the Watershed Watch

Newsletter of Salt Lake County's Watershed Planning & Restoration Program

Fall 2019, Issue 20

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Upcoming Events

Get to the River Festival
Month of September 2019

1st Annual Salt Lake County Stormwater Coalition Social
September 18, 2019

Utah Climate Week
Utah Climate Action Network
September 30-October 6, 2019

Research Landscapes: Land
Utah State University
October 1, 2019

Restoring the West Conference 2019: Managing Water by Managing Land
Utah State University
October 8-9, 2019

Utah Municipal Elections
November 5, 2019

13th Annual Salt Lake County Watershed Symposium
Salt Lake County Watershed Planning & Restoration Program
November 20-21, 2019

SALT LAKE COUNTY WATERSHED

Watershed Planning and Restoration
2001 S. State Street
Salt Lake City UT 84190
(385) 468-6600
slco.org/watershed

Why we collect snowpack data up the Cottonwood Canyons each year

by Watershed Planning & Restoration

Monitoring snowpack depth and density at various elevations and aspects (north versus south facing slopes) provides important information for streamflow forecasting. This helps Salt Lake County prepare for spring runoff and any flooding that might occur.

Early in the 2018-19 **water year** (October 1 through September 30), it was looking like we might have another dry winter. Then things turned around quickly. Coming off the prior year's 49% of average snowpack, we ended with snowfall across the state ranging from 130% to 200% of average. We had a lot of snow—and a lot of wet snow—that started falling earlier in the season than is typical, and with much higher densities than normal due to warmer than normal snowfall events.

On the Wasatch Front, the potential for big spring flows is always highest in Big and Little Cottonwood Creeks. In order to improve our forecasting, Salt Lake County's Watershed Planning & Restoration Program has been collecting snowpack data at high elevations in both canyons since 2013. Starting at 8500' in Big and Little Cottonwood Canyons, we'll work our way up, stopping at snow courses that are each around 1,000 sq.ft. and include 5 to 10 measuring points. These areas were selected because they accurately represent

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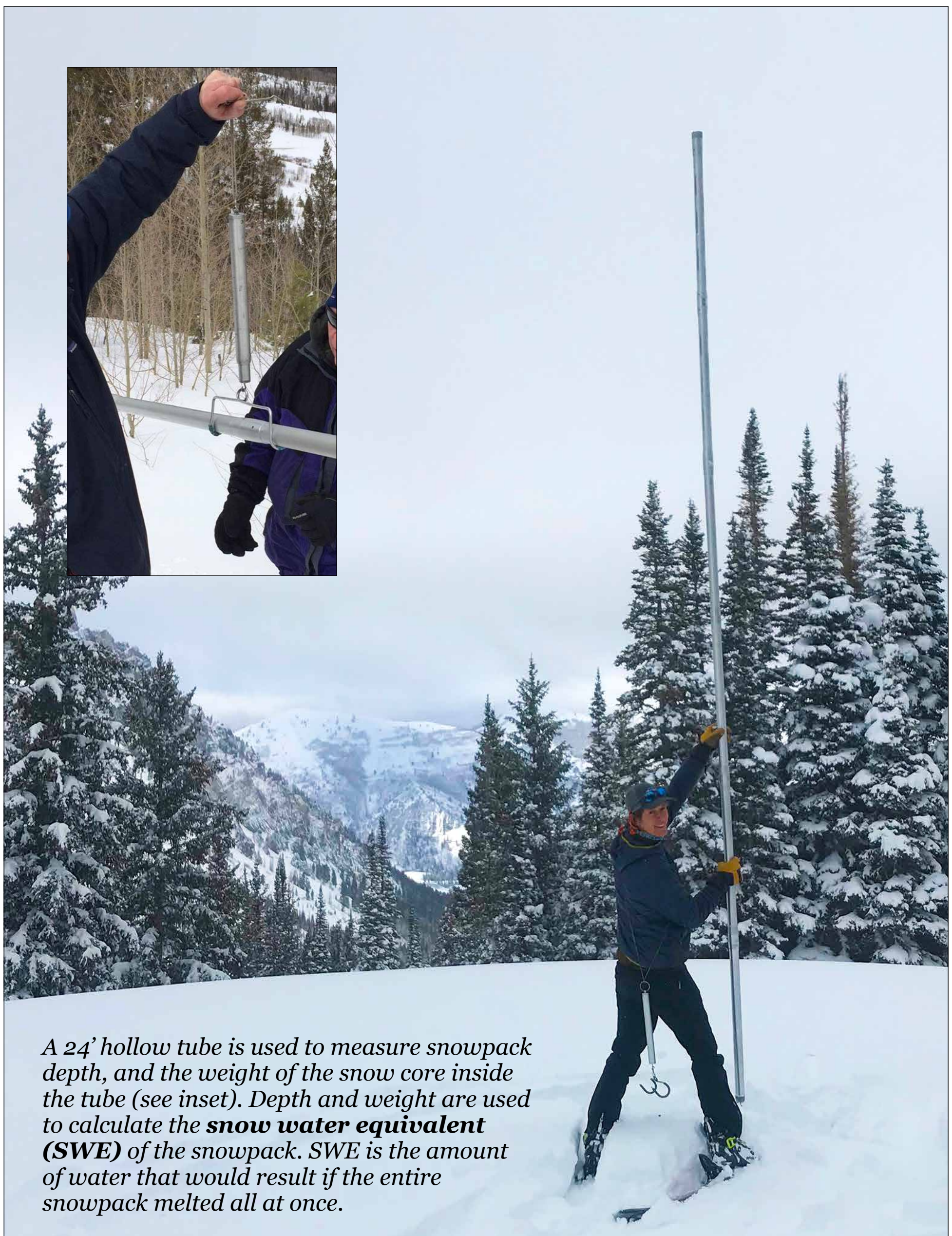
Watershed scientists trek up Big & Little Cottonwood Canyons all winter and spring to collect snowpack data, which is used for streamflow forecasting and to prepare for spring runoff.

SNOWPACK DATA

continued from cover

overall snowpack and precipitation conditions on specific aspects and elevations. At each measuring point a hollow aluminum tube (up to 24' long) is pushed down to the ground surface to measure the depth of the snowpack, and then the core sample of snow inside the tube is weighed. The depth and weight are used to calculate the **snow water equivalent (SWE)** of the snowpack. SWE is one of the primary measurements taken at NRCS SNOTEL (SNOwpack TELemetry) sites and snow courses across the western United States. SWE is used by hydrologists and water managers to gauge the amount of liquid water contained within the snowpack. It is the amount of water that would be released from the snowpack if it were to melt all at once.

Heavy, dense snow holds more water as compared with a light, dry snowpack. Prior to this year the highest densities we've ever recorded in our snow surveys have been in the 50% range, but this winter we saw significantly denser snowpack with one measurement at 66%. Snowpack density has significant implications for the spring melt scenario. Dry snow is light with lots of air pockets. This lower density insulates itself well, which slows down melt when temperatures start warming up in the spring. Of course there are many other variables that play into the timing of spring runoff, not just the consistency of the snowpack. It's what the weather is doing, how much direct solar radiation is hitting the snow, and at what angle. Air temperature is critical as well. Daytime highs and nighttime lows are equally as important. In the ramp-up to runoff we keep a close eye on the lows, checking every day to see if temperatures are getting below freezing overnight at the 9000' elevation.



*A 24' hollow tube is used to measure snowpack depth, and the weight of the snow core inside the tube (see inset). Depth and weight are used to calculate the **snow water equivalent (SWE)** of the snowpack. SWE is the amount of water that would result if the entire snowpack melted all at once.*

A "water year" is generally defined as the wet season in locations that are dependent on snow melt for water. This delineation is useful west of the Rockies, where rainfall is generally 20 inches or less and most precipitation falls in the late fall and winter and early spring, often as snow at higher elevations. The USGS determines this to be October 1 through September 30.

This year we were concerned about a weird melt, and the potential that the models we've developed wouldn't capture the spring melt perfectly. Our models use GIS to analyze aspect, slope and elevation. We then apply the SWE over the GIS data and run the model a few different ways. We've had tremendous success with this simple system over the past few years, but it had only been tested in years with less snow, drier snow, and lower density snow. Prior to this year, our model had not been tested against a snowpack this wet and this deep. Once we entered the melt cycle, we weren't seeing the nighttime lows dip back down below freezing. The risk of an isothermic snowpack was real, where the temperature is constant all the way down through the snowpack. When that happens, the melt can happen suddenly and very quickly.

As it turned out, our snowmelt model predicted spring runoff volumes and timing extremely well. Runoff in Big and Little Cottonwood Creeks officially peaked in the wee hours of June 7 & 8. Snowpack data from the 2018-2019 water year will inform the model and contribute to our streamflow forecasting capabilities moving forward. □

“Instant” riparian vegetation improves streambank restoration success

by Watershed Planning & Restoration

During one really long week in August, we installed three truckloads of custom grown wetland sod and bio-logs bursting with mature water loving plants. We’re talking roughly 25,000 pounds of veg! We used these pre-grown, fully-rooted products at several of our ongoing streambank restoration sites on the Jordan River, located at roughly 4800 South to 5100 South. To install the wetland sod, over 1,500 linear feet of river shoreline was prepped and the mats were secured with wooden stakes to ensure good soil contact. The bio-logs have minimal soil requirements, so they were installed along the front edge of the sod (further out into the river) and secured with earth anchors and cables.

Beginning in 2015, we reshaped these stream banks and rebuilt floodplains to sustain major flood flows, improve fish and bird habitat, and improve the diversity of native riparian plant communities. The wetland sod and bio-logs will provide an additional layer of erosion protection and further enhance the buffer of healthy native plants along the water’s edge. □

(1) Wetland sod and bio-logs were delivered from North Fork Native Plants in Idaho. (2) Check out the mature plants in these bio-logs… those are 4’ tall willows! (3) The sod rolls were staged at the river’s edge, unfurled in the water, and then floated down to the restoration site. (4) Wetland sod is secured to a prepared soil “shelf” with large wooden stakes for good soil contact.

Streams 101: Anatomy of a healthy stream system

by Watershed Planning & Restoration

A stream is a complex living system where the physical characteristics of the stream bed and the valley it's contained within—including its shape, elevation drop, and soil types—interact with dissolved nutrients and organic matter in the water to create an environment rich with life.

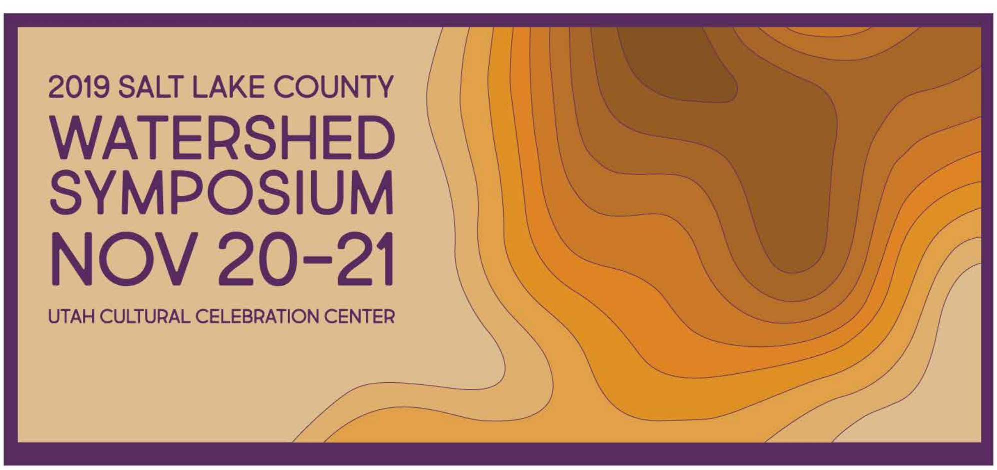
Too often, streams are treated as drainage channels, with no other purpose than to move storm runoff (and all its associated pollutants) downstream as efficiently as possible. Understanding and respecting steams as dynamic ecosystems will go a long way towards protecting water quality and stream health. In fact, streams do a much better job of protecting us and our property during flood events when they're healthy.

Components of a healthy stream include:

- Cool, clear, oxygen-rich water that is free of pollutants and excess algae.
- Gravel and cobble, without too much sand and silt, for aquatic insects and fish spawning.
- Presence of both slow pools to provide cover and refuge, and riffles (fast water running over shallow rocks) to support aquatic insects, fish spawning and feeding.
- Adequate amounts of water flowing in the stream during summer.
- Fallen logs, branches and other natural debris to provide habitat and cover for aquatic and riparian species.
- Abundant, native riparian (streamside) vegetation to stabilize banks and provide shade, food and shelter for wildlife.
- A functioning floodplain where the stream can store and absorb floodwaters, dissipating their destructive energy. High waters overflow out of the channel and onto the floodplain.

This article was excerpted from the *Stream Care Guide: A Handbook for Residents of Salt Lake County*, which is available on our website. Printed copies of the guide are also available upon request. For more info, visit www.slco.org/watershed/resource-center/guide-books/ □

Lush and healthy riparian vegetation lines this section of upper Big Cottonwood Creek.



Join us for the **13th Annual Salt Lake County Watershed Symposium**.

Free and open to all, the Symposium provides a comprehensive review of the current state of our watershed, while creating learning and networking opportunities for a broad cross-section of stakeholders.

Register today at:
watershedsymposium2019.eventbrite.com