Natural Resources

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Exploring Utah's Water

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This factsheet is intended to help Utah citizens better understand where our water comes from, the different ways we use water, and the challenges of meeting our multiple, and often competing needs. A better understanding of Utah's water will help as we work together to plan for the future.

Where Does Our Water Come From?

All of the water we use in our taps, hoses, and irrigation ditches at one point falls as precipitation and accumulates in streams, lakes, reservoirs and groundwater aquifers. Precipitation falls unevenly across Utah, with portions of southern Utah receiving an average of 5 inches per year, while mountain regions in northern Utah receive up to 60 inches per year. Precipitation is also seasonally variable – winter snow is the primary source of water for spring runoff, which fills our reservoirs and restores our groundwater. Finally precipitation in Utah, like most places, varies between years.

This variability makes planning very difficult. For example, a series of particularly wet years in the 1980s exceeded reservoir capacity, resulting in flooding in the streets of Salt Lake City and pumping water from the Great Salt Lake to the West Desert. This was followed by a multi-year drought, triggering conflicts between different water users, concerns about low levels of the Great Salt Lake and an increased interest in water conservation throughout the state. We clearly need to include this type of variability into our planning process.

Utah is split into two large watersheds, or basins, which dictate where water ultimately flows (Figure 1). Both watersheds include rivers that cross state boundaries, resulting in the need for river compacts, which are multi-state agreements on the use and management of these rivers.

The Great Basin

The western half of the state is part of the Great Basin, with no outlet to the sea. Most of the water in Utah's portion of the Great Basin flows to the Great Salt Lake. Water evaporates, leaving salts that accumulate over time. The salinity results in unique life forms and mineral deposits. The Bear River is the largest river in the Great Basin with an estimated natural flow of almost 1.2 million acre-feet per year[1] (1 acre foot is the equivalent of water used by a family of 3-4 in one year). The Great Salt Lake also receives water from the Weber and Jordan Rivers as well as smaller tributaries. Enroute to the Great Salt Lake, water for human uses is stored in Utah Lake, Bear Lake, Willard Bay Reservoir, Deer Creek Reservoir, Jordanelle Reservoir, Flaming Gorge Reservoir, and many smaller reservoirs. Not all water in the Great Basin flows to the Great Salt Lake. One example is the Sevier River, which transports water to Yuba Lake and terminates in Sevier Lake.

The Great Basin.

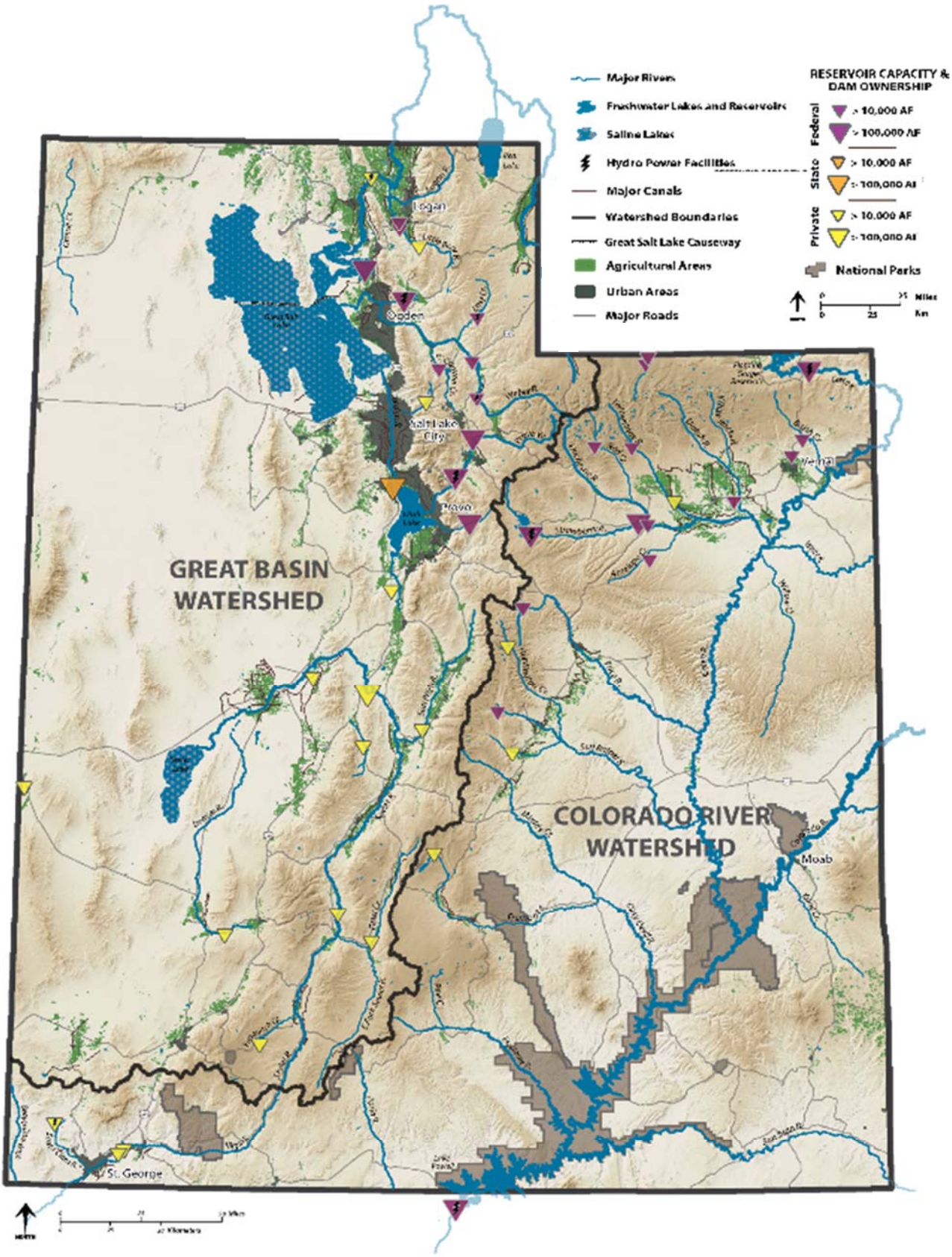

Figure 1: Utah's water is accumulated and utilized differently across the state. Most of Utah's population lives in the Great Basin watershed, which also has significant agricultural areas. Some of the water resources in the Great Basin are saline, meaning they cannot be used for municipal or agricultural uses, but support unique ecosystems. The Colorado River watershed contains many large rivers, including the Green River, Duchesne River, and Colorado River. Major dams include Glen Canyon Dam, Flaming Gorge Dam and Strawberry Dam.

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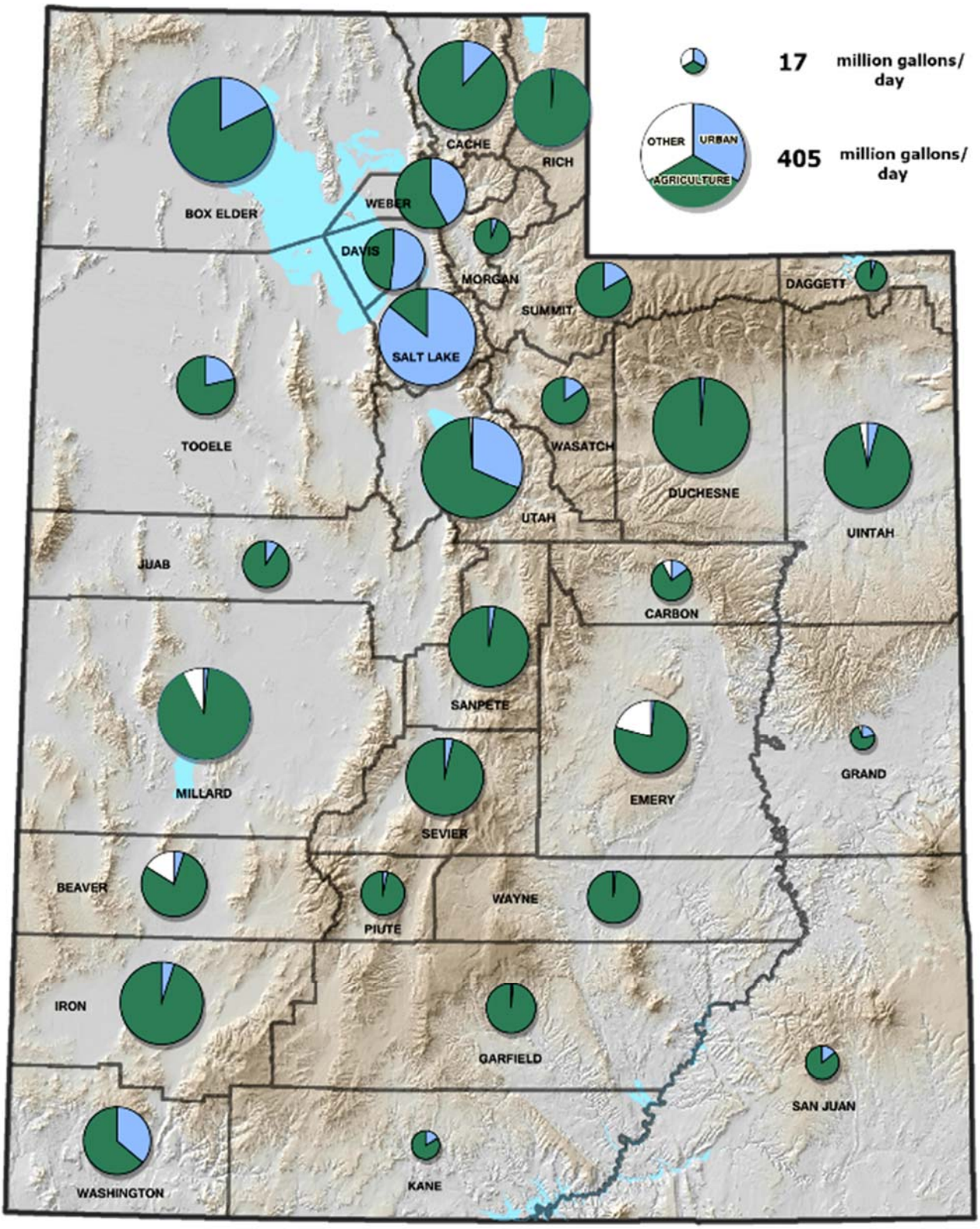

Figure 2: A snapshot of Utah's annual water withdrawals in 2010[3]. Pie chart size is proportional to each county's average daily water withdrawals and are sectioned by agriculture (green), urban (blue) and other uses (white). Agriculture includes water for irrigation, livestock and aquaculture. Urban includes public and self-supplied industrial and domestic uses. Other includes water for mining or hydropower.

The Colorado River Watershed

Water in the eastern half of the state enters the Colorado River or its tributaries. The Colorado River is Utah's largest river and drains several states upstream. Although the Colorado River historically emptied into the Gulf of California (in Mexico), the many demands on this water typically cause the Colorado River to dry before reaching its outlet. Utah is a member of the Colorado River Compact, which dictates 1.37 million acre-feet of the Colorado River per year is used in the state. Utah currently uses about 70% of this allotment.[2]

The Colorado River.

What Happens to Our Water?

Approximately 87% of Utah's surface runoff evaporates or is used by plants before it reaches rivers or ground-water. This leaves an average of about 7.3 million acre-feet per year for all other water uses[2], of which 4 million acre-feet is used for agriculture and 1 million acre-feet for urban uses. Water that remains in streams and rivers provides environmental benefits such as fish habitat and streamflow to sustain the unique Great Salt Lake eco-system and its surrounding wetlands. Figure 2 demonstrates the variability of Utah's water withdrawals by county. A snapshot view of water withdrawals is useful for understanding variability throughout the state and how needs are location dependent. What cannot be seen in this figure is how water supply and withdrawals vary from year to year and the fact that the "non-consumptive" portion of agricultural and municipal water withdrawals are returned to water bodies (though often with changed water quality).

What Challenges Do We Have?

Preserving our standard of living while supporting the different demands on our water resources present a number of challenges. These include:

Understanding and negotiating multiple and competing needs. Water demands include agricultural needs, municipal water supplies, industrial uses, and water for the environment to support aquatic habitats and ecosystems.

Building water cycle variability into our planning processes. Precipitation and streamflow can vary drastically between years. This is natural, but we must include hydrologic variability, such as very wet and dry years, into planning processes to improve water management in the future.

Supporting a growing population. Utah has the fourth fastest growing population in the country[4], resulting in rapidly increasing water demands. The areas of most rapid growth, however, aren't always near areas with the most abundant water resources, so water redistribution remains a concern.

Complying with all legal constraints. Surface water in Utah is distributed according to the doctrine of prior appropriation, or a "first in time, first in right" priority system. These legal constraints are extremely complicated, however, and must recognize land transfers, changes in land uses, river compacts that allocate water between different states, and many other complexities.

Planning for changes in our global climate. Climate variability means that the past no longer accurately represents the future. Management and conservation of our water is improved by planning for a shift in the frequency, timing, and volume of precipitation in Utah.

Credits

1. Lower Bear River Water Quality Management Plan. 1995. http://www.deq.utah.gov/ProgramsServices/programs/water/watersheds/docs/2012/03Mar/Lower_Bear_WQMP_1995.pdf

2. Utah's Water Resources: Planning for the Future. 2001. file:///C:/Users/A01138618/Desktop/Factsheet/Citations/For%201.37%20maf%20of%20colo%20allocation-%20colorado%20compact.pdf

3. Estimated Use of Water in the United States in 2010. USGS. http://pubs.usgs.gov/circ/1405/pdf/circ1405.pdf

4. United States Population Growth. 2015. https://en.wikipedia.org/wiki/List_of_U.S._states_by_population_growth_rate

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