



MEETING MINUTES

Water Quality Task Force

June 29th, 2017
9:30-11:45 AM
195 North 1950 West,
Red Rocks Conference Room

PRESENT:

Jim Bowcutt	DEQ/DWQ
Sonja Wallace	SITLA
Carl Adams	DEQ/DWQ
Craig Miller	Division of Water Resources
Ellen Bailey	USU
Jay Olsen	UDAF
Chris Kane	UACD
Krissy Wilson	UDWR
Rhonda Miller	USU Extension
Ahmed Karimi	University of Utah
Nancy Mesner	USU Extension
Bill Zannotti	UDFFSL
Melissa Noble	UDDW

I. DISCUSSION

Ahmed Karimi(University of Utah)- Microbial Source Tracking (see presentation)

- *E. coli is present in all feces and can live in water up to 100 days.*
- *Just because E. coli cells are dead, you can still use them to do MST testing.*
- *There is no cattle grazing on the East side of the Salt Lake valley, and the tests should not pick up deer and elk, so the question remaining is, why are the levels of bovine results showing up*

in the Mill Creek and Little Cottonwood canyons? In some instances bovine was higher than all other sources of Bacteria encountered. This needs to be re-evaluated.

- *Location maps for monitoring results would be useful when presenting the results.*
- *There is a long ways to go before standards will be developed using MST. It is more likely to be used for source identification.*

Nancy Mesner (USU Extension)-Statewide NPS Information and Education campaign (See presentation)

- *The last big outreach program that the state did was the 2003 watershed protection project with Governor Walker.*
- *USU Water Quality Extension would like to start a statewide NPS outreach campaign.*
- *The big water districts should be included in this campaign. They have deep pockets, and have a vested interest in good clean surface water. At a minimum the Jordan Valley and Weber Basin Water conservancy Districts should be contacted.*
- *A subcommittee of the Task Force will be developed to head up this campaign prior to the next Water Quality Task Force meeting. The results of this meeting will be sent out prior to the next meeting, and discussed at the next Task Force meeting.*

Jim Bowcutt Utah Division of Water Quality) Nonpoint Source Program 2016 Annual Report (See presentation)

- *In FY 2017 \$1,004,260 in 319 funding was awarded to three projects, the Logan River Restoration Project, Local Watershed Coordinators / NPS Technical Assistance, and the Water Quality Education / Volunteer Monitoring Program.*
- *\$1,000,000 in State NPS funding was also awarded to various projects around the state. These projects largely consisted of riparian improvement projects as well as animal feeding operations.*
- *For every \$1 that was spent in NPS funding \$3 in match was obtained.*
- *In FY-2017 5 watershed plans were completed and four others were initiated.*
- *Many other notable accomplishments took place as well such as: the development of a Statewide Monitoring Plan, the updating of the State NPS MOU, and the revision of the Statewide NPS Management Plan.*

- *A success story was completed for the Chalk Creek Watershed.*
- *FY-2018 Nonpoint Source Grant recipients were selected, and a list of funded projects can be found in these minutes.*

II. ADDITIONAL ITEMS

- Erica Gaddis has been hired as the new Director of the Division of Water Quality
- The next meeting will be held on October 5th from 1:00- 3:00.

Microbial Source Tracking

UPDATE BY

AHMED KARIMI AND RAMESH GOEL



UTAH ENGINEERING
COLLEGE OF ENGINEERING | THE UNIVERSITY OF UTAH

Water Contamination

12 million people die annually due to water contamination

July 20, 2017



Findings by the United Nation's (UN's) Convention to Combat Desertification indicates that twelve million people die annually due to water shortages or contaminated drinking water.

The findings also revealed that the world's drinking water supplies have fallen by almost two thirds since 1950 while desertification is threatening the livelihoods of one billion people out of which 135 million people have already been rendered homeless.

Land is becoming a scarce resource since one quarter of the earth's surface (an area of over 3.6 billion hectares) is threatened by desertification.

Professor Kwabena Frimpong Boateng, Minister of Environment, Science, Technology and Innovation, said this in a speech read on his behalf during the World Day to Combat



Gov. Herbert declares state of emergency for Utah water contamination

11:40 AM on July 20, 2017



VIEW PHOTO GALLERY

Gov. Herbert declares state of emergency for Utah water contamination

The governor's declaration is the first time in Utah's history that a state of emergency has been declared for water contamination.

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Health Concerns

- Impaired Waterbodies contains pathogens detrimental to our health
- Animal feces : Cryptosporidium, Giardia lamblia, Salmonella (Myers *et al.*, 2014)
- Human feces: hepatitis A virus, *Shigella* ssp., and Norwalk-group viruses (Anderson *et al.*, 2005)



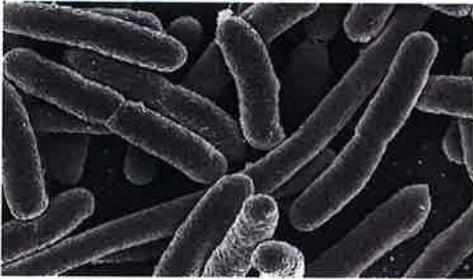
Source: armchairadvocates.com

Microbiological Water Quality

- Is concerned with microorganism living in waterbody and how they affect water quality
- Essential water quality Parameter
- Waterbody is monitored for **Indicator bacteria**



Current Indicators Bacteria use in Colilert IDEXX Method

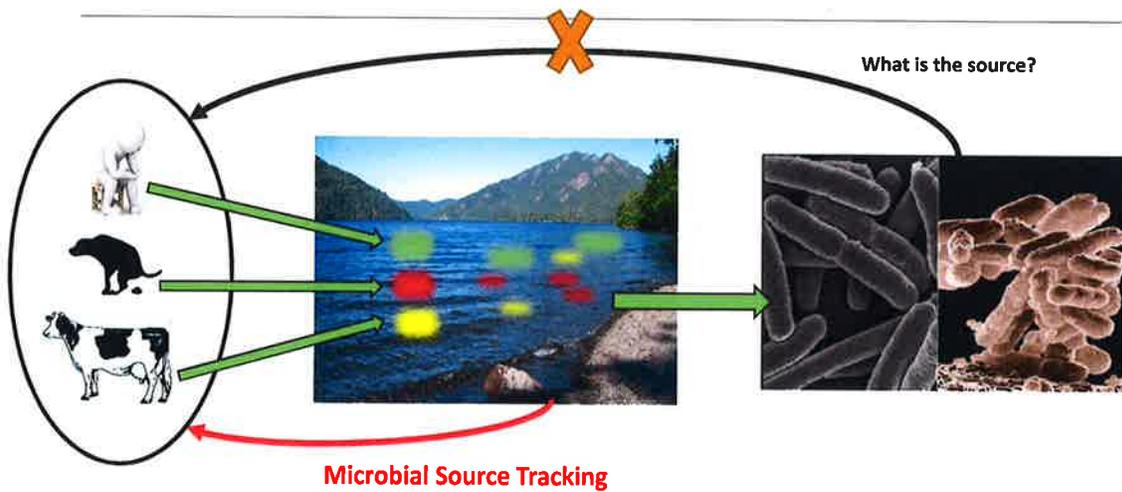


E. coli : are gram negative, rod shaped, facultative anaerobic bacteria that is almost exclusively found in feces of warm blooded animals in large volumes



Total Coliform : is gram negative, rod shaped, facultative anaerobic bacteria that is found in soil, water, vegetation, and in intestinal track on warm-blooded animals

What is Missing ?



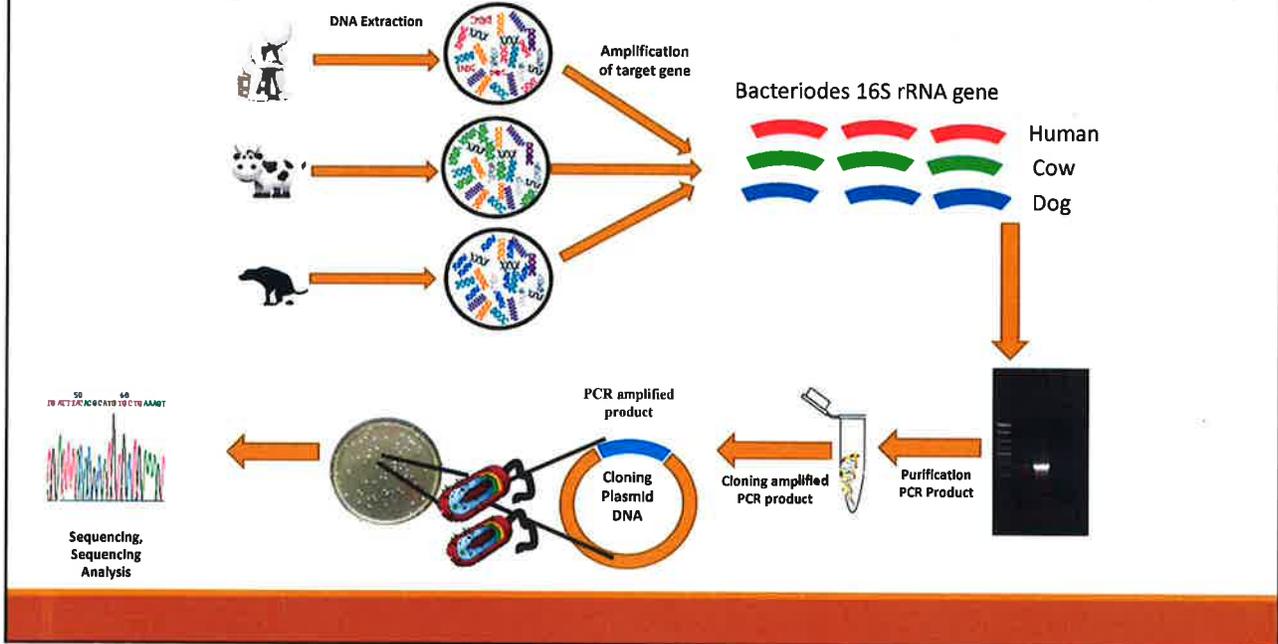
Microbial Source Tracking

- **MST** is a set of new approaches to determine host sources of microorganisms from environmental samples
- These methods simply take advantage of naturally occurring genetic differences in same bacterial species
- It can be used to assess stream and recreational water quality and associated human health risk
- MST has two distinct approaches: **library dependent and library independent**

Our approach

To use Library Independent host specific qPCR targeting bacteroides 16S rRNA gene to identify and quantify host of fecal contamination

PCR Amplification and Cloning for Plasmid Standards

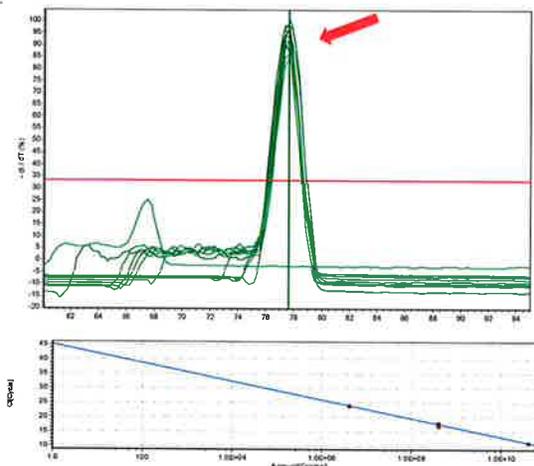


qPCR Process

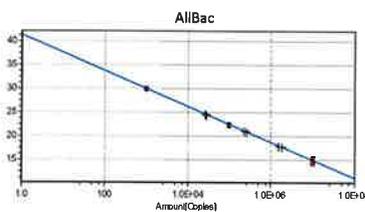


Quality Controls for qPCR

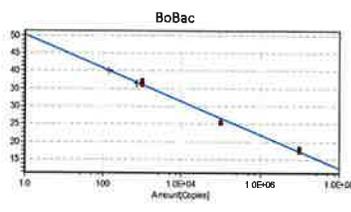
1. Deviation in Ct values in comparison to standard should not be less than ± 3.3
2. R^2 values should not be below 96%
3. Efficiency 90% - 110%
4. T_m value of amplified product should remain same.



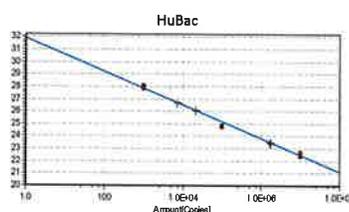
Quality Assurance/Quality Control



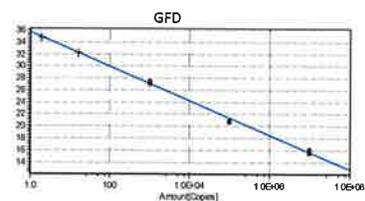
AllBac 10^3 to 10^9
 $R^2 = 99.7\%$



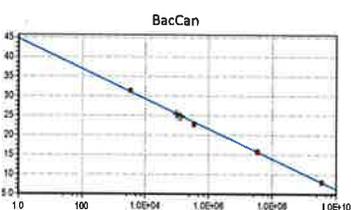
BoBac 10^3 to 10^9
 $R^2 = 98.7\%$



HuBac 10^7 to 10^{11}
 $R^2 = 99.3\%$

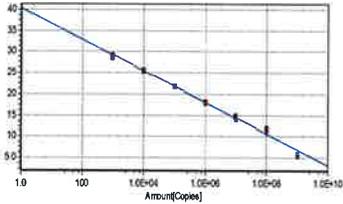


BacCan 10^2 to 10^8
 $R^2 = 99.9\%$

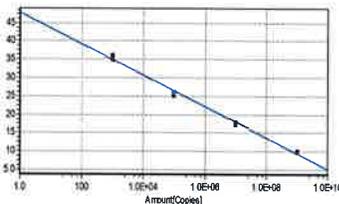


GFD 10^2 to 10^8
 $R^2 = 99.24\%$

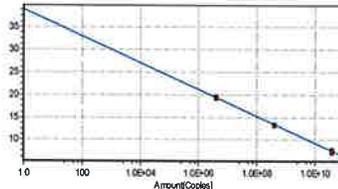
Plasmid Standards



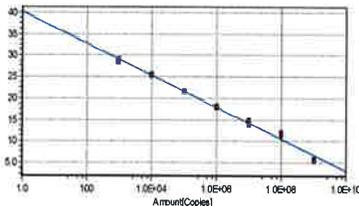
AllBac 10^3 to 10^9
R² = 99.1%



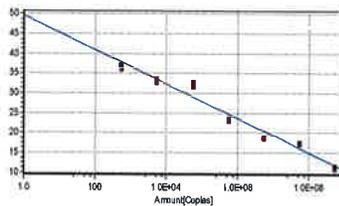
BoBac 10^3 to 10^9
R² = 99.5%



HuBac 10^7 to 10^{11}
R² = 99.8%



BacCan 10^2 to 10^8
R² = 96.4%

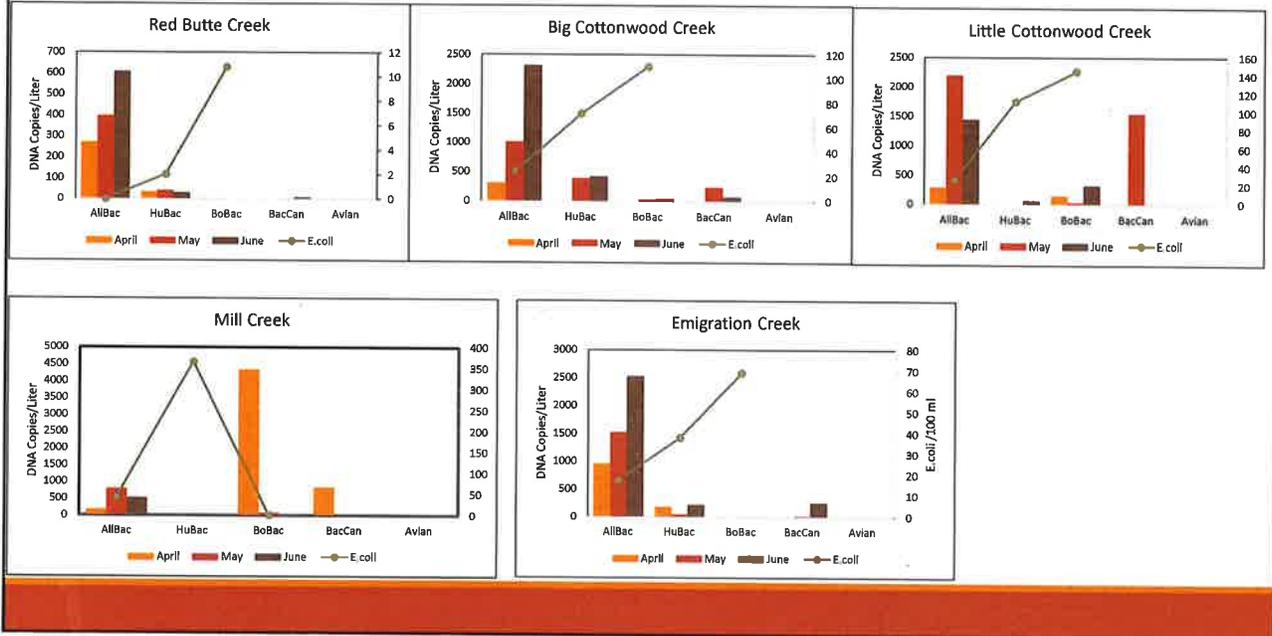


GFD 10^2 to 10^8
R² = 96.4%

Primers Used

Primer Name	Forward Primer	Reverse Primer	Product size (bp)	Annealing Temperature (°C)	References
Hubac	HuBac566f, 5'-GGGTTTAAAGGGAGCGTAGG-3'	HuBac692r, 5'-CTACACCACGAATTCGCCT-3'	116	60	(Layton et al., 2006)
AllBac	AllBac296f, 5'-GAGAGGAAGTCCCCAC-3'	AllBac412r, 5'-CGCTACTTGGCTGGTTCAG-3'	106	60	(Layton et al., 2006)
BoBac	BoBac367f, 5' GAAG(G/A)CTGAACCAGCCAAGTA-3'	BoBac467r, 5' GCTTATTCATACGGTACATACAAG-3'	100	57	(Layton et al., 2006)
BacCan	BacCan-545f1 5'-GGAGCGCAGACGGGTTTT-3'	BacUni-690r1b 5'-CAATCGGAGTCTTCGTGATACTA-3'	145	60	(Kildare et al., 2007)
GFD	F 5' TCG GCT GAG CACTCT AGG G- 3'	R 5'-GCG TCT CTT TGTACA TCC CA- 3'	123	57	(Green et al., 2011)

Results for Jordan River Tributaries April-June 2017



Conclusion

- Avian and Canine Bacteroides showed least indication of water contamination in all sites
- Bovine Bacteroides Contamination in mainly occurred in Little and Big Cottonwood Creek
- Human Bacteroides contamination was present in all sites in small concentrations

Acknowledgements

The funding for this research is provided by Non-Point Source Management Program through Utah Department of Environmental Quality (DEQ).

Thank you

Questions ?



Is it time for another statewide PR campaign about nonpoint source pollution?

NOV 26, 2009

GOV. WALKER ENCOURAGES STUDENTS AND UTAHNS TO PROTECT WATERSHEDS

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Utah Gov. Otene Walker unveiled an aggressive plan to improve water quality throughout the state by introducing her Watershed Initiative which falls under the Walker Work Plan.

The program is comprehensive and is designed to improve both water quality and quantity over the coming years. To initiate the program, the governor will focus on segments of 25 key streams and reservoirs.

"This project can affect every Utahn in a positive way," said Walker. "In order to improve Utah, today and tomorrow, we need to ensure our future prosperity have a clean and sustainable supply of water."

A watershed is an area of land from which all water drains to the same location such as a stream, pond, lake, river or wetland. Watersheds are dynamic natural systems that not only provide water for use and habitat for wildlife and livestock, they help clean our air and offer places to recreate and find solitude. They also contain timber, energy and mineral resources, and are the headwaters of our food supply.

"It is my goal to provide for cleaner rivers and lakes, to enhance water yield, and to increase public awareness and wise use of Utah's watersheds," Walker noted.

The Initiative will also offer educational materials and a website (www.wadepwaterbody.utah.gov) so schools, businesses and individuals can find their local watershed and possibly join an already existing program or start their own. By the winter of 2010, the governor will assemble her Cabinet for a watershed progress report.

Source: Utah.gov

Is there a need?

Is there interest among the partners on this committee?

What messages or approaches are important to different partners?

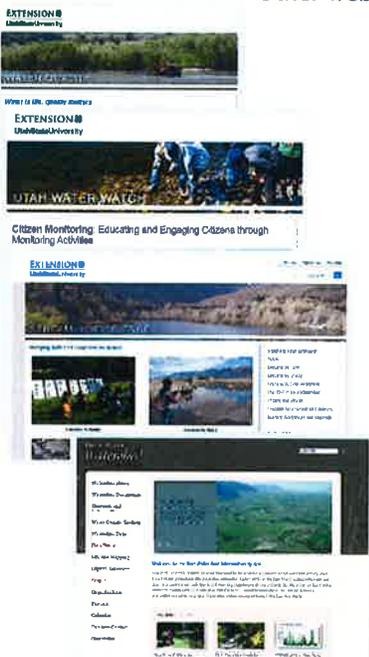
Possible resources? Types of contributions from different partners?

What are desired outcome(s)?

Existing resources: Repurpose much of the outreach materials / resources developed over past 10+ years

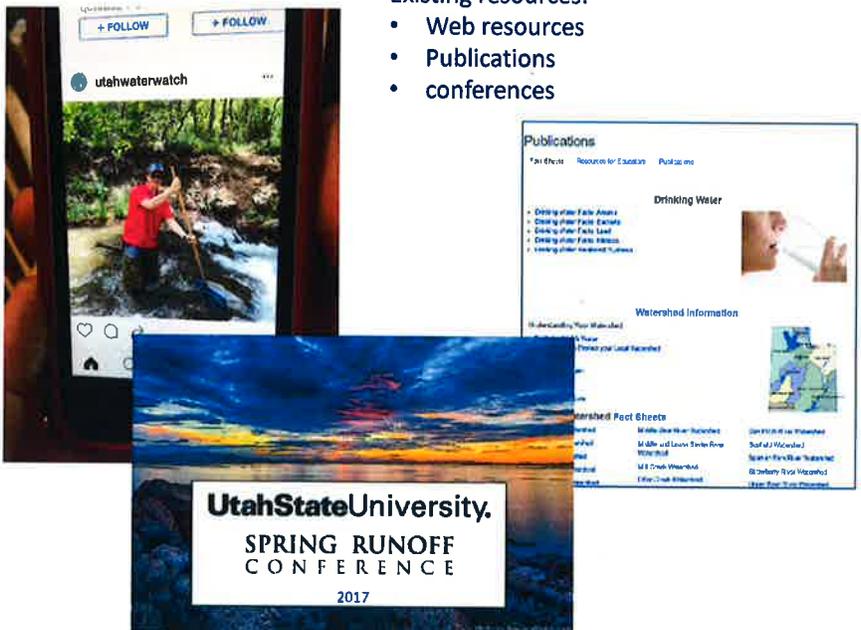


Other websites:



Existing resources:

- Web resources
- Publications
- conferences



Interactive displays

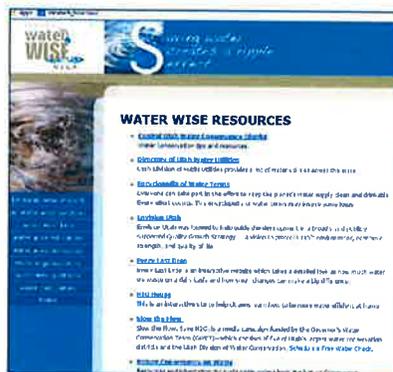
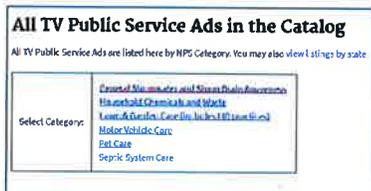
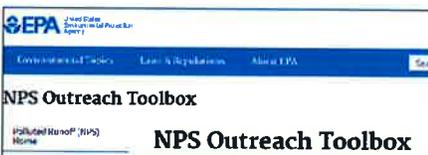


Workshops, trainings, field days, tours



Existing resources:

- EPA's Outreach website
- Other agency and nonprofit resources



Ways You Can Celebrate Water Week

The Intermountain Section organizes an amazing Water Week each year that is filled with many activities and events for all! See our calendar of events above.

- Participate in a [Water Celebration or Fair](#) with your local water utility
- Go to your local [Public Library](#), and check out the many children and adult books or participate in a book reading
- [Golf](#) to support water projects in third world countries at the [Water For People Benefit Golf Tournament](#)
- Download materials from this website to complete a [Scout Badge](#)
- Enter one of our [Poster](#) or [Photo Contests](#)
- Tour a [Conservation Garden](#) or [Water Facility](#)
- Download our [Action Package](#) to plan a personal activity for your family or friends
- Volunteer to do [Water Quality Monitoring](#) with Utah Water Watch

Possible approaches?

- Ramp up, re-energize and increase visibility of current approaches –
 - Watershed based activities
 - Tours / one on one outreach / field days
 - Newsletters / social media
 - Work with local leaders / decision makers
 - Citizen science / youth education
 - State-wide conference

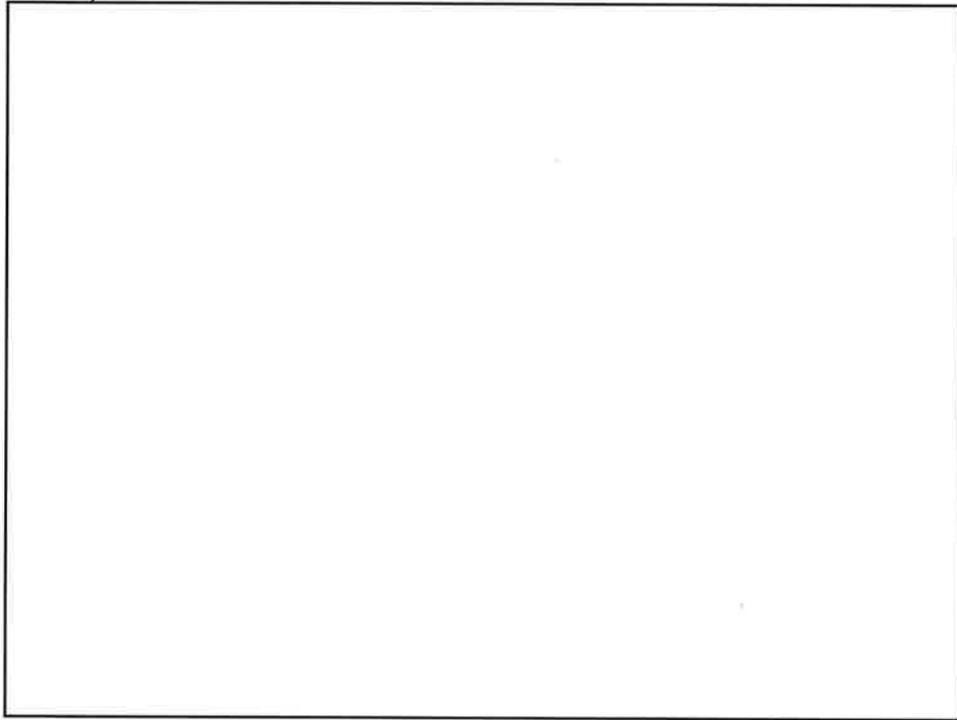
- **Other PR approaches**
 - TV / media campaign like Slow the Flow
 - Social and print media
 - PSAs, targeted interviews, highlight events
 - Public Transit ads; Bill boards; inserts in newspapers / bills, etc
 - Work directly with governor's office and legislators for increased visibility
 - Speaker "bureau" – list of dynamic speakers to get the message out
 - Merge with other PR campaigns
 - Contests / competitions

Next steps?

Consensus on moving forward

Reorganize WQTF Outreach Subcommittee

Meet soon to develop plan/strategy



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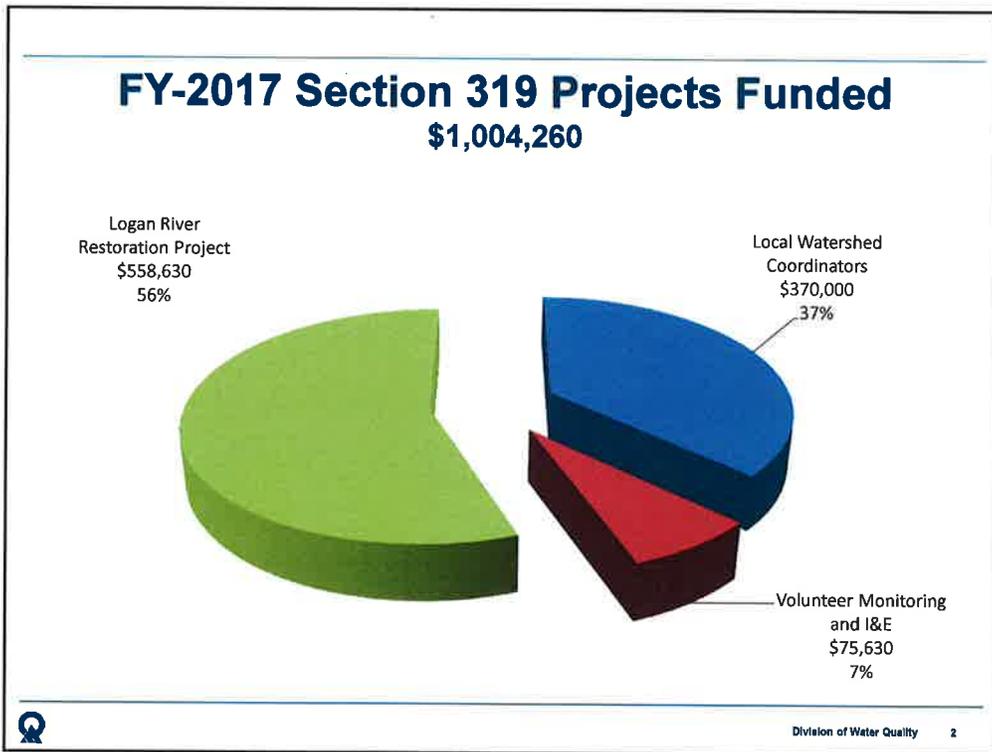
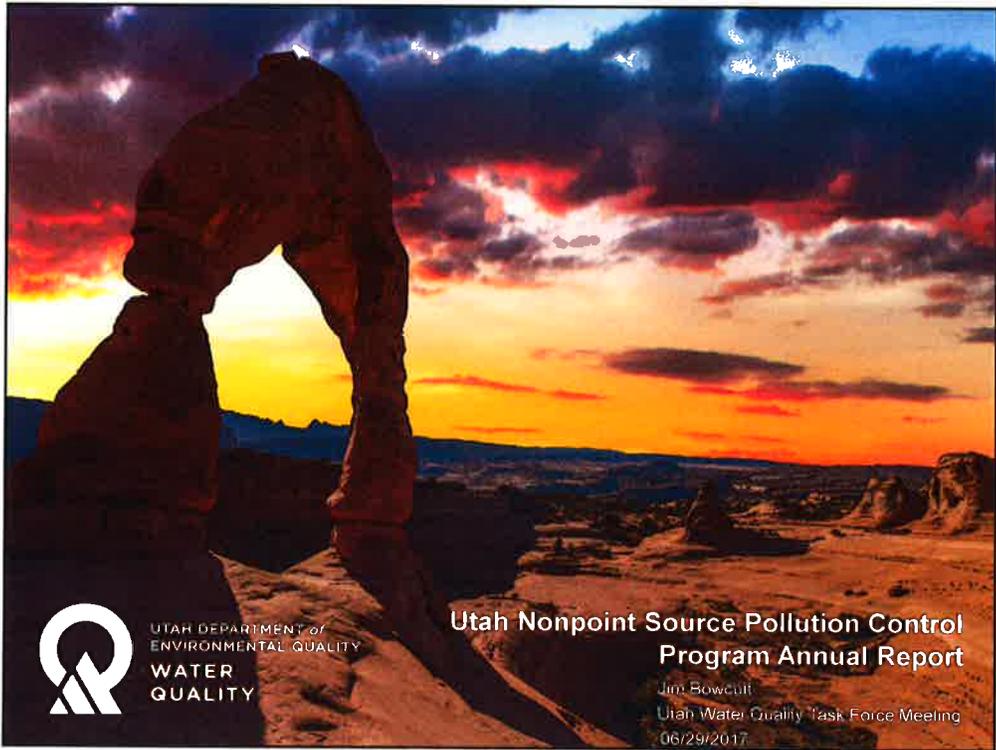
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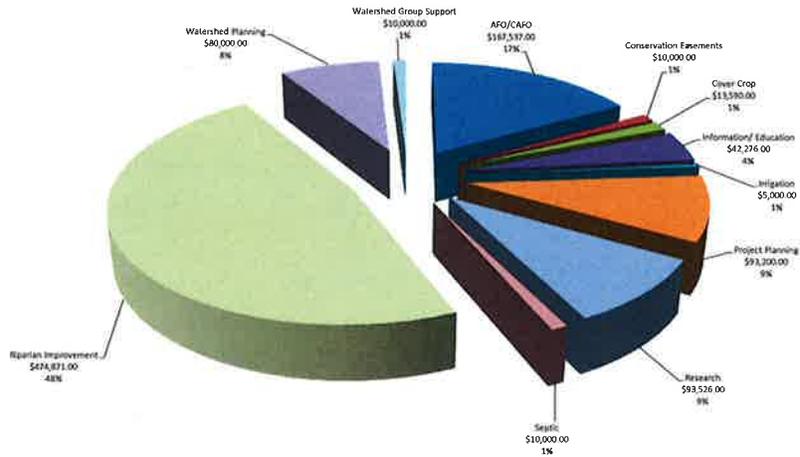
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Source: Utah.gov



BMP Types Funded with FY-2017 State NPS Funds

\$1,000,000



FY-17 Grant Deliverables

- 7 Local watershed coordinators funded throughout the state
- 2 Animal feeding operations fixed
- 6 Information and education projects funded
- 5.7 Miles of riparian fencing
- 6.4 Miles of stream bank restoration
- 120 Acres of cover crop
- 75 Beaver dam analogue structures
- One spring protection project
- 126 Acres of conservation easements
- 70 acres converted from flood irrigation to sprinkler irrigation



Project Match for FY-2017 NPS Grants

Source	Amount
NRES	\$1,597,056
Landowner Match	\$1,225,490
LIDAF	\$40,232
Local government	\$900,509
Willi	\$559,370
BLM	\$20,000
Universities	\$50,420
USFWS	\$15,000
Other	\$1,430,118
Total	\$6,038,195

For every 1\$ in NPS funding spend 3\$ in match was obtained



Watershed Planning

Plans Completed

- Upper Bear River
- San Pitch Watershed Plan
- South Fork of Chalk Creek
- Maple Creek
- Logan River

Plans Being Developed

- Montezuma Creek
- Otter Creek
- Pelican Lake
- Huff Creek



Other NPS Achievements in FY-2017

- Development of a statewide NPS monitoring plan
- Update of the State NPS MOU (UFFSL, UDWR, USFS, BLM, UDAF, UDEQ, USNPS).
- DEQ has begun updating the Statewide NPS Management Plan, along with other relevant documents.
- Chalk Creek success story



Chalk Creek Success Story

- Beneficial uses include, domestic use (1C), cold water fishery (3A), and agriculture (4).
- Listed for sediment, phosphorus, and bugs.
- Chalk Creek is a very flashy system.
- As a result a TMDL was developed for the watershed focusing on reducing the sediment loading to the watershed by 138,200 tons/year.

August 13th, 2014August 7th, 2014

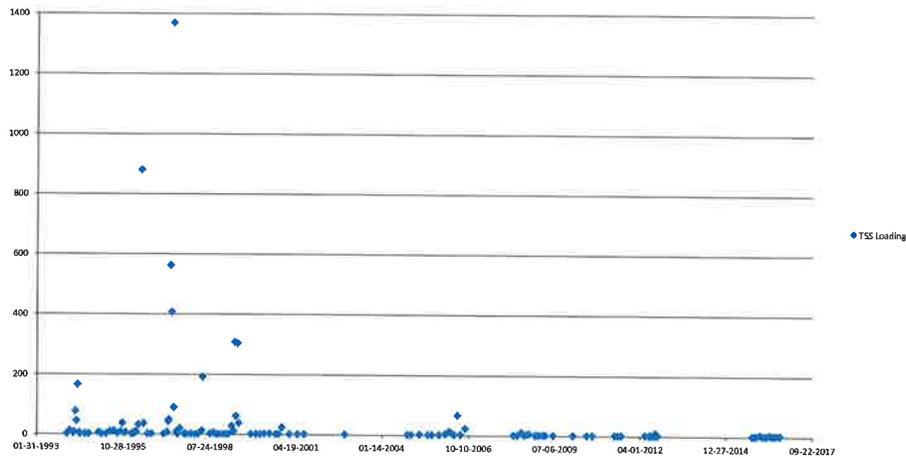
Implementation

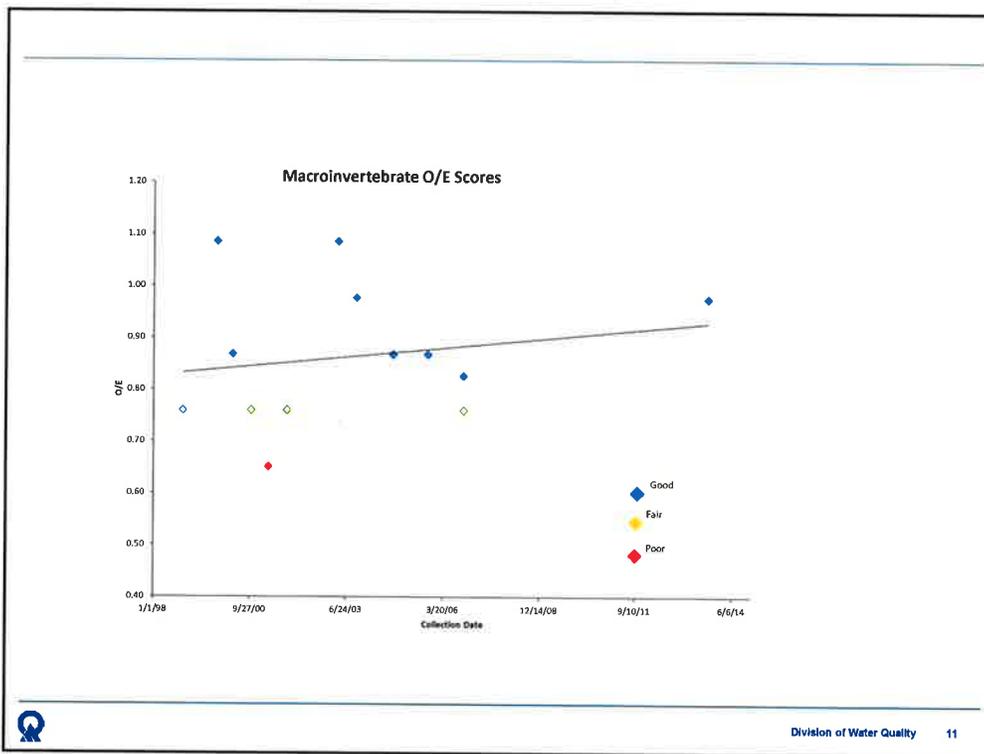
- Project work began in 1990
- \$2,360,650 in Section 319 funding
- \$1,502,371 in matching funds
- \$324,896 in additional federal funding
- 2.5 miles of streambank
- 363 acres of riparian protection
- 1200 acres of irrigation improvement
- Two coal mine sites reclaimed



Water Quality Data

TSS Loading (tons/day)
Chalk Creek at U.S. 189 Crossing





Looking Forward

- Recently delisted for macroinvertebrates in one assessment unit.
- Additional work will continue in the South Fork of Chalk Creek. Still listed for phosphorus and sediment.
- Possible delisting candidate once nutrient standards are developed.
- Development of Huff Creek watershed plan

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Other DEQ Nonpoint Source Projects

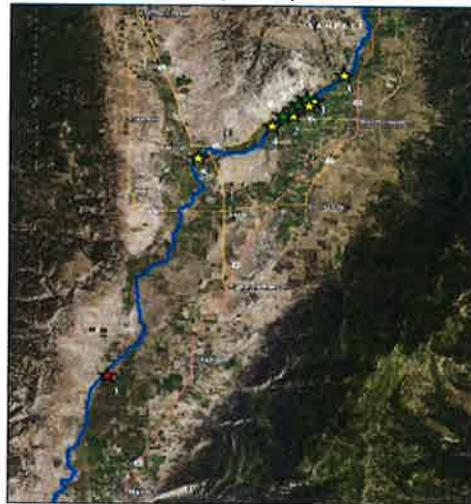
Logan River Restoration Project



DE

Project Map

ts



- ★ Irrigation
- ★ Stream bank
- ★ Pasture
- San Pitch River

0 2 4 8 Miles



DEQ Nonpoint Source Projects

Wallsburg Watershed Restoration Project



The central image is an aerial map titled "Proposed Wallsburg Stream Restoration Locations". Red lines on the map indicate the areas for restoration. To the left is a photo of a stream with fallen trees and debris. To the right is a photo of a yellow excavator working on a stream bank with workers nearby. A legend in the bottom left of the map shows a red square labeled "Proposed Restoration".

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DEQ Nonpoint Source Projects

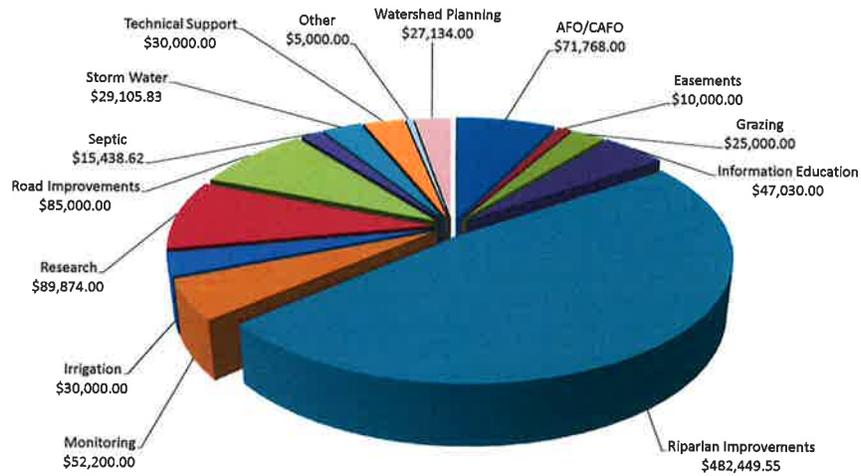
Mud Creek Restoration Project



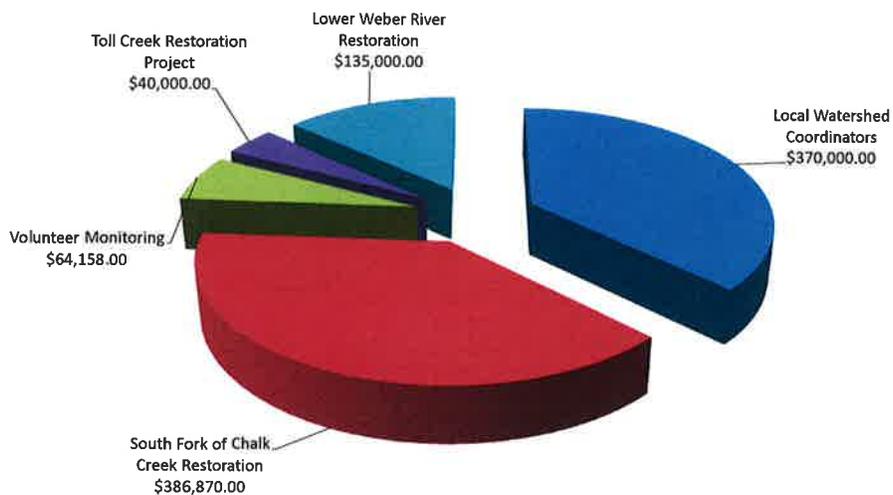
The slide features four photographs illustrating the Mud Creek Restoration Project. Top-left: A log structure built across a stream to manage erosion. Top-right: A wide dirt road or construction site in a rural landscape. Bottom-left: A dirt road winding through a valley. Bottom-right: A stream bank with a wooden fence and trees.

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State NPS Projects Funded in FY-2018



Section 319 Projects Funded in FY-2018 (Estimated \$996,028)



QUESTIONS

Jim Bowcutt
Utah NPS Program
Coordinator
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801-536-4336

