

Water Resources Plan

December 2021

By:

Utah Division of Water Resources

With valuable input from the State Water Plan Advisory Committee

U T A H S T A T E W A T E R P L A N

Foreword

Friends,

2021 will go down as one for the books. In addition to a worldwide pandemic, wild weather events hit hard, including record-high temperatures, extreme drought, as well as flooding. In July, 99.94% of the state was in “extreme” and “exceptional” drought – the two worst categories according to the U.S Drought Monitor. The Great Salt Lake and Lake Powell both dropped below their previous record lows. Utah experienced some of the worst water supply conditions on record and relied on water stored in reservoirs, which underscores the importance of water planning.

This Water Resources Plan is a planning document that looks decades into the future and has been years in the making. Thank you for your patience, as the staff who worked on this plan put in a tremendous effort to produce a solid plan. We are grateful to the State Water Plan Advisory Committee that helped shape this plan through their input, reviews, and feedback.

This plan is not a “drought response plan.” Rather it provides a comprehensive look at Utah’s current water use and supply conditions and future demand scenarios. It focuses on three water management principles: reliable data, supply security, and healthy environment. It also prioritizes actions the Division of Water Resources plans to undertake in the coming years.

Water management is complicated and involves the coordination of multiple state agencies as well as local suppliers. A collaborative effort is underway to produce a more holistic “State Water Plan” rather than this division-specific Water Resources Plan. Contributing agencies include the Governor’s Office of Planning and Budget, Department of Agricultural and Food, Department of Environmental Quality (divisions of Drinking Water and Water Quality), and Department of Natural Resources (divisions of Water Resources, Water Rights, Wildlife and Forestry, Fire and State Lands). This coordinated action plan will include a comprehensive implementation strategy as the state continues to plan for rapid growth, climate change, and sound management of an uncertain natural resource.

A safe, reliable water supply is critical to Utah’s prosperity and quality of life. Climate scientists predict climate change will bring drier conditions and more extreme weather events, both of which we have seen in 2021. We look to science and data and continued collaboration as we prepare for the future.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian Steed". The signature is fluid and cursive, with the first name "Brian" and last name "Steed" clearly distinguishable.

Brian Steed
Executive Director
Utah Department of Natural Resources

Acknowledgements

The Board of Water Resources acknowledges staff members of the Utah Division of Water Resources (Division) in the River Basin Planning Section for their dedication and valuable contribution to this document. River Basin Planning staff responsible for plan development include: Russell Barrus, Anny Baynard, Arthur Guo, Laura Haskell, Rachel Shilton, and Rick Webster. We also acknowledge former staff members (Josh Palmer, Marcie McCartney, and Kim Wells) and other existing Division staff who have contributed to the plan through writing, editing, graphics, and reviewing.

Division staff prepared this plan under the leadership of former Directors – Todd Adams and Eric Millis (retired); current Director – Candice Hasenyager; Deputy Director – Joel Williams; and Assistant Director – Todd Stonely.

The board extends its gratitude to members of the State Water Plan Advisory Committee (Advisory Committee) who provided invaluable insight and data, reviewed the document for accuracy, and lent their support. Participants serving on the Advisory Committee represent state and local government, industry, environmental concerns, business, academia, and the public. Participants include: Alan Matheson, Scott Baird, Kerry Gibson, Marcelle Shoop, Evan Curtis, Mark Thomas, Darren Hess, Scott Ericson, Warren Peterson, Peter Gessel, Jay Olsen, James Toledo, Shirlee Silversmith, Stephen Handy, Steven Burian, Mark Stratford, and Randy Crozier.

The Board also extends a special thanks to the other individuals who took time to attend the virtual open house in conjunction with this document. Many people provided the Division with valuable comments, all of which have been carefully considered and incorporated where appropriate. Without all these contributions, the product before you would be incomplete.

Preface

One of the major responsibilities of the Utah Division of Water Resources (Division) is comprehensive water planning. Over the years, the Division has prepared a series of documents under the title “Utah State Water Plan.” This includes two statewide water plans, an individual water plan for each of the state’s 11 river basin planning areas, and numerous special studies. The preparation of these plans involved several major data collection programs as well as inter-agency and public outreach efforts.

This document is the latest in the “Utah State Water Plan” series and the third statewide water plan. Although this plan can be viewed as a general guide to direct Utah’s water-related planning and management into the future, it was specifically written to highlight actions that the Division can take in the coming years to fulfill its mission to: plan, conserve, develop, and protect Utah’s water resources. Unlike previous water plans, this plan was written in a more conversational tone to be accessible to the general public.

This plan summarizes key data obtained through the previous water planning documents, introduces new data where available, and addresses issues of importance to all future water planning efforts. Where possible, it identifies water use trends and makes projections of water use. It explores various means of meeting future water demands and identifies important issues that need to be considered when making water-related decisions. Water managers and planners will find the data, insights, and direction provided by this document valuable in their efforts. The general public will discover many useful facts and information helpful in understanding the complexities of Utah’s water resources.

It should be noted that the municipal and industrial projections of water need contained in this plan are based on current and historical data reported to the state by various water users and models that attempt to predict future conditions as best as possible. These projections suggest that most areas of the state will have adequate water supplies to satisfy growth if Regional Water Conservation Goals are met. However, several areas will need to acquire additional water supplies – most notably Washington County and portions of the Wasatch Front. The Division acknowledges that the impacts of drought and climate change on future water supplies are difficult to predict. The unprecedented drought of 2021 highlights the challenge of forecasting the water supply that will be available in the future.

Table of Contents

Foreword.....	iii
Acknowledgements.....	v
Preface.....	vii
Appendices	xii

Chapter

1 Introduction.....	1
Plan Focus	3
An Action Plan.....	3
Reliable Data	4
Supply Security	4
Healthy Environment.....	5
Goals	6
2 Population & Municipal Water Use.....	9
Water Is Where You Live.....	10
How Utah Grows Matters	10
Every New Utahn Needs Water.....	11
How Utah Reports Water Use.....	16
The Importance of Water Planning.....	19
3 Water Supply	21
Water Supply	22
Introduction.....	22
Measuring the Water Supply	22
Existing Reliable Supply	24
Diversion vs. Depletion.....	26
Water Budget	28
Water Budget Changes	31
Water Budget Results	31
Evaporation & Evapotranspiration.....	35
Cloud Seeding – Increasing Water Supply.....	35

	How Cloud Seeding Works.....	36
	Cloud Seeding Cost.....	38
	Water Storage	39
	Water Supply Challenges	39
	Climate Change.....	39
	Drought	40
	Utah Drought Planning	41
	Drought Mitigation.....	42
	Recommendations	43
4	Water Use Trends and Projections	45
	Estimating Future Population.....	46
	Water Demand Model.....	46
	Water Demand Model Variables	46
	Recommendations	54
5	Water Conservation.....	57
	Water is Utah’s Most Precious Resource.....	58
	Fast-Tracking Water Conservation	60
	Expanding Turf Buyback	60
	Integrating Land Use & Water Planning.....	60
	Secondary Water Meters	60
	Agricultural Optimization	60
	Water Conservation Plans.....	62
	Utah’s Weekly Lawn Watering Guide	62
	Water Loss Accounting.....	62
	Water Education	64
	Learning Leads to Taking Action	65
	There’s Work to Do	65
	Recommendations	69
6	Future Water Supply, Demand, & Development.....	71
	Using Supply and System Demand Estimates to Predict Future Needs	72
	Water Conservation, Agricultural to M&I Conversions, and Development Work Together..	74
	Estimating Agricultural to M&I Conversions	75
	How Much Is Enough?	78

Water Supply Infrastructure Needs	81
Development Projects	85
Central Utah Project	85
Central Water Project	85
Lake Powell Pipeline Project	85
Central Iron County Water Supply Projects.....	86
Airport Recharge Project.....	87
Pine Valley Water Supply and Conservation Project	87
Bear River Development.....	88
Board of Water Resources Funding	90
Other Water Project Funding.....	90
Water Reuse.....	92
Potential Water Reuse Benefits and Applications.....	92
Water Reuse in Utah.....	92
The Future of Water Reuse.....	93
Recommendations	95
7 Agricultural Water Use Optimization	99
Recommended State Water Strategy.....	100
Agricultural Water Optimization Task Force	101
Utah Department of Agriculture and Food Water Optimization Program	102
Utah Watershed Councils Act.....	102
Water Banking Act.....	103
Best Management Practices	103
Conveyance System Improvements.....	103
On-farm Improvements.....	104
Recommendations	106
8 Water Law.....	109
Introduction to Utah Water Rights Law	110
Water Rights	110
Water Right Adjudication.....	111
Water Distribution According to Existing Water Rights.....	111
Federally Reserved Water Rights	111
Conclusion.....	112

Interstate Streams.....	112
Colorado River Compact.....	112
Drought Contingency Planning.....	113
Utah’s Colorado River Use.....	115
Colorado River Authority.....	115
Salinity Control Agreements.....	115
Bear River Compact.....	116
Water Banking in Utah.....	117
Recommendations.....	119
9 Watersheds.....	121
What is a Watershed?.....	122
River Basin Plans.....	123
Big Picture Watershed Challenges.....	123
Impaired Waters.....	125
Watershed Councils.....	129
Keeping the “Great” in Great Salt Lake.....	129
The Future of Utah’s Watersheds.....	130
Recommendations.....	130
10 Conclusion.....	133
Summary of Recommendations.....	134
Reliable Data.....	134
Supply Security.....	135
Healthy Environment.....	136

Appendices

(Available online at: water.utah.gov/2021WaterPlan)

Appendix

- A Glossary
- B Abbreviations and Acronyms
- C Population Projections
- D 2018 Water Budget Model Results
- E Demand Model Results
- F Agriculture Land to M&I Transition

G Water Supply and Demand

H Water Reuse Project Lists

I Public Comments and Responses (Fully available by the end of January 2022)