UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

MEETING MINUTES

Water Quality Task Force

January 9th, 2018
9:00-11:30
195 North 1950 West,
Red Rocks Conference Room

PRESENT:

Jim Bowcutt	DEQ/DWQ
Sonja Wallace	SITLA
Carl Adams	DEQ/DWQ
Tyler Thompson	UDNR
Ellen Bailey	USU
Jay Olsen	UDAF
Gary Kleeman	EPA
Ben Radcliff	USBR
Rhonda Miller	USU Extension
Amy Dickey	DEQ/DWQ
Scott Paxman	Weber Basin Water
Bill Zannotti	UDFFSL
Melissa Noble	UDDW
Jim Harris	DEQ/DWQ
Kerry Schwartz	BLM
Diane Menuz	UGS
Jon Hilbert	JVWCD
Chris Kane	UACD
Sarah Seegert	UDWR
Rhonda Thiele	UDOT
Hugh Hurlow	UGS

I. DISCUSSION

Amy Dickey (Utah Division of Water Quality)- Virgin River TMDL(see presentation)

- *ATMDL has been completed for the North Fork of the Virgin River*
- *The TMDL is for E.coli. While it appears that most of the E.coli loading is coming from the irrigated pastures, septic systems and inputs from wildlife have also been considered in this study.*
- *All the data that was used to develop the TMDL was surface water data. No subsurface data was used in the development of the TMDL.*
- *The DWQ is already seeing results from developing grazing management plans for the pastures.*
- *The data being used for the TMDL was collected by the BLM, U.S. National Park Service, UDAF, and DEQ.*

Rhonda Thiele (Utah Department of Transportation)-UDOT Storm Water Program

- *The Stormwater Program is not an environmental program of UDOT (NEPA etc.). It is a stand-alone program in the maintenance shop*
- *The previous Stormwater program staff was in reality a 20% FTE distributed among 4 regions. They are now in the process of hiring 4 fulltime stormwater staff to be housed in regional offices.*
- *Rhonda's responsibilities include: Outsourcing Storm Water Protection Plans, which are then reviewed by UDOT staff and completing stormwater inspections.*
- *Each of UDOTs snow removal sites are required to have an MS4 permit.*
- *Each time equipment is used it is washed down, and the wash water is stored in a detention basin. Sometimes these ponds will over flow. DEQ is working with UDOT to develop a general permit for brine production, and effluent limits will be assigned. It is difficult to find a way to dispose of the salt brine.*
- *The UDOT spill response team has been very busy as of late. Saftey managers are being educated on what UDOT's responsibility is with those spills. If any enforcement actions result, EPA will be the agency that takes that action.*

- ***TDS increases in many waterbodies in the winter months, but no other options besides salting the roads are available to keep the public safe. Currently 3 different types of salt are being used depending on the location and climate of the roads.***

<u>Ellen Bailey (Utah State University Water Quality Extension)</u> Statewide Information and Education Campaign. (See presentation)

- ***In a current meeting that was held by the I&E subcommittee of the Water Quality Task Force Three topics were identified as topics that will be addressed during this statewide I&E campaign. They are: septic systems, small farms, and human waste in recreational areas in southern Utah. Wetlands were also discussed as a possible topic, but the committee is not sure the direction that will go yet.***

<u>Hugh Hurlow (Utah Geological Survey)</u> Tintic Valley Pinyon/Juniper Removal Study. (See presentation)

- ***In recent history there has been 300% encroachment of PJs in the West***

- ***UGS is currently conducting a study in a treatment area in Tintic Valley to help determine the benefits of large scale PJ treatments. The majority of the study currently focuses on spring flow before and after the treatments.***

- ***Surface flow is being analyzed as well as subsurface water. Various wells have been drilled to monitor the aquifer in the area.***

- ***The results of this study will be ready in the next few years.***

- ***Utah State has done similar studies in the Weber Watershed, near Deseret Land and Livestock***

- ***In the future, Tebbs springs and Rocky Pass in the Grouse Creek Area will be studied.***

II. ADDITIONAL ITEMS

- March 8th will be the date of the Agency Coordination Meeting, and will be held in place of the Water Quality Task Force Meeting.

- Any updates to the utahcleanwater.org website should be sent to Ellen Bailey.

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

North Fork Virgin River *E. coli* TMDL
Water Quality Task Force Meeting
January 9, 2018

Amy Dickey
Utah Division of Water Quality

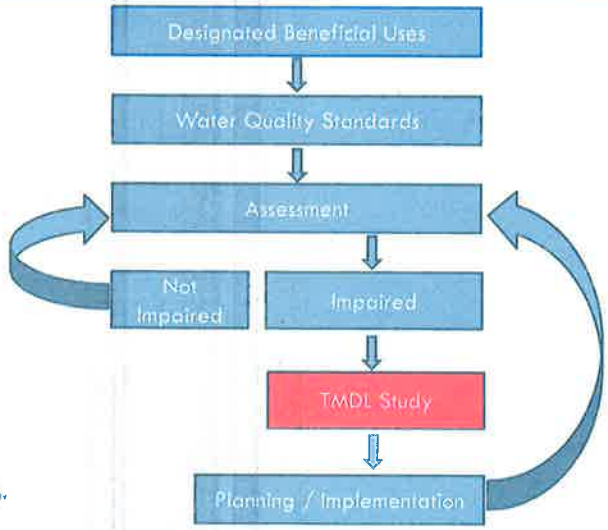
Overview of Presentation

- TMDL Background
- Specifics of the North Fork Virgin *E. coli* TMDL
- Next Steps/Timeline

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

TMDL Background

Restoration Approach



UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

TMDL Process

- Identify sources of pollutants
- Define the water quality goal and allocate loads
- Implement management practices to achieve standards
- Monitor and modify the plan as needed

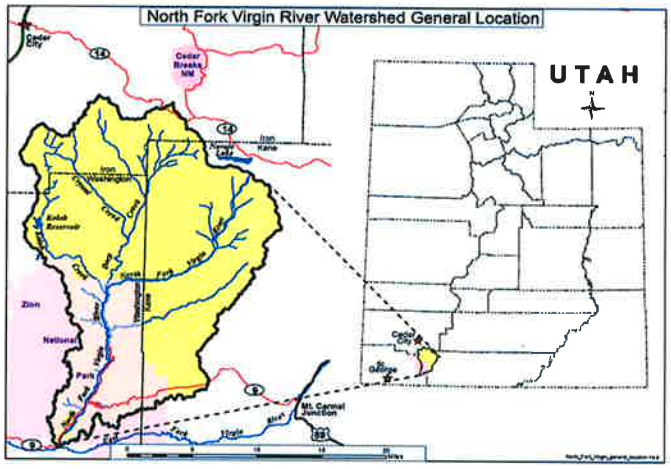
TMDL = LA + WLA + Margin of Safety

- LA = Load Allocations from nonpoint sources
- WLA = Waste load allocations from point sources
- Margin of Safety = To account for environmental variability

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

North Fork Virgin River
E. coli Impairment

North Fork Virgin River



UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

North Fork Virgin Beneficial Uses

- Class 1C: Drinking Water
- Class 2A: Frequent Primary Contact Recreation
- Class 3A: Cold Water Fishery
- Class 4: Agricultural Uses

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Impairment

North Fork Virgin River 303(d) listed for *E. coli*

Upper Assessment Unit: 2010

- North Fork Virgin River from Deep Creek confluence to headwaters

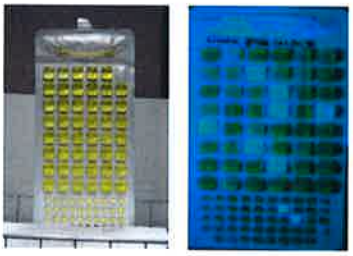
Lower Assessment Unit: 2012

- North Fork Virgin River from confluence with East Fork Virgin to Deep Creek

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

E. coli Background

- *E. coli* (Escherichia coli) inhabits the lower intestine of warm-blooded animals
- Most *E. coli* strains are harmless, but some can result in illness
- *E. coli* comes from fecal contamination



IDEXX Colilert trays

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

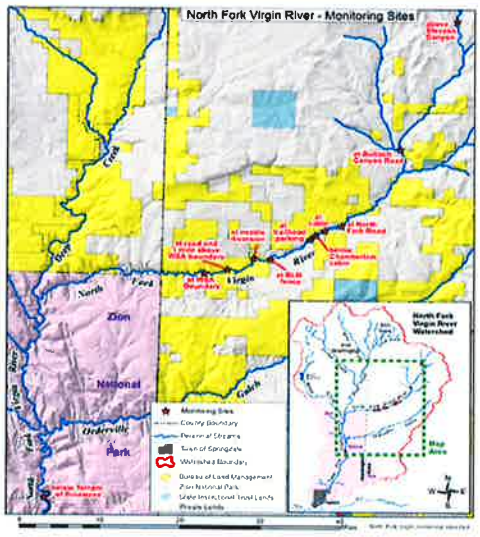
Zion Narrows – Natural Wonder of Utah

- 400,000+ visitors in 2016
- 3,000+ Narrows campers / year
- 2,000+ Narrows hikers / year

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

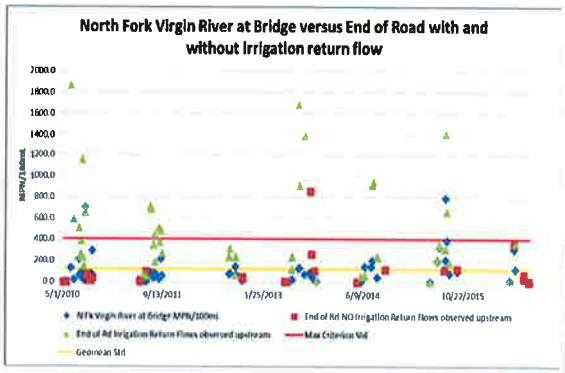
Monitoring

- Ongoing since 2010
- Collected by DWQ, Zion NP, and BLM
- Multiple sites throughout upper watershed



UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

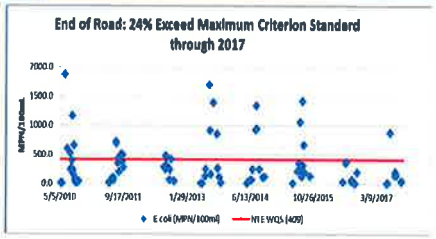
Irrigation Return Flows

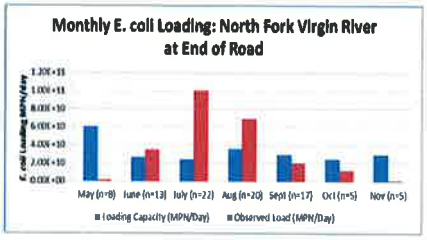


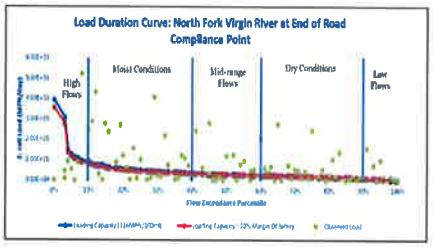
Site Description	n	Minimum E coli concentration (MPN/100mL)	Maximum E coli concentration (MPN/100mL)	Geometric Mean All Samples (MPN/100mL)
Return Flow South at Narrows Trailhead	18	185	11,199	661
Return Flow North at Narrows Trailhead	26	12	7,270	238
Return Flow South upstream of old cabin	5	2	17,329	180
Return Flow South at Cabin on BLM	19	6	5,794	396
Return Flow above WSA at End of Road	27	5	6,131	581

North Fork Virgin River
E. coli TMDL

Data Analysis for End of Road

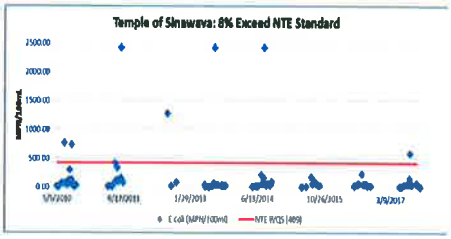


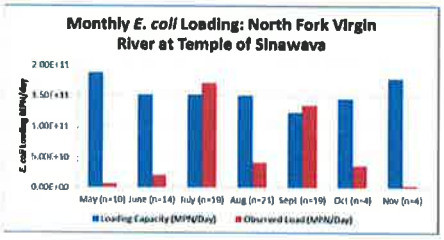


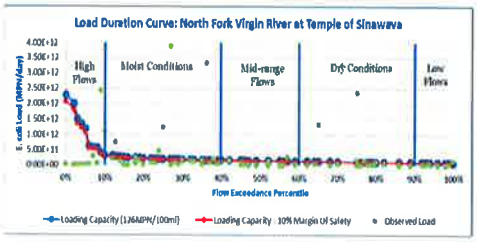


UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Data Analysis for Temple of Sinawava







UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Source Assessment

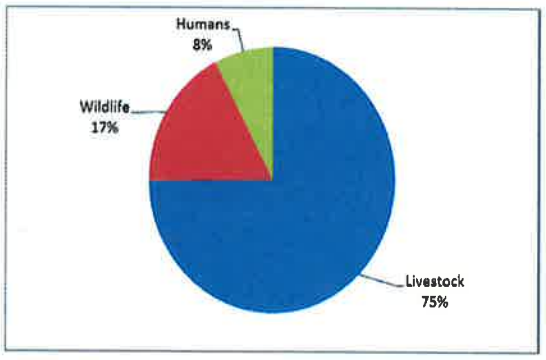
Evaluate all potential sources of E. coli in the watershed

Human

Wildlife

Livestock

Source Estimate Summary



Animal*	Bacteria Production Rate (cfu*/animal/day)
Humans	2.00×10^{9}
Elk	3.30×10^{10}
Bighorn Sheep	1.20×10^{10}
Deer	3.50×10^{9}
Cows	3.30×10^{10}
Sheep	1.20×10^{10}
Horses	4.20×10^{10}

*all literature values were taken from Zeckoski et al. 2005

*cfu = colony forming unit

Water Quality Restoration Strategy

- Improve/Increase Streamside Vegetated Buffers
- Riparian Fencing
- Analysis of Septic Systems
- Irrigation System Improvements
- Outreach/Education Programs

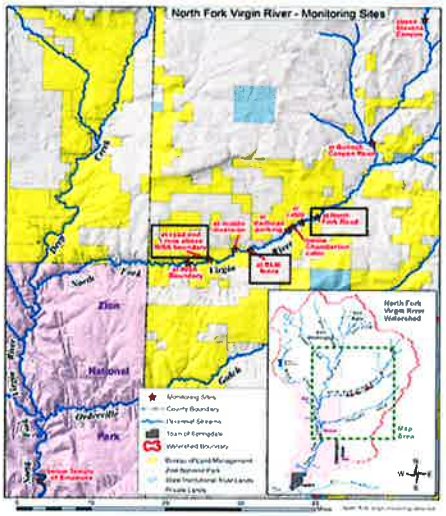
UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

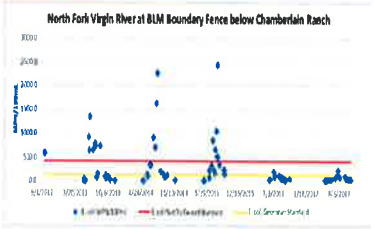
Accomplishments To Date

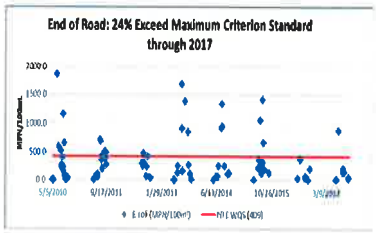
- Trailhead Outhouse
- Chamberlain Ranch Grazing Management Plan
- Changes in grazing practices
- Removal of outhouse over canal
- Irrigation water management / Flow measurement
- Continued coordination and monitoring by multiple agencies

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Water Quality Improvement







Next Steps and Timeline

What's next?

Read and comment on draft TMDL by January 19th

https://deq.utah.gov/ProgramServices/programs/water/watersheds/approvedtmdls.htm

Timeline

Approximate Date	Task
December 2017	Draft TMDL
December 20-January 19	30-day comment period
February 28, 2018	Water Quality Board for preliminary approval, initiate rulemaking
March-April 2018	Rulemaking process with public comment
May 2018	Water Quality Board to request adoption into rule
May 2018	Submit final TMDL to EPA for approval

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

Questions?

Contact Information:
Amy Dickey, Lower Colorado Basin Watershed Coordinator
adickey@utah.gov
801-536-4334

Statewide Water Quality Outreach Camapign

Updates 1.9.2017

Three Topics

- Septic Systems (owner focused)
- Small Farms/Homeowners with a few animals
- Human waste on trails

- Each has a target area to start the campaign.
- Wetlands was a 4th topic idea, but do not have much follow-up

Septic systems

- Pineview Reservoir
  - area is growing
  - listed for low DO, eutrophication
  - Septic maintenance – one area for improvement
- Target septic owners
  - most education currently to the septic installers
  - Stress cheaper to maintain than replace

Small Farms/Homeowners

- Box Elder/Cache Counties
  - Has a large number of small farms or homeowners with a couple animals
  - Many of these are adjacent to streams
- Not well educated on BMPs to protect the waterways from animal waste and damage to streams.

Human Waste on Trails

- Zion National Park
  - 4 million people visiting the park
  - Human waste becoming an issue due to the massive amount of people using the trails
- Go out to the trailheads to interact with the visitors
- Could be a low cost social media campaign

Campaign Plan

- Three step process

1. Use surveys to assess current behavior and knowledge in target areas
2. Develop materials for campaign (depends on target audience)
   - Signs, videos, handouts, social media, tie into current materials (i.e. Slow the Flow), etc.
3. Follow up – measure outcomes of campaign

- Materials will be adapted for additional regions statewide
- Still collecting initial information/data already collected on these topics

GROUNDWATER MONITORING OF PINYON-JUNIPER TREATMENT PROGRAMS

UGS Groundwater & Wetlands Program

Hugh Hurlow, Lucy Jordan, Stan Smith, Emily McDermott, Miles McCoy-Sulentic, Ethan Payne

Funded by Utah's Watershed Restoration Initiative and Utah Division of Water Quality Nonpoint-Source Program

- P-J Forest Encroachment and Treatment Programs
- Previous Studies -- Central Oregon
- Hydrologic Effects of Encroachment and Treatment
- UGS Approach to Groundwater Monitoring of Treatments
- Study Areas: Tintic Valley, Grouse Creek Mts, Montezuma Creek

UTAH GEOLOGICAL SURVEY geology.utah.gov

Downward Encroachment of Pinyon-Juniper Forests

Fire suppression
Climate change
Overgrazing

- Increased fuel loads
- Decreased available water
- Decreased ground cover
- Increased erosion
- Decreased biodiversity
- Decreased groundwater recharge

Wildfire Hazard

Invasive Species

Reduced Sage Grouse Habitat

UTAH GEOLOGICAL SURVEY geology.utah.gov

USBLM and UDWR have implemented large-scale (millions of acres eventually) removal of juniper and pinyon from sage steppe, for restoration of sage grouse habitat and wildfire risk reduction.

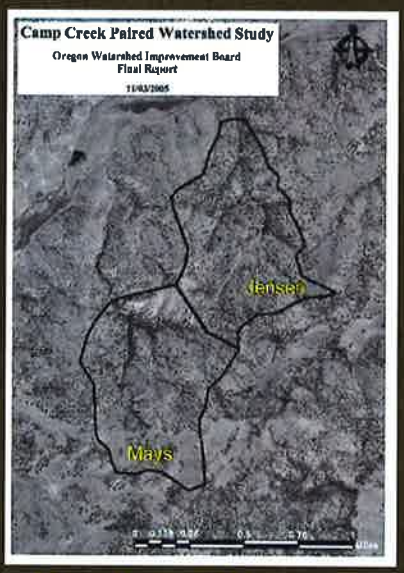
Before and After Photos of a Restoration Project in Northeastern Utah

Before: This area of Clay Basin was overrun by Pinyon Juniper, which was destroying grasses and other native plants.

After: The area is now more suitable to wildlife because of the re-emergence of grasses and other vegetation that was being threatened by the pinyon juniper.

UTAH GEOLOGICAL SURVEY geology.utah.gov

CENTRAL OREGON EXPERIMENT
OSU Extension



West section of Mays watershed prior to juniper harvest (6/29/05).

West Section of Mays watershed after juniper harvest (11/2/05).

Mean elevation 4500 feet
Mean annual precipitation 13 inches
~300 acres each

UTAH GEOLOGICAL SURVEY geology.utah.gov

CENTRAL OREGON EXAMPLE STUDY
Spring Discharge

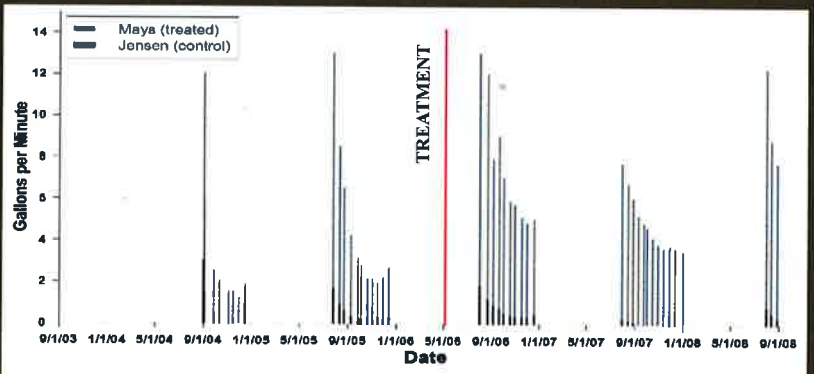
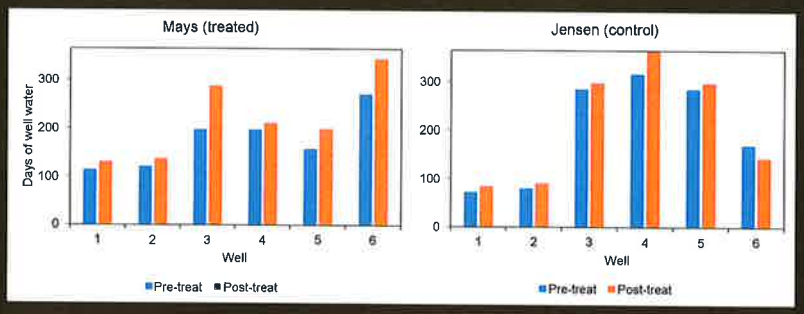


Figure 2. Differences in late season spring flow before and after treatment.

UTAH GEOLOGICAL SURVEY geology.utah.gov

CENTRAL OREGON EXAMPLE STUDY
Well water availability



Additional Changes:
- Increased late-season intermittent streamflow
- Increased minimum and average soil moisture

UTAH GEOLOGICAL SURVEY geology.utah.gov

HYDROLOGIC EFFECTS OF JUNIPER TREATMENT

A. Reduced Transpiration – JUNIPER >> SAGE + GRASS

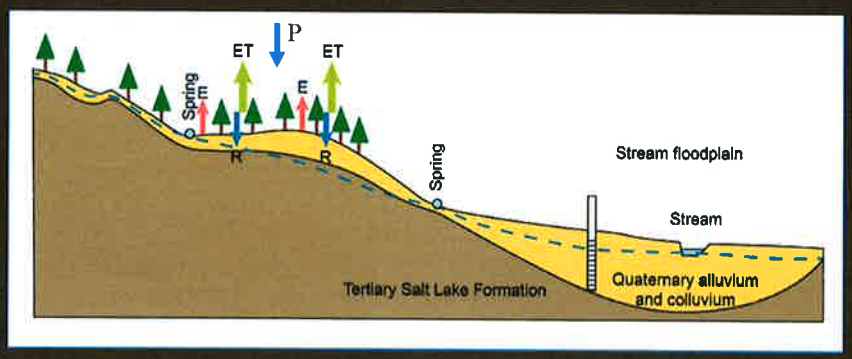
B. Reduced Interception – More snowmelt reaches ground

C. Increased Evaporation/Sublimation of Snowmelt – Less shade, but intercepted snow also evaporates

D. Runoff and Erosion – Greater right after treatment, decreasing as successor plants establish

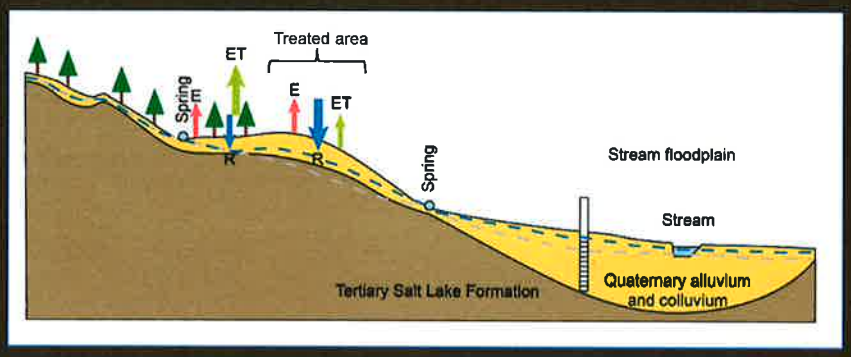
UTAH GEOLOGICAL SURVEY geology.utah.gov

Pre-treatment Hydrogeology



UTAH GEOLOGICAL SURVEY geology.utah.gov

Post-treatment Hydrogeology



UTAH GEOLOGICAL SURVEY geology.utah.gov

PROJECT DESIGN

- Test hypothesis that removing juniper leads to increased groundwater recharge and improved water quality.
- "Paired-Basin Approach" - Monitor a nearby untreated watershed as a control for climate-related changes.
- 5-year project - Begin monitoring at least 2 years before cutting to establish baseline response of groundwater to climate variability. Monitor at least 2 years after cutting.
- Monitor climate, spring flow, stream base flow, shallow groundwater, soil moisture, weather, wetlands, chemistry, and stable-isotope composition.
- Estimate changes in recharge in treated areas, accounting for variations in precipitation, snowpack, and temperature.

UTAH GEOLOGICAL SURVEY geology.utah.gov

- TOOLBOX – Tailor equipment and strategy to local conditions
  - Climate
  - Streamflow
  - Spring Flow
  - Shallow Groundwater
  - Soil Moisture
  - Vegetation
  - Chemistry
  - Statistical Analysis

- CLIMATE: Nearest existing station (WRCC Co-op or NRCS SCAN) or install new small station.

UTAH GEOLOGICAL SURVEY geology.utah.gov

- STREAMFLOW: Install flume or weir above & below treatment area; observation & temperature sensors for intermittent flow.

- SPRING FLOW: Install flume and/or by hand (timed filling).

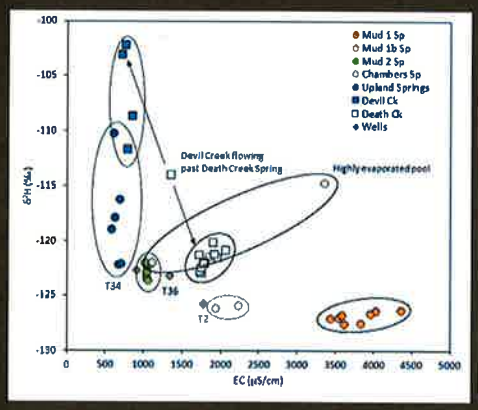
Flume in Death Creek below Death Creek Spring

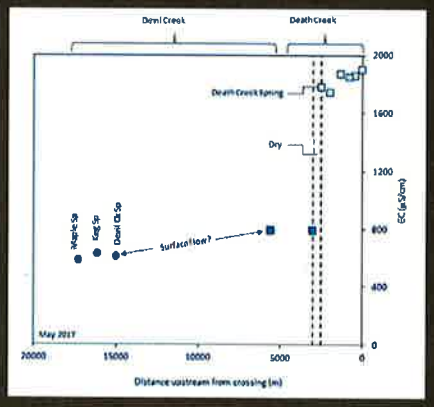
Lucy Jordan installing tipping bucket flume at Mud Spring 2

UTAH GEOLOGICAL SURVEY geology.utah.gov

- SHALLOW GROUNDWATER: Install piezometers to measure gradients or groundwater-surface water interaction.
- SOIL MOISTURE: Below root zone in upland forested areas to measure recharge to groundwater table; in root zone adjacent to groundwater-supported wet meadows to test possible expansion due to greater discharge.
- VEGETATION: Establish survey plots in upland forest, wet meadow, and aquatic settings.

- CHEMISTRY: Measure seasonal variations and post-treatment changes in major solutes, stable isotopes, and tritium to detect changes in local recharge; mixing models to quantify.



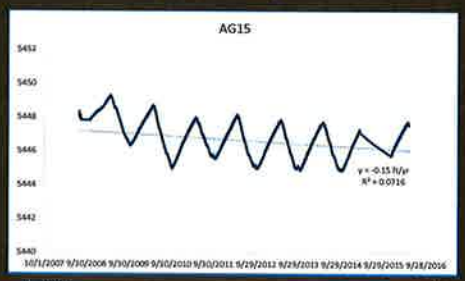


UTAH GEOLOGICAL SURVEY geology.utah.gov

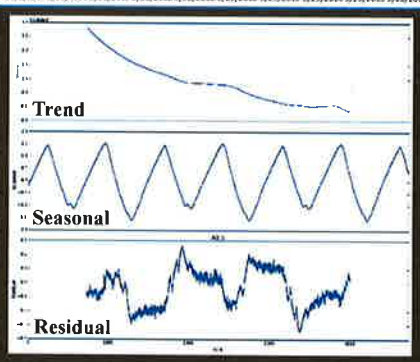
- DATA ANALYSIS: Time series decomposition - Look for changes in established patterns/ response of hydrologic system to climate variations (continuous monitoring).

Snake Valley

Transducer Data



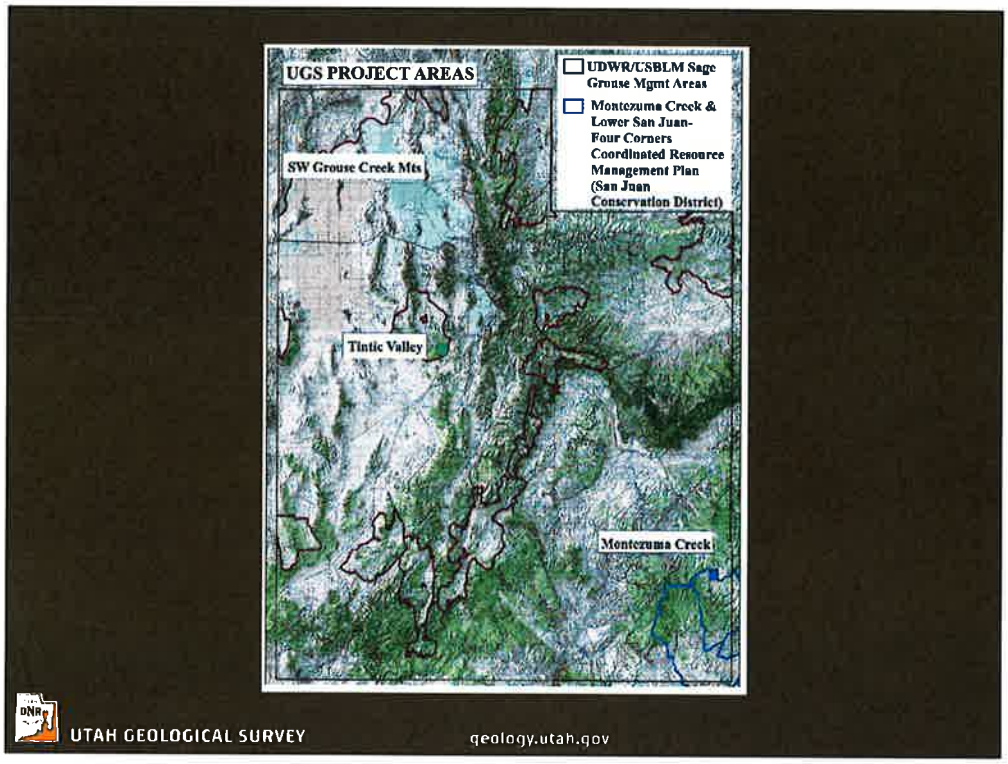
Trend-Decomposition Analysis

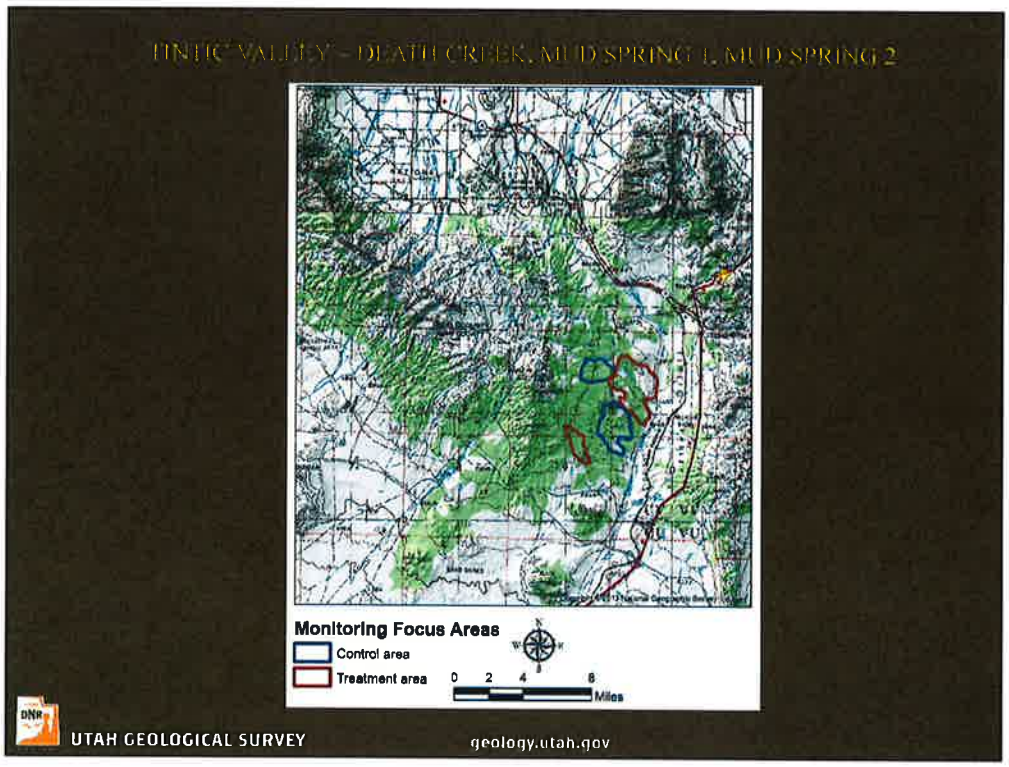


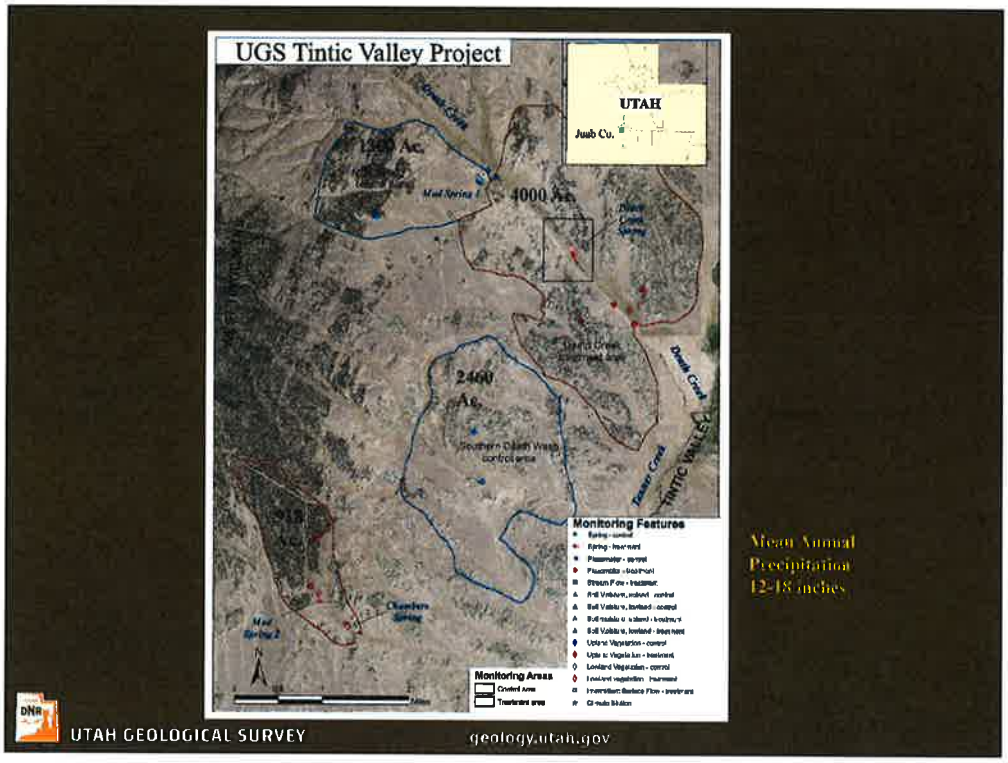
Tintic Valley

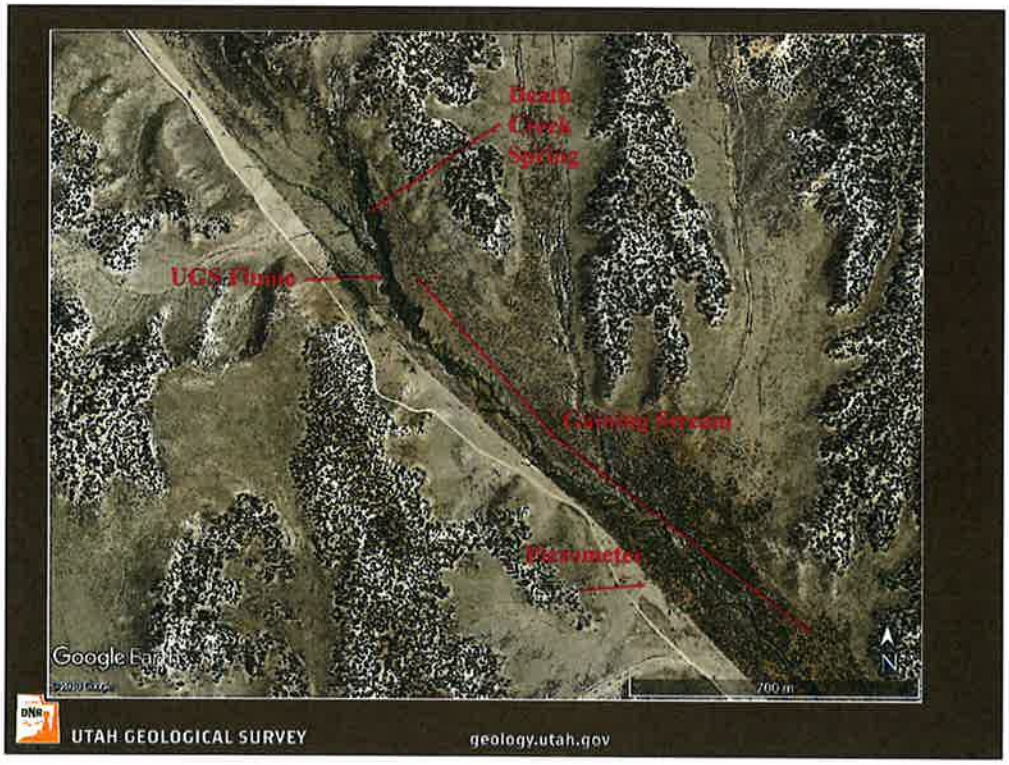
PROJECT AREAS

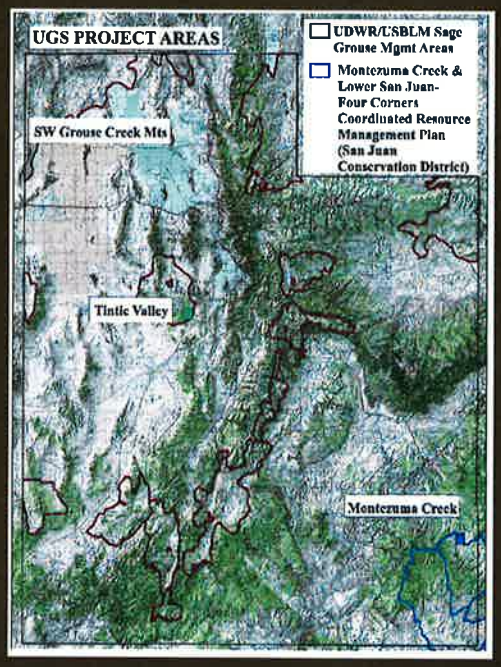
- Tintic Valley
  - In progress: treatment scheduled for 2020
  - Paired Springs
  - Death Creek - surface water-groundwater interaction, dilution
  - Upland and wet meadow vegetation and soil moisture
- Grouse Creek Mts.
  - Two sets of paired springs
  - Piezometers in valley fill
  - Piezometers at spring heads
- Montezuma Creek
  - Early planning stages
  - Treatment is part of a Watershed Coordinated Resource Management Plan


UGS PROJECT AREAS
UDWR/USBLM Sage Grouse Mgmt Areas
Montezuma Creek & Lower San Juan-Four Corners Coordinated Resource Management Plan (San Juan Conservation District)
SW Grouse Creek Mts
Tintic Valley
Montezuma Creek
UTAH GEOLOGICAL SURVEY
geology.utah.gov


TINTIC VALLEY – DEATH CREEK, MUD SPRING 1, MUD SPRING 2
Monitoring Focus Areas
Control area
Treatment area
0 2 4 8
Miles
UTAH GEOLOGICAL SURVEY
geology.utah.gov


UGS Tintic Valley Project
UTAH
Juab Co.
4000 Ac.
2460 Ac.
Death Creek
TINTIC VALLEY
Monitoring Features
Monitoring Areas
Mean Annual Precipitation 12-18 inches
UTAH GEOLOGICAL SURVEY
geology.utah.gov


Death Creek Spring
UGS Flume
Gaining Stream
Piezometer
Google Earth
700 m
N
UTAH GEOLOGICAL SURVEY
geology.utah.gov



PROJECT AREAS

- Tintic Valley
  - In progress; treatment scheduled for 2020
  - Paired Springs
  - Death Creek - surface water-groundwater interaction, dilution
  - Upland and wet meadow vegetation and soil moisture
- Grouse Creek Mts.
  - Two sets of paired springs
  - Piezometers in valley fill
  - Piezometers at spring heads
- Montezuma Creek
  - Early planning stages
  - Treatment is part of a Watershed Coordinated Resource Management Plan

UGS PROJECT AREAS
UDWR/USBLM Sage Grouse Mgmt Areas
Montezuma Creek & Lower San Juan-Four Corners Coordinated Resource Management Plan (San Juan Conservation District)
SW Grouse Creek Mts
Tintic Valley
Montezuma Creek