



The drought of 1934 was so severe in Utah that even grasshoppers went hungry. Most crops withered, reservoirs and culinary water supplies ran low and Mormon wards prayed for rain. The situation prompted Gov. Henry H. Blood to call for the development of a state water conservation program. The federal Drought Relief Service purchased and slaughtered livestock across the parched West, including 206,000 sheep and 126,000 heads of cattle in Utah.

# AGGREGATING THE PUZZLE

by Kristen Munson

**I**t was a natural disaster made worse because states were still recovering from the economic fallout of the Great Depression. In “Utah’s Great Drought of 1934,” historian Leonard J. Arrington credits the swift organization of state and federal leadership and the “cooperative spirit of the people” for mitigating the suffering. In short, it could have been worse.

Earlier this year NASA climatologists predicted a mega-drought could occur in the American West within the next 30 years. Climate models already project Utah will experience reduced snowpack in the decades ahead. For one of the driest and fastest growing states in the nation the demand for water will likely only increase. However, sociologists at Utah State University argue that is just part of a larger narrative about the future of water in Utah.

“It’s objectively not the case that everyone faces the same water challenges even in a state that has a meta narrative of an over-arching problem,” says Douglas Jackson-Smith, a co-principal investigator for the state’s largest water sustainability study. “It’s not that it’s unimportant, or not the main story or the big story, but it’s not everyone’s story. And it’s not the whole story. I think the iUTAH project and our social science research is trying to address that complexity and understand the diversity of our water situation.”

The innovative Urban Transitions and Aridregion Hydro-Sustainability (iUTAH) project is a five year, \$20 million multi-disciplinary research and training grant awarded to the state in 2012 by the National Science Foundation. It spans three watersheds and involves every university across Utah in an effort to examine water issues affecting the region.

Imagine trying to assemble an enormous puzzle without having a picture of what it’s supposed to look like in the end. Some people will focus on assembling the edge pieces. Others might organize pieces into piles of specific textures or color. Over time patterns will emerge and all of the pieces will start to connect. That’s what it’s like trying to tease out the complexities of the water system. It requires building bridges across disciplines to see how the various elements fit.

“I hope that in 10 years one of the things we are known for is



Douglas Jackson-Smith discusses the Logan Canyon canal diversion.

# WATER IS JUST A QUINTESSENTIAL

picking apart the urban environment and identifying some really meaningful dimensions,” Jackson-Smith says. “We already do that in the natural environment *ad nauseam*. We tend to be really good at attending to all the really fine-grained nuances of micro climates and soil classifications, but when it comes to the characterizing of urban landscapes — the human and built side of it — we’re hardly scratching the surface.”

Jackson-Smith is a rural sociologist who explores the people side of complex natural systems. The human aspect of the water system has not historically been as rigorously studied as the hydrology and ecology components. But devising a strategy for managing water requires an understanding of water users — who they are and what they believe — and the external drivers that constrain their behavior such as the housing development where one lives and the social structure that influences one’s everyday decisions. He wants to know why people do what they do and what enables them to do things differently.

“That’s thinking like a sociologist,” he says.

His research involves studying how demographic changes and the various forms of urban development may become important structural drivers in the water system. For instance, two rapidly growing and understudied segments in the Salt Lake County and Wasatch County housing markets include renters and residents of multi-unit buildings. Both groups tend to have less authority over water decisions than homeowners and single-family home dwellers. Without examining how these groups differ in how they perceive water issues and potential solutions, projections about the future of water may be inaccurate.

“I’m just really interested in aggregating the puzzle and getting a clear-eyed vision about how we’re changing as a society,” Jackson-Smith says. “How is our built environment changing and how is that going to play into how this transition unfolds? I don’t hear a lot of decision makers and public discussion around those issues of differentiating urban growth.”

The iUTAH project focuses on transitioning urban water systems with the aim of providing water managers and local leaders with data to make informed decisions. Jackson-Smith argues the dialogue

needs to extend beyond per capita figures of water use and generic policy prescriptions. Water footprints vary at the parcel level and using average numbers may oversimplify problems and thwart the development of meaningful solutions. He suspects devising such solutions will likely require connecting two disparate conversations about water in the state: water for agriculture and water for urban users.

“It’s just the third rail of Utah politics,” he says. “I think part of the reason we don’t have that conversation here is that we don’t want to have a mean, dragged down fight over water with agriculture.”

Interestingly, neither do the majority of the population Jackson-Smith has been surveying the past two years. Over 80 percent of urban residents surveyed report that they do not want to take agriculture’s water.

“Ag has a very special place in their hearts,” Jackson-Smith says. “I don’t want to take Ag’s water, but I think it’s happening and in ways that are not thought through and as effective as they could be. It would help if we could find a safe space where farm irrigators and urban water planners could openly discuss how to co-manage their water systems to handle projected population growth.”

He suspects changes in water law and water markets could create a framework that allows farmers to be rewarded for using less. Jackson-Smith himself has a small farm in Richmond. He believes reducing water consumption in the agricultural community “is not a heavy lift,” but an impossible one to broach without a mechanism that provides everyone with the cover to come to the table. However, he predicts changes will come in the state over the next two decades whether the conversations occur or not.

“I am much more of a believer and predictor that it’s going to be a rugged imperfect transition; how rough the transition is will probably depend on how receptive our decision makers are to information that we might be able to generate,” he says. “Maybe the goal of social scientists is just to characterize the system, not change it or fix it, but at least understand it, to find out where the levers are that make a difference.”

## CHALLENGING ASSUMPTIONS

To find out what some of those levers are, he

and Courtney Flint, an associate professor of sociology at Utah State, have been asking Utahns what they think about water.

“Utah State is a land-grant university. We can help with this,” Flint says from her desk in Old Main. “Our mission really is not just to send information out to the public, but to be mindful of what the needs are for the state and the region. How do we know if we don’t ask?”

In 2014, she and Jackson-Smith created a household survey administered in 23 neighborhoods across three counties in Utah. Researchers used a format designed to increase participant response rates called the drop-off pick-up method, which involves going door-to-door to deliver and collect surveys. It also requires a lot of manpower so Utah State undergraduates were deployed to help collect data.

“The students were the vanguard. They were knocking on doors,” she says.

She believes getting undergraduates involved in research is critical for optimizing their educational experience and enhancing the creativity of each project. Flint has already hired more than two dozen students to work on iUTAH projects. For instance, a team of students conducted interviews with people in Logan and Salt Lake City about the value of local mountains. Afterward they transcribed and coded the interviews and turned them into a video summary. Much of the conversation revealed how the mountains are valued for recreational purposes, but also as the water tower for local communities.

“The students were just incredible. They brought so much innovation to the research I think we really pushed some new boundaries,” Flint says.

Instead of using traditional charts she felt a digital narrative would be a more powerful vehicle to explain the results of the study, but her students figured out how to execute the idea. Flint pulls up a video on her computer screen and clicks play. A young man’s voice fills the room. “What brings you up here today,” he asks study participants along the Logan River. People spoke of the benefits of water: It’s calming. It’s essential to life. And we need to conserve it.

“You didn’t hear my voice in this,” Flint says. “The students made it on the basis of

Courtney Flint stands before a gorgeous waterfall found in Spring Hollow Campground in the canyon.

# PART OF THE LIVED EXPERIENCE

what they were learning and were careful to be representative of all the themes they were hearing.”

Flint joined the faculty in 2013 to work on the iUTAH project. She studies how communities value natural resources and perceive threats to them such as drought and fire. However, if people don't feel vulnerable to a particular threat, they will not make behavioral changes that could mediate risks. In other words, knowing about an environmental problem is not enough; people need to feel they have something to lose. But those aren't always easy conversations.

“You can't even get to actions and solutions if you can't find out what we hold in common, what we value,” Flint says. “It's kind of like instead of asking ‘what is the risk?’ it is asking ‘what is at risk?’”

In recent years she's flipped her line of questioning to start from a more positive place. She thinks more in terms of wellbeing than risk and focuses more on values.

“I am impressed with what a tool that has been in research to open a conversation,” Flint says.

She may be new to Utah, but Flint is no stranger to the West. She grew up in Montana and spent her undergraduate years studying in Arizona. Her relationship to water has always been complicated — just like it is for most Westerners.

“Water is just a quintessential part of the lived experience,” she says. “It shapes our landscapes. It is highly valued experientially for recreation. It's about spiritual issues. So it's not just about something we use. It's not just a resource. I think in science today, especially water science, we tend to have kind of narrowed the scope and we look at water as a problem. We look at water as a risk, as a threat to our wellbeing as in either having not enough or too much.”

She has started using a more exploratory approach to uncover the depths of people's experiences with water. For instance, the

household survey she and Jackson-Smith created is a massive data set they're still analyzing over a year later. Over the summer they completed general summary reports and found that people are generally more supportive of a range of policies such as mandatory water restrictions and stricter efficiency standards for new development. Flint has been following up with participants to understand what they meant when they ticked boxes. One can generalize patterns from survey data, but Flint isn't so sure it captures the complexity of people's concerns about water.

“I'm finding with the qualitative work we get richer feelings and a little bit more why people are thinking what they are thinking,” she says. “I want to challenge some of the scientific assumptions that people are just gross overusers of water. That they're ignorant. And if we could just tell them what to think they would do the right thing. Well, it's really more complicated than that.”





**Andrea Armstrong** and **Eddy** along a Logan neighborhood canal close to campus.

## STRIKING A BALANCE

Andrea Armstrong, '15, has witnessed some of that complexity in the field studying the human side of water management as a doctoral student in sociology at Utah State. Her piece of the puzzle involves exploring how local authorities work together.

“A lot of research on Western water has taken the very large-scale perspective ... and those tend to involve state and federal agencies,” Armstrong says. “They make big dams, big infrastructure and while those types of policies and programs do set the stage in which local water decisions are made, the day-to-day activities of water management occur in our city and local irrigation organizations.”

Her work focuses on how these organizations make decisions and examines their points of connection in the water system. Armstrong's interest in soggy places stems from a childhood spent knee deep in streams in upstate New York. She found herself drawn to studying Utah's riparian zones once she arrived in Cache Valley, which often means the local canal system.

The canals were the first irrigation system in Cache Valley. As municipalities have grown some have connected to the irrigation systems, which can serve as a way to drain storm water. But this adds a new layer of complication, Armstrong says. When cities lay more concrete it can intensify storm runoff and change the water flow in canals as additional discharge is

connected to irrigation systems. Managing changes to the irrigation system requires local coordination.

She has spoken with more than 75 water managers around the state to understand local water management operations. One of her primary research findings has been that, despite the reputation of water being a contentious issue out West, that storyline often falls apart in everyday practice.

“If you think about our irrigation systems in Utah, they all hang together on coordination and cooperation,” Armstrong says. “We are able to convey water from the top of Providence Canyon to Nibley through a series of agreements and a real sincere effort to work together. While it's a hard topic to approach people about, once you see how people are connected within the water system the conflict fades away quite a bit.”

She attributes much of the success to the connections the people in charge of the infrastructure have with one another and willingness to work through challenges that arise. Through her interviews with water managers she has found that uncertainties such as changes in flow due to climate change throw wrenches into their planning efforts. However, they are responding with a desire to increase system efficiencies. This often means changes in infrastructure such as making

improvements to pipelines to prevent evaporation or seepage. However, plugging leaks may affect local ecology near canals and wetlands.

Armstrong admits “it doesn't come without difficulty.”

This spring she starts a new position as an assistant professor of environmental studies at Lafayette College, but she will remain tied to western water research. She will continue examining how local water management organizations adopt infrastructure changes to meet growing needs. As Armstrong considers the future she finds herself hopeful about the state of water in Utah.

“We have great scientists at the Utah Climate Center who are thinking about what climate change is going to mean for Utah. So we have information,” she says. “The other great part about our water system is that we built it. We do have some control over water once it's here and we can design a system to meet our future needs. The complicated part is deciding what those needs are and striking a balance between natural and human uses. If we can come up with a plan and if we can try to foresee some unintended consequences of water changes, then I am confident that things will be okay. Humans have the ability to adapt. We always have.” ■