

Chapter 09

Chapter

Watersheds

Chapter Highlights

- The goal for watershed management is to maintain a healthy balance as things change, such as climate, forest health, and urban development.
- Multiple agencies and organizations are dedicated to healthy watersheds, and collaboration has never been more important.
- Great Salt Lake is an excellent example of how all watershed actions have consequences.
- Utah's ecosystems and environment need water – not all water can be for human consumption.

Utah is known for its recreation, beautiful landscapes, mountains, and the greatest snow on earth. Relatively healthy watersheds support this quality of life with high-quality, clean, reliable, and inexpensive water because spring runoff, streams, and gravity do the hard work for us (the existing water supply doesn't need to be pumped hundreds of miles to our taps).

Watershed management aims to maintain a healthy balance as things change, such as climate, forest health, and urban developments. There are several agencies and organizations that are dedicated to healthy watersheds, and collaboration has never been more important.

Watersheds and the ecosystems within are fragile and need water. Human uses, although essential, need to be carefully managed to avoid irreparable harm to natural systems. Great Salt Lake is an excellent example of how upstream actions can impact the entire watershed downstream.

Watersheds are the source of a region's water and life. Utah is fortunate to have relatively healthy watersheds. There is no other feature that defines an area more.

Map 9-1 depicts the state's river basin planning areas and Regional Watershed Councils. The Division of Water Resources (Division) defines watersheds by the basin planning area.

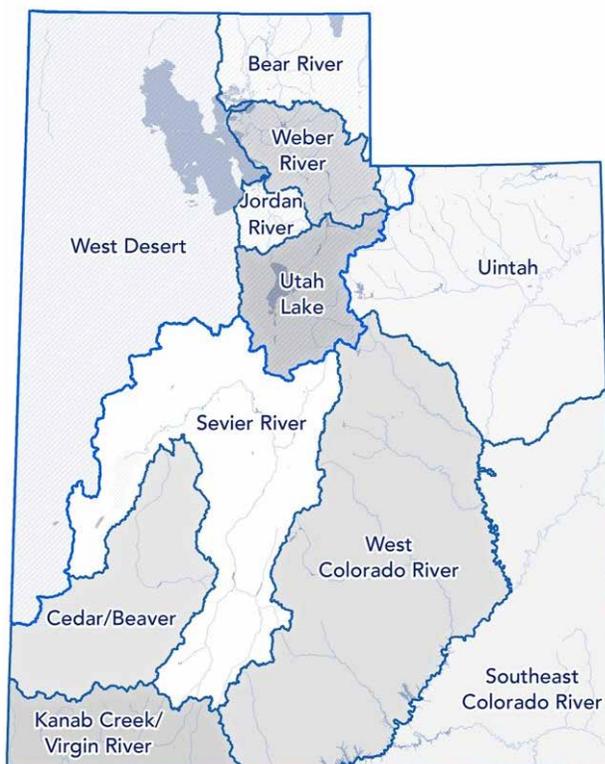
A healthy watershed is essential to support various interests including quality of life, public health, natural and man-made environments, economic viability, water

quality, and outdoor recreation. This chapter gives a general watershed overview. More detailed watershed information is provided within the Division's river basin plans, Division of Water Quality, and other state and federal agencies.

What is a Watershed?

A watershed is an area that collects snow and rain. Watershed boundaries are created by natural geographic features that determine where water will collect and run off. All precipitation will be funneled from the highest point to the lowest point. Some of the water is used to rejuvenate soils, some fills streams and reservoirs to provide a sustainable supply of water, and some supports important ecosystems.

Map 9-1 Utah River Basin Planning Areas



River Basin Plans

To facilitate water planning, the Division divided the state into 11 smaller watersheds or river basin planning areas (see Map 9-1). River basin plans provide useful water supply and watershed information to help the state, regional, and local water districts, counties, and cities make informed water-related decisions. These plans also identify issues that are unique to each area and provide a valuable platform for stakeholders to help formulate solutions that are best suited for local conditions. The Division publishes river basin plans for each area as needed. These are available on the Division's [website](#).

Big Picture Watershed Challenges

Watersheds throughout the world are experiencing challenges, and Utah's are no different. There are multiple considerations, risks, and opportunities within watershed health (see Graphic 9-1).

Water resources are essential for ecosystems, wildlife, water quality, humans, and economies to thrive. Environmental flows will be critical in some areas to maintain healthy watersheds and to keep species from needing protection under the Endangered Species Act. Providing sufficient water for these needs will also keep species management under state authority and help Utah continue economic growth and



Bald eagles fishing at Farmington Bay
PC: Cindy Costa

Graphic 9-1 Watershed Planning and Management Considerations

WATERSHED PLANNING & MANAGEMENT CONSIDERATIONS



VIABILITY (HEALTH) OF THE WATERSHED



ECONOMIC



QUALITY OF LIFE



CLOUDSEEDING



ACCESS



RECREATION



FLOOD CONTROL



DROUGHT MITIGATION



WATER SUPPLY AND YIELD



ENDANGERED SPECIES PROTECTIONS



INVASIVE SPECIES CONTROL



WATER QUALITY

development without regulatory uncertainty. Healthy watersheds and environmental flows also enhance outdoor recreational activities, such as boating and angling.

Water planners and managers are tasked with trying to find the right balance among them. Not every decision leads to a healthy watershed. It's important to recognize that collaboration needs to happen with federal, state, local, non-governmental organizations, and the public to address issues and find solutions that will continue to support Utah's watersheds.

Impaired Waters

The Utah Department of Environmental Quality's Division of Water Quality (Water Quality) protects, maintains, and improves the water quality of Utah's surface and groundwater through its regulatory, non-regulatory, and grants and loans programs. Water Quality ensures the state's waters meet the requirements of the Clean Water Act and Utah Water Quality Act through:

- Water quality standards
- Permits, inspections, and compliance/enforcement for pollutants discharged to surface and groundwater
- Water quality monitoring and assessment
- Watershed protection plans that bring impaired waters into compliance with water quality standards
- Grants and loans for the construction of wastewater/stormwater infrastructure
- Funding to address nonpoint source pollution
- Spill response

Water Quality prepares a biennial [Integrated Report](#) (biennial report) on the state's water quality to fulfill requirements under the Clean Water Act. The biennial report includes a list that describes the general water quality of Utah's assessable waters and another list of waterbodies that are impaired (not meeting water quality standards) for one or more pollutants.

Water quality assessments for the biennial report are based on data collected throughout the state for assessment units. Assessment units are geographic areas that loosely follow hydrologic unit boundaries and typically include rivers, streams, lakes, ponds, and reservoirs. Each assessment unit has unique beneficial uses specified in state water quality standards ([R317-2](#)). Beneficial uses include sources of domestic water, recreation, aquatic life, agriculture, and uses specific to the Great Salt Lake. Water quality standards use numeric criteria for toxic pollutants (e.g. metals, organics) and conventional pollutants (e.g. pH, dissolved oxygen, temperature, total dissolved solids) as well as narrative criteria. Water Quality develops, maintains, and updates the 303(d) assessment methods it uses to evaluate the water quality in these assessment units against water quality standards.

Water Quality assessed the water quality in 913 assessment units for the 2018/2020 biennial report over the period of record of October 1, 2010 to September 30, 2018. Of the assessment units, 23% were fully supporting their beneficial uses, 35% had insufficient data to assess, and the remaining 42% were listed as impaired (not supporting one or more beneficial uses). These results are shown in Graphic 9-2.

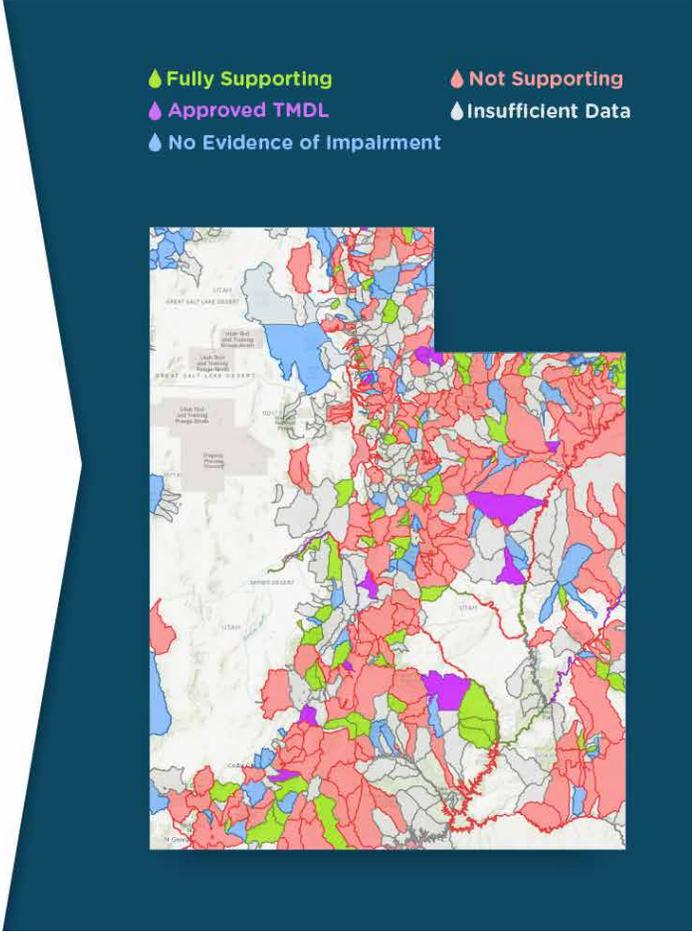
Graphic 9-2 Overview of Utah’s Supporting and Impaired Waterbodies

NEARLY HALF OF UTAH’S WATERS DO NOT SUPPORT BENEFICIAL USES



UTAH’S IMPAIRED WATERS INCLUDE:

34 drinking water sources	19/24 blue ribbon lakes 99/159 blue ribbon stream segments
Waters in 5 National Parks & 29/43 State Parks	524 stream miles on private agricultural land



Water Quality uses the biennial report to identify water quality issues, and the total maximum daily load (TMDL) process to bring impaired waterbodies back into compliance with state standards. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still maintain its beneficial uses. Pollution sources may be point (e.g., wastewater treatment plants and municipal stormwater) and/or nonpoint sources (e.g., stormwater and agricultural runoff). Point source reductions are generally addressed through permits, while nonpoint source reductions are addressed through voluntary, incentive-based programs.

Each TMDL characterizes the sources contributing to the impairment for a particular waterbody and identifies the pollutant reductions required from these sources. Impaired waterbodies are listed for the specific water quality parameter that fails to meet state standards. These parameters can include metals, salts (total dissolved solids), dissolved oxygen, E. coli (an indicator of fecal contamination), temperature, or macroinvertebrates. Each watershed has different sources or issues to address. Table 9-1 summarizes the water quality impairments in Utah waterbodies by basin.

Table 9-1 Summary of Impairments by Basin

Basin Name	Impaired Parameter	# of Impairments
West Desert	pH	3
	Boron	1
	E. coli	1
Bear River	Max. Temperature	14
	E. coli	13
	Macroinvertebrates	8
Weber River	E. coli	13
	Copper	11
	Max. Temperature	9
Jordan River	E. coli	15
	Macroinvertebrates	15
	Total Dissolved Solids	14
Utah Lake (Upper Provo River)	E. coli	6
	Aluminum	4
	Macroinvertebrates	3
Uintah Basin	Aluminum	16
	Min. Dissolved Oxygen	16
	Max. Temperature	14
Utah Lake (Lower Provo River)	pH	9
	E. coli	3
	Macroinvertebrates	3
Lower Sevier River	Max. Temperature	6
	Total Dissolved Solids	5
	Copper	4
W Colorado River	Max. Temperature	21
	Macroinvertebrates	14
	Min. Dissolved Oxygen	12
Cedar-Beaver	Max. Temperature	5
	E. coli	3
	Aluminum	2
Upper Sevier River	Max. Temperature	8
	E. coli	3
	Macroinvertebrates	3
SE Colorado River	Total Dissolved Solids	9
	Macroinvertebrates	8
	Max. Temperature	8
Lower Colorado River	Max. Temperature	9
	Total Dissolved Solids	7
	Boron	5



Sailing on Great Salt Lake
PC: Utah Division of State Parks

Water Quality is currently implementing 65 TMDLs in partnership with local, state, and federal agencies, local conservation districts, and watershed groups. Water Quality prioritizes its list of impaired waters slated for restoration under a TMDL based on the risk to human health from the impairment, public input, and activities associated with beneficial uses (i.e., blue-ribbon fisheries, proximity to drinking water sources, high recreational use in state and national parks). Unfortunately, Water Quality is unable to conduct a TMDL on every impaired waterbody given existing resources. It does, however, provide grants for watershed plans and is exploring other tools (e.g., market-based approaches) to address impairments. Water Quality also administers up to \$2 million annually in state and federal grants to address nonpoint source pollution.

Growth poses a significant challenge to Utah's water quality. Increased demand for water coupled with increased point and nonpoint discharges inevitably lead to impacts that harm water quality. Aging infrastructure, limited resources, and continuing deterioration of water quality without commensurate means to protect and maintain it will perpetuate this decline. Any development of water resources should consider the infrastructure needs to treat the water to meet the water quality requirements of the intended use.

Wildfires also impact watershed health, ranging from immediate effects during a fire to long-term watershed changes. According to the USGS, runoff from burned areas contains ash, which can change the chemistry of lakes, wetlands, reservoirs,

rivers, and streams. This runoff can also include other contaminants and impact erosion.

Watershed Councils

Recognizing the many unique and complex issues that face Utah watersheds and the need for better collaboration, the state is working toward establishing a statewide watershed council, as well as local watershed councils. These councils will provide a forum for state and local agencies, industry, conservation groups, recreation interests, tribal interests, water quality experts, and other interested stakeholders to come together to discuss important issues and work together to devise sustainable solutions. In accordance with the Watershed Council Act ([State Code 73-10g-Part 3](#)), passed during the 2020 Legislative session, the Division is organizing the Utah Watersheds Council, a statewide council and 11 local watershed councils in each of the Division's river basin planning areas (see Map 9-1), with an additional local watershed council for the Great Salt Lake watershed.

Addressing only one or two challenges in a watershed can be harmful due to the interconnected nature. Invasive species impact recreation. Viability and water quality impact endangered species. Water supply impacts economics, as does the expense of mitigation efforts. All this underscores that ignoring one need can have a domino effect. Promoting integrated water resources management that balances impacts and benefits should be the collective goal. There is perhaps no greater example of

the need for collaborative solutions in Utah than the challenges and opportunities tied to Great Salt Lake.

Keeping the "Great" in Great Salt Lake

Great Salt Lake water levels have been declining for many years. In 2021, due in part to extreme drought, Great Salt Lake reached all-time low levels since lake level monitoring began in 1847. These developments have highlighted the concerns surrounding the long-term health and viability of the Great Salt Lake.

Great Salt Lake and its associated wetlands are critical ecosystems for migratory birds and a variety of other wildlife species. Five out of the 11 watersheds in Utah flow into Great Salt Lake. If less water flows to Great Salt Lake, there could be serious impacts to the natural system, wildlife, and human health. Utah faces the challenge of balancing the water needs for a growing Wasatch Front population with maintaining a healthy Great Salt Lake.

In 2016, the Division partnered with state agencies and institutions to produce the Great Salt Lake White Paper (USU 2016). The paper outlines the impact humans have had on Great Salt Lake since settlers entered the valley, and how future development could impact the terminal lake.

Water development is projected to be needed on the Bear River. Diverting and depleting water from any of the five watersheds that would have flowed into Great Salt Lake lowers its water level. The proposed Bear

River Development project, for example, is estimated to impact lake elevation by an average of 8.5 inches at full development. A drop in elevation (caused by humans or a changing climate) decreases the surface area of Great Salt Lake, which can result in exposed lake bed, increased dust, impacts to ecosystems and wildlife, and reduced air quality. In order to balance future demands within this valuable and unique watershed, people, and organizations with varying priorities and interests will need to collaborate. Keeping the “Great” in Great Salt Lake depends on it.

In the 2019 General Legislative Session, [HCR10](#) was passed that recognizes the importance of flows to Great Salt Lake, its wetlands, and the need to address declining water levels. HCR10 has created a collaborative process where various stakeholders and interest groups encourage participation to strengthen Great Salt Lake and improve lake levels. The Division will continue to provide modeling support as part of this collaborative process, including refined estimates of the impacts of proposed water developments and climate change on water levels in the lake.

The Future of Utah’s Watersheds

Water policy is set at federal, state, and local levels. However, individual actions impact watershed health, and participating in these discussions is something all Utahns can do. Whether learning about watershed restoration projects, forest and wildlife management practices, becoming involved in water quality discussions, or asking

how current and future water supply plans impact a watershed, each person’s feedback, involvement, and ideas are important.

Recommendations

The Division will work with cooperating partners to implement the following recommendations:

- Research and identify ways to get more water to Great Salt Lake.
- Continue to collaborate in efforts to achieve HCR10 goals, which brings stakeholders together to protect and preserve Great Salt Lake.
- Establish the Utah Watersheds Council and local watershed councils.
- Continue working with the Aquatic Invasive Species Task Force to prevent the spread and establishment of aquatic invasive species in Utah’s watersheds.
- Work with stakeholders to identify and secure critical environmental water needs.
- Consider infrastructure needs to treat water to meet the water quality needs of the intended use.

Chapter 9 Links

HB166 Watershed Council Act - <https://le.utah.gov/~2020/bills/static/HB0166.html>

Great Salt Lake White Paper - https://digitalcommons.usu.edu/wats_facpub/875/

Bear River Development Feasibility Study - <https://water.utah.gov/bear-river/>

Concurrent Resolution to Address Declining Water Levels of the Great Salt Lake (HCR10) - <https://le.utah.gov/~2019/bills/static/HCR10.html>



Sunset at Great Salt Lake