the Watershed Watch

Newsletter of the Salt Lake County Watershed Planning & Restoration Program

Fall 2018, Issue 19

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2018 Utah Public Works Fall Conference & Storm Water Expo
APWA Utah Chapter
October 1-3

Utah Climate Week
Utah Climate Action Network
October 1-7

2018 Midterm Elections
November 6

2018 Salt Lake County Watershed Symposium
Salt Lake County Watershed Planning & Restoration
November 14-15

SALT LAKE COUNTY WATERSHED

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slco.org/watershed

The importance of monitoring water quality in Salt Lake County streams

by Watershed Planning & Restoration

Reliable water quality data is critical to understanding the overall health of our watershed, specifically how development and other landscape-altering activities can impact the health of our streams. To gain a better understanding of water quality data and trends, Salt Lake County Watershed Planning & Restoration has been collecting chemical and biological data in county streams since 2009.

Routine monitoring of water quality allows the Watershed Program to analyze stream segments where watershed conditions appear to be changing, identify potential areas of concern, and plan restoration activities to address impacts and improve stream health. It also helps to understand the impacts of seasonal high flows, as well as irrigation and storm drain inflows to streams.

The distribution of the County's sampling sites is based on the availability of water, therefore not all streams are monitored on the same schedule and at the same intensity. The goal is to regulate both sampling frequency and sampling density per each creek subwatershed to accurately establish the best estimate of overall watershed health. But there are limiting factors. Some west side streams flow only during irrigation season from April to October. Some east side streams are unsafe to access during winter months. Stream hard freeze, construction activities,

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Collecting aquatic macroinvertebrate samples (a.k.a. bugs) in upper Little Cottonwood Creek. This biological data is an especially helpful tool to assess stream water quality.

New stream gauges provide crucial data for water supply, water quality, and flood protection

by Watershed Planning & Restoration

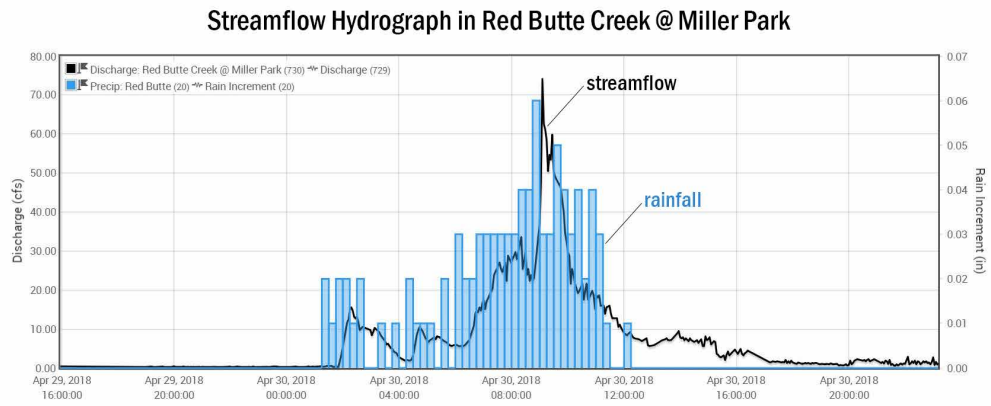
With funding from the Jordan River Commission, Salt Lake County Watershed Planning & Restoration is installing three new streamflow gauges! Two are already up and running: one in lower Emigration Creek at Westminster Campus, and one at 4800 South on the Jordan River. The third new gauge is in the works and will be installed on lower Parleys Creek in Hidden Hollow Park.

Stream gauge measurements are key to understanding the relationship between precipitation and streamflow (e.g., how quickly streamflow reaches its peak), which can vary significantly depending on the level of watershed development. Locating the new gauges at lower elevations in the watershed, will augment the data collected from our existing streamflow gauges at higher elevations. This will help us gain a better understanding of the level of "flashiness" in our urban streams.

Flashiness is an important component of a stream's hydrologic regime. A "flashy" stream is one with significantly increased flows that occur immediately after the onset of a precipitation event and then a rapid return to baseflow conditions shortly after the end of the precipitation. That is to say, water that precipitates within a flashy stream's watershed will make its way quickly from the land into the stream and be flushed through the system rapidly. Urban development is the primary cause of flashiness, where acres and acres of impervious surfaces (roads, sidewalks, rooftops, etc.) send stormwater racing into storm drains. By contrast, precipitation that falls on areas with more natural landscapes will absorb into soils, thus making it's way more slowly into streams.

The hydrograph (below) illustrates perfectly the flashiness of Red Butte Creek, as recorded at the Miller Park stream gauge in Salt Lake City. Here we see streamflow (black line) rise and fall sharply during a rain event in April 2018. At 2:00 AM, baseflow was roughly 0.3 cfs (cubic feet per second), but within an hour after the rain began (indicated by the blue bars), streamflow had increased to 10 cfs and proceeded to increase for the next six hours. By 9:00 AM streamflow reached over 70 cfs – that's roughly 240 times higher than baseflow conditions! In a non-flashy stream, the hydrograph would show a much more gradual rise and fall in streamflow over time, with both occuring *after* the rainfall event as ended.

To view Salt Lake County's streamflow and precipitation gauge data, go to rain-flow.slco.org/home.php □



Adding rainfall to a stream hydrograph reveals the extreme flashiness of Red Butte Creek, where streamflow rises rapidly immediately after precipitation begins and then returns rapidly to baseflow once the storm ends. This is typical of small, urban streams.

12th Annual Salt Lake County Watershed Symposium

November 14-15, 2018

Free and open to all, the Watershed Symposium encourages a comprehensive review of the current state of our watershed while creating learning and networking opportunities for a broad array of stakeholders.

Hosted annually by Salt Lake County Watershed Planning & Restoration.

Some of our favorite comments from last year:

"We are all in this together and we need to engage in opportunities for sharing and building connectivity so that we can effectively address the critical and timely needs that exist in our watershed..."
-Lynn DeFreitas, FRIENDS of Great Salt Lake

"The Symposium is tremendously important to the future of all of Utah."
-Zach Frankel, Utah Rivers Council

"Great location, topics, presentation structure, opportunity to engage with fellow professionals and community. Seriously one of the best, well-run conferences I've ever attended. "

Register today!

2018watershedsymposium.eventbrite.com

The amazing Great Salt Lake!

by Watershed Planning & Restoration

It's salty. It's stinky. It's buggy. Many people think that the water that ends up in the lake has simply gone to waste. Actually, that couldn't be further from the truth. Great Salt Lake supports a rich and dynamic biological system of regional, national, and global significance. The amazing abundance of bird life at Great Salt Lake has earned it the designation as a "Western Hemisphere Shorebird Reserve." Each year over seven million birds from 257 different species rely on the lake during their thousand-mile or more migrations. Remote islands, shorelines, and about 400,000 acres of wetlands provide safe sanctuary for migratory birds to feed, nest, and rest. These diverse water environments are connected to expansive playas and uplands that create excellent habitats for innumerable plants, invertebrates, reptiles, amphibians, mammals and birds.

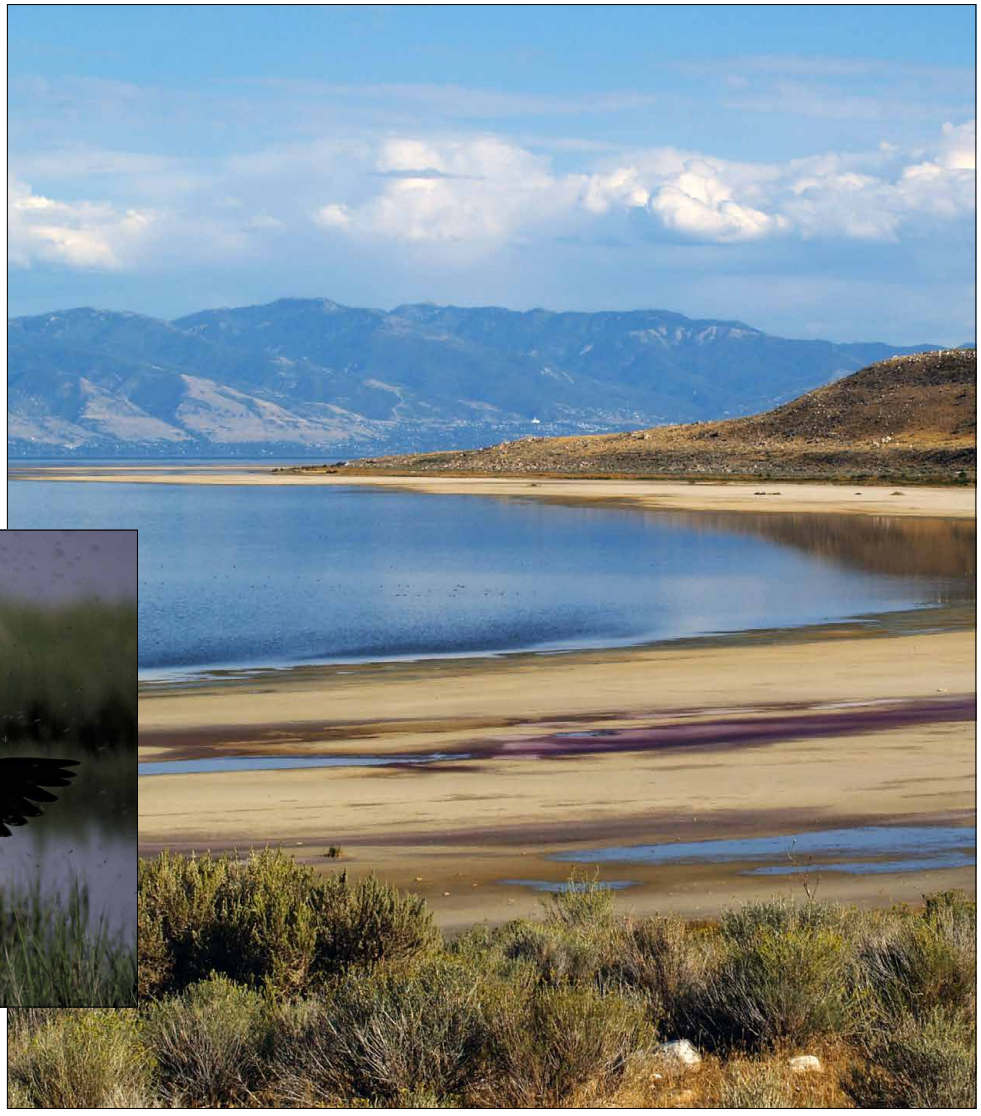
Great Salt Lake sits at the bottom of a closed basin. It is a terminal lake with no outlet, so the only way water can leave is by evaporation. For the most part, what goes into the lake, stays in the lake. The vast majority of water flowing into the lake comes from the Bear, Weber and Jordan Rivers. This fresh water contains naturally occuring dissolved minerals and salts, which get left behind during evaporation. Over many thousands of years this has created a salty inland sea. Of course, minerals and salts aren't the only things that never leave the lake. Chronic levels of heavy metals, such as mercury, and excess nutrients from human activities are among the pollutants of concern.

Pollutants aren't the only human caused impact to the lake. After years of declining water levels, portions of the lake hit record lows in 2016. A 2017 study analyzed 170 years of water data and concluded that consumptive water use, rather than long-term climate change, is the primary culprit. Health problems caused by dust from exposed lakebed, and loss of critical habitat for plants and animals are just two consequences of a shrinking lake. Finding a balance between human consumption and conservation will be key to maintaining the health and stability of the lake. Our place in the Great Salt Lake watershed means that residents of Salt Lake County play an integral role in determining the health of the lake ecosystem.

Learn more at:

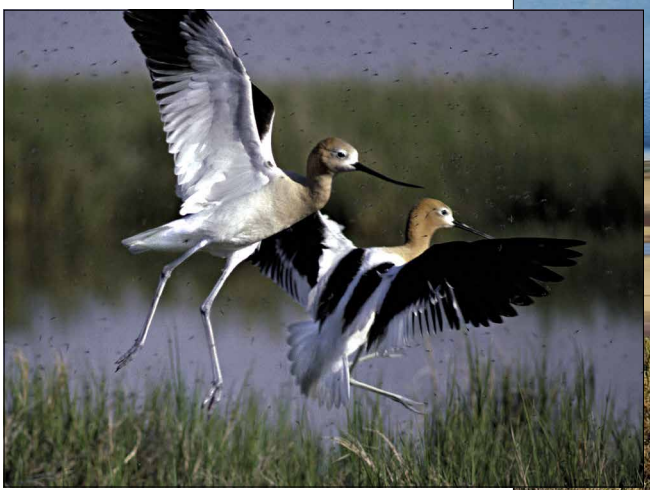
- Decline of the world's saline lakes https://www.nature.com/articles/ngeo3052
- Great Salt Lake Ecosystem Program https://wildlife.utah.gov/gsl/
- Friends of Great Salt Lake https://fogsl.org/ □

Photo ©Brigitte Werner



The lake is alive! Bacteria, algae, zooplankton, brine shrimp, and brine flies form an important food web.

Photo ©U.S. Fish and Wildlife Service



American avocets take flight in a cloud of brine flies. Over 7 million birds from 257 species stop at the lake each year.

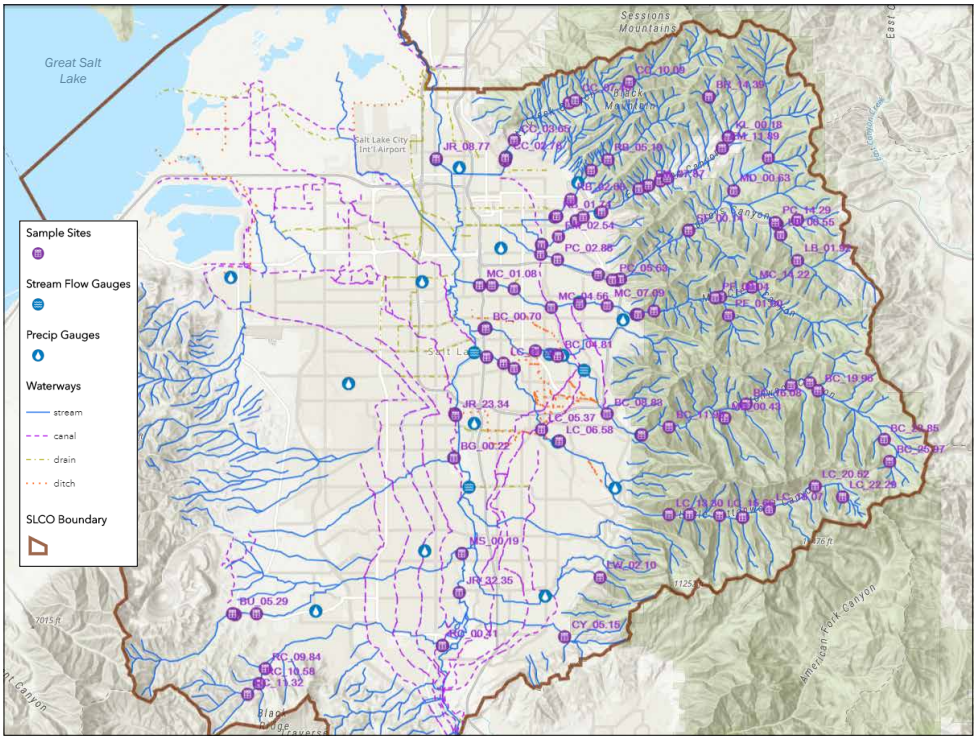
MONITORING WATER QUALITY
continued from cover

instrument failure, and so on, can all inhibit data collection. Considering these barriers, the County collects as many samples as possible.

The chemical data collected include temperature, pH, dissolved oxygen, conductivity, total dissolved solids, and turbidity. The biological data include E. coli bacteria and aquatic macroinvertebrates (a.k.a. bugs). Aquatic bugs are an especially helpful tool, as the presence and/or absence of certain species provides a clear picture of the overall health of the stream ecosystem. In addition to water quality monitoring, the Watershed Program maintains a network of streamflow and rain gauges placed strategically throughout the watershed. Understanding the flow of water in streams plays a vital role in flood protection, water supply, pollution control, and environmental management. Streamflow measurements are key to modeling watershed pollutant loads and flow data are also used to assess the relationship between precipitation and streamflow (e.g., how quickly streamflow reaches its peak), which can vary significantly depending on the level of development in the watershed.

While the County data are collected to provide a general assessment of water quality, and not to meet any regulatory requirements, the Watershed Program does work with agencies collecting data for regulatory reasons. The Utah Division of Water Quality collects water quality data at various locations in the county for the purpose of supporting regulatory programs. Salt Lake City Public Utilities collects water quality data for the purposes of drinking water source protection and treatment.

Ultimately, the goal of Salt Lake County's ongoing water quality monitoring is to serve as a check and measure of the stresses put on our urban streams, help understand the type and severity of water quality impairments, and guide decisions regarding stream restoration. Specifically which stream restoration techniques are appropriate, and where. □



Ongoing water quality monitoring is critical to understanding the health of the overall watershed. Salt Lake County's Watershed Program collects water chemistry and E.coli bacteria samples monthly at 54 sample sites. Aquatic macroinvertebrate samples are collected annually at 50 sites.

Bugs in the bubbles. What can they tell us?

Unlike fish and other more mobile animals, aquatic macroinvertebrates (a.k.a. bugs) cannot move away from polluted waters. Most have an annual life cycle, but some larger species can spend up to five years as larvae living under water. By taking one sample of a macroinvertebrate community, biologists are potentially compiling at least a year's worth of water quality data.

Among the different species there is a wide range of tolerance to pollutants; some are very sensitive and cannot survive changes in their environment, while generalists can adapt more easily. The presence and/or absence of certain bugs provides a clear picture of the overall health of the stream ecosystem. For example, finding stonefly macroinvertebrates (pictured above) is a very good sign! Found under rocks in swiftly flowing cool water, they're an indicator of excellent water quality.

Through ongoing monitoring, changes in the aquatic bug community can determine if pollutants are widespread in the waterbody, as well as what those pollutants might be.