



## Hands on Watershed Education Opportunities for Students and Educators

### Background

A critical element in successfully reducing nonpoint source pollution is educating citizens on how their activities affect water quality. Bringing this message to youth through direct programming and through teacher training is an important element of citizen education, providing early and lifelong awareness and commitment to good practices which protect and restore our waters.



The Northern Plains & Mountains Regional Water Quality Program has successfully incorporated hands-on elements of monitoring and mapping into our K-12 watershed education programs. These programs help students understand how streams and lakes function within watersheds and how activities and changes in the watershed affect the health of water bodies. The students develop a sense of place and a sense of community. The programs encourage students to become involved in their watersheds through activities ranging from monitoring to stewardship to community outreach projects.

Over the past three years we have greatly expanded educational opportunities throughout our region -- improving our educational materials, increasing opportunities for teacher training, directly working with thousands of students, and reaching many more through our many partners in this effort.

### Activities.....

Statewide efforts are shared across our region, resulting in improved opportunities and materials. Utah has developed curricula and activities that utilize stream, wetland and lake monitoring techniques to actively engage students in their local watersheds.



Stream Side Science, a curriculum for 9<sup>th</sup> grade Earth Sciences, has just been published and distributed throughout Utah.

Programs include watershed specific stream monitoring programs (*A River Runs Through Us*), watershed and water quality experiences for camps, and summer lake monitoring at state parks.

Utah also conducts teacher trainings throughout the year, organizes watershed festivals, provides activities at community events, and works directly in hundreds of classrooms each year.

South Dakota provides hands-on training for high school students and teachers at the Oak Lake Field Station. Activities include lake and stream sampling for water quality, prairie vegetation, ecology, stream organism and experience in constructing sampling equipment.

Montana also offers on-line watershed education courses and resources, including a water quality resource guide for 4-H educators and education for teachers who want to learn how to incorporate water resource science into their classroom. For more information: <http://waterquality.montana.edu>



Teacher workshops combine classroom instruction on watershed functions, water quality and field experience.



Camper learns about aquatic insect adaptations through “build a bug” activity.

North Dakota also provides a series of publications and lesson plans for teachers covering topics such as groundwater and water quality.

Colorado has a wide variety of programs for K-12 students and their teachers. *SPLATTE* provides interdisciplinary curricula specific to Colorado divided into 10 units, including ecosystems, historic influence, the river in art and literature, political action projects and careers in water.

The two-CD set, “*A River’s Journey - Water in the West*” is a narrated interactive, photographic journey from the headwaters of the Colorado River to its terminus coupled with an extensive, teacher-developed water education curriculum.

The *Thirsty Lizard Project* presents middle school teachers with the materials to teach their students about water use in America and about how to substitute good water management habits for bad. *Water’s Ways* is a hands-on science kit that introduces 3<sup>rd</sup> grade students to the water cycle, climate, aridity and good water management practice. Students also learn the basics of the scientific method, including designing experiments, determining variables, organizing data and graphing. *Adopt-A-Watershed*, a school-community learning experience using a local

watershed as a living laboratory in which students engage in hands-on activities, making science applicable and relevant to their lives. It weaves education with the community developing collaborative partnerships and reinforcing learning through community service.



South Dakota and Utah have also begun developing GIS curricula for students, which expands the capabilities of teachers and students and provide better tools for understanding water quality and watershed functions.



### Seeing Results.....

Since 2001, Utah's programs have reached over 14,000 youth. Of these over 8000 were involved in 1 hour to all day activities. In the past 3 years, over 1,200 teachers have learned about water quality and watershed functions. Over 400 of these teachers attended extended (1-2 day) workshops.



Utah Governor Olene Walker's watershed initiative promotes active involvement in watershed management and targets youth education as an important component. The Governor's Office has endorsed Utah's Streamside Science 9<sup>th</sup> grade earth science curriculum as the official watershed education curriculum for grades 7-12.

### Taking Action.....

Examples of stewardship activities by youth that have resulted from our programs include:

- Trash clean up on multiple stream segments
- Fencing and tree planting
- Presentation of results at TMDL and other watershed meetings
- Stream and wetland adoptions

### Evaluation and feedback .....

Teachers are extremely supportive of these programs and materials, in particular the effective linkage of science-based materials with relevant hands-on activities. Teachers especially appreciate that the materials are correlated to state core curricula standards and learning objectives.

Teacher trainings have been very well received. In response to teacher requests, additional trainings are being offered, as are advanced workshops, such as a recent teacher workshop on macroinvertebrate identification offered in Utah. Teachers especially like the

combination of science concepts with field experience.

Evaluations have found that students learn basic watershed and water quality concepts through these hands on activities, retaining the content in these programs until the end of a school year. Longer term evaluation is ongoing.

For more information on youth educational programs in the Northern Plains & Mountains Regional Water Quality Program, please visit the following web pages:

[www.csuwater.info](http://www.csuwater.info)

<http://cfwe.org/SchoolPrograms/>

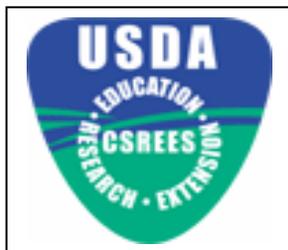
<http://waterqnd.ndsu.nodak.edu/>

<http://waterquality.montana.edu/docs/education.shtml>

<http://www.extension.usu.edu/waterquality/>

<http://www3.sdstate.edu/academics/collegeofagricultureandbiologicalsciences/biologyandmicrobiology/oaklakefieldstation>

<http://www.region8water.org>



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