

#	The Conversation	Table Host	Abstract
1	Rediscover natural water storage for fun and profit	Amy Chadwick Ecologist, Great West Engineering	Got water? Great! How about 20 years from now? Are you taking advantage of the ample inexpensive opportunities to keep water around for more of the year? If you are interested in learning or sharing knowledge about the state of our source waters, how to keep water on your land, and what we can do to keep our streams flowing, join Amy Chadwick, Stream and Wetland Ecologist at Great West Engineering for a discussion about trends in headwaters and water supply, restoration techniques, permitting hurdles, and management approaches for improving natural water storage.
2	Soil and Water Make More Than Mud: Soil Health and Water in Montana	Ann McCauley Associate Director, Soil and Water Conservation Districts of Montana	Join Ann McCauley, Associate Director with the Soil and Water Conservation Districts of Montana, for a discussion on the role healthy soils play in water cycling, drought resiliency, and water quality issues. The conversation will highlight the numerous benefits of increased soil organic matter, and will share stories of what Montanans are doing around the state to build soil, hold onto water, and improve their bottom line. Each 1 percent increase in soil organic matter helps soil hold 20,000 gallons or more water per acre. This is equivalent to approximately 3/4" of rainfall!
3	CSKT Water Compact	Chas Vincent Senator, Montana Legislature	Much of the policy discussion surrounding the CSKT Water Compact, unfortunately, is best summed up with a Will Rogers quote: "It isn't what we know that gives us trouble. It's what we know that ain't so." This table discussion will be focused on your questions about the CSKT Compact, and what it means for MT.
4	A Discussion on Water Quality Changes in Montana	Chase Bell Water Quality Monitoring and Assessment Specialist, MT DEQ	Access to clean water is essential to human health and to Montana's economy; it is important this valuable resource remains part of Montana's natural heritage. Join the Montana DEQ Water Quality Division as we discuss water quality changes focused on two uses of Montana's waters, recreation/tourism, and agriculture; and how one's experience has changed over time. An example of a recreational change would be; a favorite lake or river you visit is more frequently experiencing algae blooms severe enough that you may avert from recreating there. Montana's agriculture industry also utilizes Montana's waters. Has there been a noticeable change in water quality that has challenged the way water is being used by producers? An example is; salt concentrations have reached levels where irrigation timing must be changed compared to historic use; or in a different circumstance, nuisance plant growth is more frequently clogging irrigation outtakes or canals. Many times, changes in water quality are triggered by siffs in water quality or changes in land and water use upstream. Join our discussion about any noticeable water quality changes you have observed.

5	Watershed Organizations, the State Water Plan, and Water Quality Planning	<p>Dave Shively Executive Committee, Clark Fork and Kootenai River Basins Council</p> <p>Erin Farris-Olsen, Executive Director, MWCC</p>	<p>For nearly 17 years the Clark Fork Task Force was empowered under statute to develop basin water management plans to contribute to the State of Montana’s State Water Plan, and the Task Force model was recently utilized by the state in the creation of councils for the Yellowstone and Missouri Basins for the purpose of plan development in those basins (also specified in statute). Given the important roles that watershed organizations play in the state’s river basins (planning, watershed restoration, water management, water quality), and considering the fiscal challenges faced by state agencies including the DNRC and DEQ, how can we improve agency-group coordination to achieve common objectives? Better defining the statutory authority of watershed organizations to aid in the implementation of the State Water Plan and other water management activities is recommended.</p>
6	What the Hell is Happening to the Smith River?	<p>David Stagliano Aquatic Ecologist, MT Biological Survey</p>	<p>Many of Montana’s Rivers have been experiencing unprecedented changes in annual discharge and water temperatures due to highly fluctuating climatic and weather patterns. In this case study from the Smith River, Montana, we use USGS gauge data, fisheries, algae and macroinvertebrate data to 1) evaluate when these physical changes began to affect these communities on a decadal scale, 2) how they have established this new shifted baseline on which we judge aquatic biological integrity on the river and 3) discuss ways to pull the Smith River out of this downward spiral.</p>
7	Integrating Traditional Ecological Knowledge with Western Science for Optimal Agricultural Resource Management Plan	<p>Dawn AimsBack Water Policy Planner, Blackfeet Tribe- Agriculture Resource Management Plan (AMRP)</p>	<p>The valuable oral history that is passed down through one generation to the next sets a tone that echoes the relationship between environment and the Amskapi Pikuni (The Real People- Blackfeet). Dawn Delaney- Aims Back reflects on the conversation on Farmers/ Ranchers and the need to conserve the land with high respects to culture in mind. This approach allows to observe the natural process and incorporate it into modern day management, through the concept of Traditional Ecological Knowledge and Western science; the two sustain and blend the notion for overall healthy ecosystems and adequate water management.</p>
8	Arts Spark Conservation Conversations	<p>Dede Taylor Founder and Producer, Mountain Time Arts</p>	<p>At Mountain Time Arts we produce bold public art events that enliven relationships to the history, culture and environment of the Rocky Mountain West. As SW Montana grows explosively, we use art to spark new ideas while sharing perspectives. The 3-year series WaterWorks brings creativity to conversations about resource sustainability. We collaborate with artists, scientists, conservationists, members of the agriculture, fishing, and Native American communities. From their voices, we produce bold and surprising performance, video installation, and visual art works set in the landscape. Jim Madden and Dede Taylor, co-founders of MTA with Mary Ellen Strom, will share how they merge arts and science in a unique approach to grappling with environmental challenges. We’re a resource for conservation, giving a boost to climate data with experiences that inspire people to become active citizens – and we do some pretty cool stuff! View our website, mountaintimearts.org, and join us at the table!</p>

9	Irrigation and Groundwater Recharge	<p>Ginette Abdo Ground Water Investigation Program, Manager, MBMG</p>	<p>Irrigation that occurs on only 2% of Montana’s total land mass has a profound effect on Montana’s groundwater and surface water. The USGS estimates that of the 10.4 million gallon/day used for irrigation about 2.2 million gallon/day is consumed leaving about 8.2 million gallons/day (about 79%) that is potentially available for groundwater recharge and irrigation return flows to streams. This recharge has changed the natural historical interactions of recharge and discharge creating new hydrologic systems that we now expect as the norm. This new recharge can raise groundwater levels and alter the amounts and timing of stream baseflow. Recharge water comes from ditch leakage as well as excess applied irrigation water not consumed by crops. What are the implications of expecting this to continue as the norm even as land-use changes reduce irrigated acres? This and other considerations are up for discussion.</p>
10	Dams, Damns, and Dynamos	<p>Gordon Brittan Development Officer, Cat Creek Energy</p>	<p>Basic facts: Hydropower supplies roughly 36% of Montana's total electricity production, six of the ten largest generating plants in the state are dammed, they satisfy basic needs. But dams are damned: they have all kinds of bad environmental impacts and there are few places to put new ones. An available option is to develop analogous off-stream facilities. They satisfy the three basic dam needs - electricity generation, flood control, when-need water - without the unwanted side effects. Ideally water is pumped from existing to new reservoirs using wind and solar sources. Result: fully-renewable grid-scale load-following water and kinetic energy storage that balances intermittent wind and solar, mitigates floods, and supplies water even in climate-change-bound times.</p>
11	Utilizing Beaver Mimicry to Improve Watershed Health	<p>Graham Gaither Water Policy Planner for Blackfeet Nation ARMP, Big Sky Watershed Corps Member</p> <p>Jacob Levitus</p>	<p>This table discussion will showcase a unique intersection of water and wildlife conservation occurring in the Blackfeet Reservation. As weaknesses in irrigation systems are identified and corrected, higher volumes of water will be utilized for agriculture. A variety of innovative projects and solutions are being developed so that wetlands and other water storage features may be replenished and preserved. In one such project utilizing volunteers from Big Sky Watershed Corps and The Native Science Fellows at Blackfeet Community College, beaver dam analogues will be constructed along various creeks and streams in the Reservation to restore riparian habitat and reintroduce the beaver back into its native habitat. The blockage of creeks slows down river flow while replenishing waters along creek banks, restoring wetlands and increasing water storage, allowing native wildlife and plants to flourish. These processes will not only have economic benefits, but also significant ecological benefits as the beaver and other native flora and fauna return to the area. Innovative projects such as this are essential to increasing economic and ecological independence for The Blackfeet Nation.</p>

12	Wells Going Dry in Western Montana?	James Swierc Hydrogeologist, Lewis & Clark Water Quality Protection District	Alluvial valleys in Western Montana generally have high yielding alluvial aquifers with recharge with water levels and recharge related to local river and stream flows. Wells in these aquifers typically maintain sufficient yield to support local development of the groundwater resource. However, in areas outside of the main valleys, private wells, often exempt wells used for development in “closed” basins, frequently develop yield problems requiring deepening or replacement of existing wells. The discussion will center on how local groups identify and respond to these conditions. When this occurs, what type of monitoring programs, if any, are developed to characterize the problems? Are these types of problems associated with specific geologic formations, and/or locations relative to development in the lower part of valleys? Is this an issue with “exempt” wells only, or are other higher yield irrigation or water supply wells impacted? What steps, if any, are taken to mitigate the problems? Lots of questions with no answers, but we might find out that the problems are pretty much the same in different areas, which means the same solutions might work in these areas as well.
13	How Montana Policy Can Support Ag Producers	Maggie Zaback Lead Organizer, Northern Plains Resource Council Brad Sauer	Did you know, by increasing soil organic matter by just 1%, 20,000 more gallons of water can be stored per acre? As water is increasingly at risk in Montana, our farmers and ranchers may offer innovative solutions to be resilient from drought, flooding and other disasters. Ag producers across the state are making efforts to be more resilient for the ecosystem and their communities. What role should the state play in supporting their efforts? Let's talk about it!
14	Delusional Tendencies in Stream Restoration - Call a Barb a Barb!	Karin Boyd Principal Geomorphologist, Applied Geomorphology Scott Gillilan, Gillilan Associates	Are you concerned about projects that are couched as “stream restoration” but actually detract from long-term river function? Are practitioners actually following their mission statements? Many projects labeled as restoration give little nod to long-term function or resiliency. The nation’s portfolio of stream restoration projects is becoming increasingly scrutinized as absolutely worthless in the context of ecological uplift. Channel Migration Zone management, floodplain connectivity, beaver mimicry, Stage 0 restoration, setbacks, point of diversion flexibility, infrastructure consolidation, mitigation, armor removal... are there more creative ways we can optimize ecological function in the face of corridor development and climate change? Should we just get out of the way? Can we ever decriminalize overbanking? Join us for a lively conversation about geomorphic emancipation.

15	Mussel Up: Montana Wages War on Aquatic Invasive Species	Kate Wilson Invasive Species Specialist DNRC and Stephanie Hester	Aquatic invasive species (AIS) pose one of the greatest threats to freshwater resources and biodiversity. When invasive mussel larvae were detected in Tiber and Canyon Ferry Reservoirs in the fall of 2016, Montana's AIS Program expanded dramatically in response. Explore how AIS can impact Montana's waterways and communities, and what is planned for the 2018 season. Kate Wilson and Stephanie Hester of DNRC's Invasive Species Program will lead a discussion on AIS work in the state; the importance of partnerships in protecting Montana's waterways; the role and work of the Montana Invasive Species Council; the mandate of the newly created Upper Columbia Conservation Commission; and best management practices for ensuring boats, equipment and gear are CLEAN, DRAINED and DRY after each use in a waterway. Montana's beautiful waters and healthy aquatic ecosystems provide extensive benefits to critters, residents and visitors alike, come and share your thoughts on protecting these resources.
16	"Never the same river twice..."	Katherine Chase Surface Water Specialist, USGS	More than 2,000 years after Heraclitus, we still struggle to describe streamflow. Hydrologists, managers, and just about everyone that works and recreates around streams and lakes ask and strive to answer water-related questions. Will there be awesome rapids for our next raft trip on the Blackfoot? How often does Tenmile Creek go dry? What the heck is a 100-year flood? Let's talk about where to find answers to these questions as well as other Montana water information, and discuss some of the jargon used to describe floods, droughts, and streamflow. Katherine Chase is the Surface Water Specialist for the USGS Wyoming-Montana Water Science Center, and would love to hear your thoughts on how we can better communicate all things water.
17	Federal Water Policy	Kathleen Williams Candidate for U.S. Congress, Williams for Montana	Kathleen Williams has over 30 years of experience in water policymaking. This year, she is running against Greg Gianforte to be the second ever Congresswoman from Montana. Come meet with Kathleen over lunch; she wants to hear about your top priorities for federal water policy!
18	Soil Moisture Data to Support Your Decisions	Kevin Hyde Montana Mesonet Director, MT Climate Office	Rainfall measurements only tell us how much water reached the surface. Measurement of soil moisture guides prediction of water available for plant growth. How much water entered the soil profile? How deep did it go? How does soil moisture change over time? How can this information support your management practices and drought planning and response? The Montana Mesonet is a climate and soil moisture observation system in development across the state. We need your input and advice: What climate and soil moisture data do you most need? What is the most effective way to deliver the data and information to you? What decision support systems would most help with your management decisions? How can we build a sustainable system together?

19	River Basin Management Models	Larry Dolan Hydrologist, MT DNRC	Our River basins are complex assemblages of natural streams, irrigation systems, reservoirs, aquifers, and much more. Managing these intricate systems, under conditions which vary from year-to-year and are changing, has led to the development of computer river basin management models. Starting in the 1970s, DNRC and the Bureau of Reclamation began building models for Montana basins and the models have become more sophisticated as our knowledge of basin dynamics has increased and computer systems have become more powerful. The models typically include the operation and management of irrigation systems, reservoirs, municipal users, hydropower, instream flows and, to some extent, groundwater. As such, they allow us to simulate how to best manage a system to provide water for multiple resources. This conversation will be about these models including some history, what they are used for, insights they can provide us, and what the future holds for river basin modeling.
20	Fish or Farmers? Who wins when water's scarce?	Leon Szeptycki Director, Water in the West Program, Stanford University Laura Ziemer Senior Counsel and Water Policy Advisor, Trout Unlimited	In times of water scarcity, tension rises over competing demands for water. The worst outcomes happen when a lack of water creates a zero-sum game of winners and losers. The silver lining to increasing water demand in the West--coupled with increasing periods of drought and low-snowpack years--is that more people are thinking more creatively about getting out of the zero-sum scenario. Innovative strategies, infrastructure improvements, and better use of better data are all creating more resilient water supplies for farmers, fish, and people. Leon and Laura will describe some of the Best of the West examples, where opposing interests have come together to find solutions to water scarcity. Our conversation at this table will be about how some of these efforts in other parts of the West could inspire Montana-grown solutions.
21	Creating Partnerships Across Boundaries	Loren Birdrattler ARMP Project Manager, Blackfeet Nation ARMP Casey Gallagher	This table discussion will showcase the potential for the positive changes that occur when two agencies develop effective partnerships that truly consider both side's strengths and weaknesses. The Blackfeet Nation and Milk River Watershed Alliance (MRWA) are identifying challenges that can be worked on cooperatively along the Milk River, such as the loss of 200,000 acre-feet of water by the time the river has reached the Canadian border due to failing infrastructure. The infrastructure currently impacted includes a diversion and various canals for irrigated water. This loss of water effects users downstream who are not able to receive the water they need to properly irrigate their farmland, as well as impacting environments for wildlife such as the endangered Pallid Sturgeon, whose absence would have significant effects on the local ecosystem.

22	Water politics, with Lorents Grosfield, former legislator	Lorents Grosfield	Random thoughts about water: 1. Every time you flush your toilet, you are adding to instream flow. 2. Clean water-- that is pure H2O and nothing else-- occurs only in a sophisticated laboratory. 3. Rivers are nature's primary sewers. 4. Water use efficiency is not necessarily efficient. 5. A million gallons is not much water. 6. Montana gives vast amounts of water to downstream states, over 14 trillion gallons a year. 7. River setbacks are about fish vs lawnmowers. 8. Dilution can be a solution to pollution-- love those mixing zones. 9. We need to close the state and move everybody out-- after all, in Montana we're entitled to a clean and healthful environment. 10. Etc.
23	Buying water rights for public water is absurd! And so is watering your lawn!	Mark Cunnane Principal, Western Groundwater Services, LLC	Montana water laws presently require a public water user to buy water rights to offset depletion of surface water. These costs can exceed the cost of the associated infrastructure. The water being purchased is for the people of the state. Should historic water rights become a cash cow? Should our tax dollars have to be used to buy these rights? How can we make effective and fair changes to these laws? Can water policy be used to influence smart growth? Can we someday live without our green chem-lawns?
24	Montana's Economic Growth Trend & What They Mean for Water	Patty Gude Associate Director, Headwaters Economics	In the twentieth century, economic competition was about accumulating physical capital. Today it is about attracting human capital. Our Montana landscape may be dominated by gorgeous agricultural and natural open spaces, but our economy is very metropolitan, driven by growth in industries like health care and real estate. Did you know that over half the jobs in Montana are concentrated in our four most populated counties? Today, those same four counties capture about 80% of Montana's population growth. But, half of our new housing is being built in low-density subdivisions with lot sizes averaging 10 acres or larger. What do these trends mean for water? Patty will lead a discussion about the challenges and opportunities in how we manage water resources in the face of rapidly changing demands.
25	Musselshell Judith Rural Water Project	Robert Church Principal, Great West Engineering	The Central Montana Regional Water Authority (CMRWA) is a coalition of eight incorporated communities and rural areas in central Montana with a long legacy of poor water quality and limited quantity. The CMRWA has been planning a regional water project called the Musselshell Judith Rural Water System for over ten years with the goal to provide communities and rural residents in the region with a reliable supply of high quality drinking water. The project plans on utilizing high quality Madison Aquifer groundwater and a 250-mile piping system to deliver water to users. The project has completed several key milestones to date including federal approval of the Feasibility Report, obtaining all water rights needed for the project, proving a benefit cost ration of 1.28:1 and completing a 2240-foot-deep test well that delivers over 575 gpm with minimal drawdown. The project is currently seeking federal authorization with legislation sponsored by Montana's congressional delegation.

26	Collaborative water stewardship west of the continental divide	Samantha Tappenbeck Area Resource Specialist, Soil and Water Conservation Districts of MT	Join Samantha Tappenbeck, Area Resource Specialist with the Soil & Water Conservation Districts of Montana, for a discussion about her work with conservation districts, watershed groups, and landowners in northwest Montana. Samantha’s program was developed in response to a need for a coordinator and technical resource on issues of water quantity and quality in the Clark Fork and Kootenai Basins. Samantha is working west of the continental divide to connect conservation districts and stakeholders to available resources to meet their needs. Samantha has assisted organizations to develop and present workshops, apply for grants, implement projects, develop watershed restoration plans, and identify and establish new partnerships to meet goals. During the Great Water Conversations Lunch, she will highlight a few recent projects and answer questions about water stewardship in northwest Montana.
27	Fundamental Change in Water View	Sarah Robbin Assistance Provider, Rural and Tribal Environmental Solutions (RATES)	Does it make sense to conserve water in a surface water rich environment? Explore the challenges of Public Drinking Water systems in an increasingly arid climate. In a state where most drinking water comes from the ground, how do encourage conservation while using millions of gallons of water for irrigation. What lessons can be learned from California and Colorado and applied to Montana.
28	Water in the Information Age	Sharon Brodie President Four Corners Community Foundation	Do you have the right stuff? In this era of big data the sheer amount of available data can be overwhelming, yet sometimes we still feel like we don’t have the specific information we need to make important decisions concerning our watersheds. What baseline data does every watershed need to make those decisions? Is there a cost - be it an economic cost, and environmental cost, a social cost, or an opportunity cost – to not having the information you need? Sharon Brodie is President of the Four Corners Community Foundation (FCCF). FCCF’s current research project is an interactive software platform called H2O Tools. H2O Tools takes data from multiple existing public sources and combines it in a way that makes it easy to access and understand. Their mission includes leveraging their investment in the platform to other interested watersheds.
29	The Flash Drought of 2017 – What it Means for the New Normal	Michael Downey Water Resources Planner/Supervisor, DNRC	<p>Much of Montana experienced record drought conditions last summer. Many crops in eastern Montana failed to germinate at all and for those that did many were harvested for hay because summer precipitation was too low to produce a grain crop. In the west, the big story was a wildfire season that burned over 1.1 million acres and ranks as the third highest in acres burned behind the 3 million in 1910 and 1.3 million in 1988. Interestingly, these events are set in the backdrop of a high and in some cases record snow pack and exceptional soil moisture headed into last spring.</p> <p>The drought of 2017 is exceptional because the indicators used to evaluate hydrologic and agronomic conditions failed to alert us to the situation until it was well upon us. It is not that the experts read the data incorrectly or fell asleep at the wheel. The problem was that a combination of factors mostly</p>

			related to precipitation timing and temperature combined to create conditions that deteriorated much more rapidly than most of us, including our predicative models, could ever have guessed. We will discuss what precipitation in Montana might look like in the future in light of recent history and the Montana Climate Assessment. We will also discuss some long held myths regarding Montana's water supply and snowpack.
30	Worldly Water	Sunni Heikes-Knapton Watershed Coordinator, Madison Conservation District	The discussion will include observations made by an American about the recreational, economic, and cultural relationship of the Nordic people with their water resources. Participants are encouraged to reflect on comparisons to other parts of the globe where they have observed the different forms of these relationships, and what can be learned from other nations. No lutefisk will be served at this table.
31	Don't get lost in the SWAMP! Let us show you how to navigate it.	Todd Myse Research Hydrogeologist, MBMG	The Montana Bureau of Mines and Geology has an online surface-water data mapper tool that stores and disseminates information collected throughout the State. This website was developed as part of the Surface Water Assessment and Monitoring Program (SWAMP). The SWAMP mapper tool provides a "one-stop shop" that enables the user to quickly identify current and historic surface-water monitoring sites providing flow, stage, and water quality information (where available). The mapper tool is currently running usability tests to, make the mapper and the data presented, more useful to users from different backgrounds. Come to this table to learn about the mapper, the data it provides, and general questions about some surface-water projects happening throughout the State.
32	40-something Female Seeks Special Someone(s) for Casual, 1.5-Hour Relationship	Torie Haraldson Water Quality Tech. Specialist, Gallatin Local Water Quality District	About me: I work for the Gallatin Local Water Quality District and am tasked with designing and implementing a Surface Water Monitoring Network for long-term trend monitoring. My hobbies include calibrating YSIs and searching in vain for grants that cover monitoring equipment and lab analysis. About you: Must love long walks in the river and sharing your feelings. Insight into your most personal thoughts about the challenges, pitfalls, and successes of similar work is a must. A willingness to open up about effective sampling design is highly desirable. Let's meet at the Radisson Hotel on Tuesday at noon. I'll be the girl with the maps and spreadsheets on my table, a pen in my hand, and an overwhelmed-yet-hopeful expression on my face.

33	An innovative approach to protecting our rivers	Wendy Weaver Executive Director, MT Aquatic Resources Services	Channel Migration Easements (CME's) are a unique and effective conservation strategy designed to enable large rivers and their floodplains to function at their fullest potential. They are a pragmatic tool that can achieve conservation at large scales by compensating landowners in return for giving up their right to install features such as armor, levees, dikes, or flow detectors that reduce a river's ability to naturally migrate and access its floodplain. Montana Aquatic Resources Services (MARS) has completed two CME's along the Yellowstone River to date, and believes this is scalable model that should be implemented in other large river systems throughout the state and the country. MARS is Montana's in-lieu fee service provider that continually strives to develop innovative solutions to aquatic resource challenges.
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