

THE 2021 UTAH WATER USERS WORKSHOP
MAY 17-19, 2021
The Dixie Center, St. George, Utah
<http://conference.usu.edu/uwuw/>

GENERAL SESSIONS

A. CHALLENGES & OPPORTUNITIES IN DNR,UDAF & DEQ

B. UTAH WATER OUTLOOK

Jordan Clayton - NRCS, Glen Merrill - NWS

The speakers will present the current state of weather events and water supply for the 2021 water year. They will discuss in detail weather patterns, precipitation and temperature anomalies, the Utah water supply forecast in addition to current drought conditions.

WORKSHOP SESSIONS

- 1. Water Right Issues of the State Engineer**
Teresa Wilhelmsen

- 2. Special Master Findings & Virgin River Adjudication**
Rick Knuth

- 3. Use of Drone Technology in Agricultural Applications**
Mark Quilter

- 4. Utah Lake Authority Proposal**
Panel

5. Online Process for Water Certificates & Proofs
Blake Bingham

After the approval of an application to appropriate, change application, or exchange application of water the applicant is required to put the water to beneficial use. The applicant, as part of the approval process, is provided a time period to put the water to beneficial use. Once the water is put to beneficial use, the applicant shall submit proof of beneficial use. In cases where the approved application meets certain criteria in lieu of hiring a professional the applicant may submit an Affidavit of Beneficial Use. An Affidavit of Beneficial Use can be submitted using an online tool. This presentation will be discussing when the online tool can be used. And a demonstration will be provided on how to use the online tool.

6. Water Banking
Nathan Bracken & Emily Lewis

7. Where's the Data? - Utah Water Rights - Cancelled

8. Groundwater Management Plan Amendments - Cancelled

9. Adjudication Update - Cancelled

10. Streambed Access Update
Greg Hansen

11. How Geology & Hydrology are Interrelated
Tom Marston

12. Water Infrastructure Funding Opportunities

**R.J. Spencer, Jim Bowcutt, Shalaine Debernardi,
David Snyder and Aimee Rohner**

The Bureau of Reclamation plays a key role in the WaterSMART (Sustain and Manage America's Resources for Tomorrow) program as the U.S. Department of the Interior's main water management agency. Focused on improving water conservation and helping water and resource managers make wise decisions about water use, Reclamation's portion of the WaterSMART program is achieved through administration of grants, scientific studies, technical assistance, and scientific expertise. Through WaterSMART Water and Energy Efficiency Grants, Small-Scale Water Efficiency Projects, and the Water Conservation Field Services Program, Reclamation provides 50/50 cost share funding to irrigation and water districts, tribes, states and other entities with water or power delivery authority. These funding sources are designed to assist entities through planning, design, and water conservation project implementation.

13. Leak Detection Methods for Canals

Justin Rittgers

This presentation begins with a brief overview of geophysics and remote sensing, and then focuses on application of these toolkits for large-scale reconnaissance-level canal seepage detection: Recent research conducted through Reclamation's Science and Technology (S&T) Program has focused on developing new approaches for rapid detection and characterization of earthen canal embankment seepage. One developed workflow involves the use of Normalized Difference Vegetative Index (NDVI) remote sensing data images, combined with rapid (up to 10-15 mph) continuous geophysical profiling surveys conducted along canal embankments. These data are then combined to develop a new "Seepage Index" data attribute that helps to identify locations of canal seepage. Results of this new workflow can help to augment standard visual inspections and can help inform more focused and costly geotechnical investigations and remediation efforts.

14. Secondary Water Metering to Improve Efficiency

Anny Baynard

15. Precision Irrigation Applications

Neil Hansen

6. Agricultural Water Optimization Projects
Jay Olsen

17. Dam Safety Update - Cancelled

**18. Utah Reclamation, Mitigation & Conservation Commission-Provo
River Delta Restoration Project**
Mark Holden

The Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission) is a Federal agency established by the Central Utah Project Completion Act of 1992 to plan and carry out the fish and wildlife mitigation and conservation program for the Central Utah Project's Bonneville Unit. For the past 25 years the Mitigation Commission has accomplished its mission in collaboration with numerous partner agencies and organizations. The presentation provides a brief overview of some of the Mitigation Commission's most notable achievements. The presentation will focus on the Provo River Delta Restoration Project, needed to restore a naturally functioning connection between the Provo River and Utah Lake to facilitate recovery of June sucker, a fish endemic to Utah Lake and listed as a Threatened Species. The current condition of the last 1.5 miles of Provo River does not support a healthy ecosystem as it once did. June sucker are particularly impacted by its deep, channelized condition. By re-routing the mouth of the Provo River and restoring more natural conditions the ecosystem will be improved, providing benefit to many fish and wildlife species in addition to the June sucker, and for human use and enjoyment. The project includes a new public park and recreational amenities such as trails, non-motorized boat access, fishing platforms, a viewing tower, and public access areas with restrooms. Construction began in March 2020 and is expected to be complete in 2024.

19. Spider Mite Management With Water efficient Crops
Dr. Ricardo Ramirez

20. Testing Irrigation Strategies to Stretch Limited Water Supplies

Dr. Matt Yost

Drought is common in Central and South-Central Utah and producers need research-based irrigation strategies to stretch limited water supplies. Various pivot irrigation technologies such as low-elevation sprinklers and mobile drip irrigation have promising water-saving potential; but the investments required for these technologies can sometimes be too great to incentivize producers to adopt. Several well-known and less-expensive strategies exist. These strategies include: regular maintenance of irrigation systems, reducing irrigation rates, and advanced irrigation scheduling. Although these strategies seem simple and straightforward, several irrigation professionals in Utah and the Intermountain West indicate that many growers still struggle to utilize them. Furthermore, many of these strategies have not been tested with experimental rigor. Therefore, the objective of our study was to identify which inexpensive water management strategies may maintain yield with less water. An experiment was conducted at 12 commercial alfalfa (*Medicago sativa* L.) fields in South-Central Utah in 2019 and 2020. Results from these trials will be presented.

21. Day Vs. Night Irrigation in Utah

Dr. Melanie Stock

Balancing water supply with urban population growth is a top challenge in Utah. One widely accepted strategy to conserve water is irrigating at night instead of during the day. However, there is debate on whether this practice saves water – or how much. In this presentation, we will discuss the current urban irrigation needs, reasoning behind the inefficiencies of day and night irrigation times, and the research that Utah State University is conducting to answer the question: is nighttime irrigation more efficient than daytime irrigation?

22. Irrigation Water Depletion Studies

Dr. Niel Allen

Utah House Bill 381 created the Agricultural Water Optimization Task Force. One duty of the Task Force is to identify means, methods, systems, or technologies with the potential to maintain or increase agricultural production while reducing the agriculture industry's water diversion and consumption. Research projects to address this duty is the comparison of consumptive use of drip-irrigated to surface irrigated onions in Weber and Box Elder Counties. Another research project is to evaluate methods to estimate depletion using ground-based soil moisture measurement, weather data, and remote sensing in Iron County. The presentation will discuss methodology and results.

23. Regional Water Conservation Goals

Rachel Shilton & Steve Jones

24. Great Salt Lake Update

Tim Hawkes

The Great Salt Lake Advisory Council commissioned three studies this year that shed light on the lake and its future. The first explored terminal lake systems around the world, highlighting the often catastrophic costs to the environment, local economies, and human health when terminal lakes are lost. The second builds on a 2012 study and evaluates the value of the lake in economic terms for industry, recreation, human health (dust suppression), lake effect snow, and more. The final study explores various future scenarios using the Great Salt Lake Integrated Model (GSLIM), not to predict future conditions so much as to explore what, if anything, can be done to reverse long term declines in lake levels so as to preserve the many beneficial uses that the lake supports. The presentation will summarize these studies and touch on other issues surrounding the lake and what can be done to preserve it.

25. Using Beavers for Groundwater Recharge

Joe Wheaton

26. Where's the Data? (USGS) & A New Web-Based Report of Groundwater Conditions in Utah

Cory Angeroth & Ryan Rowland

Accessing water data collected by the U.S. Geological Survey (USGS) is easier than you may think. The USGS has developed several web-based tools to help you get the data you need in just a few clicks. We will demonstrate several of these easy to use tools and show our improved Utah Water Science Center website, where you can access data, publications, and information regarding active research efforts in Utah. In addition, we will preview the new, web-based format for the annual Groundwater Conditions in Utah Report, which is produced in cooperation with the Utah Division of Water Rights. The new format includes tools for selecting and displaying water level data, groundwater pumpage data, and links to all previous reports dating back to 1964. Providing access to data is an important component of the USGS' mission which is to provide the nation with reliable scientific information to minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect quality.

27. Utah Water Resources Update

Todd Adams

28. State Water Plan Update

Candice Hasenyager

29. Update on Lake Powell Pipeline

Zach Renstrom & Joel Williams

Join us to discuss the need and status of one of Utah's largest water infrastructure project, the Lake Powell Pipeline. The approximately 140-mile pipeline will deliver 86,249 acre feet of Utah's Colorado River water to the state's fastest growing and driest region in the south. Utah's Colorado River water right, water use, conservation and more will be covered. In addition, details on the project's status, timeline and next steps will be shared.

30. Quagga Mussel Update

Nathan Owens

31. Groundwater Recharge Optimization Through Site Selection
David O’Leary

32. Bear River Development & Feasibility Report - Cancelled

33. Provo City Aquifer Storage & Recovery Project
Jeff Davis

34. Human Health Risks from Exposure to Reclaimed Wastewater
Ryan Dupont & Jennifer Weidhauss

Diminished water supplies have resulted in an increased use of treated municipal wastewater (aka secondary water) for urban and agricultural irrigation. While this water is a valuable resource for augmenting water supplies, there is a potential human health risk due to the presence of waterborne pathogens or chemical contaminants in the water. To evaluate this issue, a USDA-NIFA funded project was undertaken to evaluate the abundance of seven pathogens and 12 pharmaceuticals and personal care products (PPCPs) in the Hyrum, UT secondary water system. In this study, the treatment plant effluent, secondary water systems, irrigated vegetable crops, garden soils and aerosols generated during spray irrigation were sampled in spring, summer and fall. Pathogen testing by quantitative polymerase chain reaction (qPCR) and culture-based methods detected the presence of *Escherichia coli*, enterococci, *Salmonella* spp., *Giardia* spp., *Legionella* spp., norovirus and adenovirus in all sample types. The concentration of pathogens ranged from 266 ± 1172 cells or gene copies (GC)/mL in the effluent, 58 ± 465 cells or GC/mL in the secondary water lines, 5.3 ± 6.4 log cells or GC/g in the vegetable crops, 42 ± 96 cells or GC/g in the garden soils and 31 ± 73 cells or GC/m³ air in the bioaerosol samples. Quantitative microbial risk assessment (QMRA) of five exposure routes revealed unacceptable health risks. The PPCPs evaluated included: Acetaminophen, Caffeine, DEET, Sulfamethoxazole, b-Estradiol, Estrone, Progesterone, Gemfibrozil, Carbamazepine, Triclosan, Fluoxetine and Tris-(2-chloroethyl) Phosphate. Concentrations of PPCPs in the effluent were greater (0.05 to 2.1 µg/L) than those found in the distribution line (0.02 to 1 µg/L), but surface water from Porcupine Reservoir also contained 0.01 to 0.6 µg/L PPCPs. More PPCP partitioned to vegetable flesh (nine PPCP above minimum detection limits [MDL]) than to vegetable skins (five PPCP above MDLs). Although detected in multiple sample types, the risks due to PPCP exposure were found to be insignificant, making risk reduction from pathogen exposure the priority for risk management for this reclaimed wastewater.

35. Geomorphology & Geochemistry of Pah Tempe Hot Springs

Tom Marston

**36. Mapping Groundwater Levels & Chemistry Near Great Salt Lake
Cancelled**

37. Source Water Protection Implementation

Deidre Beck

Drinking Water Source Protection (DWSP) has been a regulatory requirement in the State of Utah for many decades. Despite its long history, most public water systems see source protection as another checkbox requirement. Oftentimes plans are only "dusted off" every six years when an update is due. This presentation will discuss the importance of fully implementing your source protection plan, how to be an active member of the source protection team, and why source protection is so important in a multi-barrier approach to ensuring safe drinking water. Changes to the Improvement Priority System (IPS) rule will be discussed as it relates to drinking water source protection and plan implementation. Examples of effective and implementable land management strategies, for controlling potential contamination sources, will be offered, including failures and recent success stories.

38. Septic System Issues & Solutions

Robert Beers

Septic System Issues and Solutions addresses wastewater issues facing several Utah communities. This presentation discusses septic system impact to ground and surface waters. Installing public sewer systems is expensive and can take years to accomplish. Potential models for easily and inexpensively transitioning from the use of septic systems to public sewer will be shared.

39. Update on Harmful Algal Blooms

Kate Fickus

40. Headwater Nutrient Criteria

Jeff Ostermiller

41. AFO-CAFO Program Update

Don Hall & Hannah Freeze

"The Division of Water Quality (DWQ) in partnership with the Utah Department of Agriculture and Food (UDAF) is pleased to introduce the Agricultural Voluntary Incentive Program (AgVIP) to help farming operations develop Comprehensive Nutrient Management Plans (CNMPs) that assist in maximizing crop yields while staying in compliance with State water quality regulations. Participants in the AgVIP will have the opportunity to sit down with Certified Nutrient Management Planners from UDAF to develop a CNMP specific to their operation. As an incentive to participate, DWQ has agreed to pay each producer a one-time \$1,000 payment to develop a CNMP with a UDAF planner. Once the plan is complete and the CNMP can be implemented, DWQ will then pay the producer \$12/ac. for each acre covered under their CNMP for a 3-year period. At the end of each year the producer will sit down with their Nutrient Management Planner and review soil tests, manure tests and manure application records. Applications for AgVIP will be accepted through July 31, 2021. If you are interested in participating in the program please contact Hannah Freeze (hfreeze@utah.gov) or Jim Bowcutt (jdbowcutt@utah.gov)"

42. Soil Health & Water Quality

Sara Saunders & Terron Pickett

Some of today's agricultural practices can lead to water quality issues by increasing soil erosion and runoff if not managed properly. Soil health, often called soil quality, is a framework of practices focused on increasing the capacity of soils to minimize the impact on water quality. We will review the principles of soil health and discuss a series of tests and indicators that the NRCS uses to assess soil quality in the field. Finally, we will review how the NRCS provides assistance to farmers and private landowners to implement certain practices designed to improve soil health.

43. History of John Wesley Powell & the Colorado River

Jonathan Clegg

On May 24, 1869, Major John Wesley Powell and 9 crew members embarked on an unprecedented expedition to explore the Green and Colorado rivers from Green River, Wyoming to the mouth of the Virgin River. This 98 day journey traversed over 1000 river miles, descended over 4800 feet in elevation, cost the lives of 3 men, and forever changed the history of the West. Come and learn about Powell and his party and some of the adventures of their historic odyssey.

44. Best Practices in Safety & Risk Management for Canal Companies

Brian Child & Steve Cain

45. Shared Stewardship

Laura Ault & Tyler Ashcroft

Managers and owners of forested land in the western United States face many challenges, among them catastrophic fires, climate change, drought, insects and disease, and invasive species. Of particular concern are longer fire seasons and the increasing size and severity of wildfires, along with the expanding risk to communities, water sources, wildlife habitat, and air quality. In order to address these concerns at a landscape-scale, the State of Utah (State) and the USDA Forest Service (Forest Service) entered into a Shared Stewardship Agreement on May 22, 2019. Under the agreement, the State and Forest Service are focusing on landscape-scale forest restoration activities that protect at-risk communities and water resources in scientifically identified priority watersheds. Shared Stewardship is about identifying priorities and combining resources to achieve cross-boundary outcomes using every available authority and tool to improve forest health. Approximately \$10 million has been invested in Shared Stewardship from 2019 to 2020 by the USFS and State. It is estimated that another approximately \$6 million will be invested in Shared Stewardship 2021. While we are a long way from reversing current fire trends, we have made a start, and we believe we are on the right course.

46. Down Listing Conservation Reliant Species in Utah

Chris Keleher & Paul Thompson

47. Regional Conservation Projects - Cancelled**48. Mt. Pleasant Watershed Project**

Tracy Allen & Bryce Wilcox

49. Pole Creek & Bald Mountain Fire Disaster Recovery

Darin Robinson & Peter Quittner

50. Drinking Water Update**Tim Davis**

51. Colorado River Authority Update**Gene Shawcroft**

52. Legislative Update**Jeff Gittins**

Attorney Jeff Gittins will provide an update on water legislation from the 2020 legislative session, including bills on secondary water metering, water banking, change applications, forfeiture, watershed councils, and State water policy. Additionally, Mr. Gittins will discuss recent legal cases in Utah dealing with water, and how court decisions in these cases impact Utah water law.

53. Deer Creek Valve Replacement**Jeff Budge & Andrew Mckinnon**

54. Benefits & Costs of Real Time Water Management**Amy Green**

Water managers are faced with a variety of uncertainties. Short-term uncertainties include water supply (drought, flooding) and rapidly changing weather conditions. Longer-term concerns include climate change, future government regulations, and demand uncertainties. One of the most cost effective means for dealing with these uncertainties are real-time technologies. They are a necessity for enhanced water management. And a critical need for activities like water banking.

The Emery WCD has a complex real-time monitoring and control system in place. The system is very dynamic and growing in both the number of sites and system capabilities. The system was initiated in 1992 with 13 monitoring sites. It has since expanded to over 400 sites. The system now extends from the watershed all the way down to the individual irrigation connections. The Utah Division of Water Resources recently funded a study to evaluate the costs and benefits of the Emery real-time monitoring and control system. This session will present the results of that study, and anticipate where this system and systems state-wide will go in the future.

55. Idaho Perspectives on Title Transfer & Water Banking**Paul Arrington**

56. East Layton Pipeline Rehabilitation Project
Darren Hess

This presentation is an overview of the construction of the trenchless rehabilitation of a 1.5 mile, 30-inch and 27-inch drinking water pipeline with a “partially deteriorated” host pipe, with an emphasis on the design and constructability lessons learned. The selected rehabilitation method used during design was a tight-fit HDPE liner. Steep slopes (>0.40), nonstandard host pipe diameter sizes, and inconsistent grouting at joint locations resulted in liner design and installation approach adjustments during construction.

This project was the first tight-fit HDPE liner installation for a large diameter drinking water pipeline in the state of Utah. This project overview will be interesting for pipeline designers and asset managers faced with the challenge of rehabilitating deteriorating infrastructure.

57. Water Loss & Accounting
Todd Stonley & Shazelle Terry

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58. PFAS Water Treatment Study - Comparison of GAC to Single Pass Ion Exchange
Katie Wolohan

59. Deer Creek Intake Project
**G. Keith Denos, Deon Stockert,
Jeff Budge & Brad Jorgnesen**

60. New Water For Utah & More
Don Thomason & John Krazcek

What if there were a source of water here in Utah that is currently overlooked? What if there was a new technology that allowed this water to be used not only for irrigation but because it is so clean it can be used as secondary water and even drinking water? SREUS, an emerging technology, transforms contaminated water such as sewage and of great interest in this state, oil production water, and other waste streams, like dairy wash down water, capture the energy out of it for electrical production and in the process produce not only distilled water but BRAND-NEW water molecules out of biohazards and hydrocarbon waste. Come and find out how SREUS can create millions of new gallons of water per day as well as electrical energy.

61. Canals Plus Trails - Considerations and Opportunities
Matthew Crump

Canal corridors offer potential opportunities for building walking/biking trails because they are existing linear transportation routes, have minimal grades, and connect communities. Based on ongoing research and interviews with canal operators and other stakeholders, the presentation will explore the possible benefits, tradeoffs, and considerations for a canal company in allowing a trail in the canal corridor. Trail options for enclosed as well as open channel canals will be explained. Potential funding sources, typical license agreements, and common cross-sections will also be highlighted.

62. Guest Program - I Am Me, Mind & Body
Autumn Mackey

Autumn Mackey is a health and fitness coach for her business, I Am Me, Mind and Body. She believes that finding joy in movement, making peace with food, and learning that you have the ability to manage your mind are the foundation of a healthy body and a happy life. It is her passion to help others embrace who they are now and discover that the best way to be amazing is by simply being your self.
