

**SECTION 319 NONPOINT SOURCE POLLUTION CONTROL PROGRAM
INFORMATION / EDUCATION / TRAINING / DEMONSTRATION PROJECT
FINAL REPORT**

FY10 USU Extension Statewide NPS Pollution Education Program

Submitted by

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Environmental Protection Agency, Region 8.

Grant 102683

PROJECT TITLE: USU Extension Statewide NPS Education Project FY 10

PROJECT START DATE: July, 2010
PROJECT COMPLETION DATE: June, 2014

FUNDING:

ORIGINAL BUDGET

Total Original Budget:	\$61,667
Original EPA Grant Total:	\$37,000
Original Match Required:	\$24,667

EXPENDITURES

Total Expenditure of EPA Funds:	\$37,000
Total Section 319 Match Accrued:	\$37,000
Total Expenditures:	\$61,667

SUMMARY OF ACCOMPLISHMENTS

This grant allowed us to do the following:

- Develop, print, distribute and post on-line seven watershed factsheets that highlight watershed issues and successes across the state.
- Improved monitoring efforts by Utah watershed coordinators that will better quantify BMP effectiveness.
- Provide a minigrant that resulted in a pharmaceutical take-back campaign in Cache County, Utah
- Provide a minigrant that resulted in a new watershed partnership, public education and outreach campaigns in the Moab area.
- Provide a minigrant that funded a thank you dinner for producers in Rich County, Utah.
- Train and support 17 citizen monitors who collected water clarity data collected at 13 lakes and reservoirs..
- Train and assist volunteers in collecting E coli samples at 5 beaches and docks throughout Utah.
- Provide hands-on water quality activities to over 7,000 people at 14 different events in 6 counties.
- Provide 13 educational workshops on our water curricula to over 330 educators in 6 counties throughout Utah. .
- Provide staff support and expertise for the aquatic ecology components of the Utah Envirothon during the spring of 2011.
- Recognize two leaders in their communities (a producer and an educator) for their efforts to improve water quality and to lead by example in the Wallsburg watershed.
- Conduct ongoing assessments ranging from surveys to pre and post testing of over 1000 4th graders that are demonstrating the value and impact of our different activities. These assessment efforts also help us determine activities and directions for future outreach programs.
- Successfully leverage other funding and ongoing partnerships to provide a wide ranging, successful outreach program for Utah at minimal cost to the 319 program.

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1.0 INTRODUCTION

This final report documents the I&E activities and impacts funded by a 2010 EPA 319 grant for Fiscal Year 2010. Information and outreach efforts supporting watershed and statewide projects are essential to Utah's nonpoint source program. USU's Water Quality Extension information and outreach program has provided Utah with current and science-based NPS outreach for over 15 years. Each year, USU Water Quality Extension also leverages these 319 funds with other resources from USU's internal grants and external competitive grants to provide the most effective I&E program possible.

USU Water Quality Extension's mission is to help citizens understand how their actions may affect nonpoint source pollution levels, and thus improve the quality of our state's waters and the benefits that citizens derive from these waters. As such, we support the goals and objectives of Utah's State NPS Pollution Management Plan (Final, July 2013), the Utah's NPS Task Force, and the Utah Partners for Conservation and Development (UPCD). Our outreach programs are always based on input solicited from multiple partners throughout the state. In this way, we are able to respond to new needs and interests, eliminate programs that are no longer needed, and reduce redundancy with other outreach efforts throughout our state. We collaborate with state agencies, federal partners, and non government organizations to develop and deliver NPS education to the public. Our partnership approach encourages coordination, consistency, reduces redundancies, and provides an integrated NPS pollution control message statewide.

Our programs target different ages and sectors of the population, tailoring messages, materials and activities to be as effective as possible. The state's watershed coordinators are our primary audience. Although we focus on 303(d) listed water bodies, or those with on-going TMDL efforts. We include all of Utah's watersheds and watershed coordinators in our programming. Educators and Utah's youth comprise another significant part of our total outreach effort. We feel strongly that programs that provide citizens with increased understanding, coupled with opportunities to take action, will be most effective at producing long term stewardship and desired changes. With this end in mind, this grant helped us with our ongoing expansion of a citizen monitoring program.

2.0 PROJECT GOALS, OBJECTIVES AND ACTIVITIES

The four project objectives and associated tasks supporting these objectives are listed below.

Objective 1. Provide educational and outreach support for watershed groups throughout Utah.

Task 1. Produce watershed fact sheets in support of the watershed coordinators and watershed projects

Task 2. Provide minigrants to watershed groups that will be used for NPS educational and outreach programs.

Task 3. Provide other support for watershed coordinators

Task 4. Support citizen monitoring as an effective way to educate citizens about water quality and watershed concepts.

Objective 2. Raise the awareness of Utah's school aged children and educators about watershed functions and nonpoint source water quality issues.

Task 5. Develop and provide water quality related experiences for youth.

Task 6. Develop and provide water quality and watershed science training for educators

Task 7. Provide support for Utah's Envirothon competition

Objective 3. Provide recognition for activities in Utah that protect our water quality.

Task 8. Provide funding and support for Utah's NPS Water Quality Awards.

Task 9. Present I&E program materials and successes at a national meeting

Objective 4. Provide timely and accurate reporting to EPA concerning progress and completion of this grant.

Task 10. Produce timely interim and final reports on the project.

2.1 PLANNED AND ACTUAL MILESTONES, PRODUCTS, AND COMPLETION DATES

Task 1- Watershed Factsheets

In consultation with the UDWQ basin coordinators and the head of the UDWQ Nonpoint Source program on their highest priorities, we produced the following 7 watershed fact sheets:

- Scofield Reservoir
- Lower Bear River
- Wallsburg Watershed / Main Creek
- Pack Creek and Mill Creek
- Virgin River
- Strawberry River
- Little Bear River

In developing each factsheet, we requested information from the local watershed coordinators and DWQ basin coordinators about Best Management Practices (BMP's) implemented that could be highlighted, other relevant watershed facts, and important partnerships. We then produced a draft that was circulated back to the coordinators and watershed groups. Finally, each factsheet went through an external review process through USU Extension.

Outcomes:

Six of the 7 contracted fact sheets have been completed, gone through extensive review with the appropriate stakeholders and watershed coordinators. We have printed 200 copies of each of these, distributed about 150 to the local coordinators and local extension offices. We hold on the remaining copies for our own statewide programming. We also post all completed factsheets on our USU WQ Website (www.extension.usu.edu/waterquality), and USU Extension's website (www.extension.usu.edu/publications). The remaining fact sheet covers the Main Creek project in the Wallsburg watershed. The stakeholder review process has been extended with this factsheet, but all comments are now in, the factsheet is formatted and we anticipate it to go to the printers by the end of October 2014.

Impacts:

These fact sheets provide the local coordinators and their partners with a way to highlight recent projects, promote the extensive partnerships involved in these watershed projects, and educate citizens on the value of good watershed management and best management practices. We have now produced 23 of these fact sheets. Watershed coordinators tell us they appreciate these fact sheets and we continue to get requests for new ones. We view this as a clear indicator of their value. We now print fewer initial hard copies of each fact sheet. This allows us to periodically update the fact sheets, post the most recent versions to the website, and print the updates upon request.

The following comments from readers and reviewers demonstrate the value of these publications:

- “Exceptionally well-written”
- “An excellent overview of the activities of the Virgin and Santa Clara rivers”
- “Very timely, very significant”
- “Interesting and informative publication... I'm also impressed by the number of partners.”

Task 2 – Mini Grants for watershed outreach activities

Short proposals were solicited from the various watershed coordinators for minigrant projects. The deliverables in our original contract indicated we would fund six \$500 mini-grants. After reviewing proposals and consulting with the UDWQ NPS program coordinator, we actually selected three projects, with an award of \$1000 each:

- Introductory Education Programs – Tessa Groff, USU Extension
- Pharmaceutical Program – Justin Elsner, USU Extension
- Cooperator Dinner – Brady Thornock, Upper Bear River Watershed Coordinator

Upon completion of the project, each watershed coordinator submitted a final report. Below are summaries from these three reports.

Tessa Groff, USU Extension, Southeast Colorado River Watershed Coordinator. Introductory Education Program.

This minigrant helped initiate an education campaign to introduce citizens to local water quality issues and to the new Moab Area Watershed Partnership (MAWP). The MAWP includes representatives from over 20 agencies, nonprofits, land managers and other interested parties. Mid-project, Groff was replaced by a new watershed coordinator, who assisted in finalizing the tasks associated with this minigrant.

Outcomes:

- As originally proposed, the watershed coordinator at the time (Tessa Groff) anticipated a series of community programs on separate topics of concern (pet waste, stormwater, septic system management, etc). Following a more thorough needs assessment, Groff and Mike Johnson, the county Extension agent, developed a single PowerPoint presentation that was more in depth, presented all the important topics in a more integrated manner, and could be used in a number of different settings.
- They also conducted a survey to gain feedback on local community interest and understanding of water quality issues in the Moab area.
- Finally, a brochure was developed by the local watershed coordinator and approved by the Moab Area Watershed Partnership (MAWP). The brochure contains information about the mission and goals of MAWP, a diagram showing watershed functions and educational tips for protecting water quality. One thousand color copies were ordered through Canyonlands Copy Center, a local Moab business, and distributed amongst partners as well as displayed at public buildings including, but not limited to, the court house and library.

Impacts:

- The MAWP partners expressed positive feedback about the brochure and were excited to use it as an outreach and education tool. It will be useful in branding the MAWP, distributing the MAWP's mission and educating the public about the function and importance of watersheds and watershed health.
- Participation in the community program was low, but all those in attendance joined in a positive discussion on water related issues.
- Surveys provided USU Extension and the MAWP with information about the local viewpoint on water quality and quantity concerns for the Moab community. Participants stated that they felt the PowerPoint and presentation were very educational and should be offered in the community again.

Minigrant to Justin Elsner, USU Extension, Middle and Lower Bear River Watershed Coordinator, to conduct a pharmaceutical outreach program.

This minigrant was used to conduct a Prescription Drug Disposal Day in coordination with the counties prescription drug coalition. The coalition includes partners with different concerns, including preventing drug abuse from prescription meds, preventing theft, and protecting water quality from inappropriate disposal methods. The event was held at a locally owned, popular pharmacy. All collected drugs were disposed of properly by the local sheriff's department (one of

the partners in the coalition). The event was advertised in advance through a wide variety of media.

Outcomes:

- 274.25 lbs of prescription drugs were collected.
- 161 people dropped off medicine
- 147 Disposal Site Magnets, 100 UOAD pamphlets, 50 Key Chains were given away
- Disposal Information factsheets were distributed.

Impacts:

- Almost 275 pounds of prescription drugs were properly disposed of.
- Many citizens, through the actual drop off and through outreach about the event, learned about the multiple risks of improper disposal of medications and learned how to properly dispose of these meds.
- By identifying motivations for participation, the demographics of participants, and how these people heard about the event, we can more effectively promote and target future take away events as well as other ad campaigns. In fact, using some of this information, a flier about pharmaceuticals was produced shortly after this event by the local watershed coordinator, Justin Elsner.
- They were effective at reaching a significant target population (the elderly).

Brady Thornock, Upper Bear River Watershed. Coordinator Cooperator Dinner. Task completed as of annual report, but no watershed coordinator's report yet.

This minigrant was used for a dinner thanking local producers in the Upper Bear River watershed who have participated in conservation efforts. Other partners contributing to the planning and funding of this event were the local Conservation District, and the local Farm Bureau.

Outcomes:

- The dinner was attended by many of the producers in this small community.
- In addition to a meal, the producers were each given a pair of leather gloves with "working for water quality" embossed on the back.
- Finally, an award was given to one of the producers for his years of service to the local Conservation District.

Impacts:

- The local watershed coordinator, Bracken Henderson, reported that events such as these are very popular in this community. They provide an explicit and well-publicized thank you to producers who often feel that they are asked to do more than their share for water quality and other conservation actions.
- The goodwill generated by events such as these are responsible, to a large extent, for the ongoing participation in watershed protection projects by members of this agricultural community.

The coordinator wrote the following about this event: *“The Conservation District is very appreciative for the UWCC’s contribution of this mini grant. It, along with previous grant awards, has been a big help with improving awareness of water quality in the watershed. This increased awareness has led to many opportunities for water quality projects that have been planned and implemented the past few years. A continued interest in water quality projects portrays the success of efforts backed by these mini grants through UWCC.”*

Task 3 – Provide other support for watershed coordinators

USU WQ Extension participated to the Watershed Coordinator Training workshop in Logan Utah in July 2011. About 20 watershed coordinators and other WQ professionals attended.

Outcomes:

- Our part of the workshop consisted of a detailed discussion of the issues and concerns associated with developing and implementing an effective monitoring plan. We discussed individual situations and watersheds, giving examples of solutions to specific monitoring concerns.
- We also participated in a field trip where we looked at several sites, worked through a monitoring check list to attempt to identify concerns and appropriate choices.
- The PowerPoint from the workshop has been included in the notebook produced by UDWQ for the monitors.
- Each participant received a printed BMP Monitoring Guide that we recently completed (using other funding). The monitoring manual and additional materials and information are available through the USU WQ Extension web site:
<http://extension.usu.edu/waterquality/htm/watershedmanage/bmps/>.

Impacts:

- This workshop was part of an ongoing effort to encourage local watershed coordinators to improve their monitoring approaches for best management practices. This effort will increase our understanding of what practices are most effective in this region and will help justify and promote these efforts with other citizens because we will have better knowledge of the actual water quality and other improvements that result.
- In Sept 2010, USU WQ Extension also partnered with University of Wyoming and Montana State University WQ specialists to provide a 1 week workshop on the Crow Reservation in Montana. This partnership was possible because of workshop materials and methods developed as part of a regional USDA project and tested at workshops such as the 319 funded workshop reported on above. About 20 tribal members from around the country attended, as well as EPA and state representatives. We worked through the elements of the BMP monitoring manual funded in part by this grant, and conducted several field trips where we discussed monitoring concerns and techniques.

Task 4 – Support for citizen monitoring

Outcomes:

- In 2011 18 citizen monitors measured water clarity using Secchi Depth measurements at 15 sites on 13 lakes and reservoir. A total of 110 different measurements were taken over that summer. Instead of creating a final report to send only to the volunteers, an interactive map was created which provided information about the sites and access to the secchi depth data online. This became the prototype for our current Utah Water Watch website map displays (see www.extension.usu.edu/utahwaterwatch). Volunteers were enthusiastic about this new and exciting way of accessing and displaying their data.
- In addition, 7 citizens were trained on the collection and processing of E. coli samples using the IDEXX method. Three of the volunteers worked with Water Quality Extension and 2 worked directly with the Division of Water Quality. Citizen monitors collected samples at a total of 9 lakes and Water Quality Extension staff processed the samples at USU from 3 lakes.
- We also conducted several surveys in 2011, one was sent to current and past citizen monitors and another was sent to potential partners in an expanded citizen monitoring program.
- Eleven volunteers returned the survey. In general all enjoy the program but would like to do more. They would also like to learn more about the lakes and reservoirs they are monitoring, and would like to know how the data is being used. Only a few of the volunteers currently use the data for their own purposes. The volunteers are willing to spend more time sampling for us. Extending the program to Utah Water Watch with more sampling opportunities will allow the volunteers to feel like they are doing more for “their” water sources.
- Forty six potential partners returned the survey. About half the respondents expressed concern that an expanded citizen monitoring program would require them to assist in recruiting and training the volunteers. Some of these also expressed concern about the value of the data being collected. The other respondents were more positive in general about citizen monitoring. The majority of all partners were supportive of citizen monitoring as long as the monitors are well trained, there is sufficient oversight of monitoring activities, and the monitors and program is unbiased.
- The ongoing Utah Lake Watch program, along with our survey results, help raise awareness of the potential value of a broader based citizen monitoring program. In order to facilitate this increased focus on citizen monitoring, discussions on hiring a full time coordinator began in 2011.

Impacts:

- Our Lake Watch Program provided providing current water quality data on 13 lakes for UDWQ's lake management program.
- We demonstrated the value of citizen monitors in collecting and processing samples for E. coli analysis.
- This program demonstrated the interest by Utah citizens in participating in volunteer monitoring efforts.
- Utah Water Watch was initiated in the following year, and has subsequently (with other 319 and NSF grant funding) grown each year, expanded to two tiers of monitoring in lakes and streams, and now has hundreds of volunteers who enter their data on an online database supported by USU WQ Extension.

Task 5 – Water Quality Experiences for Youth

Outcomes:

Deliverables include hands-on activities at camps, fairs or field days that increase awareness by youth and their leaders of NPS pollution and prevention, assessment of impacts and improved materials and activities, all posted on our web site. All activities are assessed and correlated to Utah core curriculum standards and intended learning objectives. We partner with other agencies and organizations and use these activities as models for other watershed groups. Specifically,

- *This grant helped support water quality activities in 9 counties in Utah.*
- *Over 7,100 youth participated in hands on activities in 2011 where they learned about watersheds and water quality, and how they can help protect them.*
- *Specifically, we provided hands on water quality activities at events such as Natural Resources Field Days, Science Night at the Swaner EcoCenter, the Hardware Ranch Elk Festival, stormwater fairs in Davis, Weber, Cache and Washington Counties. We also organized and provided activities at the annual Bear River Celebration in Logan, Utah in partnership with the Utah Division of Wildlife Resources and the Logan City Environmental Department.*

Impacts:

- A graduate research project evaluating the effectiveness of one day camps and field trips is almost completed. ***This project, funded by USDA, has determined that short term (1-2 hours) hands-on interactive field days do increase knowledge and understanding of water science and water protection among young students (4th grade).*** We found that this knowledge gain is more substantial when coupled with other activities, such as the high quality classroom lessons that this grant has allowed us to develop. The gains in knowledge were retained by these students for at least 9 months following the single field day event.
- Evidence of behavioral or attitudinal change was harder to statistically quantify. We did find, however, that students' responses to open ended questions (such as "what would you tell a friend about rivers" were far more detailed and nuanced after the students had

participated in this one short event. Typical answers before the event were “Rivers are cool”. After the event, typical answers were “I’d tell my friend to take care of rivers because cool bugs live in them and these bugs need clean water.” (Kinder et al...2014, submitted paper)

Task 6 – NPS Water Quality Training for Educators

Deliverables include workshops on water quality and watershed concepts for educators, increased use of water quality education materials in various curricula, and information on the effectiveness of our workshops. Funding from this grant covered out teacher outreach program for both 2010 and 2011.

Outcomes:

- During 2010 and 2011, 332 teachers participated in our water quality educator workshops throughout the state. These workshops included training for Utah Envirothon advisors, training elementary teachers how to use macroinvertebrates in their classrooms, Master Naturalist workshops, Stream Side Science workshops, CMaP workshops, and training 4-H leaders.
- We also trained teachers whose classes are participating in the Mountain Wilds to Wetland Wonders program. The MWWW program is an opportunity for students in Box Elder County to go on field trips to the Hardware Ranch Wildlife Management Area and the Bear River Migratory Bird Refuge. With these two field trips they have the chance to compare water quality at two ends of the watershed and see what differences they can find.
- The Stream Side Science manual has been reprinted with new teaching “threads” to help teachers in their lesson preparations. Also added was the new Invasive Species lesson plan.

Impacts:

In 2011, we initiated a review of our popular Stream Side Science (SSS) curriculum. We worked with various state education partners, including the State Office of Education.

- SSS is viewed as a highly effective and valuable curriculum.
- Based on this evaluation, we were asked to add additional lesson plans and to reprint the manual with “threads” that allow teachers to focus on specific types of lessons, such as a focus on biology or chemistry. In response, we created a new lesson plan on Invasive Species, which has now gone through the review process and is included in the new printing of SSS, and on all the web materials.

Task 7 – Support for Utah Envirothon

100% complete

The Utah Envirothon was held on April 30, 2011 at the Bear River Migratory Bird Refuge in Box Elder County. The special topic issue was Salt and Fresh Water Estuaries.

Outcomes:

- USU WQ Extension assisted in developing and providing background information on water quality and watershed science, in addition to estuary issues.
- We helped train the teachers who sponsor teams.
- We also wrote and administered the water station test at the competition, and provided hands –on activities for all students who participated. The activity consisted of a discussion of what clean water means, beneficial uses, and the Utah water quality standards. The students also tested the pH, DO, nitrates, temperature and turbidity of the water at the refuge to determine compliance with Utah water quality standards.
- Seventy-five high school students participated in this event in teams of four to five.

Impacts:

- This activity reaches high achieving students from both rural and urban areas of the state and provides incentives for them to analyze a current environmental problem and increase their detailed knowledge of natural resource issues, including water quality and watershed science.
- This activity is a demonstrated pathway to STEM careers, and is seen as a high quality recruiting event for several of the universities across the state.

Task 8 – Statewide NPS awards

These funds were used for two awards, presented as Utah Water Quality Leadership Awards at the 2013 Wasatch Conservation District annual dinner and tour in 2013. The event was attended by a large number of local producers and by state and federal agency representatives and partners. Award winners were chosen in consultation with the Utah Division of Water Quality. Presentations were made at a local Conservation District dinner and tour,

Outcomes:

- Alan Brown is the local Water Conservation District. He has been extremely important in providing leadership and ongoing support for a watershed management process in the Wallsburg Watershed area. The example he has provided has inspired other producers in the watershed to seed implementation of best management practices on their properties to improve riparian structure and function, to restore stream flows, to improve irrigation practices, and to improve grazing practices through off-site watering and grazing management. The level of participation, number of partners and enthusiasm for this project are impressive and can be attributed directly to the leadership of Mr. Brown.
- Kelly D Gallo is a teacher in Heber City. She has been actively involved in water quality projects with her students, is a Utah Water Watch volunteer, and worked closely with her Envirothon Team. The team won the state competition in 2012, developing for the competition an integrated management plan for multiple benefits for a hypothetical (but typical) Utah ranching operation. The students presented their report to local producers

and other citizens at the Wasatch Conservation District field tour and meal, and Ms Gallo was presented with her award at this event as well.

- Both Mr. Brown and Ms Gallo received plaques, with the following citation: "Presented by the Water Quality Board for outstanding leadership in protecting and restoring water quality in the State of Utah." They also received \$400 in appreciation for their outstanding efforts.

Impacts:

- Acknowledgement of citizen efforts in protecting and improving our watersheds and water quality is an essential component of the state's NPS outreach efforts.
- These winners are role models for others in their communities.
- The youth involved in Ms Gallo's Envirothon Team demonstrated an impressive knowledge about land use management and measures taken to protect water resources. These students will take these insights with them to their chosen careers.

Task 9 – Present on findings from this grant at a national meeting

Outcomes:

I gave a presentation on our watershed education programs, with an emphasis on development and assessment of impacts, at the American Society of Limnologists and Oceanographers annual meeting. "Stream Side Science: Watershed Education that makes a difference". Feb 2013. Nancy Mesner and Andree' Walker Bravo. American Society of Limnologists and Oceanographers Annual Meeting, New Orleans, LA.

Impacts:

The talk was well attended, reaching a slightly different audience than the usual USDA / extension audiences. After the meeting, I received multiple contacts from educators around the country asking for information about our programs. I also gave an invited talk at Miami University in Ohio on the same topic, meeting with biology and zoology department faculty on their youth education programs.

Objective 4. Provide timely and accurate reporting to EPA concerning progress and completion of this grant.

Task 10 - Reporting

This final report represents the last of our reporting requirements for this grant.

2.2 EVALUATION OF GOAL ACHIEVEMENT AND RELATIONSHIP TO THE STATE NPS MANAGEMENT PLAN

Our activities were specifically aligned with the state NPS management plan and Utah's NPS Program goals.

We provided educational and outreach support for watershed groups throughout Utah.

- We produced factsheets for six watersheds in the state. These watershed factsheets are used by watershed coordinators for outreach and education and to gain support for new projects from landowners and local communities.
- We provided minigrants to three watershed coordinators around the state. In all three cases, the coordinators worked with local partners to leverage these relatively small grants (\$1000 each) and to result in multiple benefits. With these funds:
 - The Moab Area Watershed Partnership was formed, citizens in the area were surveyed to better understand pressing interests and needs, and a brochure was developed and printed about local NPS issues.
 - A pharmaceutical disposal campaign in the lower Bear River Watershed partnered with law enforcement and health professionals and collected hundreds of pounds of prescription drugs. Follow up surveys and questions provided important information on what motivates people to properly dispose of pharmaceuticals.
 - In the upper Bear River watershed, an appreciation dinner for ranchers and other producers in the area helped demonstrate the value of these individuals' efforts.
- We trained watershed coordinators on developing and implementing effective monitoring programs to quantify impacts of best management practices.
- We continued to support our Lake Watch citizen monitoring program, providing lake data to the UDWQ's lake assessment and protection program. More importantly, we conducted a survey that indicated that citizen monitoring on a large scale would be well accepted within Utah. This has led the way to the development and implementation of Utah Water Watch with subsequent 319 and other funding.

We raised awareness of Utah's school aged children and educators about watershed functions and nonpoint source water quality issues.

- Over 330 educators participated in workshops to learn our water-based curricula.
- We participated in Utah Envirothon. We produced factsheets for six watersheds in the state. These watershed factsheets are used by watershed coordinators for outreach and education.
- Over 7000 youth participated in our hands on activities about water protection and aquatic ecology.
- We continued to revise and improve our Stream Side Science Curriculum, making it easier to use and more relevant to current Utah teachers.

We provided recognition for activities in Utah that protect our water quality.

Two individuals were recognized for their efforts to improve water quality in Utah at the Wasatch Conservation District tour and luncheon in 2013. Alan Brown is a local conservation leader and producer who has led by example, resulting in significant enthusiasm and buy in for a watershed project in the Wallsburg watershed. Kelly Gallo is a highly effective teacher whose students won the state Envirothon competition, producing a realistic and detailed plan for managing some lands for multiple uses and benefits.

Finally, we conducted ***Needs and Impact Assessments*** , a critically component of the statewide plan. We obtain feedback on all our programs. We solicit input from partners on emerging problems and potential new programs that would be effective. We work with partners statewide to ensure that our materials are current, scientifically accurate and effective at reaching the target audience.

2.3 SUPPLEMENTAL INFORMATION

7 new watershed factsheets helped watershed managers highlight water quality issues and NPS successes to the state and within their local watersheds.



Minigrants to three different watershed resulted in diverse and effective projects:



A minigrant to the middle Bear River watershed group funded a successful pharmaceutical take back program, survey, and educational campaign.





A minigrant to the newly formed Moab Area Watershed Protection council resulted in surveys, presentations and an informational brochure, which all contributed to ongoing efforts and to their existing web page.

A minigrant to the upper Bear River watershed group funded an appreciation dinner for local producers and other stakeholders. Globes with a water quality message were an additional thankyou to all participants.



We provided outreach activities to over 7000 youth at activities across the state.



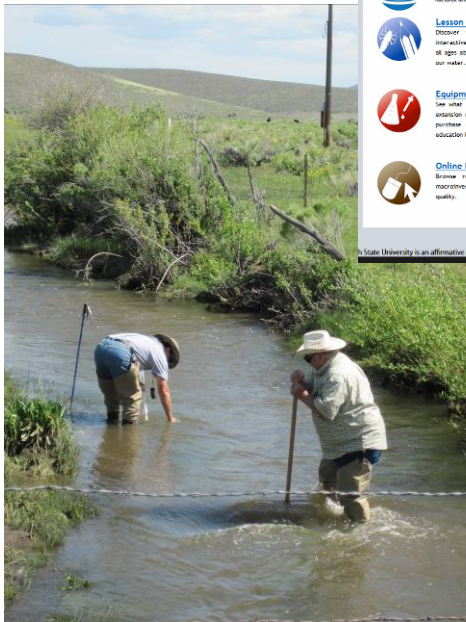
We trained over 330 teachers on use of water related curricula that we have developed and tested. We continue to improve access to these materials on our website.

Educator Resources

Water Quality Extension offers several resources for teachers including training workshops, lesson plans, activities, and materials located in each county.

<p>Stream Side Science The Stream Side Science curriculum is a set of twelve lesson plans designed to teach watershed science to middle and high school students. The curriculum originally targeted grades 9-11 but has been used effectively by grades 5-12. The curriculum is aligned to national and state core standards.</p> <p>Lesson Plans Discover the scientific methods using these fun and interactive lesson plans that help teach kids and adults of all ages about protecting and maintaining the quality of our water.</p> <p>Equipment & Supplies See what supplies are available for checkout from an extension office near you, or view a list of where to purchase supplies to make your own water quality education kit.</p> <p>Online Resources Browse resources such as posters, websites, and microorganisms pictures to help you teach about water quality.</p>	<p>Training & Workshops Find out what workshops we offer and when we'll be in your city or request a workshop near you.</p> <p>Kids' Page! Dive into water quality coloring pages, activity books, and games designed specifically to help kids learn about water quality and have fun.</p> <p>Contacts</p>
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Citizen monitoring activities included enhanced lake monitoring events and training.



The UACD supported Envirothon met at the Bear River Migratory Bird Refuge to learn more about Salt Lakes and Estuaries. The winning team (below) competed in the national contest.



3.0 LONG TERM RESULTS IN TERMS OF BEHAVIOR MODIFICATION, STREAM/LAKE QUALITY, GROUND WATER, AND/OR WATERSHED PROTECTION CHANGES

Long term results in water quality are difficult to link directly to educational and outreach programs. We focus primarily on evaluating short term results from many of our programs in the belief that the short term knowledge gains lead to long term behavior changes in many cases. We do, however, see long term changes in Utah with respect to attitudes, personal choices and land use management, agency policies, and general awareness of watershed and water protection

Our work and support of the Utah Watershed Coordinating Council provides training opportunities and materials so that these coordinators can be as current and effective as possible in implementing watershed plans in their areas. A change in monitoring is one way that we have been effective. Watershed coordinators are increasingly understanding the importance of demonstrating impact, and now know that they must develop monitoring plans that relate specifically to project objectives and that are initiated early enough to capture baseline (or pre-impact) conditions.

Our youth curricula continue to gain credibility and expand in use across the state. An assessment of *Stream Side Science* (Mesner and Walker., 2007. *Streamside Science: Tailoring Watershed education to meet the needs of teachers. Journal of Soil and Water Conservation: 104A – 109A.*) demonstrated that Stream Side Science, when taught by trained teachers, does increase student's knowledge and awareness of water science and the importance of protecting water quality. Our surveys indicate that the curriculum continues to be used by teachers who take our trainings, and our formal assessments indicate that the curriculum results in significant increases in student understanding of watershed and water quality science and policy.

These funds were used to begin planning for a 2.5 year study on the effectiveness of short term programs (for example, 1-2 hours of contact at a field day). An enormous amount of NPS outreach across the country is conducted through these short contact events, yet little is known about their effectiveness. This study should shed light on whether these programs have value or whether the dollars invested in these events could be used in other ways.

We are encouraged that citizen monitoring is increasingly being accepted in Utah as a means of collecting credible data and as a powerful tool for citizen outreach. We have a solid foundation for citizen monitoring in the state and will build on this with our partners as these approaches continue to expand in Utah. We have demonstrated that E coli monitoring is possible by citizen monitors and anticipate that screening level monitoring will result in earlier detection and greater protection of our swimming beaches and other high use areas.

Our 319 funds also help support work funded primarily from other sources, such as our USDA CEAP project, our EPA targeted watershed project, our watershed monitoring guidance document and web site, and several projects funded through USU's Ag Experiment Station.

4.0 BEST MANAGEMENT PRACTICES (BMPS) DEVELOPED AND/OR REVISED (FOR DEMONSTRATION PROJECTS)

4.0 BMPs DEVELOPED AND/OR REVISED

Not applicable (demonstration projects only)

5.0 MONITORING RESULTS FOR DEMONSTRATION PROJECTS

Not applicable (demonstration projects only)

6.0 PUBLIC INVOLVEMENT

Our program success is made possible by the continued participation and support from many partners throughout the state and region. We work closely with the Water Quality Task Force and its I & E subcommittee, and we solicit feedback and gain support from many partners, including: Utah Association of Conservation Districts, Utah Department of Natural Resources - Division of Wildlife Resources, Utah Department of Agriculture and Foods, Utah Department of Environmental Quality - Division of Water Quality, Utah Office of Education, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, BLM, U.S. Forest Service, local jurisdictions, local schools and school districts, the Utah Watershed Coordinating Council, and nonprofits including the Utah Society of Environmental Education.

7.0 ASPECTS OF THE PROJECT THAT DID NOT WORK WELL

The majority of the tasks associated with this project exceeded expectations. The biggest hold up on this project was the watershed fact sheets. The process used when we started creating these fact sheets required an active give and take between our staff and the watershed coordinators. This process seems to have stagnated somewhat by the time this funding came along. Relatively late in the project, Mesner (PI) realized that the process needed to be shaken up a bit. We improved the maps, increased the level of review, and were more aggressive about seeking input on the content. Our hope is that these efforts will improve fact sheets in the future – either new ones or revisions of factsheets that are due for revisions.

8.0 FUTURE ACTIVITY

We will continue working closely with watershed coordinators and the Utah Watershed Coordinating Council to ensure appropriate education and outreach in all watersheds of the state.

We will continue to improve and expand our youth activities and educator workshops to ensure that youth and educators are receiving high quality materials and education. We are currently working with the Utah State Office of Education and several other partners to expand our Stream Side Science curriculum to reach a broader audience.

By working with the UDWQ we plan to increase public interest and participation in citizen monitoring programs. We are working closely with the recently formed Utah Monitoring Council and other partners in development and implementation of Utah Water Watch, with a dedicated coordinator and sufficient funding to truly determine whether this will be a valuable program for Utah.

9.0 INFORMATION AND EDUCATION OUTPUTS

- Seven watershed factsheets were produced for watershed projects around the state. All were printed and also posted on www.extension.usu.edu/waterquality and linked to other websites around the state.
- We trained Utah watershed coordinators on developing monitoring plans to quantify BMP effectiveness. We used this same training approach and materials at a weeklong monitoring workshop on the Crow Reservation in Montana (using other funding).
- Minigrants to three different watershed coordinators resulted in diverse and effective projects: a pharmaceutical take back campaign, a watershed outreach and education campaign, and a thank you dinner for producers.
- In 2011, secchi depth was measured at 13 lakes and reservoirs by 17 citizen monitors. In addition, 7 citizen monitors were trained in collection and processing of E coli samples, and 5 of these volunteers collected E. coli samples during the summer season.
- Over 7,000 youth participated in our hands on water quality activities at 14 different events in 6 counties.
- Over 330 educators attended 13 workshops and trainings in 6 counties throughout Utah. .
- We provided staff support and expertise for the aquatic ecology components of the Utah Envirothon during the spring of 2011.
- Two leaders in their communities (a producer and an educator) were recognized for their efforts to improve water quality and to lead by example in the Wallsburg watershed.
- Ongoing assessments ranging from surveys to pre and post testing of over 1000 4th graders are demonstrating the value and impact of our different activities. These assessment efforts also help us decide about activities and directions for future outreach program