked for common or changing themes in the responses.

Data was also collected through a community mapping activity before and after the intervention. Students were instructed to draw a map showing special places that they could go to around the school. When the maps were finished, students participated in a semiformal interview with the teacher where they were asked to identify all the features on their map. Maps and interview transcripts were analyzed for a number of natural and non-natural features identified, and the geographic range covered by the maps.

Data Collection and Analysis

The study looked for changes in knowledge, interest and attitude toward the environment over time. Data was collected using the attitude questionnaire, animal identification test, interest interview and community mapping instruments before and after intervention.

Quantitative data was collected from the animal identification test, attitude questionnaire and community mapping, and was analyzed through descriptive statistics to determine if a change did in fact occur. Open-ended questions from the attitude questionnaire, and qualitative information from the interest interview, were analyzed for common themes. Those themes were then analyzed to determine if there were any patterns to the responses.

Group data was analyzed to determine if change did in fact occur and to describe the characteristics of that group change. Data from a low, mid and high student was then extracted and analyzed in relation to the class average to determine whether the effect was more or less significant for low, mid and high students.

Because research emphasizes the powerful outcomes of time spent in wild nature with an important adult, our program design involved frequent outdoor experiences led by the kindergarten teacher. There were two components to the outdoor experience. The class frequently visited and explored natural environments within walking distance of the school. We also designated a more distant, wilder location (15 minutes away by bus) as Our Special Place and visited it several times throughout the duration of the project.

Outdoor experiences in the surrounding environment happened daily. They were initially scheduled into a block of time each day to create a habit of outdoor learning

time. As outdoor time became entrenched in the day, access to the outdoors became more spontaneous and flexible.

Planned outdoor activities were drawn from resources, such as *Five Minute Field Trips: Teaching About Nature in Your Schoolyard* (Thomson and Arledge 2002); *Sharing Nature with Children* (Cornell 1979); *Place-Based Education* (Sobel 2004). Planning was informed by Wilson's (1986) guidelines: begin with simple experiences, provide frequent positive outdoor experiences and focus on experiencing versus teaching.

The schoolyard at Coulee School offered many rich opportunities. Off the gravel of the play structure, there is a terraced, bushy memorial garden, big poplar trees, long grass and ready access to fields. A 15-minute walk north of the schoolyard offers a hay field and slough. Activities in the schoolyard and at the slough were planned with "wildness in mind" in order to maximize the positive influence of wild nature mentioned in the literature. Over the course of the five-month study, a new subdivision being built north of Coulee expanded toward the slough and blocked the walking path for two weeks. The new construction presented an unexpected opportunity for conversation and questions.

Remembering the role of a significant adult in shaping environmental responsibility, we carefully considered the teacher's contribution to the children's experience. The teacher

enthusiastically supported the children's budding sensitivity for wild places, demonstrating personal interest and enjoyment, and modelling care and respect for the natural environment (Wilson 1986; Sivek 2002)]. In order to broaden the network of important adults, parents and other community members were invited to join as assistants and fellow nature-learners (Kals, Shumacher and Montada 1999; Chawla 2006).

Five times over the course of the project the class visited Our Special Place, an intact buffalo jump surrounded by native grassland called "Women's Coulee." We timed our visits so that students could experience the coulee across the seasons: late fall, winter and spring. Our activities at the coulee mirrored our daily outdoor activities within Coulee; however, the trips to the coulee were far richer and more spontaneous because of its diversity and wildness. On one trip the students were able to study large, perfectly formed snowflakes that covered the ground. On another the group startled a female great horned owl from a nest that we had assumed to be empty. One boy said to his teacher on the bus ride back to school, "Feel my heart. It's still going really fast." On a return trip, with binoculars to study the owl, the students found prairie crocuses blooming.

We made changes within the classroom to support our outdoor experiences. Curricular instruction integrated environmental themes. Because we were employing a place-based education model, we were

eager to allow our curricular decisions to evolve with the place, interests and growing knowledge of the students.

The program was aligned with the requirements of the Alberta Education curriculum for kindergarten. The provincially mandated program objectives were reviewed before implementation and categorized on a scale of one to three according to projected ease of integration. The teacher kept a journal to record the process of integrating objectives, as this was one of the major implementation concerns for teachers of place-based education (Smith 2002).

The space and routines in the classroom were also redesigned to support the children's outdoor experiences. Following their explorations, students came into the classroom to record their observations and research their questions. Reference books were readily available. Art materials were on hand to encourage students to represent their nature discoveries with their own hands and in various media. Nature journalling became a regular part of the experience as it "is hands-on learning at its best" (Leslie 1996, 37).

The room decorations reflected a focus on our natural place and nurtured the natural human penchant for displaying nature in homes and interior spaces (Flannery 2005). Natural materials were used as much as possible. Students were given an opportunity to share nature treasures on a well-lit discovery table at their viewing height.

Outcomes

The five-month place-based environmental education trial in the kindergarten class at Coulee School yielded a number of powerful results. Quantitative and qualitative data indicate that the implementation resulted in student growth in knowledge, interest and attitude toward the natural environment.

Asked to identify the photographs of 16 local native animals in a pretest and post-test, the group increased their correct answers by 32 per cent. This increase in animal knowledge is a very powerful first step especially in the light of the work of Lindemann-Matthies (2005) who found that the more plants and animals children could identify in the field, the more appreciation they would show for all kinds of plants and animals.

An attitude questionnaire, administered as a pretest and post-test, measured the students' empathy and emotional affinity with the natural world—their concern for animals and plants, participation in animal make-believe, love of nature, feelings of freedom in nature, feelings of safety in nature and feelings of oneness with nature. A response of "no" to the question: Is it a good idea to pick wildflowers? was marked "positive" because it showed empathy for and an emotional affinity with nature. Positive student responses on the attitude questionnaire increased 23 per cent on the post-test.

When students were invited to explain why and why not on their

answers to the post-test attitude survey, an interesting change emerged. Many students took longer to answer the questions than they had on the pretest, now having to sort out an issue that was no longer obvious to them. For example, on the pretest many students quickly and confidently stated that the spider should not be put outside, but should be killed. On the post-test students talked about the fact that spiders might bite or make a mess with their webs, explained methods for picking the spider up and considered carefully before giving their response. Some students felt the need to explain behaviours that they now felt were inconsistent with what we had been learning. When asked if it was a good idea to pick wild flowers, some explained that they did pick wild flowers, but only in places where there were lots of flowers.

For both pre- and post-tests, students drew a map showing special places that they could go to around the school. Pre-test maps showed a fairly equal representation of natural and man-made features. On the post-test, however, 83 per cent of the features drawn on the post-test maps were natural. There were no animal drawings in the pretest maps, but animal drawings were included in almost all of the post-test maps. The scope of the maps also expanded. Pretest maps were almost all restricted to the boundaries of the schoolyard. The post-test maps showed a much wider geographic scope, indicating a broadening view of the world around the school and an expanding

awareness that other creatures live in the places close to us.

Conclusion

The environmental education trial at Coulee School kindergarten allowed us to study how extended outdoor experiences within a place-based environmental program can influence awareness of and empathy toward the environment. Throughout the project we observed students exhibiting a genuine, excited sense of connection to the natural world and an eagerness to learn more. These are important first steps toward realizing the vision for Coulee School—developing leaders in environmental stewardship.

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Jonas Cox began his teaching career in a small school in the Willamette Valley in Northwest Oregon. He received his doctorate in 1997 from the University of Iowa, where he studied the development of time concepts in school-aged children. He has been on the faculty of Gonzaga University School of Education for the past

decade. He has served actively in the Environmental Education Association of Washington and has collaborated with students and colleagues to publish several articles exploring new approaches to environmental education.

Charles Salina was an elementary and high school principal for 21 years before joining Gonzaga University in 2005 to serve as director of the Master of Leadership and Administration program. Currently on special assignment, he spearheads a federally funded School Improvement Grant by serving as turnaround principal at Sunnyside High School, in Washington State. Salina's expertise includes implementing the school improvement process, establishing learning communities, and developing the capacity of informal and formal leaders.

Fay Mascher began her teaching career with a variety of special education

teaching positions in British Columbia and Alberta. In 1992 she settled in High River and soon thereafter began her work at Cayley School, where her focus has been on primary education. In addition to her keen interest in environmental education, Fay was instrumental in founding the Cayley School strings program, which now delivers violin instruction to students from kindergarten to Grade 5.

*An earlier version of this article was published in the Clearing Magazine, 2010 Compendium Issue, pp 35–39 (www.clearingmagazine.org). This article was previously published in *Early Childhood Education*, Volume 39, Number 2. Minor changes have been made to spelling and punctuation in accordance with ATA style.*

**For the purpose of this article, the school has been given a fictitious name.*

A Canoe in Singing Waters

Elizabeth Grossman

Not long ago, it seemed all wild streams would soon be dammed. Now, instead of mourning the death of America's free-flowing rivers, communities are celebrating the resurrection of trout streams, canyons, rapids and riffles.

Wisconsin sits right in the middle of the continent, but it is also an intensely watery place, with over 40,000 miles of creeks, streams, rivers, lakes and water passages called flowages. When European Americans settled Wisconsin in the 19th century, they put these waterways to work, and the state now has about 3,800 dams.

But "Wisconsin's dams are showing their age," says Helen Sarakinos of the River Alliance of Wisconsin. "There are more and more dams that people cannot afford to repair and maintain. It's a growing infrastructure crisis," she explains. So dams in Wisconsin have been coming down.

Wisconsin is not alone. As former Secretary of the Interior Bruce Babbitt observed, "We have been building, on average, one dam a day, every day since the Declaration of Independence." There are over 75,000 dams on the Army Corps of Engineers, National Inventory of Dams, which includes only dams over six feet tall. But the nation's dam building peaked in the 1970s, and since 1998, according

to the World Commission on Dams, the rate of decommissioning dams in the United States has overtaken the rate of construction. With 108 dams removed since 1955, 57 of those since 1990, Wisconsin leads the nation in dam removal.

Curious to see some of this activity, I visited Wisconsin in July 2000 and canoed stretches of two rivers that were flowing freely for the first time in over a century. One of them, the Baraboo River, flows through glacier-carved hills in south central Wisconsin. Dam building began on the Baraboo in the 1830s, and 11 dams once blocked the river's mainstem. In 2000, just two dams remained. Today there are none. All 120 miles of the Baraboo's mainstem and 350 to 400 miles of tributary streams are now open to migratory fish and other aquatic species.

My guide to the Baraboo was John Exo, natural resource educator with the University of Wisconsin Extension Service. Along with a group gathered for a river awareness event, we paddled part of the river freed by that winter's removal of the nearly 160-year-old Oak Street Dam in the city of Baraboo. The new current pushed at our boats. Rocks once submerged by the dam's impoundment had surfaced and vegetation was beginning to cover the newly exposed riverbanks. The

Baraboo was again a river and not a "lake," as people often call the slack water behind a dam.

"There's a growing culture of people who make it a regular part of their lives to get on the river," Exo says. Several new businesses catering to paddlers and anglers have opened locally and are succeeding beyond their initial expectations.

The sediment that had accumulated behind the Baraboo dams—all removed between 1998 and 2001 because repair and maintenance were not cost-effective—is now washing away, uncovering the naturally rocky river bottom. With the river flowing freely, water quality has improved dramatically. No longer slowed in impoundments, the river is becoming hospitable habitat for aquatic insects like caddis flies and mayflies that feed an increasing number and diversity of native fish. Before dam removal, fish that tolerated sluggish and poor quality water, like carp and bullhead, dominated in the Baraboo. Species that need cooler, swifter water—small-mouth bass, walleye and a growing number of lake sturgeon—are now taking their place, a change appreciated by local anglers.

In July 2000, I also canoed part of the Prairie River freed 10 months before by removal of the Ward Paper Mill Dam in the central Wisconsin

city of Merrill. The river had been dammed since the early days of Wisconsin statehood to power sawmills and later a paper mill. The last mill had closed, and its dam, cracked and no longer properly licensed, was rated a “high hazard” by the Federal Energy Regulatory Commission. The owner, International Paper, wanted to sell the property but could not find a new owner willing to assume responsibility for the repair. Removal was clearly the practical course of action. But Merrill’s residents, particularly those with waterfront homes, were devoted to the mill pond and fiercely opposed to removal of the dam.

The Prairie River, known for its trout fishing, now flows entirely undammed. Paddling, we saw great blue herons, kingfishers, a harrier, a horned owl and a bald eagle. With the dam gone, there is now plentiful food for fish-eating birds. The freshly exposed riverfront had been seeded with rye grass and was beginning to green up. Wildflowers, rushes and sedges lined the banks under a canopy of oak, birch, hemlock, pine and ash.

When I asked Helen Sarakinos how Merrill’s stretch of the Prairie River was doing now, she sent me an article from a local paper describing the planned 99-acre riverfront park devoted to “low-impact, silent sport recreation.” There will be fishing piers, trails, canoe landings and an outdoor education centre. With state grant money, the Wisconsin Department of Natural Resources recently completed restoration work here to improve trout and wetland habitat. Community opposition to the removal has turned to support.

“It was a matter of getting the visual imagery,” says Dan Wendorf, of the Merrill Parks and Recreation Department, who helped build support for the project by going house to house showing homeowners sketches of the new park.

Given the community’s initial negative response to the dam’s removal, this turnaround is remarkable. “If this one can wind up with a happy ending, any one can,” says Sarakinos, alluding to the contentiousness most dam removal efforts provoke.

Dam removal contradicts many Americans’ notions of progress. From colonial days on, dams have facilitated the growth of industry, agriculture, commerce and settlement. Questioning the value of a dam means readjusting our notion of progress. It also means relearning what a river is and how to live with one not controlled by locks and reservoirs.

“It’s a great leap of faith to go from open water lake to stream, and people tend to like the status quo,” says Meg Galloway, state dam safety engineer with Wisconsin’s Department of Natural Resources.

As communities in Wisconsin have discovered, maintaining and operating an older dam and bringing it up to current safety and environmental standards often costs more than the revenue yielded by its hydropower. Similarly, all across the country, communities are identifying marginal dams and questioning the relicensing of dams whose environmental and social impacts are too costly.

There is no official government tally of dam removals, but the

nonprofit organization American Rivers reports close to 500 dams removed in the US since 1912—over half of them in the last 20 years. As of January 2000, dams had been removed or removals planned in over 40 states and the District of Columbia. After Wisconsin, the most dams have been removed in Pennsylvania, California and Ohio.

“Dam removal is still controversial at the community level” even in Wisconsin, cautions Meg Galloway. Public safety and economics, not environmental activism, are the primary reasons so many Wisconsin dams are coming down, she notes, and there’s more funding for removing dams that threaten public safety than for dam repair. In what Helen Sarakinos calls “a novel and encouraging sign,” some Wisconsin communities are assessing their dams proactively, considering their options before removal becomes urgent.

“These are wise economic decisions that generate benefits for the river and the community,” says Sarakinos. In her experience, once a dam is out and people start reconnecting with the river, the community begins to take pride in the resulting environmental good. Merrill, where opposition to dam removal was nearly unanimous, is a perfect example. With a restored trout stream, bird-rich wetlands and a new park in the works, Dan Wendorf calls the results “a wonderful opportunity.”

“One of the things we’ve learned,” says Sarakinos, “is that this is about people. And you can’t shortcut that process.”

Dam removal alone cannot solve all of a river's problems, but it's an important step in the ongoing process of river restoration. Where dams have come out, rivers' natural conditions have begun to return. As communities in every region of the country can learn from those in Wisconsin, while these changes may be daunting—even scary—to contemplate, they can also bring unanticipated benefits.

Home from Wisconsin, I reread the "Wisconsin" section of Aldo

Leopold's *A Sand County Almanac*: "It ... seems likely that the remaining canoe-water on the Flambeau, as well as every other stretch of wild river in the state, will ultimately be harnessed for power," wrote Leopold in the mid-1940s. "Perhaps our grandsons, having never seen a wild river, will never miss the chance to set a canoe in singing waters." Wouldn't Leopold be gratified to know that some of these rivers are now being set free?

Elizabeth Grossman is the author of Watershed: The Undamming of America and Adventuring Along the Lewis and Clark Trail, and coeditor of Shadow Cat: Encountering the American Mountain Lion. She lives a minute's walk from the Willamette River in Portland, Oregon.

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Water Warrior

Kim Green



Award-winning professor David Schindler speaks his mind on the imminent danger to our world's fresh water supply.

U of A biological sciences professor David Schindler has experienced something of a personal loss that is probably at least in part attributable to global warming. While living in Manitoba he kept and raced over 100 sled dogs, and still had around 70 when he came to Alberta. But he's now down to only 18—including a couple that are rather long in the tooth. He and his wife take the dogs for runs but no longer race them because the race circuit that used to provide enough prize money to at least break even on the animals' food costs has all but disappeared.

"There's often just not enough snow," he says. "You can't be transporting your dogs and sled

a race site only to find out there's no snow to race on. So as a result there are fewer races and less prize money while costs have increased."

Schindler is something of a campus and, indeed, world superstar in his field. The awards that have come his way over the years (after getting his PhD from Oxford where he studied as a Rhodes Scholar) include the Volvo International Environment Prize (1998), the Gerhard Herzberg Gold Medal for Science and Engineering (2001)—that came with \$1 million in research funding and is considered the highest honour for Canadian researchers—the Killam Prize (2003), Officer of the Order of Canada (2004), and being named a Fellow of the Royal Societies of Canada (1983) and London (2001) as well as winning the \$150,000 Stockholm Water Prize (1991), which is the water sciences equivalent to the Nobel Prize.

The Stockholm prize was awarded primarily for his research at the Freshwater Institute in Winnipeg, where he worked for 22 years co-ordinating the Experimental Lakes Project (ELA) in northern Ontario that demonstrated how acid rain, phosphates, flooding from hydroelectric dams and climatic warming all combined in a lethal cocktail that certainly altered and

could also destroy life in freshwater lakes.

The research conducted by the ELA was instrumental in getting legislation passed in North America that banned phosphate-based detergents and helped curb sulphur-spewing industrial developments.

But that was just one battle in an ongoing environmental war taking place around the world. In Alberta that pits big oil, urban sprawl, massive increases in agricultural intensity and the spread of livestock "factories" against the limited water supply we all depend on for our survival.

"It amazes me," says Schindler, "that there are people who still think that the glaciers that are at the headwaters of all the major rivers in this province don't provide any discernible flow quotient to the rivers. It's clear that about 15 per cent of the water in the rivers is coming from these glaciers, and they've all experienced significant decline in recent history, some of them retreating up the mountainsides by almost two kilometres during the last century.

"We also think that the 20th century has been normal in the province in terms of our precipitation patterns. But nothing could be farther from the truth. It's been unusually moist and stable compared to previous centuries and

we could be facing a drought in the future that will make the one we experienced in the so-called Dirty 30s look pale by comparison. I think sometime, probably in the next quarter century, we are going to find ourselves in a several-year drought and then we're going to know what water scarcity is all about."

Schindler's clearly not one to mince words, and his strong opinions have often placed him at loggerheads with government officials and university administrators. "I've got over 100 awards to my credit," he says, "and probably just as many reprimands."

That's not surprising for a scientist who almost a decade ago said: "Freshwater supplies will be the first global resource to reach crisis proportions under climate warming. In Canada, the direct and indirect effects of climate warming will be increased acidification, decreased fish production, more difficulty in navigation, increased exposure of aquatic organisms to ultraviolet radiation, biodiversity losses, water shortages for agriculture and increased concentrations of toxic wastes. There will also be amplified pressure to divert Canadian water to populous areas of the US. Water will precipitate a global crisis."

Here in the province where the ex-pat American from Minnesota has made his home, taking on citizenship in 1992—"I kind of consider myself an ecological refugee"—he says his major concern right now is "water quality and quantity in the western prairies. Every time I think about it I get a

knot in my stomach. I keep warning people here in Canada not to take for granted the relatively pristine lakes and streams, the wildlife in the forest and the fresh air because they sure don't have any more of it where I come from.

"With water in particular, we have to get people back in touch with where it comes from. There are a lot of people who believe that water comes from taps. Period. Just like steaks come from Safeway; people are really alienated from the countryside where water is produced and cleaned. This is true for many aspects of nature and it is tragic. Taking this down to the municipal level, much of the Edmonton area was once a wetland that has since been filled in. For example, Groat Road used to be Groat Creek. These streams were fish bearing and used to run into the North Saskatchewan River but have since been turned into cement.

"Of all the environmental problems we face today, fresh water is probably the most important. Our lakes and streams are Mother Nature's sewers and the water tends to reflect everything we do. There exists here a myth of abundance with regard to fresh water. We are told that Canada has more fresh water than any other country. In fact, there is a lack of fresh water available to the most populated parts of Canada and most fresh water is in the north or flowing toward the north. Alberta, in particular, has a water deficit: evaporation is greater than precipitation."

Everything we do to our water, Schindler points out, is played out

on a backdrop of climate warming that he pegs at approximately two degrees in the past 20 years. Several climate models have demonstrated that the coming years could see an increase of up to nine degrees in summer temperatures. Along with increased heat comes increased loss of soil moisture. Some predictions point to a 30 to 50 per cent decline in prairie soil moisture, which could spell disaster for agriculture.

Schindler mentions a 60-page online document he's halfway through reading called *Smoke, Mirrors & Hot Air: How ExxonMobil Uses Big Tobacco's Tactics to Manufacture Uncertainty on Climate Change*. Prepared by the Union of Concerned Scientists, the report states that between 1998 and 2005 ExxonMobil "has funneled nearly \$16 million to a network of 43 advocacy groups that seek to confuse the public on global warming science."

"What they also do," Schindler says, "is fund legitimate science at major universities so they can say, 'see, we're not biased.'" They also have shell sites on the Internet that purport to tell the truth about global warming but are just propaganda for big oil. There's no competent scientist working in the field today who disputes the legitimacy of the facts behind global warming.

"Compare two very different Alberta landscapes," he continues, "both receiving 400 millimetres of rain per year. Between Fort McMurray and Fort Chipewyan are areas that are, in large part, a wetland landscape. Move to the area

surrounding the Oldman Dam in southern Alberta and you'll find the landscape is extremely dry and the grasses don't grow beyond July due to lack of moisture. The difference in temperature between these two vastly different climates is an average of five to seven degrees annually. This is a good indication of the enormous effect that a continually rising temperature might have on our landscapes."

Schindler also points to the change in land use around Alberta, with housing developments putting increased pressure on the land, and lakes in the area that once had a few cottages around them now ringed with large homes. He mentions a particularly nasty phenomenon at Pigeon Lake, about an hour outside Edmonton. When told that they would not only have to pay to have their septic tanks pumped out, but would also have to pay to have that waste treated at a sewage treatment plant, some residents simply cut holes in their tanks and allowed the raw sewage to flow onto the land and into the lake. "That's simply ludicrous," Schindler says. "We all have to take personal stewardship of the environment."

There's also the matter of logging, oil and gas extraction, agriculture and road-building all

diverting water and leading to the drying up of the wetlands around the province. "The problem with this," he says, "is that the wetlands are part of the kidneys of the landscape, removing pathogens, absorbing nutrients and holding water back on the landscape to prevent sudden floods.

"We fill in wetlands, denude riverbanks, spread manure, fertilizers, pesticides and herbicides on the landscape. Intensive livestock operations contribute major pathogens, as well as antibiotics and hormones that go into our surface and ground water. If we did any planning, we would leave the wetlands, use low tillage and less fertilizers, herbicides and pesticides. We would leave at least 30-metre buffer strips along river and stream banks, and keep livestock well away from them."

He also points to the obvious things—low-flush toilets, water-conserving shower heads, appropriate vegetation for the climate it's grown in, maybe even a dual water system where we only treat the water we need for drinking. Around the U of A campus he also notices a lot of waste and says, "We really shouldn't be growing and watering Kentucky bluegrass when there's more appropriate ground

cover for our locale. And do we really need that many lawn mowers running around in the summer when everyone knows they pollute more than cars?

"I suspect that a university-wide environmental assessment done by someone who knows what he or she is doing could save us a lot in the long run," he says. "I don't doubt the university is doing a lot, but I have a hunch they could do a lot more. If universities aren't going to take leadership roles, I don't know who is going to do it in today's society."

And it's the people going to university right now and those who've only recently graduated that he calls on to carry the banner of environmental responsibility that he's been holding aloft for so long.

"If I have one final message," he says, "it's that what I'm saying and have been saying for most of my career is of particular importance for people under 35. I'm not going to be around to see the full effects of this ignorance around water. But you are."

This article originally appeared in New Trail, Spring 2007. Reprinted with permission. Minor changes have been made to spelling and punctuation to fit ATA style.

Resources

An Environmental Education Menu of Professional Learning Opportunities for Teachers

Environmental education offers an exciting way to teach your curriculum and make meaningful connections for your students. Thanks to ConocoPhillips Canada, teachers can now access many relevant professional learning opportunities! The Alberta Council for Environmental Education (ACEE) and the ATA believe that professional learning can come in a wide variety of formats, ranging from workshops to high-quality lesson plans. Below is a list of organizations that provide such professional learning opportunities for teachers. For more information about each resource, go to www.abcee.org/menu/.

Online Professional Learning Resources

Alberta Agriculture and Rural Development

A guide to growing school gardens in Alberta.

Alberta Environment

Alberta Environment offers kits and resources that correlate with curriculum and can be ordered for free.

ATCO Energy Education Mobile

The Energy Education Program is designed to teach Grade 4 students and Albertans about Alberta's energy resources and how to use them wisely. A free downloadable teaching guide is available.

Green Learning Canada Foundation

From e-cards to full online unit plans, from glaciers to consumerism, there is something here for everyone.

Parks Canada in Schools

The Teacher Resource Centre on the Parks Canada website provides lesson plans, unit plans, student-ready activities, online interactive tours, contests, stories and images.

Science Alberta Foundation

Wonderville.ca is Science Alberta Foundation's award-winning website that features curriculum-linked

resources that help to achieve your educational outcomes. Activities include games, videos, word searches, puzzles and comics, all of which make science relevant and meaningful in your classroom and beyond.

Workshops for Teachers

ACEE

From environmental storytelling to helping students become environmental citizens, ACEE has several workshops and presentations to choose from.

Battle River Watershed Alliance

The Caring for Our Watershed Contest is an opportunity for youth in Grades 7–12 to win money for themselves and their school through stewardship ideas. Your students could be the 2012 winners!

Calgary Zoo—Grounds for Change

A variety of resources, workshops, curriculum activities and

support from our knowledgeable staff ensures that the Grounds for Change program offers something for every school.

Canadian Parks and Wilderness Society (CPWS)

CPWS offers training workshops and presentations on various environmental themes, whereby participants learn about the topic and participate in a demonstration of the activities. Currently offering the following popular workshops: Grizzly Bears Forever, SOS: Save Our Species, Five-Minute Field Trips, along with personalized programs.

Centre for Affordable Water and Sanitation Technology

In this 60–90 minute workshop, teachers and youth leaders will be trained on CAWST’s educator resources and how to deliver them effectively to the youth they work with. This workshop is ideal for schools that want to increase awareness of global water issues and motivate students to take action.

Full Circle Adventures

Full Circle Adventures provides half-day workshops that allow teachers to learn the uses and identification of local plants.

Green Learning Canada Foundation

Green Learning Canada Foundation offers energy and environmental programs for Grades 4–12 online at no charge to teachers. Green Learning also offers PD workshops for teachers at ATA conventions, district PD events and school-based PD events. To request a PD session, contact Kathy Worobec at kathyw@greenlearning.ca.

Global, Environmental & Outdoor Education Council (GEOEC)

GEOEC provides lesson plans, articles, websites, professional development and information on upcoming events, such as their annual conference.

Inside Education

Inside Education offers all-expenses-paid, curriculum-relevant teacher professional development tours that give a first-hand look into the people, places and perspectives of Alberta’s environment and natural resources.

Safe Drinking Water Foundation

Operation Water Drop webinars teach teachers how to use the Operation Water Drop kits effectively in their classrooms.

Scientists in School

Looking for professional enrichment on discovery-based learning and ideas for classroom-friendly, hands-on experiments for elementary teachers? Please contact us to explore a learning opportunity for your team.

In-School Presentations

We know that teachers learn a lot when they invite guest speakers into their classroom. Here are a few such presentations:

Alberta Science Literacy Association

Our signature program is Scientists and Engineers in the Classroom in which scientists engage students through class presentations and hands-on activities across all age groups.

City of Edmonton

As a part of the Treat it Right! Wastewater program, the Department of Drainage Services is offering free puppet shows to Grades 2 and 4 classes. They also provide waste and stormwater teachers’ guides for Grades 4, 5 and 8, and Grade 5 wetland field trips.

Liliana’s Ecorations

Liliana’s Ecorations offers eco art classes and workshops for children. Learn how to create environmentally friendly art projects with your students.

Praxis: The Science and Technology Hotline

This is your link to the educational and scientific communities in southeastern Alberta that offer numerous programs that connect to classrooms.

Southern Alberta Technology Council (SATC)

SATC offers free presentations on How to Get a Science Fair Started in Your School, and How to Help Students Create an Award-Winning Science Fair Project. SATC will also launch the Alberta Science Literacy Association’s Scientists and Engineers in the Classroom program in the fall of 2011.

Worms at Work

This is an excellent Grade 4 presentation for students on Waste in Our World.

For information on more environmental education resources in Alberta, visit the Encana Environmental Education Resource Centre at www.abcee.org/resources/search/.

Operation Community Water Footprint: Put Your School on the Map!

The Safe Drinking Water Foundation (SDWF) invites all teachers to put their school on the map! Teachers are encouraged to engage their Grades 6–12 students in the Operation Community Water Footprint program (www.safewater.org/education/school-programs/operation-community-water-footprint.html). Students will calculate their community's water footprint (that is, how much source water it takes to produce one litre of treated drinking water). Then teachers can put their school on the map at www.safewater.org/education/put-your-community-on-the-map.html, and

enter their community's water footprint. They can also share what they and their students are doing to educate others about drinking water issues and to alleviate those issues in their community and other communities. Students will be able to compare their community's water footprint to those of other communities across Canada and see what actions other students are taking.

For more information, e-mail info@safewater.org, phone 306-934-0389 or visit the SDWF website at www.safewater.org.

Climate Kids: The Power of One Aluminum Can

Laura K Lincoln

What can you do with the energy saved by recycling one aluminum can? In the newest Green Career profile on NASA's Climate Kids website, recycling program educator Kate Melby explains how recycling is a powerful way individuals, businesses and schools can help the environment. Read her profile and find out what that one aluminum can can do at [http://climate.nasa.gov/kids/greenCareers/recyclingcoordinator/!](http://climate.nasa.gov/kids/greenCareers/recyclingcoordinator/)

Check out NASA's great science sites for kids:

- Climate Kids (<http://climate.nasa.gov/kids/>)
- SciJinks (<http://scijinks.gov>)
- The Space Place (<http://spaceplace.nasa.gov>)

Laura K Lincoln is the outreach coordinator at NASA Space Place.

Research Project: Psychologically Deep Experiences in Nature

Have you had a special or meaningful nature experience in the last six months? A University of Alberta researcher is seeking people who would be willing to fill out a survey on their experience. The survey, which will take about 15–20 minutes, can be found at www.surveymonkey.com/s/5XJ6XRD. If you have any questions, please e-mail the researcher Lara Fenton at lfenton@ualberta.ca. Thanks in advance!

Global, Environmental and Outdoor Education Council

Mission Statement

To promote involvement in quality global, environmental and outdoor education

Objectives

- To provide a vehicle for Alberta teachers for professional development and communication in global, environmental and outdoor education
- To study and make professional recommendations about global, environmental and outdoor education issues
- To network with other provincial organizations that have similar concerns

Membership

- Regular member—Active and Associate members of the Alberta Teachers' Association, as specified in ATA bylaws, are entitled to full privileges of council membership including the rights to vote and to hold office.
- Student member—Student members of the ATA are entitled to all benefits and services of council membership except the right to hold office.
- GEOEC members may also choose to belong to the Canadian Network for Environmental Education and Communication (EECOM) for an additional fee.
- ATA members may sign up for a GEOEC membership through the ATA website as their choice of one free specialist council membership included in the ATA annual fee.
- ATA members and subscribers may also sign up for a GEOEC membership and pay a fee determined by the GEOEC executive. From time to time the executive may decrease the fee to provide incentives for membership recruitment.

Subscribers

- Persons who are not ATA members as specified by ATA bylaws receive all the benefits and services of

council membership except the rights to vote and hold office. Subscribers do have the right to serve as community liaisons on the council executive.

Publications

- The GEOEC recognizes the wide range of interests among members and strives to foster the exchange of ideas and provide information and articles relating to the various components of the elementary and secondary curricula through the publication of *Connections*.
- The GEOEC maintains a website in order to publish timely information and provide access to like-minded organizations and individuals.

Annual Conference

- The annual conference features a blend of activities, indoors and outdoors, ranging from hands-on workshops to social gatherings. All grade levels are represented in sessions. The emphasis is on practical information and application. The annual general meeting of the GEOEC is held in conjunction with the conference.

Executive

- Members are elected to serve on the GEOEC executive.
- Contact the president or past president of the GEOEC through the ATA office if you are interested in seeking a position.
- Elections take place at the annual general meeting during the annual conference.

Workshops

- Various activities and workshops are organized by the GEOEC either as standalone events or in conjunction with other organizations.

Join now and become involved in the Global, Environmental and Outdoor Education Council

Name _____ Alberta Teaching Certificate No _____

Address _____ Postal Code _____

School or Employer _____ Grade Level/Specialty _____

New Membership

Renewal of Membership

\$25.00 Regular Membership

\$12.50 Student Membership

\$30 Subscription

\$10 EECOM Membership (in addition to GEOEC membership)

Make cheque payable to the Alberta Teachers' Association and mail it with the application to the Association at 11010 142 Street NW, Edmonton AB T5N 2R1.

Permission for Use of Photographs or Student Work

The Alberta Teachers' Association (ATA) requests the permission of parents/guardians for the reproduction of photographs depicting their children and/or the reproduction of work assignments completed by their children. The photograph/work will be reproduced in the Global, Environmental and Outdoor Education Council (GEOEC) newsletter, *Connections*, and is intended for teacher professional development.

Name of student _____

I, _____ (printed name of parent/guardian of student), agree to the use of this photograph/work for the purpose stated above.

Signature _____

Relationship to student _____

Address _____

Postal code _____

We have recently begun posting archived issues of *Connections* on the GEOEC website (www.geoec.org/newsletter). Are you willing to have your child's written work posted on the Internet as well?

- Yes, I agree to have my child's written work posted on the GEOEC website.
- Yes, I agree to have my child's written work posted on the GEOEC website, using a first name only.
- No, I do not want my child's written work posted on the GEOEC website.
-

Please fax or mail forms to

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The Alberta Teachers' Association

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