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Drought Update for the Week of Sept. 13

SALT LAKE CITY (Sept.16, 2021) – As one of the driest states in the nation, drought is no stranger to Utah. However, conditions this year are some of the worst on record. The <u>U.S. Drought Monitor</u> comparison (at right) visually depicts drought conditions in January 2020 and 2021.

Record dry soils heading into last winter severely impacted the effectiveness of spring runoff, which soaked into the ground rather than refilled reservoirs. Conditions were monitored closely, and water-saving actions were taken across the state.

We appreciate those who implemented water-saving actions, for example:

• Jordan Valley Water Conservancy District's water deliveries were down nearly 31% this August compared to last August.



The images above compare drought conditions from January 2020 and January 2021. In 2020, 56% was in "moderate drought," the lowest drought category and nothing was in "extreme" or "exceptional" categories. Compared to 100% of the state in drought at the beginning of 2021, with 90% in "extreme" drought.

- Washington County Water Conservancy District's service area (including district and municipal supplies) saved almost 600 million gallons of water this summer (June, July and August) compared to 2020 use, despite a 3.26% population increase.
- Salt Lake City service area saved about 1.8 billion gallons since July 1, compared to the averaged water use over the same time period for 2018, 2019 and 2020.
- Sandy City saved 962 million gallons over this time last year.
- Applications for water-saving rebates have also seen a large uptick.



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"As irrigation season winds to a close, we appreciate all who reduced their use. It has made a difference," said Utah Department of Natural Resources Executive Director Brian Steed. "With about 60% of our municipal water supply used for outdoor irrigation, cutting back saves that water for later use."

The following <u>drought</u> impacts from the week of Sept. 13 are compiled by the Utah Divisions of <u>Water Resources</u>, <u>Water Rights</u>, <u>State Parks</u>, Wildlife Resources, the <u>Department of Environmental Quality</u> and the <u>Department of Agriculture & Food</u>.

At-a-glance changes for the week:

- Thirty-two of Utah's largest 42 reservoirs are below 55% of available capacity (31 last week, with Jordanelle dropping this week). Overall statewide storage is 49% of capacity, slightly less than last week.
- Of the 98 measured streams, 50 flowed below normal this week compared to 44 last week.
- Boat ramp closures remain the same as last week, with 12 closures at 10 state parks, including Jordanelle, Antelope Island, Echo, Hyrum, Millsite, Piute, Rockport, Quail Creek, Willard Bay and Yuba. Caution advisories have been issued for seven additional state park boat ramps. View conditions <u>here</u>.
- An Emergency Disaster Relief Loan Program was launched this week by the Utah Department of Agriculture and Food to aid farmers and ranchers who've experienced loss due to the extreme drought. This program provides loans of up to \$100,000 to eligible producers to assist with financial and other losses experienced due to drought conditions such as crop loss, increased feed costs, loss of livestock, and more. More information and applications can be found <u>here</u>.
- Waterfowl hunting season begins soon in Utah, and hunters should be aware that drought conditions have impacted some species, likely resulting in fewer birds in Utah this fall. Low water levels in some areas will also impact access to some waterfowl management areas. <u>Visit the DWR website</u> for more details.

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FULL REPORT: WEEK OF SEPT. 13

Precipitation and soil moisture

- Precipitation accumulation (as measured at NRCS SNOTEL sites) continues to be well below average. To restore conditions to "average" for the year, Utah still needs nearly 8 inches of rain between now and the end of September.
- Overall (mountain and valley locations), the state has seen 75.1% of the precipitation typically received in a normal water year (Oct. 1 through Sept. 30).
- Air temperatures for the week were 5.8 degrees Fahrenheit above average.
- Soil moisture remains high at 8.6% above average (11.8% last week) for this water year. Wet soils are critical in the fall as the state begins to accumulate its winter snowpack. As seen in the chart below, significant increases and decreases in soil moisture are typical for fall.



Recent rainstorms are reflected as a significant increase in soil moisture followed by a significant decline in the state soil moisture sensors (found at mountain <u>SnoTel sites</u>). Healthy soil moisture levels allow snowpack runoff to enter the streams and reservoirs rather than get absorbed by dry soils. Monsoonal patterns never occurred the last two years, leading to record dry soils in October 2020 and throughout the winter (reflected in the graph above).

Streamflows

- Cumulative flow of 28 headwater streams is tied for the lowest on record for the previous 30 years.
- Fifty (44 reported last week) of Utah's 98 streams reporting data are flowing below normal. Temporary high flows due to rainstorms have receded and streams are returning to lower flows typical of this year.
- Seven streams are flowing at their lowest levels ever recorded, two more than last week.
- Daily flow from 28 headwater streams has decreased as the effect from rainfall recedes. Flow is currently between the 30-year median and minimum.



Daily Flow from 28 Headwater Streams

Flows for 28 headwater streams were added together to show how Utah's water supply is being affected. This chart shows the Water Year (WY) from October to September as compared to the median and minimum values (1990-2020). Significant increases from recent storms can be seen. Unfortunately, a few days of high flows don't make up for over a year of near-record low flows.

Reservoir and Lake Levels

- The capacity of major reservoirs statewide dropped to 49% of storage capacity (50% last week).
- Thirty-two of Utah's largest 42 reservoirs are below 55% of available capacity (31 last week with Jordanelle dropping this week).
- The Great Salt Lake's elevation dropped to 4190.7, about 8 inches below the record low.



Drought Effects on Priority Distribution of Water Rights in Utah (updated Sept. 14)

Water rights are distributed by the state engineer with priority going to the earliest rights. For example, a water right established in 1889 is entitled to receive its full flow before water rights established in 1890 or later can receive any water. This principle is called the "Prior Appropriation Doctrine" or "first in time, first in right." The earliest water rights in Utah are called "direct flow" rights, meaning they cannot be stored. Storage reservoirs were built later on, so storage rights generally have priority dates later than direct flow rights. However, some "high" water rights (direct flow rights with late priority dates) exist.

While public water suppliers own some water rights, others are held by individuals like farmers and ranchers. Priority distribution happens every year, not just during droughts, and occurs irrespective of the type of use. Most water rights are fully or partially curtailed by mid-summer when the natural flow of a stream drops following spring runoff. The term "natural flow" refers to the total supply of a stream, which is generally different from the flow of the stream at any particular point.

Natural flow on complex systems is determined using accounting models developed by the Division of Water Rights. Water can be stored on the system when the natural flow is greater than 100% of the direct flow rights. When the natural flow drops below 100% of the direct flow rights, these rights are reduced according to priority date. Storage, if available, can be released to make up all or part of the deficit. The amount of storage available on each system is a function of the specific projects developed on the system over the last hundred-plus years. This year has seen an early decrease in natural flow because of very little spring runoff. In previous years systems were generally storing water in mid-June, sometimes in considerable amounts, while 2021 has seen some of the earliest water rights being curtailed.

While statewide, there are many different river systems, the information below highlights water rights priorities, natural flow and direct flow on just four of them. CFS below stands for cubic feet per second.

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Date	Priority from River	Natural Flow	% Direct Flow Rights
Sep 2, 2019	1899	687 cfs	49%
Sep 2, 2020	1899	775 cfs	56%
Sep 2, 2021	1897	625 cfs	45%

Middle Bear River – Priorities: Direct Flow (1860 - 1909), Storage (1911), High Rights (1914 - 1989)

• Currently, 45% of the direct flow water rights are being met with earliest priority rights being fulfilled from 1860 to 1897.

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Date	Priority from River	Natural Flow	% Direct Flow Rights
Sep 14, 2019	70% 1 st Class	108 cfs	24%
Sep 14, 2020	40% 1 st Class	62 cfs	14%
Sep 14, 2021	35% 1 st Class	54 cfs	12%

Upper Provo River – Priorities: Direct Flow (1st Class - 17th Class), Storage

• Currently, 12% of the direct flow water rights are being met, consisting of 35% of 1st Class rights.

Upper Duchesne River – Priorities: Direct Flow (1900 - 1964), Storage (1964)

Date	Priority from River	Natural Flow	% Direct Flow Rights
Sep 13, 2019	Storage	448 cfs	40%

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Sep 13, 2020	1910	187 cfs	17%
Sep 13, 2021	1918	287 cfs	26%

• Currently, 26% of the direct flow water rights are being met with the earliest priority rights being fulfilled from 1900-1918.

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Date	Priority from River	Natural Flow	% Direct Flow Rights
Sep 13, 2019	49% 1 st Class	145 cfs	36%
Sep 13, 2020	30% 1 st Class	90 cfs	22%
Sep 13, 2021	15% 1 st Class	44 cfs	11%

Upper Sevier River – Priorities: Direct Flow (1st Class – 3rd Class), Storage

• Currently, 11% of the direct flow water rights are being met, consisting of 15% of 1st Class rights.

Natural Flow Distribution on Four River Systems (Sep 14)

Percent Values Greater than 100 Indicate Water Being Stored



Well Replacements

In addition to surface water rights, the state engineer oversees groundwater appropriation and construction of groundwater wells. As groundwater conditions change, well owners may need to replace their well. This may be due to issues with the existing well or the need to drill deeper. When this happens, a water user files either a replacement or renovate application. In some cases, a change application may need to be filed. This is dependent on the individual status of the user's water right.

- Three new well-replacement and deepening applications were filed in the last week. The total number of replacement and deepening requests this year is 111 statewide.
- As a comparison, there were 113 in 2020 and 102 in 2019. The average annual count during the past five years is 107.