2019 WATER MASTER PLAN

CACHE WATER DISTRICT

PREPARED BY

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EXECUTIVE SUMMARY

CACHE WATER DISTRICT

BACKGROUND

The Cache County water department completed a county-wide water master plan in 2013 to identify key long-term strategies with regards to regional water resources within the county. The plan included an evaluation of potential regional water management structures and a recommendation to create a water conservancy district. In response, the Cache Water District (CWD) was formed following the 2016 election and replaced the Cache County water department.

CWD is governed by eleven board members, one elected member from each voting district in Cache County, three elected at-large members and one agricultural representative that is appointed. The board hired a district manager in 2018 to help stay more informed on water issues and assist the district in fulfilling its purposes.

PLAN PURPOSE

The main purpose of this plan update is to evaluate and identify key actions that CWD should focus on over the next five years. The following more specific master plan steps were followed to achieve this purpose:

- Maintain and strengthen relationships between the stakeholders and CWD
- Understand new interests or concerns of key stakeholders
- Obtain updated water supply and demand information
- Identify, evaluate, and prioritize actions to be included in the new action plan
- Prepare a 5-year action plan and estimated budget to complete the action plan

RECOMMENDED 5-YEAR ACTION PLAN

The action plan for the next five years is made up of specific actions that fit within eight focus areas that are listed and generally described below. A year by year list of the specific categorized actions is given in Section 6 of the master plan report for each year from 2020 through 2024.

Water Banking - Participate in the Utah Division of Water Resources (DWRe) water banking pilot program to identify banking strategies for use in Cache County including ways to address growing municipal needs, sustain agriculture, and improve in-stream flows.

Multi-Jurisdictional Secondary Water - Obtain funding for and participate in the Crockett secondary water environmental study and project and support other multi-jurisdictional secondary water opportunities in the district.

CACHE WATER DISTRICT

Bear River Development - Review and evaluate the DWRe Bear River Development Report and evaluate long term plans and options as it applies to CWD. Communicate regularly with DWRe about CWD options and Bear River Development updates.

Multi-Jurisdictional ASR Program - Obtain funding and evaluate Aquifer Storage and Recovery (ASR) potential in more detail for Green Canyon and Logan Island area and provide support and coordination for development of ASR at these and other feasible locations.

Irrigation Delivery Efficiencies - Work with Irrigation companies to prioritize canal segments to line or pipe based on seepage losses and impacts to instream flows and natural riparian areas. Support and coordinate design and construction of improvements.

State Committees and Legislation - Continuously monitor legislative activities related to water, participate in Utah Water Task Force, Bear River Development meetings, and other state water committees. Assist in drafting new water bills as needed to meet the purposes of CWD.

Conservation - Continue secondary water audits, support of the slow the flow campaign, conduct water-wise landscaping classes, inform residents of existing conservation incentives and rebates, and begin plans for a water conservation demonstration garden.

Local Outreach – Meet annually with city managers, city councils, and the Logan City Water Board to promote 40-year water right plans, give legislative updates, and discuss other key water issues. Plan annual Northern Utah Water Conference and participate in annual local water fair.

Other - Assist with other opportunities as they arise and as they fit within the purposes of CWD.

These actions will allow CWD to:

- Protect the water resource (Water Rights and Supplies)
- Protect the Bear River Allocation
- Bank Water Rights
- Provide Adequate Reliable Irrigation Supply
- Conserve Water
- Provide Funding and Technical Assistance
- Guide Water Legislation
- Improve Understanding of Environmental Water Needs

More details of how the 5-year action plan was developed are given in the master plan report.

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1 INTRODUCTION

1.1 Background

Cache County completed a county-wide water master plan in 2013 to identify key strategies and actions that should be focused on with regards to regional water resources within the county. That plan also included an evaluation of various water management structures to determine the structure that should be implemented to meet key objectives identified in the master plan and complete the priority actions.

The master plan gave a recommendation to create a water conservancy district for the water management structure in the county. The county then began a stakeholder process to create by-laws for a district and define the district purpose and mission. The public voted in 2016 to create the Cache Water District (CWD).

CWD is governed by eleven board members, one from each voting district in Cache County, three at-large members and one agriculture representative that is appointed by the Cache County Council. The board hired a district manager in 2018 to help stay more informed on water issues and help CWD fulfill its purposes. Figure 1-1 provides an overview of the CWD boundaries, the streams, reservoirs, major canals, and the cities within the boundaries.

CWD contracted with J-U-B Engineers and the Langdon Group (Consultant Team) in the spring of 2019 to update the master plan.

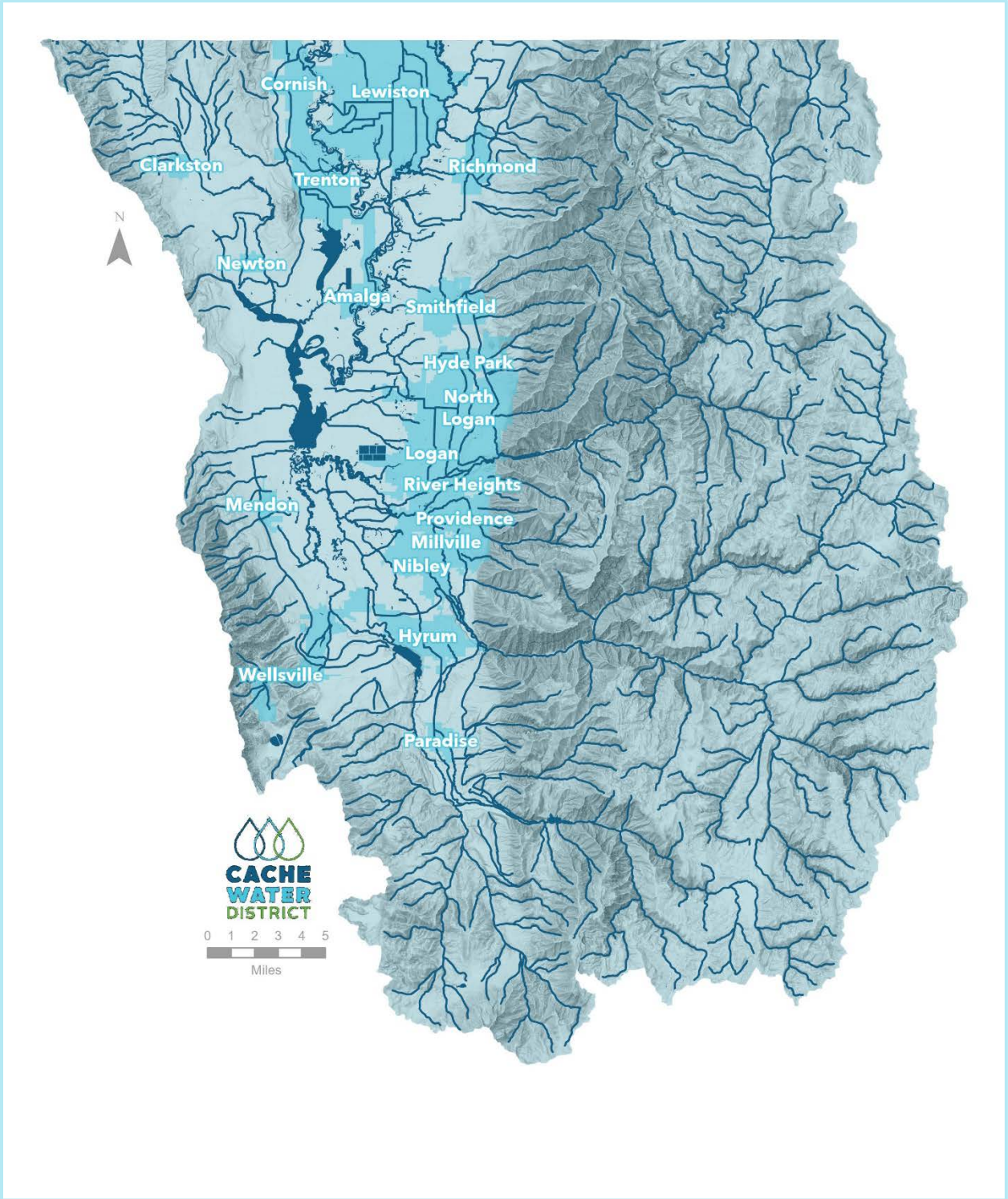

Figure 1-1: CWD Overview Map

1.2 Purpose of Master Plan Update

Cache County and CWD made progress within the focus areas identified in the 2013 master plan. The progress includes:

- Public education to improve water conservation including participation in the state "Slow the Flow" campaign
- Participation in an Aquifer Storage and Recovery (ASR) project in Millville City in cooperation with Utah Geological Survey
- Work with Utah State University on a water banking study
- Work with the Nature Conservancy to gain more understanding of environmental flow needs in Cache County rivers
- Participation in the Crockett Pressurized Irrigation Master Plan
- Participation in water-use audits to identify water use inefficiencies

The main purpose of this plan update is to identify key actions that CWD should focus on over the next five years.

The following goals were set for the master plan update to achieve the plan purpose:

- Maintain and strengthen relationships between the stakeholders and CWD
- Understand new interests or concerns of key stakeholders
- Obtain updated water supply and demand information
- Identify, evaluate, and prioritize actions to be included in the new action plan
- Prepare a 5-year action plan and estimated budget to complete the action plan

1.3 Bear River Development

An important component of the water master plan is the Bear River water resource which includes many rivers that are tributary (rivers that drain) to the Bear River. All the area within Cache County drains to the Bear River.

In 1991, The Utah Division of Water Resources (DWRe) was tasked with developing the Bear River waters based on legislation that was defined as part of the Bear River Development Act (BRDA). The BRDA identified the volume of water that could be stored in the Bear River drainage basin during winter months without negatively impacting the existing water right holders along the river and at the Bear River Bird Refuge. In the BRDA, 220,000 acre-feet of water can be developed in Utah. Storage facilities are needed in order to capture this water. The 220,000 acre feet of water is to be split as listed in Table 1.1.

Table 1-1: Bear River Development Act Allocations

Bear River Development Act Allocations (acre-feet)	
Bear River Water Conservancy District	60,000
Jordan Valley Water Conservancy District	50,000
Weber Basin Water Conservancy District	50,000
Cache County or a Conservancy District in Cache County	60,000

DWRe recently released the Bear River Development Report that evaluates possible reservoir sites and combinations for reservoirs in Box Elder and Cache County to develop the allocation. The evaluated sites were selected through an earlier report that was completed in July 2014 which is entitled the Bear River Pipeline Concept Report.

1.4 Representation on State Water Issues

Utah water laws and legislation are frequently changed and updated. In the water community, there are organizations experienced in water management and water issues that provide guidance to legislators as they vote to modify or establish new water law. Three major organizations that have a strong influence on the formation of Utah water law are:

- The Utah Water Task Force
- Executive Water Finance Board
- The Water Development Commission
- The Utah Water Coalition

CWD needs to continue to have a strong presence amongst these organization and others on water legislation issues such as the Bear River Development Act.

1.5 Cache County Water History

Cache County is more diverse because of the efforts that have been made in the past to develop water. Figure 1-2 gives an overview of some of the major past water milestones in the County. An increase in water policy and development activities has occurred during each of the last three 50-year periods. This trend will continue moving into the future as the population continues to increase in the County and along the Wasatch Front. With the increase in water policy and development, Cache County needs to dedicate more resources toward water management and development.

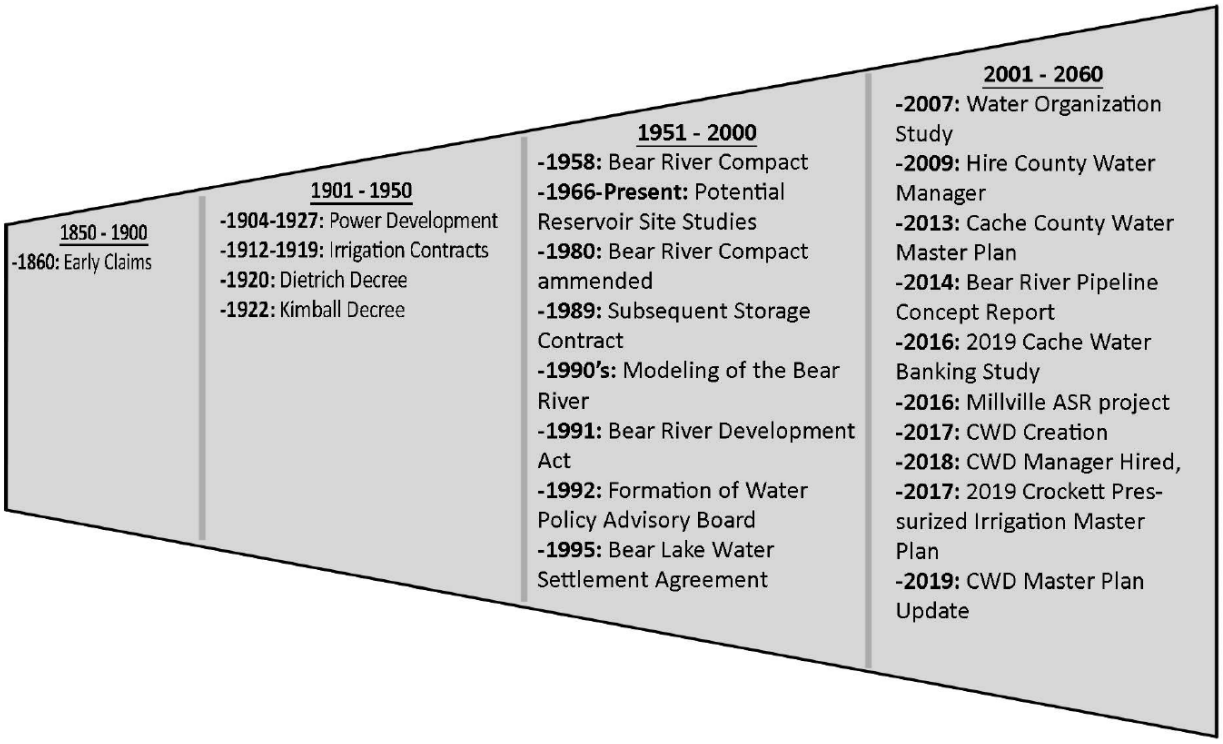

Figure 1-2: Major Water Milestones

1.6 Master Plan Update Overview

This master plan update includes the following components:

- **Stakeholder Process** – A stakeholder process was followed that involved interviews with key stakeholders, meetings, and workshops with the CWD board members. This process is explained in greater detail in Section 2.
- **Supply and Demand Projections Coordination** – The DWRe participated in this project by providing updated existing and projected municipal and industrial supplies and demands. The Consultant Team made updates to the irrigation supply values. The process and results are given in greater detail in Sections 3 and 4.
- **Technical Analysis of Alternatives** – The Consultant Team completed an evaluation of potential actions for the next 5 years. This evaluation was based on the updated objective criteria and 5-year priorities identified through the public process and is explained in Section 5.
- **5-Year Priorities and Action Plan** – The overall conclusions are included with a 5-year action plan in Section 6.

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2 PUBLIC PROCESS

2.1 Introduction

Water is a very important resource and plays an important role in social and physical needs. The water interests of stakeholders in the County play a major role in the creation of a comprehensive water strategy. A very thorough stakeholder involvement process was undertaken to help develop the 2013 Cache County Master plan. This master plan update involved a smaller group of stakeholders, but included representatives with agricultural, environmental and municipal interests.

2.2 Situational Assessment

The CWD manager met with representatives from various irrigation companies during the 2019 calendar year to gather feedback on key water issues and potential future water strategies. The manager and the consultant team conducted interviews with additional key stakeholders once this master plan update was started. These interviews were held to gain new understanding of the current water concerns and positions on Cache County water issues. These interviews included additional irrigation company representatives, stakeholders with environmental water interests, and water representatives from selected municipalities.

2.2.1 Interview Objectives

The key interview objectives were:

- Understand new interests or concerns of the key stakeholders
- Maintain and strengthen relationships between the stakeholders and CWD
- Identify new actions to evaluate and prioritize for CWD to include in the new action plan
- Verify objectives used to evaluate project alternatives

2.2.2 Interviews

Representatives from a variety of water backgrounds and positions were interviewed including the following:

- The river commissioners for the major rivers within CWD boundaries
- Representatives of irrigation companies served by the Blacksmith Fork River
- Representatives from the following communities:
- Richmond
- Wellsville
- Millville
- Providence
- North Logan
- Amalga
- USU faculty to discuss environmental water needs
- Audubon Society
- Trout Unlimited
- Irrigation company board members

A copy of the general outline that was used to guide the interviews is provided in Appendix 2-A. Appendix 2-B gives a list of the people interviewed with a list of key notes that are categorized based on potential action types.

2.2.3 Environmental Stakeholder Meeting,

Some specific questions arose from the environmental stakeholder meeting including the following:

a. Where are environmental and ecosystem water uses located?
b. How would potential dams in the bear river basin change or enhance potential environmental water uses?
c. How should environmental groups interact with the district?

More detailed notes from this meeting are included in Appendix 2-C.

2.2.4 Key Themes from Interviews

During the interviews the stakeholders were asked specifically what they thought CWD could do to help. A list summarizing the responses to this question is provided in Figure 2-1.

What can CWD do to help?

- *Make sure Cache County residents have enough water for buildout*
- *Provide a voice on water rights legislation*
- *Protect Cache County interests with regard to Bear River development*
- *Make sure farmers can continue to farm and afford water*
- *Protect local water interests and rights as new developments occur*
- *Continue to be "accessible"*
- *Facilitate a water bank*
- *Help obtain funding and provide some funding for studies*
- *Continue to coordinate with the city water leaders and help cities "bring their issues to the finish line"*
- *Understand environmental water needs*

Figure 2-1: Stakeholder interview Key Themes

The following key themes were taken from the stakeholder interviews and are related to what stakeholders said CWD can do to help.

- **Guide Water Legislation -** CWD needs to continue to be a voice for the water users in the county on key legislative issues. For example, currently there are some concerns about new legislation requiring secondary water metering and a desire to know what it entails and means for local water users.
- **Manage Water Resources -** CWD should play a key role in future studies that will guide how Cache County residents use and manage water resources.

- **Bank Water Rights -** There is an increased level of momentum behind water banking and the related possibilities and feeling that CWD could play a key role in facilitating banking opportunities.
- **Investigate Beneficial Secondary Water Opportunities -** There is an increased interest in secondary water systems as areas in the valley are developing further. With this there is a need to identify processes to develop secondary systems in a way that benefits all parties involved. CWD could play a key role in coordinating and seeking funding for these efforts as many secondary water opportunities will require coordination between multiple entities.
- **Understand Environmental Water Needs -** Further research and investigation is needed here in the County to understand what the environmental water demands are along the rivers, wetlands, and other water bodies.
- **Provide Funding Assistance -** CWD could help water entities obtain grants or loans to assist with projects and could help fund studies that match the CWD purpose.

2.3 CWD Board Updates

Periodic updates on the master plan progress were given to the CWD board at board meetings. Updates were given on:

- September 16, 2019
- November 18, 2019

Summaries of the updates are given in Appendix 2-D.

2.4 CWD Board Workshop

On October 24, 2019 the board held a workshop meeting. The purpose of the workshop was to identify priorities to focus on through the next 5 years. The meeting included a quick review of the CWD purpose statement from the by-laws and then an exercise to identify the 5-year priorities.

2.4.1 District Purpose

The CWD purpose statement is shown in Figure 2-2. The attorney that prepared the by-laws during the formation of CWD, Mark Anderson, attended this workshop to give an overview and review of what water conservancy districts can and can't do under the state code.

District Purpose

The purposes of the District include planning for and facilitating the long-term conservation, development, protection, distribution, management and stabilization of water rights and water supplies for domestic, irrigation, power, manufacturing, municipal, recreation and other beneficial uses, including the natural stream environment, in a cost effective way to meet the needs of the residents and growing population of Cache County;

In furtherance of protecting and preserving water supplies that are necessary for Cache County's future, the District will assist in water conservation education and programs; assist local municipalities and Cache County as they establish and implement water management policies and ordinances while maintaining the autonomy of existing water suppliers; undertake environmental and other studies to provide information necessary to make proper, timely water use decisions; obtain grants and low cost loans to upgrade and construct needed water infrastructure; and adopt the current version of the Cache County Water Master Plan as adopted by the Cache County Council ("Master Plan") until such time as the Cache Water District adopts its own water master plan.

Figure 2-2: District Purpose

After the board members reviewed the purpose statement, they participated in an exercise to identify which parts of the statement they felt are important to them for the next 5 years. Each of the board members were given the same number of dots to place on the areas of their choice. This exercise showed that a broad range of the purposes listed in the statement are important to the board. The results are included in Appendix 2-E.

2.4.2 Identification of 5-Year Priorities

The board next participated in an exercise to identify which objectives they felt were most important for CWD to fulfill its purpose through the next five years. A complete list of objectives used in the exercise is given in Appendix 2-E along with the results of the exercise. The list included objectives used in the 2013 water master plan (updated based on 2019 stakeholder interview feedback) as well as some objectives that were submitted by the board members prior to the workshop.

The board members were first each given ten red dots and asked to place one dot next to each of the ten objectives they felt were most important for the next five years. This allowed the board members to review each of the objectives in the list. Following this initial exercise, the board members were each given four green dots and were asked to go back and place one next to each of the four objectives most important to address in the next five years.

The objectives that received green dots are included in the 5-year priorities and shown in Figure 2-3. Further discussion of each priority can be found in Section 6.

5-Year Priorities

- *Protect Water Rights and Supplies*
- *Protect Bear River Allocation*
- *Bank Water Rights*
- *Provide Adequate Reliable Irrigation Supply*
- *Conserve Water*
- *Provide Funding and Technical Assistance*
- *Guide Water Legislation*
- *Improve Understanding of Environmental Water Needs*

Figure 2-3: 5-Year Priorities

2.5 Draft Report Comments

Prior to the adoption of the this report the CWD board gave a period (November 27, 2019 through December 31, 2019) for the public to provide comments on the draft report. The written comments that were received by CWD are duly noted by CWD and are included in Appendix 2-F.

This master plan focused on the action plan for the next five years. Some items in this report were updated or modified based on the comments and some of the comments may be addressed later by the CWD board or by other entities.

Sections 3 and 4 will not impact the 5-year action items of this plan update and will be provided for informational purposes following an update of the water supply and demands by DWRe.

5 ANALYSIS OF ALTERNATIVES

5.1 Introduction

Water planning is very important to help preserve and develop the water that is needed now and for the future. An evaluation of project alternatives was completed to make recommendations for future actions. This section of the report explains the process that was used to evaluate the alternatives.

When dealing with water issues, there are a variety of interest groups with different water priorities. A rational planning procedure was followed based on a multi-objective approach to evaluate alternatives and identify what types of projects will be best to meet the objectives. The evaluation is based on conceptual ideas and is a living document that may be updated over time as more detailed information is made available.

The evaluation conducted as part of the 2013 Cache County Water Master Plan was used as a base for the current evaluation. The steps, objectives and metrics were adjusted based on stakeholder input to best represent the current needs of CWD.

The evaluated project alternatives are split into two categories:

- Capital Improvement Project Alternatives
- Other Project Alternatives

The alternatives were split into these two categories because many of the "Other Project Alternatives" are studies that require much less overall capital funding to complete than the "Capital Improvement Project Alternatives." By comparing them against other studies it became easier to identify the preferred studies.

5.2 Project Objectives

The objectives are divided into the following four categories:

- Water Supply Development
- Water Conservation
- Implementation
- Environment

5.3 Metrics

Metrics define how well a given alternative meets each objective. The metrics originally used in the 2013 Cache County Master Plan were inspected to ensure legitimate representation of the goals and objectives of CWD. During the evaluation process some metrics were adjusted based on information that dictated that a change be made. The metrics used in the capital improvement projects alternative analysis are listed with the corresponding objectives in Table 5.1 and the metrics used in the analysis of the "Other Projects" are listed in Table 5.2. The evaluation of "Other Projects" has fewer metrics than the evaluation of Capital Improvement Projects because some of the metrics do not apply to the "Other Projects."

Table 5-1: Objectives and Metrics for Evaluation of Capital Improvement Projects

Objective Type	Objective	Metric (method of measurement)
Water Supply Development	Protect existing water rights	Water put to beneficial use or in approved non-use status (acre-feet)
	Protect Bear River development water allocation	Bear River water developed (acre-feet)
	Provide adequate reliable future culinary supply	Additional communities with adequate culinary supply to 2060 (number)
	Provide adequate reliable irrigation supply now and in the future	Reliable late or early season irrigation supply added or put to use (acre-feet)
Water Conservation	Maintain existing irrigation delivery systems	Canals dredged, lined, piped or reconstructed (linear feet)
	Keep rights to water that are converted from Ag to M&I uses in Cache County	Amount of converted water that is banked or used in the district (acre-feet)
	Match use of water to the water quality	Residential units with secondary water (number)
	Conserve water	Water conserved for use in Cache County or to market to others (acre-feet/year)
		Identified volume of water lost through inefficiencies or waste (acre-feet/year)
Implementation	Promote collaboration and focus on regional projects	Entities that benefit (number)
	Build relatiionships with local entities as a trusted resource and advocate	Increased level of exposure to and interaction with a varied range of entities (number)
	Minimize costs	*Capital Costs ($)
		*50 year debt service and operation and maintenance costs ($ per acre-feet per year)
		Potential grant money available (yes/no)
	Inform public about the purpose of Cache Water District	Additional County residents that know the purpose of the district (number)
	Inform public about current water situation and future anticipated problems	Residents that understand how long water supplies will last (number)
Environment	Maintain or improve environmental quality	Water developed to maintain or improve wildlife habitat (acre-feet)
		Water developed to maintain or improve fish flows in natural streams (acre-feet)
		Water related recreational opportunities added (yes/no)
	Protect water quality and drinking water sources	Enhances water source protection (yes/no)
	Minimize power consumption to operate water systems	Change in power consumption (increase or decrease)

Table 5-2: Objectives and Metrics for Evaluation of Other Projects

Objective Type	Objective	Metric (method of measurement)
Water Supply Development	Protect Bear River development water allocation	Increased focus on or progress towards a plan for the Bear River water allocation
	Provide adequate reliable future supply	Additional water entities assisted in increased supply (number)
Water Conservation	Match use of water to the water quality	Potential increase in residential units with secondary water (number)
	Conserve water	Potential increase of conserved water (acre-ft)
		Identified volume of water lost through inefficiencies or waste (acre-ft)
Implementation	Promote collaboration and focus on regional projects	Entities that benefit (number)
	Build relatiionships with local entities as a trusted resource and advocate	Increased level of exposure to and interaction with a varied range of entities (number)
	Minimize costs	*Capital Costs ($)
		Potential for grant money
	Inform public about current water situation and future anticipated problems	Residents that understand how long water supplies will last (number)
Environment	Maintain or improve environmental quality	Potential for increase in water to maintain or improve wildlife habitat
		Potential for increase in water supply or quality to maintain or improve fish flows in natural streams
	Protect water quality and drinking water sources	Enhances water source protection (yes/no)

5.4 Types of Projects Evaluated

Specific examples of potential projects were evaluated at a conceptual level to see how well they met the objectives. The following types of projects were chosen to be evaluated based on input from the stakeholders.

Capital Improvement Project Alternatives

- Aquifer Storage and Recovery (ASR)
- Reservoirs
- Water Banking
- Secondary Water
- Irrigation Delivery
- Culinary Water Distribution

Other Project Alternatives

- Public Information
- Water Conservation
- Water Quality
- Other Studies

Multiple specific projects were evaluated for each of the project types.

5.5 Conceptual Project Costs

Cost estimates were created as part of the evaluation of most of the projects. All the costs are conceptual and were created solely as a tool to help evaluate and compare different types of projects. Two columns in the evaluation matrix include costs. One column gives the estimated capital cost to complete a project. A separate column gives an estimated annual payment to finance a project over a 50-year life cycle per acre-foot of water saved or developed. All of the estimates include a 35% contingency based on the uncertainty of the estimates and 15% to account for design and planning services.

5.6 Evaluation of Projects Uncertainty

There is a level of uncertainty in the analysis done for the evaluation of the conceptual projects such as:

- Unknown exact project locations
- Number of communities that will choose to participate in a project
- Amount of water that can be developed through Aquifer Storage and Recovery (ASR)
- Environmental water demands in the County
- Unknown factors that will be identified during design which will affect project costs

The evaluation tables are color coded based on ranges of values to illustrate the uncertainty associated with the evaluation. Many of the cells in the tables include estimated values listed which were used to determine what color range, or level of attainment each alternative meets for a given objective.

5.7 Key Themes

The evaluation tables are included in Appendix 5-A along with some additional explanation of the tables. Several key themes were observed as a result of the project evaluation process. They include the following:

- Water banking provides very good benefits to a wide range of users and is strong in meeting many of the objectives.
- Secondary water and irrigation delivery projects that cover multiple jurisdictions accomplish most of the objectives but require significant financial investments.
- Reservoir projects develop Bear River water but will require a significant amount of study of the environmental impacts as well as a large capital investment.
- ASR is inexpensive but provides limited amounts of water. In order to better meet the CWD objectives, a multijurisdictional ASR program should be implemented.
- Public outreach efforts, studies, and other non-capital improvement projects provide long term benefits for relatively small financial investments.

5.8 Focus Areas

The key themes were used to develop eight focus areas to be used in the creation of the specific CWD 5-year action plan. These focus areas represent types of projects that meet the objectives identified by the stakeholders.

- Water Banking
- Multi-Jurisdictional Secondary Water
- Bear River Development
- Multi-Jurisdictional ASR
- Irrigation Delivery Efficiencies
- State Committees and Legislation
- Conservation
- Local Outreach

A brief description of each of these focus areas and some key points about them is given below. The focus areas have been evaluated as part of the 5-year action plan for specific actions. The evaluation can be seen in Section 6.

5.8.1 Water Banking

A water bank is an institution with the ability to move water where it is needed most within a given area. For example, in Cache County, agricultural land is being developed. When agricultural property is developed, less water is needed to meet the demands of that land. The rights to the water could be banked for another person or group to lease for in-stream flows or other uses. DWRe plans to begin a pilot study in 2020 to develop a state-wide water marketing strategy that is voluntary, locally-driven, and facilitates temporary water transfers while maintaining low transaction costs. Cache County has been selected as one of three areas to be included in the study. Some of the goals of the study include fulfilling instream flow needs, addressing growing municipal needs, and sustaining agricultural communities.

5.8.2 Multi-Jurisdictional Secondary Water

Currently, a large amount of treated, culinary water is applied to yards throughout Cache County for the irrigation of residential landscaping. The installation of secondary water systems will put irrigation water to beneficial use, extend the supply of drinking water to support future growth and reduce overall water costs. Drinking water supplies are extended by reducing consumption during irrigation seasons. Costs are reduced by using untreated water for outdoor watering and preserving higher quality water for domestic use.

5.8.3 Bear River Development

Bear River development plans are progressing. CWD needs to continue to focus on being informed and involved in the discussions and planning process. CWD must represent the water users of Cache County in the development of a future plan that meets the CWD purposes. CWD needs to evaluate and consider the effects to streams and other water bodies within the Bear River system when making decisions to develop or not develop Bear River water.

5.8.4 Multijurisdictional Aquifer Storage and Recovery (ASR)

ASR is a method to use groundwater and surface water resources conjunctively. For example, high surface flows from streams can be infiltrated or injected into the ground during spring months to supplement ground water storage supplies. The water that is stored through this process can be withdrawn from the aquifer later in the year or during a dry year to meet demands.

Aquifer storage and recovery requires minimal structural elements and has the ability to convey water from the point of recharge to any point of use near the aquifer without extensive canals, piping and appurtenances. Aquifers also provide a water quality benefit since they have a natural ability to filter sediment and remove some biological contaminants. To maintain ground water quality, it is necessary to treat surface water to drinking water standards before injecting it into a primary drinking water aquifer. (Utah Division of Water Resources, 2004)

The Utah Geological Survey (UGS) has completed some preliminary studies of potential ASR sites in Cache County and has expressed interest in continuing additional studies. More studies are needed to determine the volume of water that can be put into the principal aquifer and stored without causing flooding of homes or other properties.

CWD should focus on ASR projects that involve and benefit multiple jurisdictions.

5.8.5 Irrigation Delivery Efficiencies

Many of the irrigation canals in the county are old and deteriorated. These canals do not efficiently deliver water and may present safety risks. Many decades have passed since the canals were constructed and they need attention.

5.8.6 State Committees and Legislation

Utah water laws and legislation are frequently changed and updated. In the water community, there are organizations experienced in water management and water issues that provide guidance to legislators as they vote to modify or establish new water law.

These organizations include the Utah Water Task Force, the Water Development Commission, and the Utah Water Coalition. Monitoring the efforts of and participating in these organizations where possible will be increasingly more important as Utah grows and develops.

5.8.7 Conservation

Continue current conservation efforts and implement new strategies to accomplish the new regional conservation goal of an 18% reduction in per capita M&I water use between 2015 and 2030. The regional water conservation goals can be reviewed at the following link: https://water.utah.gov/regional-conservation-goals/

5.8.8 Local Outreach

CWD should work with local municipalities and the general public to strengthen relationships, increase knowledge, inform, and promote efficient practices.

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6 5-YEAR PRIORITIES AND ACTION PLAN

6.1 INTRODUCTION

This master plan update process has identified the CWD 5-year priorities and provides a 5-year action plan. The action plan includes specific actions within the focus areas listed in Section 5 to complete each year along with some potential grants that may help fund those actions.

6.2 5-Year Priorities

The CWD board helped develop the 5-year priorities as explained in Section 2. These priorities are listed below:

- **Protect Water Rights and Supplies** - Protect existing municipal and agricultural water rights. through efficient conversion of water from agricultural uses to municipal and industrial (M&I) uses where development occurs. Also protect drinking water sources and support efforts to improve water quality.
- **Protect Bear River Allocation** - Continue to stay engaged in Bear River development planning and represent Cache County residents. Increase understanding of Cache County options and the long-term plan with regards to Bear River development.
- **Bank Water Rights** – Participate actively in water banking and the related possibilities to protect water rights through beneficial use, provide more flexibility to move water for needed uses, and provide compensation to water rights holders that lease water.
- **Provide Adequate Reliable Irrigation Supply** - Support and coordinate efforts to promote and fund efficient conveyance and use of irrigation supply and development of secondary water systems between multiple jurisdictions. Many of the existing irrigation delivery systems are becoming less efficient and need to be improved. Also, over the years many areas served by irrigation canals have developed into homes and businesses. As such, there is an increased interest in secondary water systems. With this there is a need to identify processes to develop secondary systems in a way that benefits all parties involved.
- **Conserve Water** - Lead efforts to meet the goal of 18% reduction in M&I water use between 2015 and 2030 established by the State.
- **Provide Funding and Technical Assistance** - Assist local water entities, or groups made up of the water entities, to obtain grants or loans for projects and provide technical assistance and funding for studies that match the CWD purpose.
- **Guide Water Legislation** - Influence water policy through the legislative process to protect the water interests of Cache County. CWD needs to continue to be a voice for the water users in the County on key legislative issues. For example, currently there are some questions about new secondary water metering legislation and a desire to know what it entails and means for local water users.
- **Improve Understanding of Environmental Water Needs** - Research and investigate Cache County's environmental water demands along the rivers, wetlands, and other water bodies. Environmental studies need to evaluate the effects to downstream rivers and lakes within the Bear River system. This understanding is key to maintaining the beauty of the County and surrounding areas. Environmental impacts should be evaluated for water planning and development efforts completed by CWD.

6.3 5-Year Action Plan

In order for the vision of the board of directors to take effect, actions based upon the plan conclusions must be taken. A specific 5-year action plan is described below and provides the prioritized actions for each of the next five years. A complete view of the 5-year action plan, as discussed in the November board update meeting can be found in Appendix 6-A. The following report sections explain and show the plan in smaller components.

6.3.1 Proposed Actions and Related Priorities

The 5-year action plan was created based on the focus areas outlined in Section 5 and the 5-year priorities outlined in Section 2. As explained in the associated sections the focus areas were developed based on stakeholder input and the 5-year priorities were developed based on the board workshop. The 5-year actions are shown in Table 6-1 along with the lists of 5-year priorities that are achieved through the actions.

6.3.2 Other Actions

CWD may be approached by entities with needs or be notified of opportunities to participate financially in water related projects. CWD may decide to assist financially in projects that fit within the purposes of CWD. The "Other" category in Table 6-1 is for these types of projects.

Table 6-1: 5-Year Plan - Actions and Related Priorities

*Proposed Actions						Related 5-Year Priorities
Focus Areas	2020	2021	2022	2023	2024	
Water Banking	Participate in DWRe water banking pilot program to investigate leasing options to address municipal needs, sustain agriculture, and improve instream flows etc.	Participate in DWRe water banking pilot program to investigate leasing options to address municipal needs, sustain agriculture, and improve instream flows etc.	Create a water bank (website, management, etc.) and begin advertising.	Continue management and implementation of bank. Hire part time water bank coordinator.	Continue management and implementation of bank.	Protects Water Rights and Supplies Banks Water Rights Provides Adequate Reliable Irrigation Supply Guides Water Legislation Improves Understanding of Environmental Water Needs
Multi-Jurisdictional Secondary Water	Obtain funding for Crockett pressure irrigation Project. Start Crockett environmental process. Support other secondary water opportunities.	Crockett environmental study. Mapping of secondary water systems. Support other secondary water opportunities.	Crockett environmental study. Mapping of secondary water systems. Support other secondary water opportunities.	Support Crockett design. Feasibility study for another secondary system. Support other secondary water opportunities.	Begin Crockett construction. Feasibility study for additional secondary system. Hire a part time project coordinator. Support other secondary water opportunities.	Protects Water Rights and Supplies Provides Adequate Reliable Irrigation Supply Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs
Bear River Development	Review the current DWRe Bear River Development report as it applies to Cache Water District.	Funding for study of environmental demands along streams.	Evaluate environmental demands along rivers.	Evaluate environmental demands along rivers. Begin a feasibility evaluation on potential local reservoir sites.	Continue reservoir feasibility evaluations.	Protects Water Rights and Supplies Protects Bear River Allocation Provides Adequate Reliable Irrigation Supply Guides Water Legislation Improves understanding of Environmental Water Needs
	Maintain communication with DWRe with regard to long term plans for CWD.					
Multi-Jurisdictional ASR Program	Obtain funding for Green Canyon and Logan Island ASR evaluation.	Evaluate Green Canyon and Logan Island ASR projects.	Create water development agreements for an ASR project if studies show favorable outcomes.	Support and coordinate design of ASR system(s). Evaluate other ASR sites.	Support and coordinate construction of ASR system(s). Evaluate other ASR sites.	Protects Water Rights and Supplies Protects Bear River Allocation Provide Adequate Reliable Irrigation Supply Provides Funding and Technical Assistance
Irrigation Delivery Efficiencies	Prioritize canal seepage study areas, obtain funding, and measure seepage losses along major canals in Cache County in cooperation with canal companies.	Continue seepage loss studies. Evaluate return flows to rivers or adjacent riparian areas for canals with high seepage losses. Prioritize areas to pipe or line.	Provide information and support to irrigation companies for grants to line or pipe the segments found with the most seepage loss and fewest impacts to stream flows and natural riparian areas.	support and coordinate design of improvements. Begin grant assistance for other projects.	Support and coordinate construction of Improvements.	Protects Water Rights and Supplies Provides Adequate Reliable Irrigation Supply Conserves Water Provides Funding and Technical Assistance Improves understanding of Environmental Water Needs
State Committees and Legislation	Continuing Actions: Monitor legislative activity, provide information on new water related bills including secondary metering bill (S.B. 52). Participate in Utah Water Task Force, Bear River Development meetings and TMDL meetings. Assist in drafting new water bills.					Protects Water Rights and Supplies Protects Bear River Allocation Investigates Water Banking Provide Adequate Reliable Irrigation Supply Guides Water Legislation
Conservation	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow. Demonstration garden planning. Hire part-time conservation coordinator.	Conduct secondary water audits with USU. Participate in slow the flow campaign. Demonstration garden.	Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs
	Conduct water-wise landscaping classes and inform residents with regard to existing conservation rebate programs and incentives.					
Local Outreach	Continuing Actions: Meet annually with city managers, city councils and the Logan City Water Board to promote 40-year water right plans, give legislative updates, and discuss other key water issues such as source protection. Meet with cities and irrigation companies that express interest in secondary water systems. Plan annual Northern Utah Water Conference and participate in annual local water fair.					Protects Water Rights and Supplies Protects Bear River Allocation Investigate Water Banking Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs
Other	Assist with other opportunities as they arise and as they fit within the purposes of CWD.					To be determined

*Actions that affect finances, infrastructure, or property owned by other entities will require coordination and agreement with those entities.

6.3.3 5-Year Action Plan Conceptual Budget Plan

Table 6-2 shows the conceptual budget plan and potential funding opportunities for each action in the 5-year plan.

Table 6-2: 5-Year Plan - Budget and Grant Sources

Focus Areas	Estimated Budget Plan					Potential Grant Sources
	2020	2021	2022	2023	2024	
Water Banking	$ 10,000	$ 10,000	$ 10,000	$ 50,000	$ 50,000	BOR Water Marketing Strategies Grant - DWRe obtained grant for 2020-2022
Multi-Jurisdictional Secondary Water	$ 25,000	$ 75,000	$ 75,000	$ 50,000	$ 100,000	NRCS Watershed Operations Grant BOR Water and Efficiency Grant BOR Field Conservation Services Grant
Bear River Development	$ 5,000	$ 25,000	$ 100,000	$ 100,000	$ 100,000	BOR Basin Studies Program Applied Science Tools Grant
Multi-Jurisdictional ASR Program	$ 25,000	$ 25,000	$ 25,000	$ 50,000	$ 50,000	Utah Geological Survey
Irrigation Delivery Efficiencies	$ 30,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	BOR Water and Energy Efficiency Grant
State Committees and Legislation	Covered in Salary	Covered in Salary	Covered in Salary	Covered in Salary	Covered in Salary	NA
Conservation	$ 20,000	$ 25,000	$ 30,000	$ 65,000	$ 75,000	BOR Water Conservation Field Services Program
Local Outreach	$ 10,000	$ 10,000	$ 20,000	$ 20,000	$ 20,000	BOR Water Conservation Field Services Program
Other	$ 50,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	
Totals	**$ 175,000**	**$ 320,000**	**$ 410,000**	**$ 485,000**	**$ 545,000**	

6.3.4 General 6 to 10 Year Recommendations and Philosophies

Some general recommendations to continue focusing on for years 2025 through 2029 are given below.

- Update this master plan
- Continue participation in state water planning meetings such as the Executive Water Task Force and Bear River Development planning meetings
- Review opportunities for partnering with other conservancy districts on water planning that may affect CWD.
- Allow existing water systems to continue to function within their service area and provide support and resources for operational needs, interconnection projects and future water development
- Review the action plan items of this report regularly to make sure the objectives of the plan are being met moving forward

Appendix 2-A

Interview Outline

The situational assessment interview outline used to better understand the current water needs and priorities of the stakeholders.

CACHE WATER DISTRICT

Situational Assessment Interview outline
CWD Master Plan 2019

Brief Overview of Water Master Plan Effort

The Cache Water District has hired J-U-B Engineers and the Langdon Group to update the water master plan. The purpose of the interviews is to better understand the current water needs and priorities of the stakeholders.

What water needs are most pressing for your city, organization, etc.?

Future Actions and Strategies

---------- Discussion of Water Project Evaluation Matrix----------

Review Objectives
Review key water objectives used in the evaluation matrix and discuss possible edits or adjustments to objectives.

Are there any other objectives or issues that need to be considered when evaluating future actions?

Identify Actions to Evaluate
Discuss actions that should be evaluated for the district to have in their plan.

Are there any water projects or actions that should be done to address your current needs (locally and regionally)? If so, what?

Exploratory Questions

What can CWD do to help you?

How should the CWD interact with you?

- City Council presentations?
- Email updates?
- Other?

Appendix 2-B

Respondents and Key Themes

Respondents to the situational assessment interviews and key themes gathered from the interviews.

CACHE WATER DISTRICT

Cache Water District 2019 Master Plan Update
Categorized Notes from Stakeholder Interviews

This document includes a list of persons interviewed for the master plan update and a categorized list of ideas and input collected during the interviews.

I. Interview List

Key Person Interviews		
Name	**Organization**	**Role**
Jim Watterson	Bear River	River Commissioner
Darin Evans	Summit Creek	River Commissioner
Colleen Jashinsky	Logan River	River Commissioner
Clint Hansen	Little Bear River	River Commissioner
Jason Fuhriman	Providence/Blacksmith Fork Canal	Key Irrigator
Jon Hubbard	Providence/Blacksmith Fork Canal	Key Irrigator
Jeremy Kimpton	Richmond City	City Administrator
Darek Kimball	Richmond City	City Engineer
Scott Wells	Wellsville City	City Manager
Tom Bailey	Wellsville Irrigation / Wellsville City	President/Mayor
John Drew	Providence City	Mayor
Scarlet Bankhead	Providence City	Administrative Services Director
Rob Stapley	Providence City	Public Works Director
Corey Twedt	Millville City	Recorder
David Hair	Millville City	Mayor
Chad Kendrick	Millville City	Recorder
Jordan Oldham	North Logan City	Public Works Director
Zac Root	North Logan City	Water Department
David Wood	Amalga Town	Mayor
David Rosenberg	USU	Water Research Lab
Nancy Mesner	USU	Watershed Sciences
Beliz Lane	USU	Water Research Lab
Frank Howe	USU	Wildland Resources
Clint Carney	USU	Environment & Society
Sarah Null	USU	Watershed Sciences

II. Water Storage/Bear River Development

A. Approximately 50,000 acre-feet of un-stored water passed through the Little Bear River system in 2019 and 30,000 acre-feet on average each year depending on runoff conditions

B. Most of the water that could be developed comes from the Cache County area

C. Evaluate smaller reservoirs

D. We need to make sure we don't get trimmed out of the Bear River Development Act (That we don't lose our allocation)

III. ASR

A. Many existing artesian wells may need to stop flowing before we can do huge amounts of ASR storage

B. Possible Richmond well ASR study and project to store water in lower well during the winter for summer use

IV. Water Banking

A. Possibly lease water for in stream flows

B. Use leased water income to maintain irrigation delivery systems

C. Split season leases

D. Meter systems needed

V. Secondary Water

A. Provide secondary water in Providence with Providence Blacksmith Fork Irrigation Company

B. Re-use treated sewer water for secondary uses

C. Install dry systems in new developments

D. Build a system in the Crockett Avenue service area

VI. Irrigation Delivery

A. Pipe or line canals to improve delivery of water

VII. Culinary Water

A. City interconnects are good

B. Use spring water for culinary uses and irrigation water for secondary uses through exchanges

VIII. Public Information

A. Public needs to know that the water may not always be there

B. Meet regularly with City councils about key current water issues

C. Encourage cities to have a 40 year water plan

D. Improve communication with cities and irrigation companies during legislative session

IX. Water Quality

A. Prevent erosion
B. Protect drinking water quality

X. Water Studies

A. Participate in Banking pilot study
B. Study possibility of introducing beavers at Davenport Creek to prolong the creek flow
C. Measure flows in the canal systems to identify high seepage areas and identify potential changes in stream return flows
D. Consider doing a proof on Hyrum Dam and stage/storage curve
E. Improve irrigation system mapping
F. Secondary water system feasibility studies in developed areas
G. Floodplain and impounded wetlands studies
H. Identify dewatered stream habitat segments and sources for instream flows
I. Identify how stream ecosystems connect and the barriers
J. Study the pre-development lower Bear River flows
K. Do an inventory study of ecosystem assets.
L. Complete a drought contingency plan
M. Identify impacts of piping canals
N. Identify recreational water uses
O. Stream gauging and temperature sensors
P. Study how potential dams could change or enhance environmental uses

XI. Secondary Metering

A. We need to have a strong voice on this issue
B. Metering every house or secondary connection is overkill and metering should occur at the head gate
C. Canal companies state that they only manage (are liable) to the head gates off of their canals
D. Provide support to secondary systems to meet legislative requirements for secondary water meters

XII. What can CWD do to help?

A. Facilitate a water bank
B. Provide a voice on water rights legislation
C. Keep state Legislation “in check”
D. Make sure farmers can continue to farm and afford water
E. Protect local water interests and rights as new developments occur
F. Continue to be “accessible”
G. Make sure we have enough water for buildout

H. Help cities “bring their issues to the finish line”
I. Help obtain funding and provide some funding for studies
J. Continue to coordinate with the city managers
K. Protect our interests with regard to Bear River development

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Appendix 2-C

Environmental Needs

Meeting minutes from the environmental water needs meeting with USU staff conducted July 30, 2019.

CACHE WATER DISTRICT

Environmental Water Needs Meeting with USU Staff
7/30/19

USU Faculty in Attendance

David Rosenberg	Water Research Lab
Nancy Mesner	Watershed Sciences
Belize Lane	Water Research Lab
Frank Howe	Wildland Resources
Clint Carney	Environment & Society
Sarah Null	Watershed Sciences

Notes:

- Working a lot in the Blacksmith Fork River
    - Electro Fishing – Trout Unlimited
    - In Stream flow lease with Nibley City
    - Canal seepage is causing the instream flow in Blacksmith Fork.
    - Need to identify other locations
    - Cub River and Cherry Creek
    - Nathan to meet with Belize to identify final diversions
- Systems optimization to improve water management, Lower Bear River. Dissertation for flood plains and impounded wetlands in Cache County and Box Elder County.
    - Some field data.
- Ongoing data from a landscape scale on habitat in the Bear River. Uncertainty
    - Imperfect information – instream habitat.
    - Dewatered sections of habitat – Ag water, instream water, diverting a substantial amount of the flow
- Expanding in-stream flows. Needing to procure a source for environmental flows. Shepard the water.
    - District isn't quite set up to do
    - Lease or a bank with the irrigators if waters are not being used.
- Water banking will help.
- State engineer's office was excited about accounting for the extra water.
- Spend time in the sub surface because it keeps the water cool.
- Trade off because more mass in the water keeps the water cool.
- Water banking has some challenges.
- It costs money because you have to measure things. Dry damming. Changing the system.
- Banking – water could be leased twice.
- Look to other states and other districts to how they do it. Having the measurements in place to track it.
- How do you set up the measuring system?

Document – uses that we've talked about are good. They haven't changed much in the last 5-7 years.

- Access – raging debate at the state level. Who has access to streams? Promote environmental access.
    - Access to the stream bank and access to the bed.
- Ecosystem habitat – how do they connect with each other? The barriers of the systems. Worked with the Weber River to remove barriers.
- Mimicking a natural hydrograph
- Understanding what flows were previously part of the lower systems.
    - What our ecosystem is adapted to.
- Bear River is the perfect example. Bear Lake → BRCC
- Long Term Reconstructed – Tree Rings
- The Bear River Simulation Model → Is doable but hasn't been done. Could be a good thesis.
- Site on The Bear. Estimated Natural Flow.
    - Exists.
- 1st Dam is another gage for natural flow.
- Woodruff Narrows – Bear River into Wyoming back into Utah and back into Wyoming.
    - Water budget table.
- Water balance – Bear River Commission.
- Exists for Cities but not so much Ag .
- Maybe the state is doing it now because they are updating the Bear River Model. Return flows in Box Elder County and Cache County.

Key Questions

1) Where are environmental and ecosystem water uses located?

- Some of them are where they are needed.

2) They are studying in areas where there is low conflict.
    a. Access – 10 of landowners and the city
    b. People have been really helpful but even with that they have been
    c. Bear river bottoms – conservation easement – Amalga/Trenton – Hunting
    d. Private land – Shooting (isn't safe)
    e. Water flows and data too. That is particularly hard with the ag sector. Want to go somewhere where there are good records.
    f. The quantity of landowners you have to deal with. PacifiCorp was the landowner.
    g. Amount of coordination that is required. Landowner drives financial help.
    h. Key is the water banking – who is willing to pay what for that benefit. People that live along the river are excited about it but people that don't live on the river.
        i. Water bank – who is going to pay for it.
    i. If there is access in using it.

Other Ideas?

- Pilot study or other efforts. Inventory study – ecosystem assets. Until the county has a good sense of what is here they won't be able to manage it well.
- The district should get involved in one of the leases – small projects. Foot in the door. Already doing stuff.
- Partnering with Trout Unlimited. Bank will be set up in Cache County. There is value in having water go to the great salt lake. Keeping it in the discussion so it doesn't drift away.
- PacifiCorp relicensing – Cutler. Opportunity to do a large recreational study – Grazing leases. Research management decisions.
    - Two pathway process – public input on their own. Then there is the public input through the FURC.
    - It is hard to stay engaged with because it is a long process.
- Think about potential dams in the bear river basin could change or enhance those potential uses. Engineering studies that only look at water supply benefits.
- Water Banking Study
    - Work that David and Belize did in the Blacksmith Fork and the Logan. Put water banking to the test. Physical measurement infrastructure set up. Fish and bug studies.
    - The City has decided that it isn't physically feasible that they can't do a lease with Trout Unlimited.
    - Most of Cache County's rivers are private. Can we add access for people do don't have access?
- Small private companies could make a huge impact.

How should environmental groups interact with the district?

- Lowest level would continue to coordinate on these things to go forward. Trying to get a collaborative project.
- Could help broker the relationships. Defines some of the key questions. Put together a key proposal.
- Local, here close, and needs to happen.
- Could turn this into a project with the district.
- Drought Contingency Plan.
- Another thing is communicating. Present some of the findings in the Bear. Studies and requests for proposals.
- Tree rings. What were the flows pre-diversions? Put together a partnership.
- Identify the best studies to do first.
- What is happening to the water rights?
- USU groups could help with quantifying the water movement of the bank.
- Look at what is going to be gained instead of what is going to be done.
- Crockett Diversion – if that system is piped, study the eco impacts of piping the canals.
- Measuring the canals to see which ones are losing the most. Probably have the most environmental impacts.
- Compromise – Riparian negotiation.

    - Where does that water come from? Where is the change of water use?
- There is time to play out alternatives. Smaller reservoirs, etc. Keeping these things on the table.
- One work around for those questions. Simulate all the alternatives. Water reliability.
- Do we have a reliable system?
- Cache County is very vulnerable

Recreation

- How recreation plays into all of this is a selling point. Habitat is out there. Recreational analysis. Is this going to be beneficial from recreation or recreational opportunities? Should be factored into any major project that is done.
- A lot of people live here because of the recreation. Can the district buy from the bank?
- Completes decentralized pathway. Want to purchase an instream flow right.
- It will be harder to do that politically. Outside entity to contract water outside the bank will be better.
- Could potentially help. Could have a hard time influencing individuals to help. County that the district wants to help.
- Get people to see how their actions influence the aggregate.

- Try to find a way to move forward with an active role.

Biggest project

- Quantify the water demands for instream, wetlands, flood plain areas. Pick one sub area where there may be promise. Thinking that through and doing that through. Blacksmith Fork and Logan. Most likely the location for the bank to be set up.
    - South Fork of the Little Bear – Lease that Trout Unlimited has.
    - Volume and timing, quality, etc. Environmental water demands. Differences between years.
    - A lot of private users. Private individuals.
- Water bank can help.

Split season leases.

- Need to coordinate at the beginning of the season.

Second Idea

- Developing a framework for how to monitor everything, canal, instream flow, for it to work with a water bank.
- Innovative new approaches

Measuring water

- Stream gauging and temperature sensors, etc.

Data to work with.

1000 Acre Feet at Porcupine with the state that could be leveraged if needed.

Recharge groundwater – recharge the river by the aquifer. Ponds they know the timing of the flow. Water level is so strange. The homes are close so they worry about flooding.

Biggest spring in the valley. Idaho Valley and Salt Lake. ASR – Shifting irrigation systems. Storm water management to recharge the aquifers.

Division of Water Resources → Are they a player in this. Relationship is project based.

Identifying Environmental Water Demands for Cache County

May 2013
Dr. David E. Rosenberg, Dr. Sarah Null, Dr. Nancy Mesner, Dr. Joanna Endter-Wada
Utah State University

This fact sheet lists many important environmental and ecological uses of water in Cache County, Utah and the environmental benefits derived from those uses. We overview a pilot/scoping study to determine where rivers and riparian areas provide environmental benefits, how they are connected, plus quantify the volume and timing of water needed to maintain these benefits. We also estimate the cost to undertake such a study. This type of study will be needed to sustainably and cost-effectively develop water in Cache County over the coming 50 years in ways that both protect and enhance the County's water resources and unique environmental features. The work can also simultaneously identify the environmental and economic impacts of and benefits from water development strategies proposed in the County's Water Master Plan.

Important Environmental Water Uses and Associated Benefits

Use: Provide Ecosystem Habitats

- Riparian and wetland areas
  - Wildlife habitat
  - Maintain water temperature
  - Flood damage reduction
  - Protect property (and value)
  - Recharge groundwater
  - Maintain flow during dry periods
- In-stream
  - Regulate water quality (temperature, phosphorus, nitrogen, etc.)
  - Support fisheries (sport, native)
  - Support aquatic ecosystems and habitats

Use: Support Recreation Opportunities

- Hunting
- Fishing
- Boating/water skiing
- Birding
- Hiking
- Aesthetic values

Key Questions to Answer before Developing the County's Water Resources

1. Where are environmental and ecosystem water uses located?
2. How are the locations connected physically and hydrologically? If an upstream location is disturbed, what are the effects on downstream resources?
3. How do uses intersect with nearby landowners/stakeholders?
4. What volume and timing of water are needed to maintain environmental benefits?

Suggested Pilot/Scoping Study Method to Answer the Key Questions

1. Pick a few key pilot sites where multiple environmental benefits are co-located (e.g., Bear River bottoms along the Bear River, a headwaters stream like the Logan or Blacksmith fork where the river leaves the mountains and enters Cache Valley).
2. Identify environmental water uses present at each site, connectivity, and volume and timing of water needed to maintain services.
3. Gather prior existing environmental and ecosystem data within the County (e.g., USU research in Temple fork, Logan River, Cub River, Curtis Creek, Little Bear, Bear River TMDL, Cutler Reservoir TMDL, PacifiCorp recreation study for Cutler Reservoir, etc.)
4. Use prior existing data to upscale findings from pilot sites to entire Cache County.
5. Identify locations requiring further study to improve up-scaling.

Estimated Cost for Pilot/Scoping Study: $200,000 -- $250,000.

- e.g., 3-years to support 4-6 part-time personnel
- Limited primary data collection at pilot sites

Appendix 2-D

Reports to CWD Board

Summaries of two updates to board members on the master plan progress.

i: Master Plan Update Presentation – Sept. 16, 2019

ii: 5-Year Plan Draft Review Presentation – Nov. 18, 2019

CACHE WATER DISTRICT

Master Plan Update

Board Meeting – September 16, 2019

1

Presentation Purpose

Provide a progress

Review the future project alternatives

2

Stakeholder Interviews

Key Person Interviews		
Name	Organization	Role
Jim Watterson	Bear River	River Commissioner
Darin Evans	Summit Creek	River Commissioner
Colleen Jashinsky	Logan River	River Commissioner
Clint Hansen	Little Bear River	River Commissioner
Jason Fuhriman	Providence/Blacksmith Fork Canal	Key Irrigator
Jon Hubbard	Providence/Blacksmith Fork Canal	Key Irrigator
Jeremy Kimpton	Richmond City	City Administrator
Darek Kimball	Richmond City	City Engineer
Scott Wells	Wellsville City	City Manager
Tom Bailey	Wellsville Irrigation / Wellsville City	President/Mayor
John Drew	Providence City	Mayor
Scarlet Bankhead	Providence City	Administrative Services Director
Rob Stapley	Providence City	Public Works Director
Corey Twedt	Millville City	Recorder
David Hair	Millville City	Mayor
Chad Kendrick	Millville City	Recorder
Jordan Oldam	North Logan City	Public Works Director
Zac Root	North Logan City	Water Department
David Wood	Amalga Town	Mayor
David Rosenberg	USU	Water Research Lab
Nancy Mesner	USU	Watershed Sciences
Beliz Lane	USU	Water Research Lab
Frank Howe	USU	Wildland Resources
Clint Carney	USU	Environment & Society
Sarah Null	USU	Watershed Sciences

3

Initial Feedback

- **What can CWD do to help?**
  - Provide a voice on legislation
  - Provide water technical support
  - Protect local water interests
  - Continue to be “accessible”
  - Funding
  - Build trust between water entities
  - Be a source of water information

4

Objective Type: Water Supply

Objective Type	Objective
Water Supply	Protect existing water rights
	Protect Bear River development water allocated to County
	Provide adequate reliable future culinary supply
	Provide adequate reliable irrigation supply now and in the future
	Maintain existing irrigation delivery systems
	Keep rights to water that are converted from Ag to M&I uses in Cache County
	Match use of water to the water quality
	Conserve Water

5

Objective Type: Implementation

Objective Type	Objective
Implementation	Promote collaboration and focus on regional projects
	Minimize costs
	Inform public about Bear River development
	Inform public about current water situation and future anticipated problems

6

Objective Type: Environment

Objective Type	Objective
Environment	Maintain or improve environmental quality
	Protect water quality and drinking water sources
	Minimize power consumption to operate water systems

Cache Water District

J-U-B ENGINEERS, INC.

7

Evaluation Matrix

Projects

Objectives

PROJECT ALTERNATIVES	OBJECTIVES																		
	Water Supply								Implementation				Environment						
	Protect existing water rights	Protect Bear River development water allocated to Cache County	Provide adequate reliable future culinary supply	Provide adequate reliable irrigation supply now and in the future	Maintain existing irrigation delivery systems	Keep rights to water that are converted from Ag to M&I users in Cache County	Match use of water to the water quality	Conserve water	Promote collaboration and focus on regional projects	Minimize costs		Inform public about Bear River development	Inform public about current water situation and future anticipated problems	Maintain or improve environmental quality	Protect water quality and drinking water sources		Minimize power consumption to operate water systems	
	METRICS (methods of measurement)																		
Aquifer Storage and Recovery Projects																			
Green Canyon - Study and Develop ASR at mouth of Green Canyon (Study how much water goes into the aquifer) assume 10 cfs for 180 days = 3,500 ac feet per yr	3,500	3,500	3	1,000 to 10,000	0	0	0	0	Less than 50	3 to 5	$	590,000	$	13.58	50% Grant	None	None	None	None	None	No	Some increase
Deer Park Well Study - Study ASR at Logan City River Park Well	5,000	5,000	3	Low	0	0	0	0		More than 15			30		50% Grant	None	None	None	Low	None	No	Some Decrease
Petersen ASR Study - Evaluate potential of storing water from springs in the winter in an existing well near the railroad tracks to improve water quality and increase water supply. (500 gpm for winter months November-March)			1		0	0	0	0								None	None	None		None		
Smithfield ASR Study - Investigate possible ASR project in Smithfield to keep water levels higher in Amalga Marsh			2		0	0	0	0								None	None	None		None		
Reservoir Projects																			
Enlarge Hyrum Reservoir - Enlarge Hyrum reservoir to provide more irrigation to South Cache Irrigators and late season instream flows. Assumed the dam is raised 20 feet (a cost benefit evaluation would be needed to see what the ideal height would be). Geotechnical questions? coordination with Bird refuge and downstream users needed.	12,000	12,000	15	12,000	0	0	Less than 500	0	Less than 50	8 to 15					75% funding	None	None	Medium	Medium	Medium	No	No change
Trade Water in Bear Lake - Use stored water through exchanges.	5,500				0																	
Temple Valley Reservoir Study - Evaluate smaller reservoir sites (less than about 1,500 acre feet each)	60,000	60,000	15	60,000	0	0	Low	0		More than 15					75% funding for irrigation districts	None	None	None	None	Low	No	No Change
Bear River Development Storage - Participate in a state Bear River Development	60,000	60,000	15	60,000	0	0	0	0		1 to 5					75% funding for irrigation reservoir	None	None	None	None	None	No	Large increase
Small High Creek Reservoir - Small reservoir up High Creek (How much water comes out of this drainage in the winter)					0																	
Logan Airport Lagoons - Use Logan sewer lagoons for reservoir storage (3,000 ac feet plus look at use of wetlands and other areas around for storage (Could work out to about potential volume that could be stored)	3,000	3,000	15	3,000	0	0	0	0														
Small Temple Fork Reservoir - Small reservoir up Temple Fork maybe at the Canyon Creek. How much could we store there above?	8,000	8,000	15	8,000	0	0	0	0														
Rock Creek Reservoir - Small reservoir on Blacksmith Fork tributary					0																	
Dredge Logan River Reservoirs - Dredge 1st, 2nd, and 3rd Dams reservoirs on the Logan River																						
Dredge Cutler Reservoir - Dredge reservoir																						

Cache Water District

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Project Alternatives: Categories

Aquifer Storage & Recovery (ASR) - 4
Reservoirs - 10
Water Banking - 1
Secondary Water - 10
Irrigation Delivery - 6
Culinary Water Distribution - 3
Public Information - 4
Water Conservation - 6
Water Quality - 2
Water Study - 5
Other - 3

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ASR Alternatives

Aquifer Storage and Recovery Projects
Green Canyon - Study and Develop ASR at mouth of Green Canyon (Study how far out water goes into the aquifer) assume 10 cfs for 180 days = 3,500 ac feet per year
River Park Well Study - Study ASR at Logan City River Park Well
Richmond ASR Study - Evaluate potential of storing water from springs in the winter in an existing well near the railroad tracks to improve water quality and increase water supply. (500 gpm for winter months November-March)
Smithfield ASR Study - Investigate possible ASR project in Smithfield to keep water levels higher in Amalga Wells

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Reservoir Alternatives

Reservoir Projects
Enlarge Hyrum Reservoir - Enlarge Hyrum reservoir to provide more irrigation to South Cache Irrigators and late season instream flows. Assumed the dam is raised 20 feet (a cost benefit evaluation would be needed to see what the ideal height would be). Geotechnical questions? coordination with Bird refuge and downstream users needed.
Store Water in Bear Lake - Use stored water through exchanges.
Cache Valley Reservoir Study - Evaluate smaller reservoir sites (less than about 15,000 acre feet each)
Bear River Development Storage - Participate in a state Bear River Development

Reservoir Alternatives

Reservoir Projects
Small High Creek Reservoir - Small reservoir up High Creek (How much water comes out of this drainage in the winter)
Logan Sewer Lagoons - Use Logan sewer lagoons for reservoir storage (3,000 acre feet plus?) look at use of wetlands and other areas around for storage (Call Mark Nielsen ask about potential volume that could be stored)
Small Temple Fork Reservoir - Small reservoir up Temple Fork maybe above Spawn Creek. How much could we store there above?
Rock Creek Reservoir - Small reservoir on Blacksmith Fork tributary
Dredge Logan River Reservoirs - Dredge 1st, 2nd, and 3rd Dam reservoirs on the Logan River
Dredge Cutler Reservoir - Dredge reservoir

Water Banking Alternatives

Water Banking Projects
State Water Banking Study - Participate in state pilot study for a CWD water bank, could include the following: investigate banking of conserved water for instream uses, bank water that is made available during conversion from ag to municipal and lease to willing parties, identify water right holders that wish to lease water. Identify entities that have early water not being used to lease to others that need water earlier in the season. (Set up agreements to lease unused early water from Paradise Irrigation to irrigators on the Wellsville Mendon Canal). Identify irrigation companies or irrigators that are willing to not irrigate late in the season and place water rights in a bank to be leased by other users. Develop split season lease agreements for these arrangments.

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Secondary Water Alternatives

Secondary Water Projects
Crockett Avenue Pressure Irrigation Project - Construct a secondary water system in Logan to serve the Crockett diversion service area (The western halves of Logan, North Logan, Hyde Park and areas west of the three cities). This project would also include a large east to west storm water trunkline for Logan City near the northern boundary of Logan and a new recreational trail.
Benchland Irrigation Rights Study - Identify how we can use conserved water above existing service area (legal issues, water rights). How much water are you going to conserve? Switch shares to M&I and take a cut. Create a new right with a new service area. Get the canal companies to agree to change shares over to M&I.
Smithfield Irrigation Secondary Water Pipe Upgrades - Improve Smithfield Irrigation pressure pipe sizes to avoid having even and odd watering days. Replace 4" diameter pipe lines with larger lines.
Secondary Water Metering - Help secondary systems with requirements to send a report to the state by the end of year to outline how they plan to meter all secondary water connections.

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Secondary Water Alternatives

Secondary Water Projects
Millville and Providence Secondary System - Build a secondary water system in coordiantion with Providence Blacksmith Fork Irrigation Company and Spring Creek Irrigation Company with a reservoir in Millville and system to serve Millville and Providence. (Need 4 irrigation companies with 2 cities to participate)
Wellsville Secondary Water System - Build a secondary water system to serve Wellsville City
Small City Secondary Water Feasibility Study - Do a secondary water feasibility study for secondary in Mendon, Amalga or other cities on the west side off of West Cache Canal.
East Bench Secondary Water Feasibility Study - Evaluate possible secondary system to serve areas east of Crockett Avenue Service area
Secondary Water System Maintenance Plan - Identify plan for long term maintenance of secondary water systems
Water Re-use From Treatment Plants

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Irrigation Delivery Alternatives

Irrigation Delivery Projects
Rebuild/Improve Canal System - Program to rebuild or improve major canals in Cache County (1,200 ft per year). Could include reducing seepage to create more habitat for wildlife.
Maintenance Access - Create maintenance access along major canals in Logan, North Logan Hyde Park, Providence, River Heights
Canal Metering - Main canal metering
Enclose Highline Canal to Summit Creek - Pipe Highline canal to Summit Creek
Canal Seepage Study - Partner with Canal companies to measure flows along major open canals (flow greater than 25 cfs and prioritze segments to be enclosed). Include some evaluation of return flows to rivers.
Canal Piping - Pipe all canals to save 60,000 acre feet of water. Laws would need to change to allow use outside of current service areas.

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Culinary Alternatives

Culinary Water Distribution Projects
Wellsville-Mendon City Interconnect - Culinary water pipe between Mendon and Wellsville
Logan-Mendon and Newton Connection - 12" culinary water pipe between Logan and Cache Junction, 8" lines to Mendon and Newton (see old plan) cost of taking water across the valley versus the cost treating water on the west side of the valley
Emergency Interconnect - Connection between 2 neighboring cities, assume half a mile of 12" pipe. Specific interconnects might be between Millville and Providence, Benson and Amalga, Lewiston and Cornish, Millville and Nibley

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Public Information Alternatives

Public Information Projects
City Manager Updates - Discuss 40-year water rights plan, legislative updates, PacifiCorp updates
Promote Secondary Water - Promotion of secondary water sytems for new developments with city councils
Northern Utah Water Conference
Water Fair Support - Education about how water comes to homes from source, through distributions to tap (done at 4th grade level)

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Water Conservation Alternatives

Water Conservation Projects
Regional Conservation Goal - State reduction of 17-18%
Weather Stations - Install more weather stations to help with smart controllers (south end of valley)
Local Workshops/Classes - Help promote outdoor conservation
Promote Incentives/Rebates - Smart controller incenentives, Can the district help people within the boundaries know about rebates? Put on websites
Demonstration Garden - Water conservation demonstration garden (Partner with USU)
Promote Agricultural Conservation - Agricultural conservation help producers with new technology with pivots with driplines, burried driplines.

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Water Study Alternatives

Water Study Projects
Quantify Environmental Water Demands - Study along the Blacksmith Fork to quantify environmental water needs.
Drought Contingency Plan - Complete a plan to identify drought mitigation and response actions for the County.
Mapping of Water Usage Types - Culinary vs. secondary water usage areas for outdoor uses. Show where secondary water is being used and where culinary water is being used.
Optimizing Field Drains - Investige potential to irrigate using headgates on existing field drains to back water up periodically.
Irrigation Succession Planning - Plan for future management of irrigation companies/younger generation not interseted as much in doing what is needed.

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Other Alternatives

Water Quality Projects
Water Quality Monitoring - Periodically monitor quality of natural channels within District.
Cutler TMDL projects

Other Projects
Construct riparian meadows
Beaver Dams - Construct Beaver Dams on Davenport Creek, work with landowner for access, maybe do a 10 year study Knight trucking and Keller Cattle are the owners
Irrigation Contact List - Improve irrigation company contact list and website information

Next Steps

- Evaluate and Prioritize Alternatives
- Update Irrigation Diversion Data
- Create a 5-year and 10-year Action Plan
- Update the Master Plan

Questions?

Review
Draft 5-Year Action Plan

CACHE WATER DISTRICT

Board Meeting - November 18, 2019

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Agenda

CACHE WATER DISTRICT

- 5-Year Priorities
- Review 5-Year Action and Budget Plan
- Next Steps

Board Meeting - November 18, 2019

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5-Year Priority Objectives

Objective	
Protect existing water rights (prepare for ajudication)	●●●●●●●●●
Protect Bear River allocation	●●●●
Provide adequate reliable future culinary supply	
Provide adequate reliable irrigation supply	●●
Maintain existing irrigation delivery systems	
Keep rights to water that are converted from M&I uses in Cache	●●●
Promote secondary water systems	
Conserve water	●
Promote collaboration and focus on regional projects	
Minimize Costs	
Inform public about Bear River development	
Inform public about current and future water situation	

Objective	
Maintain or improve environmental quality	●●
Protect water quality and drinking water sources	●●●
Minimize power consumption	
Complete smart sustainable projects	
Maximize beneficial use	
Provide services to conty residents	
Bank water rights	●●●
Develop relationships and reputation as a trusted resource and advocate	●●
Represent Cache residents on water legislation issues	●●
Provide techinal assistance to water entities	●●●
Fund water related studies	

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5-Year Priorities

Protect Water Rights and Supplies

Protect Bear River Allocation

Bank Water Rights

Provide Adequate Reliable Irrigation Supply

Conserve Water

Provide Funding and Technical Assistance

Guide Water Legislation

Improve Understanding of Environmental Water Needs

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5-Year Action Plan

Focus Areas	Proposed Actions 2020	2021	2022	2023	2024
Water Banking	Participate in water banking pilot program - work with DWRe to complete study. Investigate leases for in-stream flows.	Participate in water banking pilot program - work with DWRe to complete study. Investigate leases for in-stream flows.	Create a water bank (website, management, etc.) and begin advertising.	Continue management and implementation of bank. Hire part time water bank coordinator.	Continue management and implementation of bank.
Estimated Budget	$10,000	$10,000	$10,000	$50,000	$50,000

Related 5-Year Priorities

Protects Water Rights and Supplies
Banks Water Rights
Provides Adequate Reliable Irrigation Supply
Guides Water Legislation
Improves Understanding of Environmental Water Needs

Board Meeting - November 18, 2019

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5-Year Action Plan

Focus Areas	Proposed Actions 2020	2021	2022	2023	2024
Multi-Jurisdictional Secondary Water	Obtain funding for Crockett pressure irrigation Project. Start Crockett environmental process. Support other secondary water opportunities.	Crockett environmental study. Mapping of secondary water systems. Support other secondary water opportunities.	Crockett environmental study. Mapping of secondary water systems. Support other secondary water opportunities.	Support Crockett design. Feasibility study for another secondary system. Support other secondary water opportunities.	Begin Crockett construction. Feasibility study for additional secondary system. Hire a part time project coordinator. Support other secondary water opportunities.
Estimated Budget	$25,000	$75,000	$75,000	$50,000	$100,000

Related 5-Year Priorities

Protects Water Rights and Supplies
Provides Adequate Reliable Irrigation Supply
Conserves Water
Provides Funding and Technical Assistance
Improves Understanding of Environmental Water Needs

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5-Year Action Plan

CACHE WATER DISTRICT

	Proposed Actions				
Focus Areas	**2020**	**2021**	**2022**	**2023**	**2024**
Bear River Development	Review the current DWRe Bear River Development report as it applies to Cache Water District.	DWRe discussions about long term plans for Cache County. Funding for study of environmental demands along streams.	Evaluate environmental demands along streams and rivers.	Begin a feasibility evaluation on potential local reservoir sites.	Continue reservoir feasibility evaluations.
Estimated Budget	$5,000	$25,000	$100,000	$100,000	$100,000

Related 5-Year Priorities
Protects Water Rights and Supplies Protects Bear River Allocation Provides Adequate Reliable Irrigation Supply Guides Water Legislation Improves understanding of Environmental Water Needs

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5-Year Action Plan

CACHE WATER DISTRICT

	Proposed Actions				
Focus Areas	**2020**	**2021**	**2022**	**2023**	**2024**
Multi-Jurisdictional ASR Program	Obtain funding for Green Canyon and River Park Well ASR evaluation.	Evaluate Green Canyon and River Park Well ASR projects.	Create water development agreements for an ASR project if studies show favorable outcomes.	Support and coordinate design of ASR system(s). Evaluate other ASR sites.	Support and coordinate construction of ASR system(s). Evaluate other ASR sites.
Estimated Budget	$25,000	$25,000	$25,000	$50,000	$50,000

Related 5-Year Priorities
Protects Water Rights and Supplies Protects Bear River Allocation Provide Adequate Reliable Irrigation Supply Provides Funding and Technical Assistance

Board Meeting - November 18, 2019

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5-Year Action Plan

CACHE WATER DISTRICT

Focus Areas	Proposed Actions 2020	2021	2022	2023	2024
Irrigation Delivery Efficiencies	Obtain funding and measure seepage losses along major canals in Cache County (canals with 30 cfs flows or greater) in cooperation with canal companies.	Continue seepage loss studies. Evaluate return flows to rivers or adjacent riparian areas for canals with high seepage losses. Prioritize areas to pipe or line.	Provide information and support to irrigation companies for grants to line or pipe the segments found with the most seepage loss and fewest impacts to stream flows and natural riparian areas.	Support and coordinate design of improvements. Begin grant assistance for other projects.	Support and coordinate construction of Improvements.
Estimated Budget	$30,000	$50,000	$50,000	$50,000	$50,000

Related 5-Year Priorities

Protects Water Rights and Supplies
Provides Adequate Reliable Irrigation Supply
Conserves Water
Provides Funding and Technical Assistance
Improves understanding of Environmental Water Needs

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5-Year Action Plan

CACHE WATER DISTRICT

Focus Areas	Proposed Actions 2020	2021	2022	2023	2024
State Committees and Legislation	Continuing Actions: Monitor legislative activity, provide information on new water related bills including secondary metering bill (S.B. 52). Participate in Utah Water Task Force, Bear River Development meetings and TMDL meetings. Assist in drafting new water bills.				
Estimated Budget	Covered in Salary	Covered in Salary	Covered in Salary	Covered in Salary	Covered in Salary

Related 5-Year Priorities

Protects Water Rights and Supplies
Protects Bear River Allocation
Investigates Water Banking
Provide Adequate Reliable Irrigation Supply
Guides Water Legislation

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5-Year Action Plan

CACHE WATER DISTRICT

Focus Areas	Proposed Actions 2020	2021	2022	2023	2024
Conservation	Conduct secondary water audits with USU. Participate in slow the flow campaign. Conduct water-wise landscaping classes.	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow. Demonstration garden planning. Hire part-time conservation coordinator.	Conduct secondary water audits with USU. Participate in slow the flow campaign. Demonstration garden.
Estimated Budget	$20,000	$25,000	$30,000	$65,000	$75,000

Related 5-Year Priorities

Conserves Water
Provides Funding and Technical Assistance
Improves Understanding of Environmental Water Needs

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5-Year Action Plan

CACHE WATER DISTRICT

Focus Areas	Proposed Actions 2020	2021	2022	2023	2024
Local Outreach	Continuing Actions: Give annual city manager updates and city council updates to promote 40 year water rights plans, give legislative updates, and discuss other key water issues such as source protection. Meet with cities and irrigation companies that express interest in secondary water systems. Promote outdoor water conservation at local water efficient landscaping workshops. Plan annual Northern Utah Water Conference and participate in annual local water fair.				
Estimated Budget	$10,000	$10,000	$20,000	$20,000	$20,000

Related 5-Year Priorities

Protects Water Rights and Supplies
Protects Bear River Allocation
Investigate Water Banking
Conserves Water
Provides Funding and Technical Assistance
Improves Understanding of Environmental Water Needs

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5-Year Action Plan

	Proposed Actions				
Focus Areas	2020	2021	2022	2023	2024
Other	Assist with other multijurisdictional opportunities as they arise and as they fit within the purposes of CWD.				
Estimated Budget	$50,000	$100,000	$100,000	$100,000	$100,000

Related 5-Year Priorities
To be determined

Board Meeting - November 18, 2019

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Estimated Budget Plan

Focus Areas	2020	2021	2022	2023	2024
Water Banking	$ 10,000	$ 10,000	$ 10,000	$ 50,000	$ 50,000
Multi-Jurisdictional	$ 25,000	$ 75,000	$ 75,000	$ 50,000	$ 100,000
Bear River Development	$ 5,000	$ 25,000	$ 100,000	$ 100,000	$ 100,000
Multi-Jurisdictional ASR	$ 25,000	$ 25,000	$ 25,000	$ 50,000	$ 50,000
Irrigation Delivery Efficiencies	$ 30,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000
State Committees and Legislation	Salary	Salary	Salary	Salary	Salary
Conservation	$ 20,000	$ 25,000	$ 30,000	$ 65,000	$ 75,000
Local Outreach	$ 10,000	$ 10,000	$ 20,000	$ 20,000	$ 20,000
Other	$ 50,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
Yearly Totals	**$ 175,000**	**$ 320,000**	**$ 410,000**	**$485,000**	**$ 545,000**

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Next Steps

- J-U-B to integrate revisions based on this meeting
- J-U-B will send the draft report to Nathan by the end of the week
- Draft report comment period
- Final 5 year plan
- Update of water supply and demand projections from DWRe

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Appendix 2-E

Board Workshop Results

Results from the Board Workshop conducted October 24, 2019

CACHE WATER DISTRICT

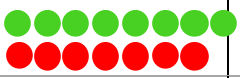
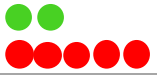
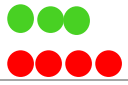
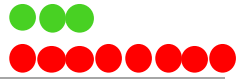
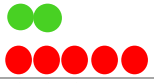
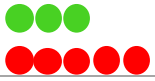
Board Workshop Results

10/24/19

Cache Water District purpose discussion and workshop results

Planning for and facilitating water rights and water supplies for long-term	
Conservation	●●●●●
Development	●●●●
Protection	●●●●●●●●
Distribution	●●●●
Management and Stabilization	●
of	
domestic	
irrigation	●●●●●●●●●
power	●●
manufacturing	●
municipal	●●●●
recreation	●●●●
other beneficial uses, icluding the natrual stream environment	●●●
in a cost effective way to meet the needs of the residents and growing population of Cache County;	●●●●●●●
In furtherance of protecting and preserving water supplies that are necessary for Cache County's future, the District will assist in:	
Water conservation education and programs	●●●●●●●
Assist local municipalities and Cache County as they establish and implement water management policies and ordinances while maintaining the autonomy of existing water suppliers	●●●●●●●
Undertake environmental and other studies to provide information necessary to make proper, timely water use decisions	●●●●
Obtain grants and low cost loans to upgrade and construct needed water infrastructure	●●●●●●●●

Cache Water District objectives discussion and workshop results

Objective		Objective	
Protect existing water rights (prepare for adjudication)		Maintain or improve environmental quality	
Protect Bear River allocation		Protect water quality and drinking water sources	
Provide adequate reliable future culinary supply		Minimize power consumption	
Provide adequate reliable irrigation supply		Complete smart sustainable projects	
Maintain existing irrigation delivery systems		Maximize beneficial use	
Keep rights to water that are converted from M&I uses in Cache County		Provide services to county residents	
Promote secondary water systems		Bank water rights	
Conserve water		Develop relationships and reputation as a trusted resource and advocate	
Promote collaboration and focus on regional projects		Represent Cache residents on water legislation issues	
Minimize Costs		Provide technical assistance to water entities	
Inform public about Bear River development		Fund water related studies	
Inform public about current and future water situation			

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Appendix 2-F

Draft Report Comments

Written comments received from the public November 27, 2019 through December 31, 2019.

CACHE WATER DISTRICT

Constructive Feedback on the 2019 Draft Cache Water Master Plan Update

These comments are also posted publicly at:
https://utahandwesternwater.wordpress.com/2019/12/31/constructive-feedback-on-the-2019-draft-cache-water-master-plan/

This Fall, the Cache Water District (hereafter, the District) released a draft 2019 water master plan update (https://tinyurl.com/2019CacheWaterMasterPlan) and solicited public feedback and comment. This draft plan follows a prior 2013 water master plan and Cache County voters deciding in 2016 to form the District. Below, I describe my involvement in the 2013 and 2019 plans, strengths of the 2019 draft plan, and suggestions to improve.

My Involvement

I formally advised Cache County and JUB Engineers in the development of the 2013 Cache Water Master Plan. In Summer and Fall of 2016, I was a strong proponent to form the Cache Water District (see blog posts [1][2]). Since the District was formed, I have been in intermittent contact with the board chair Jeannie Simmonds and District manager Nathan Daugs. On December 3, 2018, at the invitation of Jeannie and Nathan, Dr. Belize Lane and I presented tools the District could use to promote instream flows in Cache County at the District's monthly board meeting (link to minutes). On July 30, 2019, I and four other Utah State University (USU) professors and staff participated in a round table conversation on environmental water needs with Nathan and the consultant overseeing the 2019 draft plan. The consultant's notes from that discussion are memorialized in the first several pages of Appendix 2-C of the 2019 draft plan. I first read the draft plan on the night of December 29, 2019, reread the plan on December 30, 2019, and wrote this constructive feedback. Having now read the 2019 draft plan, I remain a strong supporter of the Cache Water District because the District offers the best mechanism to manage water systematically for Cache County, work with all the entities involved, and act on new opportunities to improve water management as they arise.

Strengths of the 2019 Draft Plan

The major strength of the 2019 draft plan continues a strength of the 2013 plan which is to consider and pursue a large, diverse set of water management strategies. These strategies include water banking, improvements to secondary water, aquifer storage and recovery, improvements in irrigation efficiency, water conservation, coordination with legislative efforts, public information and outreach. This diversity of strategies is a hallmark of modern portfolio management used by small and large water conservancy districts and utilities across the United States. Pursuing a diverse set of strategies is an important way to manage risk and future uncertainty (same as for investment portfolios). Additional strengths of the 2019 draft plan include:

1. **Strong emphasis on water banking including to participate as one of three anticipated pilot projects throughout Utah.** Water banking is a very important strategy to pursue immediately because banking will allow users to voluntarily, flexibly, and temporarily lease and transfer water. These leases and trades can also include keeping water in-stream for fish, habitat enhancement, or recreation. A water bank and the

associated trade prices will also likely give an early indication of water values for various agricultural, municipal, ecosystem, and other water users across the County (disclosure: In August 2019, I and several colleagues at USU submitted a large research grant to the U.S. Department of Agriculture on the topic of data-enabled water trading and banking to sustain agrosystems. One proposed study site is Cache Valley. Nathan Daugs wrote a letter of support for this grant. We expect to hear in summer 2020 whether the grant will be funded).

2. **Continued emphasis on water conservation.** The draft plan is looking to partner with the USU landscape water check program, start a conservation garden, and hire a part-time conservation coordinator in years 4 and 5. These are excellent steps to start to reduce urban water use by County residents. Conservation remains one of the District's low-cost actions given existing large per capita water use.
3. **The District has worked with agricultural and municipal water providers throughout the County and actively sought public input** (including soliciting these very comments on the 2019 draft plan). Public input is another very important part of modern water management and used by conservancy districts and water utilities across the U.S. to improve management and more directly addresses users' needs. For public input to be effective, the key personnel within the organization must be willing to listen to the input and act on the input.
4. **The summary tables of alternatives in Section 5 describing the rational planning and multi-objective approach to evaluate actions were much easier to follow than the similar material in the 2013 plan**. There is a lot of detailed and useful information in Appendix 5-A about water volumes potentially developed, capital costs, entities effected, and environmental impacts of each action considered.
5. **Improve Understanding of Environmental Water Needs is listed as an important 5-year priority**. Cache County's in-stream, riparian and wetland areas support diverse hunting, fishing, boating (including water skiing), birding, hiking, and aesthetic values and it important that we determine the water needed to support and sustain these activities.
6. **I am jazzed that the District is looking to invest $1.9 million over 5 years (2020 to 2024) on real projects.** This amount is so much more than the District has been able to spend up to now! It is exciting to see that real money will be spent on real projects. This real money shows that the efforts of numerous people in the County who care passionately about water management are starting to yield results.

Suggestions to Improve

1) Delay finalizing this draft plan until the supply and demand data are presented and the public has an opportunity to review this data. No water supply or demand data are presented in this draft plan! A single sentence on an otherwise blank page 10 reads "Sections 3&4 will be updated following an update of the water supply and demands by the State DWRe." It is impossible to completely review and provide feedback on a water master plan that lacks the basic water use and demand data. What are the County's existing water supplies? What are the existing demands? How will demands grow over time? What is the urgency of the situation? How much time does the County have? The supply and demand information are critical to fully evaluate the alternatives presented in section 5. I will state the

plain obvious again: the supply and demand data are needed to evaluate every other statement in the draft plan. Delay approving the draft plan until the demand and supply data are available and the public has a second opportunity to comment on the data and the other statements in the draft plan. Going forward with the draft plan without providing the public a second opportunity to comment on the demand and supply data will contradict and violate at least three of the plan's fundamental purposes listed on page (ii) to:

- Obtain updated water supply and demand information, and
- Evaluate and prioritize actions to be included in the new action plan, and
- Prepare a 5-year action plan and estimated budget to complete the action plan.

2) In the Analysis Section 5, **separate the Reservoir Projects into two categories: (1) re-operate existing storage and (2) Build or Dig New Storage** (Table 1):

Table 1. New Categories for Reservoir Projects

(1) Re-operate Existing Storage	(2) Build or Dig New Storage
• Store water in Bear Lake • Logan Sewage Lagoons	• Enlarge Hyrum Reservoir • State Bear River Development • Small High Creek reservoir • Small Temple Fork Reservoir • Rock Creek Reservoir • Blacksmith Fork Reservoir • Cub River Reservoir • Dredge Logan River Reservoirs • Dredge Cutler Reservoir

Projects in the first re-operate existing storage group use existing infrastructure and are very cheap because they do not require to build anything new. Projects in the second Build or Dig New Storage group are outrageously expensive because they require a lot of design, equipment, construction, permitting, and time to implement (capital costs from $22,000,000 to $500,000,000 for new storage capacity of 1,000 to 60,000 acre-feet listed in Appendix 5-A. Yes, $500 million is 1/2 billion dollars). I am unclear how the numerous environmental impacts of "low" or "none" listed in Appendix 5-A for the Build or Dig New Storage projects were determined. Typically, new reservoirs have lots of environmental impacts which take decades (if ever) to resolve through litigation, permitting with public input, or other confrontational methods. For example, a Small Temple Fork Reservoir upstream of Spawn Creek will likely completely ruin prime Bonneville cutthroat trout and beaver habitat, both of which are in short supply in the County and which the District is looking to enhance with its water banking and other efforts. Focusing on the re-operate existing storage group will achieve one of the District's important purposes to "Plan … in a cost effective way" (Figure 2-2).

3) Deemphasize Bear River Development and dramatically reduce the budget for Bear River Development projects. These projects — aka Build New Storage — are so

outrageously expensive (see improvement #2). Currently, the Bear River Development strategy has the second largest 5-year budget ($330,000) of any potential strategy (Table 2). This budget should be dramatically reduced since these actions are so outrageously costly, will take a long time to come online, and are very controversial. Instead, increase the budget for strategies like water banking, water conservation, aquifer storage and recovery, and irrigation that have much lower costs, can be implemented more quickly, and are less controversial.

Table 2. Total Budget for Strategies Sorted by Budget Amount (adapted from Table 6.2)

Strategy	Total (2020 to 2024)
Other	$ 450,000
Bear River Development	$ 330,000
Multi-jurisdictional Secondary Water	$ 325,000
Irrigation Delivery	$ 230,000
Conservation	$ 215,000
Aquifer Storage and Recovery	$ 175,000
Water Banking	$ 130,000
Local Outreach	$ 80,000
State Committees	$ -
Total	**$ 1,935,000**

4) Differentiate "Protect Bear River Allocation" that stakeholders and District board members want (Figures 2-1 and 2-3) from "build new reservoirs". The draft plan seems to equate protect Cache County interests in Bear River development with building new reservoirs. Again, building those new reservoirs will be outrageously costly, take a long time, and be very controversial. The District should instead look to "develop" Bear River water using cheaper and faster to implement strategies that have broad public support. These strategies can include water banking, defining ecosystem water demands, and many other diverse methods listed in the plan. At the same time, the District absolutely needs to protect Cache County interests – agricultural and urban water users and ecosystems — against the other big players who are actively seeking to develop Bear River water and for whom such development may be cost effective at some point in the future (e.g., the Utah Division of Water Resources, Bear River Water Conservancy District, Weber Basin Water Conservancy District, and Jordan Valley Water Conservancy District; see Table 1-1). To "develop" Bear River water and protect the County's 60,000 acre-foot allocation under the Bear River Development Act without building new reservoirs, the District will need forward and creative thinking and leadership. This leadership will need to hire good water lawyers and lobbyists so that "develop Bear River water" reflects what is in the best interests of Cache County in 2019 rather than what the Utah Legislature might have imagined 28 years ago when it passed the Bear River Development Act in 1991. It will likely be a lot less costly to hire lawyers and lobbyists to define "develop" that more flexibly to meet the needs of the County today than build new reservoirs that are outrageously expensive.

5) Clarify what is meant by "Other" in Table 6-2. This line item has the largest 5-year budget ($450,000) of any item (Table 2, above). Maybe I missed it, but I did not see a description for "other". What will all this money be spent on?

6) Develop more aggressive water conservation goals. The draft plan's current goal of an 18% reduction in 2015 water use by 2030 is pulled straight from the Utah Division of Water Resource's regional conservation goals released in November 2019 (https://water.utah.gov/regional-conservation-goals/). The state says Cache County (as part of the Bear River region) uses 304 gallons per person per day (on average) and the 18% reduction will take use down to 249 gallons per person per day. The reality is 249 gallons per person per day is still a very large daily per capita use. 249 gallons per person per day is much larger than *all* uses reported by *every* water utility that participated in the recent nationwide Residential End Uses of Water 2016 study (DeOreo et al. 2016). The group of utilities includes locations like Scottsdale, AZ and Henderson, NV that are a lot more arid than Cache County. Already (in 2016!), these utilities use 32 to 70 gallons per person per day *less* than what the draft plan sets as the goal for Cache County for 2030.

Table 3. Daily per capita water use by water utilities nationwide and percent reduction by Cache County residents needed to achieve those uses (adapted from DeOreo et al. 2016)

Agency	Total Annual Average (gallons per capita per day)	Non-Seasonal Annual (gallons per capita per day)	% Reduction from 304 gallons per capita per day
Scottsdale, AZ	217	164	29%
Henderson, NV	179	76	41%
Denver, CO	132	64	57%
Otay, CA	124	59	59%
Fort Collins, CO	114	59	63%
San Antonio, TX	113	69	63%
Santa Barbara, CA	112	53	63%
Aurora, CO	110	68	64%
Austin, TX	99	45	67%
Toho, FL	90	60	70%
Mountain, CA	87	50	71%
Miami-Dade, FL	86	80	72%
Chicago, IL	81	71	73%
Tacoma, WA	77	59	75%
RWA	69	60	77%
Cary, NC	68	52	78%
Philadelphia, PA	68	65	78%
Peel, Ontario, CAN	66	59	78%
Clayton County, GA	62	56	80%
Santa Fe, NM	62	49	80%
Waterloo, Ontario, CAN	58	43	81%
EPCOR	58	54	81%
Portland, OR	58	49	81%
Maximum	217	164	81%
Minimum	58	43	41%

Given the national data, minimum reductions of 29%, 41% or higher from Cache County's 2015 use seem in order. Achieving these reductions will require more focused water conservation programs. For example, hire a full-time conservation coordinator in years 1 or 2. Use publicly available satellite imagery to assess landscape water need, compare need to landscape water use, contact users whose use is above the need, and work with these users to reduce their use. This proactive approach would flip the landscape water check model and dispatch landscape water checkers to high use users rather than wait for users to call and request a landscape water check. Develop similar programs for agricultural water users whose use is much larger than urban use. Additionally, develop ordinances that require new developments to have low water use landscaping (compared to conventional turf grass; ordinances are mentioned in the State's regional conservation goals report but not in the 2019 draft plan). Lastly, cultivate a Cache County community conservation ethic through in-person, social media, and demonstration programs. Show residents (and have residents show each other) what our County will look like when we reduce our use below 200 gallons per person per day that is the norm for nearly every other community in the nation. All these conservation efforts are so important because they delay or avoid the need to build very expensive new infrastructure such as reservoirs.

7) Clarify the money and timeline for efforts to identify Cache County's environmental water needs. There is no listed budget for environmental efforts in the 2019 draft plan and confusingly, several actions to identify environmental water needs are listed in Table 6-1 as part of the Bear River Development project to build new reservoirs. Appendix 2-C shows the same identical 1.5-page proposal for "Identifying Environmental Water Demands for Cache County" dated May 2013 that I and three other USU Faculty wrote and was included in the 2013 plan. It is good that there is continued interest to identify Cache County's environmental water needs and I suggest to clarify what exactly the interest and intentions are. List identify environmental water needs separately in Tables 6-1 and 6-2 and as a separate project in Appendix 5-A. Defining these environmental water needs may be an early way for the County to "develop" and protect its Bear River water allocation and also ensure that other Wasatch Front entities do not harm our beloved water habitats in their thirst for Bear River water (disclosure: the 2013 plan included a 1.5-page proposal that I and three other USU faculty wrote that asked for $200,000 to $250,000 to conduct a 3-year pilot-scoping study to identify environmental water needs a few key sites).

Wrap Up

There are a lot of strengths of the draft Cache Water District Master Plan Update 2019. There are also areas for improvement. Please be in touch (david.rosenberg@usu.edu or 435-797-8689) if you want to discuss any of my suggestions to improve, particularly how to implement them so they are low cost and fast to yield results.

David E. Rosenberg lives in Logan, Utah. He is also an associate professor in the Department of Civil and Environmental Engineering and the Utah Water Research Lab at Utah State University. He tweets about water stuff at @WaterModeler. Comments + feedback on this post are welcome, use the form below.

References

DeOreo, W. B., Mayer, P., Dziegielewski, B., and Kiefer, J. (2016). "Residential End Uses of Water, Version 2." *4309b*, Water Research Foundation. https://www.waterrf.org/research/projects/residential-end-uses-water-version-2.

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Nathan Daugs
Cache Water District
199 North Main St.
Logan, UT 84321

December 13, 2019

RE: Comments on the November 11 draft update to the Cache County Water Master Plan

Mr. Daugs,

Thank you for the opportunity to comment on the November 2019 draft revision of the Cache Water Master Plan. Bridgerland Audubon Society participated in the development of the 2013 Water Master Plan and we were very heartened by the long term thinking that went into it and the strategies that emerged, particularly as it seemed to focus on conservation before concrete.

We understand the need to update the plan and the need for the Cache Water District—a result of that very plan—to own their own version, but we think this update needs more time and much more attention to detail. In particular, the report could benefit greatly from professional copyediting to improve clarity and conciseness. It omits key planning concepts (e.g., requirements and vision-mission-goals-objectives-strategies-programs-projects sequencing) and realistic implementation. A more meticulous report, even if it takes extra time, should include basic planning structures and formats proven to achieve effectiveness. After all, we want it to be used to guide, not just to collect dust.

We also believe it needs to wait until the public has a chance to digest the recent Bear River Development Report, released recently by the Utah Division of Water Resources. Whereas several members of the CWD Board feel a compelling need to build storage in Cache County for Bear River water, analysts along the Wasatch Front and models associated with Great Salt Lake that take into account realistic conservation are not showing a need for the Bear River Project at all. A shock, we know.

Assuming, however, that the CWD Board will push on to adopt something by year's end, we offer the following comments:

1. Section 1.4: add the Governor's Executive Water Finance Board to the list of important committees to monitor. It's noted in the body of the report, but not listed in the "Background and Recommended 5-Year Action Plan" section that serves as an executive summary.
2. Section 3: It's notable that "Environmental" is considered one of the three major categories of supply and demand (others being "M&I" and "Agricultural"). If we don't have a livable environment, we can't live. And we can't live well if our environment isn't well. And we don't have to use up every resource to live well.
3. Section 4.2.5 What if we achieve a more realistic goal, indeed, what other southwestern U.S. communities have already achieved—around 175 gpcd M&I demand—which would mean (300-175)/300=42% conservation? Beyond M&I we need to work towards achieving overall water

conservation in all sectors, and especially in agriculture which depletes more water than all other uses combined. Utah uses 2.6 times (i.e. 260%) more water per person that other arid countries (e.g. Greece, Spain, Italy, Portugal, Israel), and 6.5 times that of Israelis. Surely, we can improve on that. The plan should adopt explicit and ambitious goals in conservation using proven strategies from other States and Countries.

4. It's a good thing that "Section 4.6 Sources of water to meet future needs" lists "conservation" first. We need to keep the focus on conservation as the most important, and least expensive, "source" of water.
5. Section 5
    a. Introduction:
        i. Yes, "water planning" is important. But we need to recognize what the CWD's constraints are, including what they can affect and what they cannot. Alternatives don't come immediately from the need for planning; they come from having set requirements for CWD, articulating broad goals, recognizing threats to achieving those goals and developing strategies. Only then does setting objectives—milestones to hopefully be achieved—and defining metrics make sense. We need to identify key players (aka stakeholders) and write this plan so it stimulates them to participate in implementing proposed actions. CWD can, certainly, influence other actors in powerful ways, and those opportunities need to be explicit.
        ii. What is "conceptual data"? And what does it mean "to fairly evaluate the benefits of smaller tasks"?
    b. A metric is any measurable variable. It can be used to evaluate a state or change in state. It doesn't "define how well a given alternative meets each objective" unless: 1) the current and desired states are identified in terms of that metric, and 2) what we propose to do is rationally expected to affect that metric. The word, "metric," does not appear in the 2013 Water Master Plan, so how were they "inspected to ensure legitimate representation of the goals and objectives of CWD"? And in what situation(s) would there be "information that dictated that a change be made"? It rather sounds like there wasn't any specific planning process, but rather just hoping the CWD would agree with broad statements about keeping somebody else from "taking our water."
    c. Table 5.1 Objectives and Metrics for Evaluation of Capital Improvement Projects—needs major re-working.
        i. General:
            1. The "objectives" stated are really goals (not always achievable, but "guiding lights in the fog"), which, if stated that way, would make it easier to specify threats to accomplishing them. The adoption of strategies to mitigate those threats could lead to objectives with specific dates and metrics to measure progress toward eventually achieving those objectives and moving us closer to our goals. For example, a goal of "Protect existing water rights" might have a threat of "overallocation of water available in Cache County," or of demand outstripping supply resulting in very expensive water fees. One objective could be to successfully protest every water rights application for water diverted within Cache County from users outside of Cache County. The metric would be the number of protests filed and won.

2. We suggest that the metrics used in the objectives have target values. Otherwise, what's the point?

ii. Capital Improvement Projects

1. *Protect existing water rights:* CWD does not have the authority to grant water rights, and their standing to object to an application that may threaten a water right may be limited. In truth, CWD doesn't really know the status of water rights—i.e., how over-allocated is water in Cache County—so how big a problem is this? Whose rights are most important to protect? How can CWD object to over-allocation and what kinds of applications do they want to object to? A water bank might protect water rights in a non-use status for a desired future use, but is it sufficient to put water to a beneficial use if that beneficial use is by someone outside of Cache County; e.g., the Jordan Valley Water Conservancy District?
2. *Protect Bear River development allocation*: The report should clarify how measuring "Bear River water developed" (what does this even mean) translates into protecting Cache County's allocation from the Bear River.
3. *Provide adequate reliable future culinary supply*: Is this what CWD really wants to do? Is one of CWD's goals to be a wholesale water provider?
4. *Provide adequate reliable irrigation supply now and in the future*: Similar to culinary supply, is one of CWD's goals to be a wholesale irrigation water supplier?
5. *Maintain existing irrigation delivery systems*: Isn't this the job of each irrigation company? Is CWD's role to coordinate funding? Use their taxing authority to help pay for it?
6. *Match use of water to the water quality*: Isn't this less a water conservation effort and rather a way to avoid the costs of treatment, so a water supply and development topic?
7. *Conserve water*:
    a. Conservation should put a focus on current M&I gpcd (during the 2013 plan, we discovered Cache County was the only county in Utah that had increased gpcd between 2000 and 2010; something like 300 gpcd), acknowledge rates of usage in gpcd in other communities in southwest U.S., and set a target, with dates, for Cache County to achieve a lower gpcd; both for M&I (include commercial, institutional, and industrial) and agriculture. It doesn't make sense to invest in building additional storage if we're wasting what we use now. A goal might be to become the most water-conserving county in Utah by achieving gpcd levels that other, vibrant communities in the U.S. and other countries are achieving. The goal could be to become an example of wise water use. The plan should include a program to educate people on how much water they are wasting and how they can improve. An objective could be a 1% reduction each year until we achieve wise use targets, articulated as the same as is those other communities.

b. How is it conservation "to market [conserved water] to others"? Surely, it would yield some income to the entity doing the marketing, but is there a state (which has authority over water rights) policy that allocates water by proximity to its use for financial gain by the closer entity? Are we advocating for such a priority?
c. Promote collaboration and focus on regional projects: Seems worthwhile, but is the number of entities that benefit—as opposed to the number of people who benefit—really the best metric? And how will we do this? Education programs in the community and schools? Lobby Utah Legislature for more tax revenue for water projects (what taxes are dedicated to water now and what uses for those monies are stipulated)?
d. Build relationships with local entities as a trusted resource and advocate: Increased level of exposure to and interaction with a varied range of entities: What is the current visibility of the CWD and its personnel?
e. Minimize costs: Isn't it really maximizing the benefit/cost *ratio* that we want to do?
f. Inform public about the purpose of Cache Water District; Additional County residents that know the purpose of the district: How many know about CWD now (need to know that to measure the "additional" people)? Perhaps a survey of public awareness of the CWD that can be repeated every five years would have the double advantage of being a metric and also a mechanism for education.
g. Inform public about current water situation and future anticipated problems; Residents that understand how long water supplies will last: How long water supplies will last is a question of how much water there is, how much we can reduce our use of it, and whether we're considering strategies such as water re-use.
h. Maintain or improve environmental quality:
    i. "Water developed to maintain or improve fish flows in natural streams": perhaps we need to think about what fish we want where and focus on native species instead of introduced nonnative species.
    ii. Water-related recreational opportunities added: Unless we're being specific about the human, as opposed to the natural, environment, this seems out of place.

8. *Minimize power consumption to operate water systems: Change in power consumption:* It isn't the change, but rather the reduction that should be the goal. However, if everyone is accepting the mantra of population increases, energy use may inevitably increase, so we should probably use reducing energy per person per volume of water as the metric. Reducing total non-renewable energy use is certainly desirable.

iii. Other Projects
    1. Many of the metrics are the same as for capital improvement projects. Was this intentional?
    2. *Provide adequate reliable future supply; Additional water entities assisted in increased supply:* What kind of entities would quality? How could they be "assisted in increased supply"?
    3. Why would potential for increase in water be a metric?
iv. …Each "objective" really needs its own re-analysis.

d. 5.4 Types of Projects Evaluated
    i. Need to add to the list for capital projects construction and management of water transfers between communities with surplus and communities with deficits. That may, in fact, be the largest capital project that CWD could do.
    ii. Need to add to the list of other projects:
        1. Consideration of providing financial incentives for people to conserve. It is likely much cheaper than pouring concrete.
        2. Negotiations with Wasatch Front communities to let more Bear River water enter Great Salt Lake because they may be willing to pay the opportunity costs to prevent lowering the lake which would expose vast areas of mudflats and blowing dust.
    iii. 5.6 What is a conceptual project? Could use some discussion on that proposal.
    iv. 5.8.1 Water banking is the holding of water rights without putting that water to its original intended beneficial use. It remains up to those borrowing from the bank to figure out how to move the water. Two of the examples, addressing growing municipal needs and sustaining agricultural communities, need qualification because they are temporary fixes, the advantage being that withdrawing from a water bank may temporarily obviate the need for expensive infrastructure, perhaps, for example, until the population grows enough to afford drilling another well.
    v. 5.8.2 Perhaps this could be an example of the use of a water bank. Agricultural water freed when farms are converted to subdivisions could be repurposed from irrigating pastures to irrigating lawns (or xeriscape yards).
    vi. 5.8.3 There are other purposes, including keeping the level of Great Salt Lake from declining further. Cache County needs to be a team player among other populations in Utah. If other communities need it before Cache County's population growth occurs, it makes no sense to argue against them using it.
    vii. 5.8.4 There are some potential downsides, of course, including flooding out property when the over-charged aquifer pushes water out into artesian springs or expanded wetlands that make others' property less useful.
    viii. 5.8.6 Are "Utah water laws and legislation…frequently changed" in substantial ways? My sense is that it's pretty static, stilted even.
    ix. 5.8.7 The Utah regional water conservation goals are problematic, to say the least. The report set a target of 249 gpcd for 2030. But other vibrant communities in the southwest already use much less. For example, Clark County, NV – 221 gpcd, Maricopa County, AZ – 206, Pima County, AZ – 168, and Bernalillo County, NM – 148. DWRe appears to be biased toward people using

more water to justify building projects. But they ignore the fact that the federal government no longer subsidizes these projects.

These are detailed and extensive comments and suggestions. However, the two biggest takeaways we want to convey are:

1. Far too many plans just gather dust on a shelf simply because they have failed to incorporate the fundamental aspects of successful planning processes. This plan will end up likewise unless it embraces the proven concepts of requirements and vision-mission-goals-objectives-strategies-programs-projects sequencing-implementation. That would be too bad, because many people, whether pro-Bear River Dam or anti-Bear River Dam, have invested much energy in trying to provide water for future generations of people and nature. Let's not waste that investment. Let's understand and use proven planning concepts in ways that have been proven to work.

2. Bear River Development, perhaps behind a dam, is not the only source of water for a future Cache Valley, but it is the "gorilla-in-the-room" for many discussions. There is no super-compelling reason to finish the update to the Cache County Water Master Plan by the end of 2019, so let's pause, digest the recent Bear River Development Project report to see if there are any significant changes recommended from past reports before we complete our own work.

Sincerely,

Bryan Dixon
Bear River Issues Manager
Bridgerland Audubon Society

cc: Hilary Shughart
Wayne Wurtsbaugh

December 31, 2019

Cache Water District
199 North Main Street
Logan, UT 84321

RE: Master Plan Recommendations

Dear Mr. Daugs and Members of the Board of Directors:

In response to the call for citizen comments concerning the CWD Master Plan, I would like to provide the following recommendations:

- Impose development fees on approved submittals for all residential development proposals throughout Cache County, whether single family or multi-family and regardless of whether the dwellings would be subdivided and owned or rental units. The monies raises from these developer fees would augment water conservation efforts on behalf of Cache County. Imposing these fees would be a disincentive to some developers (dependent on the fee structure) and would perhaps curb sprawl throughout the valley area.

- Require developers to acquire additional land surrounding areas targeted for their subdivision development. These additional several acres of open space would provide a break in development throughout the valley and could provide catchments for rainwater and Bear River overflow. Water collected could be utilized as non-potable water serving those areas or water needs for the entire valley. This non-potable water could be used for laundry, landscaping and toilet needs.

- Protect the existing farmlands throughout Cache Valley through the creation of comprehensive plans (similar to southern Idaho's 100-year comprehensive plan) which protects agriculture lands.

- Protect existing farmlands and cattle grazing lands through the creation of land trusts that allow the land to remain private but its only uses can be agriculture. These measures to preserve our valley's agriculture lands would reduce sprawl in the valley floor, preserve precious agriculture land and provides for soil sequester of carbon.

I appreciate the opportunity to offer my recommendations to the Cache Water District and urge the organization to work diligently to create water conservation measures that balance the public's need (and responsible use) of water with Cache Valley's historical and current use of the land for agriculture purposes.

Sincerely,

Deborah Miller
Logan, Utah

Bear River Development - Review and evaluate the DWRe Bear River Development Report and evaluate long term plans and options as it applies to CWD. Communicate regularly with DWRe about CWD options and Bear River Development updates.

Multi-Jurisdictional ASR Program - Obtain funding and evaluate ASR potential in more detail for Green Canyon and River Park Well and provide support and coordination for development of ASR at these and other feasible locations.

Irrigation Delivery Efficiencies - Work with Irrigation companies to prioritize canal segments to line or pipe based on seepage losses and impacts to instream flows and natural riparian areas. Support and coordinate design and construction of improvements.

State Committees and Legislation - Continuously monitor legislative activities related to water, participate in Utah Water Task Force, Bear River Development meetings, and other state water committees. Assist in drafting new water bills as needed to meet the purposes of CWD.

Conservation - Continue secondary water audits, support of the slow the flow campaign, conduct water-wise landscaping classes, inform residents of existing conservation incentives and rebates, and begin plans for a water conservation demonstration garden.

Local Outreach – Provide annual city manager and city council updates to promote 40-year water right plans, give legislative updates, and discuss other key water issues. Plan annual Northern Utah Water Conference and participate in annual local water fair.

Other - Assist with other multijurisdictional opportunities as they arise and as they fit within the purposes of CWD.

These actions will allow CWD to:

- Protect Water Rights and Supplies
- Protect the Bear River Allocation
- Bank Water Rights
- Provide Adequate Reliable Irrigation Supply
- Conserve Water
- Provide Funding and Technical Assistance
- Guide Water Legislation
- Improve Understanding of Environmental Water Needs

More details of how the 5-year action plan was developed are given in the master plan report.

Summary of Comments on Frank Howe.pdf

Page: 4

Number: 1 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 1:33:43 PM

I would suggest that we can go beyond just understanding and enter into implementation. I would suggest "Provide Better Understanding and Delivery of Environmental Water"

1 INTRODUCTION

1.1 Background

Cache County completed a county-wide water master plan in 2013 to identify key strategies and actions that should be focused on with regards to regional water resources within the county. That plan also included an evaluation of various water management structures to determine the structure that should be implemented to meet key objectives identified in the master plan and complete the priority actions.

The master plan gave a recommendation to create a water conservancy district for the water management structure in the county. The county then began a stakeholder process to create by-laws for a district and define the district purpose and mission. The public voted in 2016 to create the Cache Water District (CWD).

CWD is governed by eleven board members, one from each voting district in Cache County, three at-large members and one agriculture representative that is appointed by the Cache County Council. The board hired a district manager in 2018 to help stay more informed on water issues and help CWD fulfill its purposes.

CWD contracted with J-U-B Engineers and the Langdon Group (Consultant Team) in the spring of 2019 to update the master plan.

1.2 Purpose of Master Plan Update

Cache County and CWD made progress within the focus areas identified in the 2013 master plan. The progress includes:

- Public education to improve water conservation including participation in the state “Slow the Flow” campaign
- Participation in an ASR project in Millville City in cooperation with Utah Geological Survey
- Work with Utah State University on a water banking study
- Work with the Nature Conservancy to gain more understanding of environmental flow needs in Cache County rivers
- Participation in the Crockett Pressurized Irrigation Master Plan
- Participation in water-use audits to identify water use inefficiencies

The main purpose of this plan update is to identify key actions that CWD should focus on over the next five years.

The following goals were set for the master plan update to achieve the plan purpose:

- Maintain and strengthen relationships between the stakeholders and CWD
- Understand new interests or concerns of key stakeholders
- Obtain updated water supply and demand information
- Identify, evaluate, and prioritize actions to be included in the new action plan
- Prepare a 5-year action plan and estimated budget to complete the action plan

1.3 Bear River Development

An important component of the water master plan is the Bear River water resource which includes many rivers that are tributary (rivers that drain) to the Bear River. All the area within Cache County drains to the Bear River.

Page: 9

Number: 1 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 1:38:28 PM
I'd suggest a more action-oriented goal such as "Understand and address new interests..."

A copy of the general outline that was used to guide the interviews is provided in Appendix 2-A. Appendix 2-B gives a list of the people interviewed with a list of key notes that are categorized based on potential action types.

2.2.3 Environmental Stakeholder Meeting,

Some specific questions arose from the environmental stakeholder meeting including the following:

a. Where are environmental and ecosystem water uses located?
b. How would potential dams in the bear river basin change or enhance potential environmental water uses?
c. How should environmental groups interact with the district?

More detailed notes from this meeting are included in Appendix 2-C.

2.2.4 Key Themes from Interviews

During the interviews the stakeholders were asked specifically what they thought CWD could do to help. A list summarizing the responses to this question is provided in Figure 2-1.

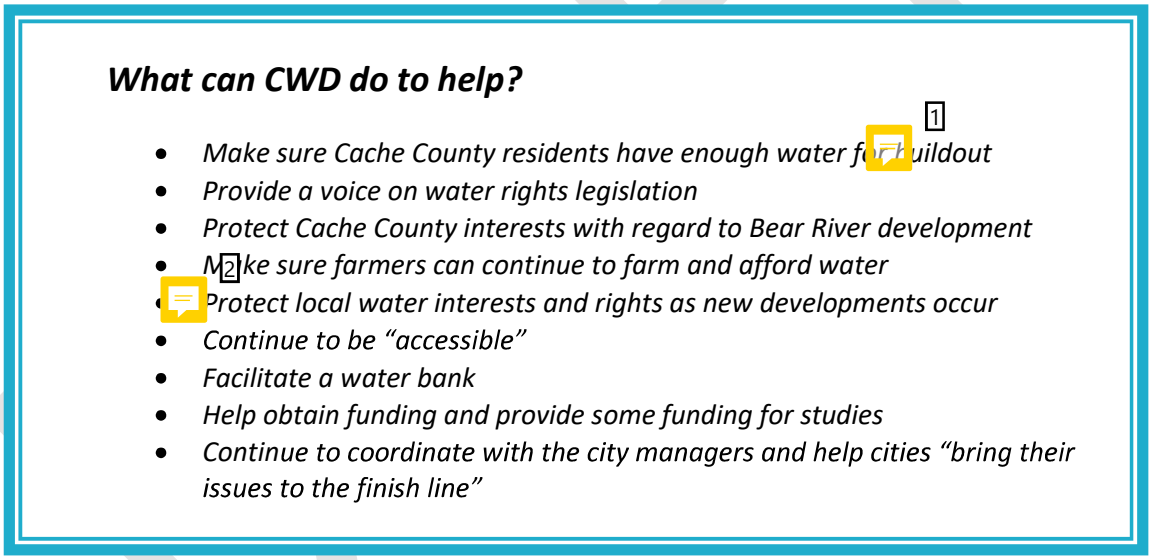


Figure 2-1: Stakeholder interview Key Themes

The following key themes were taken from the stakeholder interviews and are related to what stakeholders said CWD can do to help.

- **Guide Water Legislation -** CWD needs to continue to be a voice for the water users in the county on key legislative issues. For example, currently there are some concerns about new legislation requiring secondary water metering and a desire to know what it entails and means for local water users.
- **Manage Water Resources -** CWD should play a key role in future studies that will guide how Cache County residents use and manage water resources.

Page: 14

Number: 1 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 2:08:07 PM

buildout is vague - I'd recommend have "enough water to meet current and future needs"

Number: 2 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 2:11:37 PM

Add bullet: Understand and address environmental water needs

Table 5-1: Objectives and Metrics for Evaluation of Capital Improvement Projects

Objective Type	Objective	Metric (method of measurement)
Water Supply Development	Protect existing water rights	Water put to beneficial use or in approved non-use status (acre-feet)
	Protect Bear River development water allocation	Bear River water developed (acre-feet)
	Provide adequate reliable future culinary supply	Additional communities with adequate culinary supply to 2060 (number)
	Provide adequate reliable irrigation supply now and in the future	Reliable late or early season irrigation supply added or put to use (acre-feet)
Water Conservation	Maintain existing irrigation delivery systems	Canals dredged, lined, piped or reconstructed (linear feet)
	Keep rights to water that are converted from Ag to M&I uses in Cache County	Amount of converted water that is banked or used in the district (acre-feet)
	Match use of water to the water quality	Residential units with secondary water (number)
	Conserve water	Water conserved for use in Cache County or to market to others (acre-feet/year)
		Identified volume of water lost through inefficiencies or waste (acre-feet/year)
Implementation	Promote collaboration and focus on regional projects	Entities that benefit (number)
	Build relatiionships with local entities as a trusted resource and advocate	Increased level of exposure to and interaction with a varied range of entities (number)
	Minimize costs	*Capital Costs ($)
		*50 year debt service and operation and maintenance costs ($ per acre-feet per year)
		Potential grant money available (yes/no)
	Inform public about the purpose of Cache Water District	Additional County residents that know the purpose of the district (number)
	Inform public about current water situation and future anticipated problems	Residents that understand how long water supplies will last (number)
Environment	Maintain or improve environmental quality	Water developed to maintain or improve wildlife habitat (acre-feet)
		Water developed to maintain or improve fish flows in natural streams (acre-feet)
		Water related recreational opportunities added (yes/no)
	Protect water quality and drinking water sources	Enhances water source protection (yes/no)
	Minimize power consumption to operate water systems	Change in power consumption (increase or decrease)

Page: 20

Number: 1 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 2:34:05 PM

Should probably add one for environmental water..."Provide adequate supply to meet environmental water needs" or "beneficial water uses such as environmental water"

Number: 2 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 2:29:09 PM

Maintain "or improve efficiency of" existing irrigation...

5.7 Key Themes

The evaluation tables are included in Appendix 5-A along with some additional explanation of the tables. Several key themes were observed as a result of the project evaluation process. They include the following:

- Water banking provides very good benefits to a wide range of users and is strong in meeting many of the objectives.
- Secondary water and irrigation delivery projects that cover multiple jurisdictions accomplish most of the objectives but require significant financial investments.
- Reservoir projects develop and Bear River water but will require a significant amount of study of the environmental impacts as well as a large capital investment.
- ASR is inexpensive but provides limited amounts of water. In order to better meet the CWD objectives, a multijurisdictional ASR program should be implemented.
- Public outreach efforts, studies, and other non-capital improvement projects provide long term benefits for relatively small financial investments.

5.8 Focus Areas

The key themes were used to develop eight focus areas to be used in the creation of the specific CWD 5-year action plan. These focus areas represent types of projects that meet the objectives identified by the stakeholders.

- Water Banking
- Multi-Jurisdictional Secondary Water
- Bear River Development
- Multi-Jurisdictional ASR
- Irrigation Delivery Efficiencies
- State Committees and Legislation
- Conservation
- Local Outreach

A brief description of each of these focus areas and some key points about them is given below. The focus areas have been evaluated as part of the 5-year action plan for specific actions. The evaluation can be seen in Section 6.

5.8.1 Water Banking

A water bank is an institution with the ability to move water where it is needed most within a given area. For example, in Cache County, agricultural land is being developed. When agricultural property is developed, less water is needed to meet the demands of that land. The rights to the water could be banked for another person or group to lease for in-stream flows or other uses. DWRe plans to begin a pilot study in 2020 to develop a state-wide water marketing strategy that is voluntary, locally-driven, and facilitates temporary water transfers while maintaining low transaction costs. Cache County has been selected as one of three areas to be included in the study. Some of the goals of the study include fulfilling instream flow needs, addressing growing municipal needs, and sustaining agricultural communities.

Page: 23

Number: 1 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 2:36:14 PM
typo?

Number: 2 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 2:37:08 PM
"ARS program should be evaluated and implemented if appropriate."

Number: 3 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 2:51:54 PM
This is great! Congratulations on being selected for this study!

6 5-YEAR PRIORITIES AND ACTION PLAN

6.1 INTRODUCTION

This master plan update process has identified the CWD 5-year priorities and provides a 5-year action plan. The action plan includes specific actions within the focus areas listed in Section 5 to complete each year along with some potential grants that may help fund those actions.

6.2 5-Year Priorities

The CWD board helped develop the 5-year priorities as explained in Section 2. These priorities are listed below:

- **Protect Water Rights and Supplies** - Protect existing municipal and agricultural water rights. through efficient conversion of water from agricultural uses to municipal and industrial (M&I) uses where development occurs. Also protect drinking water sources and support efforts to improve water quality.
- **Protect Bear River Allocation** - Continue to stay engaged in Bear River development planning and represent Cache County residents. Increase understanding of Cache County options and the long-term plan with regards to Bear River development.
- **Bank Water Rights** – Participate actively in water banking and the related possibilities to protect water rights through beneficial use, provide more flexibility to move water for needed uses, and provide compensation to water rights holders that lease water.
- **Provide Adequate Reliable Irrigation Supply** - Support and coordinate efforts to promote and fund efficient conveyance and use of irrigation supply and development of secondary water systems between multiple jurisdictions. Many of the existing irrigation delivery systems are becoming less efficient and need to be improved. Also, over the years many areas served by irrigation canals have developed into homes and businesses. As such, there is an increased interest in secondary water systems. With this there is a need to identify processes to develop secondary systems in a way that benefits all parties involved.
- **Conserve Water** - Lead efforts to meet the goal of 18% reduction in M&I water use between 2015 and 2030 established by the State.
- **Provide Funding and Technical Assistance** - Assist local water entities, or groups made up of the water entities, to obtain grants or loans for projects and provide technical assistance and funding for studies that match the CWD purpose.
- **Guide Water Legislation** - Influence water policy through the legislative process to protect the water interests of Cache County. CWD needs to continue to be a voice for the water users in the County on key legislative issues. For example, currently there are some questions about new secondary water metering legislation and a desire to know what it entails and means for local water users.[1]
- **Improve Understanding of Environmental Water Needs** - Research and investigate Cache County's environmental water demands along the rivers, wetlands, and other water bodies. This understanding is key to maintaining the beauty of the County.

Page: 26

Number: 1 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 3:27:47 PM

I agree with this goal and this statement, but I think we are at the point we can begin to take some actions based on what we already understand from previous studies (e.g., Little Bear and Blacksmith Fork, Logan River Conservation Action Plan) and ongoing research (see Logan River Observatory). We absolutely do need to continue to better understand our environmental water needs as well. I would recommend a priority statement that incorporates both taking action and learning more.

I see an opportunity to begin addressing environmental needs in the Logan and Blacksmith Fork immediately and I would recommend this as a budgeted Focal Area beginning on 2020.

Table 6-1: 5-Year Plan - Actions and Related Priorities

Focus Areas	Proposed Actions					Related 5-Year Priorities
	2020	2021	2022	2023	2024	
Water Banking	Participate in DWRe water banking pilot program to investigate leasing options to address municipal needs, sustain agriculture, and improve instream flows etc.	Participate in DWRe water banking pilot program to investigate leasing options to address municipal needs, sustain agriculture, and improve instream flows etc.	Create a water bank (website, management, etc.) and begin advertising.	Continue management and implementation of bank. Hire part time water bank coordinator.	Continue management and implementation of bank.	Protects Water Rights and Supplies Banks Water Rights Provides Adequate Reliable Irrigation Supply Guides Water Legislation Improves Understanding of Environmental Water Needs
Multi-Jurisdictional Secondary Water	Obtain funding for Crockett pressure irrigation Project. Start Crockett environmental process. Support other secondary water opportunities.	Crockett environmental study. Mapping of secondary water systems. Support other secondary water opportunities.	Crockett environmental study. Mapping of secondary water systems. Support other secondary water opportunities.	Support Crockett design. Feasibility study for another secondary system. Support other secondary water opportunities.	Begin Crockett construction. Feasibility study for additional secondary system. Hire a part time project coordinator. Support other secondary water opportunities.	Protects Water Rights and Supplies Provides Adequate Reliable Irrigation Supply Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs
Bear River Development	Review the current DWRe Bear River Development report as it applies to Cache Water District.	Funding for study of environmental demands along streams.	Evaluate environmental demands along rivers.	Evaluate environmental demands along rivers. Begin a feasibility evaluation on potential local reservoir sites.	Continue reservoir feasibility evaluations.	Protects Water Rights and Supplies Protects Bear River Allocation Provides Adequate Reliable Irrigation Supply Guides Water Legislation Improves understanding of Environmental Water Needs
	Maintain communication with DWRe with regard to long term plans for CWD.					
Multi-Jurisdictional ASR Program	Obtain funding for Green Canyon and River Park Well ASR evaluation.	Evaluate Green Canyon and River Park Well ASR projects.	Create water development agreements for an ASR project if studies show favorable outcomes.	Support and coordinate design of ASR system(s). Evaluate other ASR sites.	Support and coordinate construction of ASR system(s). Evaluate other ASR sites.	Protects Water Rights and Supplies Protects Bear River Allocation Provide Adequate Reliable Irrigation Supply Provides Funding and Technical Assistance
Irrigation Delivery Efficiencies	Prioritize canal seepage study areas, obtain funding, and measure seepage losses along major canals in Cache County in cooperation with canal companies.	Continue seepage loss studies. Evaluate return flow to rivers or adjacent riparian areas for canals with high seepage losses. Prioritize areas to pipe or line.	Provide information and support to irrigation companies for grants to line or pipe the segments found with the most seepage loss and fewest impacts to stream flows and natural riparian areas.	support and coordinate design of improvements. Begin grant assistance for other projects.	Support and coordinate construction of Improvements.	Protects Water Rights and Supplies Provides Adequate Reliable Irrigation Supply Conserves Water Provides Funding and Technical Assistance Improves understanding of Environmental Water Needs
State Committees and Legislation	Continuing Actions: Monitor legislative activity, provide information on new water related bills including secondary metering bill (S.B. 52). Participate in Utah Water Task Force, Bear River Development meetings and TMDL meetings. Assist in drafting new water bills.					Protects Water Rights and Supplies Protects Bear River Allocation Investigates Water Banking Provide Adequate Reliable Irrigation Supply Guides Water Legislation
Conservation	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow. Demonstration garden planning. Hire part-time conservation coordinator.	Conduct secondary water audits with USU. Participate in slow the flow campaign. Demonstration garden.	Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs
	Conduct water-wise landscaping classes and inform residents with regard to existing conservation rebate programs and incentives.					
Local Outreach	Continuing Actions: Give annual city manager updates and city council updates to promote 40-year water right plans, give legislative updates, and discuss other key water issues such as source protection. Meet with cities and irrigation companies that express interest in secondary water systems. Plan annual Northern Utah Water Conference and participate in annual local water fair.					Protects Water Rights and Supplies Protects Bear River Allocation Investigate Water Banking Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs
Other	Assist with other multijurisdictional opportunities as they arise and as they fit within the purposes of CWD.					To be determined

6.3.2 5-Year Action Plan Conceptual Budget Plan

Figure 6-2 shows the conceptual budget plan and potential funding opportunities for each action in the 5-year plan.

Page: 28

Number: 1 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 3:38:12 PM

I would recommend a Focus Area for Addressing known environmental needs such as those on the Blacksmith Fork and Logan River. We know these rivers have unmet environmental needs based on previous investigations and beginning to address these needs, perhaps through an adaptive management approach, seems entirely appropriate.

Number: 2 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 3:11:44 PM

I would suggest moving the initiation of environmental studies up to 2020. Review of the Bear River Development shouldn't require an entire year AND the study could assist with the review. The budget should be adjusted accordingly.

Number: 3 Author: frankhowe Subject: Sticky Note Date: 1/3/2020 11:21:08 AM

Great! This task is an appropriate part of this project and the timing is good (2nd year).

Number: 4 Author: frankhowe Subject: Sticky Note Date: 12/13/2019 3:21:19 PM

I would suggest moving the hiring of the conservation coordinator up at least to 2021 potentially even to 2020. The need already exists and the coordinator could begin immediately with the slow the flow program.

Please find below comments/concerns from Logan City Public Works:

Logan City Public Works Comments to Cache Water District 2019 Water Master Plan
December 16, 2019

1. In the Executive Summary there are acronyms used that are not defined (such as ASR). This also occurs in second bullet of Section 1.2 in Master Plan Introduction.

2. There are numerous projects listed in the CIP list in Appendix 5-A that address projects within Logan City (City also assumes some request for funds to complete projects and use of City property), yet none of these were discussed in the document preparation with Logan Public Works. Seems there would be a continued buy-in from a municipality, canal company or any other entity before committing to a project within their jurisdiction.

3. Can there be a better definition of the question that is asked of Stakeholders regarding City interconnects for culinary water. In the CIP there is a project to make a Logan/Mendon/Newton culinary water connection. Who will provide the water rights, develop source, install the line, maintain the line, etc.

4. In appendix 2-C under key question 2.b the sentence is incomplete.

5. Logan City has installed 2 water quality monitoring stations (in Logan North West Field and Benson Canals prior to discharge to Swift Slough), since there is a CIP item for this with no funding, would the CWD consider adding funding now to help maintain these stations? Experience is teaching Logan City that the real cost in not the installation but the maintenance and operation of these stations.

6. Plan refers to updating City Managers of Master Plan updates, status, etc. Can this be modified to include those Cities without City Managers and who that contact position would be.

--
Bill Young, P.E.
Logan City Engineer
Phone (435)716-9160
Cell (435)994-1666

Hey Nathan – I've just have been going through this report and it goes from page 10 to page 27 – that is intentional – as it says in the TOC To be Updated? But you need a map! I've looked elsewhere, but it would have been nice.

Just checking.

So really just looking at the 5 year plan?

Your thoughts on something: One of the things that has struck me looking at many of the Water District plans is the assumption the water will always be there from precipitation and rivers. I find it interesting that the risk from changes watershed uses in Cache County isn't higher than in other areas because so much of it is privately owned, versus Forest Service or BLM. I think half your watershed is in private hands? What is protecting and paying for wildfire risks on private land? I know CWD mandate is for infrastructure and delivery, as well as for conservation, but who or what is fundamentally protecting your watershed from catastrophe or changes in land use? Is it just the case that the risk is high but the probability is low so it doesn't rise to the level of a project (other than for drinking water source protection)? Or is it buried in the actual water rights owned by the users? If so, then the State is responsible for water, and the users for the delivery?

Sorry to go so deep in the weeds, but the CWD just feels different from other districts from a watershed ownership perspective. What do you think? Am I out of whack and lost perspective? I've also been reading the BRD Feasibility study and I feel like some of their assumptions are really flawed, so now I'm questioning everything – you just don't 'win' when you try to out engineer nature over the long term.

Ok, more later, but just on the Master Plan 5 yr priorities and plans!

Ann

Dear Cache Water District,

I just reviewed the draft master plan and am writing with feedback. While I appreciate the work that has gone into this document, it's not particularly accessible for someone who hasn't been part of the process to read! (Appendix 2-C is particularly impossible to understand.) But from what I understand of it, I appreciate that it explicitly recognizes the value of in-stream flows. In general I like what's there, but would really like to see more details on how the CWD can promote conservation, particularly through working with farmers and homeowners, possibly providing incentives for changes and working with utilities to design water rates that penalize overuse and encourage conservation. I realize that CWD may be limited by state law, the ways water rights work, etc., but this is really important to the future of our valley. I hope we can go beyond just education, which is good but not sufficient on its own.

In addition, though I realize this is not a Cache-Valley-specific need, I was a little worried to see only passing mention of the value of water flowing into the Great Salt Lake. The disappearance of the GSL would have huge effects on wildlife and on the severity and heavy metal load of dust storms, and while the dust storms probably wouldn't directly affect us in Cache Valley, those are pretty significant negative impacts that I would like to see reflected in our planning.

Thank you!

Sincerely,
Tim Chenette
319 N 200 E
Logan UT 84321

James DeRito
Bear River Project Manager
jderito@tu.org

47 North 300 East
Providence, UT 84332
phone: 208-360-6165

December 16, 2019

Nathan Daugs
Manager
Cache Water District
199 N Main St.
Logan, UT 84321

Re: Water Master Plan revision

Mr. Daugs:

Thank you for the opportunity to be part of the process of updating the Cache Water District Water Master Plan. I appreciate the interview and discussion we had on September 19, 2019 and the ability to review the draft plan that you emailed to me November 25, 2019.

Trout Unlimited has had a project manager in the Bear River Watershed since 2004. This position has focused on the conservation of coldwater fishes throughout the watershed with an emphasis on irrigation water diversion infrastructure rebuilds and improvements. Completed and ongoing work has focused on fish passage at over 50 irrigation diversions. Work has included rebuilding in-stream diversion structures, replacing headgates, and installing pipes, measurement flumes, and fish screens in canals. This work improves water management and delivery for water users while allowing fish to move passed diversions and not become captured in irrigation canals. In addition, Trout Unlimited has worked with water users on the consolidation of canals and the conversion from flood irrigation to sprinkler irrigation to improve crop production and instream flows. Funding for all these projects has been coordinated from a variety of sources by Trout Unlimited, resulting in no cost to the water rights holders.

I have these following comments on the draft plan:

One of the major focal areas for the next five years is to rebuild/improve canal systems (program to rebuild or improve major canals in Cache County - 1,200 ft of canal per year). The emphasis appears to be on the rebuild process for canals themselves. Concurrently, there may be opportunities to evaluate and improve in-river diversions for these canals to improve water management and delivery. Trout Unlimited is available to assist water rights holders on a project specific basis where there are potential benefits for fish passage and stream function.

In the Executive Summary, among the bulleted list of things to be achieved with actions of the Cache Water District are “Improve our understanding of environmental flow needs”. I would propose that we

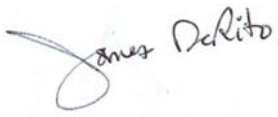
should be implementing projects to address ecological flow needs in the next five years in Cache County, rather than solely improving our understanding. We can begin with pilot project(s) to be implemented and adaptively managed to assess costs and benefits. Since the 2013 Cache County Water Plan, our understanding of ecological flow needs has greatly progressed with the completion of: 1) Little Bear and Blacksmith Fork Rivers Environmental Flows Background Study (BioWest 2015); and 2) the Logan River Conservation Action Plan (Logan River Task Force 2016). We now have a good conceptual understanding on the timing and magnitude of flows for specific sections of these rivers and the ecological variables that would benefit. Implementing ecological flow pilot studies could be in conjunction with other focal areas such as water banking, multi-jurisdictional secondary water (e.g., Crockett Pressure Irrigation Project), and irrigation efficiency improvements that are in cited in the Cache Water District 5-year plan. Trout Unlimited currently holds an instream flow water lease on the South Fork Little Bear River, the second of its kind in the state of Utah. Trout Unlimited and partners are currently looking at opportunities for instream flow projects on the Blacksmith Fork and Logan rivers.

It could be argued that the most cost-effective way to increase water supply is through demand management and conservation. It would then be beneficial to increase the pace of conservation and promote the development of specific conservation targets. These targets might be forthcoming when the Utah Division or Water Resources completes an update of the Cache County water supply and demands with future forecasting that currently has a placeholder in the draft plan? Also, it's noted in the plan that a part-time coordinator for conservation be hired in 2023. If a coordinator could be hired sooner, then the water conservation benefits and savings could be realized sooner, paying for the upfront costs of the position?

As we discussed during our meeting, reservoir sites in the headwater of the Logan River (e.g., Temple Fork upstream of Spawn Creek) or Blacksmith Fork River (e.g., Rock Creek) would come with high ecological costs. For example, both sites have very important populations of Cutthroat Trout that are of value in both these tributaries and for their connection to the mainstem rivers. These sites are located on public lands (either Federal or state) and the environmental review process for any such proposals would therefore be intensive. I would offer that sites lower in elevation and/or on private lands would be less costly both ecologically and economically.

Thank you once again for the opportunity to comment on the water plan revision process. Please contact me if you would like additional information on the suggestions contained herein. Trout Unlimited looks forward to working with you in Cache County during the next five years.

Sincerely,



James DeRito

Cc:
Paul Burnett, Trout Unlimited, Utah Water and Habitat Program Lead
Andy Rasmussen, Trout Unlimited, Utah Field Coordinator
Frank Howe, Logan River Task Force, Chair

Appendix 5-A

Evaluation of Project Alternatives

Explanation of the evaluation completed to determine the most beneficial action plan. The actual evaluation table is included after the explanation.

CACHE WATER DISTRICT

Project Evaluation Tables

1.1 Explanation of Evaluation of Project Alternatives Tables

Potential projects were evaluated using large tables called the Evaluation of Project Alternatives Tables. The tables contain the information used in the evaluation. In the Evaluation of Project Alternatives Tables, project alternatives were scored based on how they met the metrics for each objective.

The score was determined at a conceptual level and were therefore ranked based on a color scheme to easily represent the relative benefit provided by each alternative. The color scheme was divided into four color levels with the darker colors indicating a greater benefit.

Project Alternatives

The alternatives that were evaluated are listed down the left-hand side of the table and are sorted by the type of project.

A. Objectives

The goals or objectives that have been identified as important by the steering committee and project team are listed across the top of the table. These objectives are split into the following four categories:

- Water Supply Development (shown in blue)
- Water Conservation (shown in pink)
- Implementation (shown in purple)
- Environment (shown in green)

B. Metrics

The metrics for each objective is listed across the top of the table just below the objectives. The metrics provide the units and the method used to measure how well a given alternative meets the corresponding objective. In the future, as more specifics are gathered for a given alternative, more solid data can be added to the analysis.

C. Color Key

A color key is shown just below the metrics and gives four ranges of values for each metric. The alternatives were evaluated at a conceptual level. Therefore, there is a level of uncertainty in the values calculated for the evaluation. The four-color levels indicate how well the objectives or goals are attained by a given alternative, with the darker colors indicating a higher level of attainment than the lighter colors.

D. Evaluation

In the columns to the right of each listed alternative, numbers are given in cells to indicate the estimated value that each alternative has for each of the metrics. For metrics that could not be exactly quantified, without further evaluation, an assignment of “None”, “Low”, “Medium”, or “High” was given. Any cell that is labeled with “N/A” indicates that the metric in that column does not apply to the alternative listed on that row.

The strength of a given alternative can be determined by looking across a row for the given alternative and comparing how dark the cells are for that alternative with the cells for other alternatives. Alternatives that have darker cells are stronger than alternatives with lighter cells.

CAPITAL IMPROVEMENT PROJECT ALTERNATIVES	Water Supply Development				Water Conservation					Implementation							Environment				
	Protect existing water rights	Protect Bear River development water allocation	Provide adequate reliable future culinary supply	Provide adequate reliable irrigation supply now and in the future	Maintain existing irrigation delivery systems	Keep rights to water that are converted from Ag to M&I uses in Cache County	Match use of water to the water quality	Conserve water		Promote collaboration and focus on regional projects	Build relationships with local entities as a trusted resource and advocate	Minimize costs		Inform public about the purpose of Cache Water District	Inform public about current water situation and future anticipated problems	Maintain or improve environmental quality			Protect water quality and drinking water sources	Minimize power consumption to operate water systems
	METRICS (methods of measurement)																			
	Water put to beneficial use or in approved non-use status (acre-feet)	Bear River water developed (acre-feet)	Additional communities with adequate culinary supply to 2060 (number)	Reliable late or early season irrigation supply added or put to use (acre-feet)	Canals dredged, lined, piped or reconstructed (linear feet)	Amount of converted water that is banked or used in the district (acre-feet)	Residential units with secondary water (number)	Water conserved for use in Cache County or to market to others (acre-feet/year)	Identified volume of water lost through inefficiencies or waste (acre-feet/year)	Entities that benefit (number)	Increased level of exposure to and interaction with a varied range of entities (number)	*Capital Costs ($)	*50 year debt service and operation and maintenance costs ($ per acre-feet per year)	Potential grant money available (yes/no)	Additional County residents that know the purpose of the district (number)	Residents that understand how long water supplies will last (number)	Water developed to maintain or improve wildlife habitat (acre-feet)	Water developed to maintain or improve fish flows in natural streams (acre-feet)	Water related recreational opportunities added (yes/no)	Enhances water source protection (yes/no)	Change in power consumption (increase or decrease)
	COLOR KEY																				
	Less than 1,000	Less than 1,000	0	Less than 1,000	0	Less than 500	Less than 500	Less than 50	Less than 50	less than 3	None	more than $150,000,000	More than $500	None	None	None	None	None	None	No	Large increase
	1,000 to 10,000	1,000 to 10,000	1 to 5	1,000 to 10,000	1 to 5,000	501 to 5,000	501 to 1,000	50 to 3,000	50 to 3,000	3 to 7	Low	$75,000,000 to $150,000,000	$276 to $450	Low Chance	Low	Low	Low	Low	Low		Some increase
	10,001 to 20,000	10,001 to 20,000	6 to 10	10,001 to 20,000	5,001 to 20,000	5,000 to 10,000	1,001 to 1,500	3,001 to 6,000	3,001 to 6,000	8 to 15	Medium	$4,000,001 to $75,000,000	$101 to $275	50%	Medium	Medium	Medium	Medium	Medium		No change
	More than 20,000	More than 20,000	11 to 15	More than 20,000	More than 20,000	More than 10,000	More than 1,500	More than 6,000	More than 6,000	More than 15	High	Less than $4,000,000	Less than $100	75%	High	High	High	High	High	Yes	Some decrease
Aquifer Storage and Recovery Projects																					
Green Canyon - Study and Develop ASR at mouth of Green Canyon (Study how far out water goes into the aquifer) assume 10 cfs for 180 days = 3,500 ac feet per year.	3,500	3,500	1 to 5	3,500	0	3,500	0	0	0	3	Low	$ 311,354.00	$ 23.17	50%	None	None	None	None	None	No	Large increase
River Park Well ASR - Study and develop ASR at Logan City River Park Well (Assume 2 cfs for 180 days)	700	700	0	700	0	700	0	0	0	3	Low	$ 142,830.00	$ 28.49	50%	None	None	None	None	None	No	Large increase
Richmond ASR - Study and develop ASR at an existing well near the railroad tracks to improve water quality and increase water supply. (500 gpm for winter months November-March)	350	350	0	350	0	350	0	0	0	1	None	$ 142,830.00	$ 18.97	50%	None	None	None	None	None	Yes	Some increase
Hyde Park ASR Study - Study and develop ASR in Hyde Park Canyon	350	350	0	350	0	350	0	0	0	1	None	$ 142,830.00	$ 18.97	50%	None	None	None	None	None	No	Some increase
ASR in South Part of County - Investigate possible ASR project in South part of the County	Less than 1,000	Less than 1,000	0	0	0	0	0	0	0	less than 3	None	Minimal Cost	N/A	50%	None	None	None	None	None	No	No change
Smithfield ASR Study - Investigate possible ASR project in Smithfield to keep water levels higher	Less than 1,000	Less than 1,000	0	0	0	0	0	0	0	less than 3	None	Minimal Cost	N/A	50%	None	None	None	None	None	No	No change
Evaluate potential for West Side ASR - What potential is there for storage on the west Side.	Less than 1,000	Less than 1,000	0	0	0	0	0	0	0	less than 3	None	Minimal Cost	N/A	50%	None	None	None	None	None	No	No change
Evaluate County wide ASR - Study and develop ASR throughout the County	1,000 to 10,000	1,000 to 10,000	6 to 10	1,000 to 10,000	0	501 to 5,000	0	0	0	8 to 15	Medium	Less than $4,000,000	Less than $100	50%	None	None	None	None	None	No	Large increase
Reservoir Projects																					
Enlarge Hyrum Reservoir - Enlarge Hyrum reservoir to provide more irrigation to South Cache Irrigators and late season instream flows. Assumed the dam is raised 30 feet as examined in	28,000	28,000	1 to 5	28,000	0	0	0	0	0	8 to 15	Medium	$ 22,140,000.00	$ 36.30	75%	None	None	Low	Medium	High	No	Some decrease
Store Water in Bear Lake - Use stored water through exchanges. Raise the level of Bear Lake by 10.3" to achieve 60,000 acre-feet	60,000	60,000	11 to 15	60,000	0	0	0	0	0	More than 15	High	Less than $4,000,000	Less than $100	None	None	None	None	None	None	No	No change
State Bear River Development - Participate in a State Bear River development project.	60,000	60,000	11 to 15	More than 20,000	0	0	0	0	0	More than 15	High	$ 500,000,000.00	More than $500	75%	None	None	Low	Low	Low	No	Large increase
Small High Creek Reservoir - Construct a small reservoir up High Creek	7800	7800	1 to 5	7800	0	0	0	0	0	3 to 7	Low	$ 33,300,124.00	$ 197.60	75%	None	None	Low	Low	Low	No	No change
Logan Sewer Lagoons - Use Logan sewer lagoons for reservoir storage (3,000 acre feet plus?)	1,000 to 10,000	1,000 to 10,000	1 to 5	1,000 to 10,000	0	0	0	0	0	3 to 7	Low	Less than $4,000,000	Less than $100	50%	None	None	Low	None	None?	No	Some increase
Small Temple Fork Reservoir - Construct a small reservoir in Temple Fork just above Spawn Creek.	16,136	16,136	15	16,136	0	0	0	0	0	More than 15	High	$ 90,083,020.00	$ 258.40	75%	None	None	None	None	Medium	No	No change
Rock Creek Reservoir - Construct a small reservoir on Blacksmith Fork tributary near confluence with	7,800	7,800	1 to 5	7,800	0	0	0	0	0	8 to 15	Medium	$ 22,140,000.00	$ 131.37	75%	None	None	None	None	Low	No	No change
Dredge Logan River Reservoirs - Dredge 1st, 2nd, and 3rd Dam reservoirs on the Logan River	90	90	0	90	0	0	0	0	0	less than 3	None	$ 10,578,456.00	$ 5,440.25	50%	None	None	None	None	None	No	No change
Dredge Cutler Reservoir - Dredge the bottom of Cutler reservoir every 30 years	4,314	4,314	1 to 5	4,314	0	0	0	0	0	3 to 7	Low	$ 504,281,497.00	$ 5,410.43	50%	None	None	None	None	None	No	No change
Build Blacksmith Fork Reservoir - Build a new dam near the location of the existing dam as examined in 2014 DWRE Bear River Development Preliminary	40,000	40,000	1 to 5	40,000	0	0	0	0	0	8 to 15	Medium	$ 73,800,000.00	$ 85.40	75%	None	None	None	None	Low	No	No change
Cub River Reservoir - Build Cub River reservoir studied by DWRe in 2014 report.	27,000	27,000	1 to 5	27,000	0	0	0	0	0	8 to 15	Medium	$ 52,890,000.00	$ 90.67	75%	None	None	None	None	None	No	Some increase
New Reservoirs Adjacent to Sewer Lagoons - Construct 150 acre additional storage cells near Logan sewer lagoons.	750	750	0	750	0	0	0	0	0	3 to 7	Low	$ 733,659.00	$ 45.28	50%	None	None	None	None	None	No	No change
Water Banking Projects																					
State Water Banking Study - Participate in state pilot study for a CWD water bank	60,000	0	13	0	0	12,000	0	0	50 to 3,000	More than 15	High	minimal cost	Less than $100	50%	None	None	Low	Low	Low	No	No change

CAPITAL IMPROVEMENT PROJECT ALTERNATIVES	Water Supply Development				Water Conservation					Implementation							Environment				
	Protect existing water rights	Protect Bear River development water allocation	Provide adequate reliable future culinary supply	Provide adequate reliable irrigation supply now and in the future	Maintain existing irrigation delivery systems	Keep rights to water that are converted from Ag to M&I uses in Cache County	Match use of water to the water quality	Conserve water		Promote collaboration and focus on regional projects	Build relationships with local entities as a trusted resource and advocate	Minimize costs		Inform public about the purpose of Cache Water District	Inform public about current water situation and future anticipated problems	Maintain or improve environmental quality			Protect water quality and drinking water sources	Minimize power consumption to operate water systems
	METRICS (methods of measurement)																			
	Water put to beneficial use or in approved non-use status (acre-feet)	Bear River water developed (acre-feet)	Additional communities with adequate culinary supply to 2060 (number)	Reliable late or early season irrigation supply added or put to use (acre-feet)	Canals dredged, lined, piped or reconstructed (linear feet)	Amount of converted water that is banked or used in the district (acre-feet)	Residential units with secondary water (number)	Water conserved for use in Cache County or to market to others (acre-feet/year)	Identified volume of water lost through inefficiencies or waste (acre-feet/year)	Entities that benefit (number)	Increased level of exposure to and interaction with a varied range of entities (number)	*Capital Costs ($)	*50 year debt service and operation and maintenance costs ($ per acre-feet per year)	Potential grant money available (yes/no)	Additional County residents that know the purpose of the district (number)	Residents that understand how long water supplies will last (number)	Water developed to maintain or improve wildlife habitat (acre-feet)	Water developed to maintain or improve fish flows in natural streams (acre-feet)	Water related recreational opportunities added (yes/no)	Enhances water source protection (yes/no)	Change in power consumption (increase or decrease)
	COLOR KEY																				
	Less than 1,000	Less than 1,000	0	Less than 1,000	0	Less than 500	Less than 500	Less than 50	Less than 50	less than 3	None	more than $150,000,000	More than $500	None	None	None	None	None	None	No	Large increase
	1,000 to 10,000	1,000 to 10,000	1 to 5	1,000 to 10,000	1 to 5,000	501 to 5,000	501 to 1,000	50 to 3,000	50 to 3,000	3 to 7	Low	$75,000,000 to $150,000,000	$276 to $450	Low Chance	Low	Low	Low	Low	Low		Some increase
	10,001 to 20,000	10,001 to 20,000	6 to 10	10,001 to 20,000	5,001 to 20,000	5,000 to 10,000	1,001 to 1,500	3,001 to 6,000	3,001 to 6,000	8 to 15	Medium	$4,000,001 to $75,000,000	$101 to $275	50%	Medium	Medium	Medium	Medium	Medium		No change
	More than 20,000	More than 20,000	11 to 15	More than 20,000	More than 20,000	More than 10,000	More than 1,500	More than 6,000	More than 6,000	More than 15	High	Less than $4,000,000	Less than $100	75%	High	High	High	High	High	Yes	Some decrease
Secondary Water Projects																					
Crockett Avenue Pressure Irrigation Project - Construct a secondary water system in Logan to serve the Crockett diversion service area (The western halves of Logan, North Logan, Hyde Park and areas west of the three cities). This project would also include a large east to west storm water trunkline for Logan City near the northern boundary of Logan and a new recreational trail.	10,568	0	3	10,568	57,000	10,568	6,000	5,100	5,100	13	Medium	$ 88,000,000.00	$ 385.42	75%	None	Medium	Low	Low	None	No	Some Decrease
Bench Area Irrigation Rights Study - Identify how we can use conserved water above existing service area (legal issues, water rights). How much water are you going to conserve? Switch shares to M&I and take a cut. Create a new right with a new service area. Coordinate with irrigation companies to change shares over to M&I.	Less than 1,000	Less than 1,000	0	Less than 1,000	0	501 to 5,000	501 to 5,000	50 to 3,000	50 to 3,000	3 to 7	Low	Less than $4,000,000	Less than $100	50%	None	None	None	Low	None	No	No change
Smithfield Irrigation Secondary Water Pipe Upgrades - enlarge Smithfield Irrigation pressure pipe sizes to avoid having even and odd watering days. Replace 4" diameter pipes with larger pipes	Less than 1,000	Less than 1,000	0	Less than 1,000	0	Less than 500	501 to 1,000	Less than 50	Less than 50	2	None	Less than $4,000,000	N/A	None	None	None	None	None	None	No	No change
Secondary Water Metering - Help secondary systems meet requirements from the state to have secondary water metering plan.	Less than 1,000	Less than 1,000	0	Less than 1,000	0	Less than 500	Less than 500	Less than 50	Less than 50	More than 15	High	Less than $4,000,000	Less than $100	None	None	None	None	None	None	No	No change
Millville and Providence Secondary System - Build a secondary water system in coordination with Providence Blacksmith Fork Irrigation Company and Spring Creek Irrigation Company with a reservoir in Millville and system to serve Millville and Providence. (Need 4 irrigation companies with 2 cities to participate)	3,840	0	2	3,840	20,711	3,840	2,180	1,853	1,853	6	Low	$ 32,000,000.00	$ 385.42	75%	None	Medium	None	Low	None	No	Some decrease
Wellsville Secondary Water System - Build a secondary water system to serve Wellsville City residents.	951	0	1	951	5,128	951	540	460	460	less than 3	None	$ 7,920,000.00	$ 385.42	75%	None	None	None	Low	None	No	Some decrease
Mendon Secondary Water System -Complete a secondary water feasibility study for secondary water in Mendon or an other community on the west side of the county.	860	0	1	860	4,638	860	488	415	415	2	None	$ 16,500,000.00	$ 385.42	75%	None	Low	None	Low	None	No	Some decrease
East Bench Secondary Water System - Evaluate possible secondary system to serve areas east of Crockett Avenue Service area including Logan North Logan and Hyde Park.	7,468	0	3	7,468	40,274	7,468	4,246	3,609	3,609	7	Low	$ 62,189,600.00	$ 385.42	75%	None	Medium	None	Low	None	No	Some Decrease
Secondary Water System Maintenance Plan - Inform the city councils that have private secondary water systems about the need for a long term plan for maintenance and replacement of those systems.	Less than 1,000	Less than 1,000	0	Less than 1,000	0	Less than 500	Less than 500	Less than 500	Less than 500	More than 15	High	Less than $4,000,000	Less than $100	None	None	None	None	None	None	No	No change
Is there a way to get more water into Newton Reservoir? Pump water from West Cache Canal about 280 veritical feet into newton reservoir for late season use in the newton canal? Use the	300	300	0	300	0	300	0	0	0	3	Low	$ 469,631.00	$ 115.97	50%	None	None	None	None	None	No	Large increase

CAPITAL IMPROVEMENT PROJECT ALTERNATIVES	Water Supply Development				Water Conservation					Implementation							Environment				
	Protect existing water rights	Protect Bear River development water allocation	Provide adequate reliable future culinary supply	Provide adequate reliable irrigation supply now and in the future	Maintain existing irrigation delivery systems	Keep rights to water that are converted from Ag to M&I uses in Cache County	Match use of water to the water quality	Conserve water		Promote collaboration and focus on regional projects	Build relationships with local entities as a trusted resource and advocate	Minimize costs		Inform public about the purpose of Cache Water District	Inform public about current water situation and future anticipated problems	Maintain or improve environmental quality			Protect water quality and drinking water sources	Minimize power consumption to operate water systems
	METRICS (methods of measurement)																			
	Water put to beneficial use or in approved non-use status (acre-feet)	Bear River water developed (acre-feet)	Additional communities with adequate culinary supply to 2060 (number)	Reliable late or early season irrigation supply added or put to use (acre-feet)	Canals dredged, lined, piped or reconstructed (linear feet)	Amount of converted water that is banked or used in the district (acre-feet)	Residential units with secondary water (number)	Water conserved for use in Cache County or to market to others (acre-feet/year)	Identified volume of water lost through inefficiencies or waste (acre-feet/year)	Entities that benefit (number)	Increased level of exposure to and interaction with a varied range of entities (number)	*Capital Costs ($)	*50 year debt service and operation and maintenance costs ($ per acre-feet per year)	Potential grant money available (yes/no)	Additional County residents that know the purpose of the district (number)	Residents that understand how long water supplies will last (number)	Water developed to maintain or improve wildlife habitat (acre-feet)	Water developed to maintain or improve fish flows in natural streams (acre-feet)	Water related recreational opportunities added (yes/no)	Enhances water source protection (yes/no)	Change in power consumption (increase or decrease)
	COLOR KEY																				
	Less than 1,000	Less than 1,000	0	Less than 1,000	0	Less than 500	Less than 500	Less than 50	Less than 50	less than 3	None	more than $150,000,000	More than $500	None	None	None	None	None	None	No	Large increase
	1,000 to 10,000	1,000 to 10,000	1 to 5	1,000 to 10,000	1 to 5,000	501 to 5,000	501 to 1,000	50 to 3,000	50 to 3,000	3 to 7	Low	$75,000,000 to $150,000,000	$276 to $450	Low Chance	Low	Low	Low	Low	Low		Some increase
	10,001 to 20,000	10,001 to 20,000	6 to 10	10,001 to 20,000	5,001 to 20,000	5,000 to 10,000	1,001 to 1,500	3,001 to 6,000	3,001 to 6,000	8 to 15	Medium	$4,000,001 to $75,000,000	$101 to $275	50%	Medium	Medium	Medium	Medium	Medium		No change
	More than 20,000	More than 20,000	11 to 15	More than 20,000	More than 20,000	More than 10,000	More than 1,500	More than 6,000	More than 6,000	More than 15	High	Less than $4,000,000	Less than $100	75%	High	High	High	High	High	Yes	Some decrease
Irrigation Delivery Projects																					
Rebuild/Improve Canal System - Program to rebuild or improve major canals in Cache County (1,200 ft per year).	8,142	0	0	8,142	60,000	8,142	0	8,142	8,142	More than 15	High	$ 6,350,000.00	$ 49.38	50%	None	None	None	None	None	No	No change
Maintenance Access - Create maintenance access along major canals developed areas.	0	0	0	0	0	0	0	0	50 to 3,000	More than 15	High	$ 1,100,000.00	More than $500	None	None	None	None	None	None	No	No change
Canal Metering - Work with Irrigation companies to install meters at major canal diversion points that currently are not metered.	Less than 1,000	0	0	Less than 1,000	0	Less than 500	Less than 500	Less than 500	Less than 500	More than 15	High	Less than $4,000,000	Less than $100	50%	None	None	None	None	None	No	No change
Enclose Highline Canal to Summit Creek - Pipe Highline canal to Summit Creek	4,750	0	0	4,750	35,000	0	0	4,750	4,750	8 to 15	Medium	$ 11,571,875.00	$ 112.77	50%	None	None	None	None	None	No	No change
Canal Piping - Pipe all major canals to save water. Conduct seepage study to identify priority projects. File on saved water for other uses.	60,000	0	0	60,000	442,149	60,000	0	60,000	60,000	More than 15	High	$ 146,185,625.00	$ 112.77	75%	Medium	Medium	None	None	None	No	No change
Culinary Water Distribution Projects																					
Wellsville-Mendon City Interconnect - Install a culinary water pipe between Mendon and Wellsville.	1,300	0	2	0	0	0	0	0	0	2	None	$ 2,200,000.00	$ 80.00	Low Chance	None	None	None	None	None	No	No change
Logan-Mendon and Newton Connection -Install a 15" culinary water pipe between Logan and Cache Junction, 12"pipes to Mendon and Newton.	2,600	0	2	0	0	0	0	0	0	4	Low	Less than $4,000,000	Less than $100	Low Chance	None	None	None	None	None	No	No change
Providence, Millville, Nibley, Hyrum Emergency Interconnect - Build interconnects between each of these cities to allow for sharing of water during emergency situations.	1,000 to 10,000	0	4	0	0	0	0	0	0	6	Low	Less than $4,000,000	Less than $100	Low Chance	None	None	None	None	None	No	No change

OTHER PROJECT ALTERNATIVES	Water Supply		Water Conservation			Implementation					Environment		
	Protect Bear River development water allocation	Provide adequate reliable future supply	Match use of water to the water quality	Conserve water		Promote collaboration and focus on regional projects	Build relationships with local entities as a trusted resource and advocate	Minimize costs		Inform public about current water situation and future anticipated problems	Maintain or improve environmental quality		Protect water quality and drinking water sources
	METRICS (methods of measurement)												
	Increased focus on or progress towards a plan for the Bear River water allocation	Additional water entities assisted in increased supply (number)	Potential increase in residential units with secondary water (number)	Potential increase of conserved water (acre-ft)	Identified volume of water lost through inefficiencies or waste (acre-ft)	Entities that benefit (number)	Increased level of exposure to and interaction with a varied range of entities (number)	*Capital Costs ($)	Potential for grant money	Residents that understand how long water supplies will last (number)	Potential for increase in water to maintain or improve wildlife habitat	Potential for increase in water supply or quality to maintain or improve fish flows in natural streams	Enhances water source protection (yes/no)
	COLOR KEY												
	None	0	None	None	None	less than 3	None	more than $150,000	None	None	None	None	No
	Low	1 to 5	Low	Low	Low	3 to 7	Low	$100,001 to $150,000	Low	Low	Low	Low	
	Medium	6 to 10	Medium	Medium	Medium	8 to 15	Medium	$50,001 to $100,000	Medium	Medium	Medium	Medium	
	High	11 to 15	High	High	High	More than 15	High	Less than $50,000	High	High	High	High	Yes
Public Information Projects													
City Manager Updates - Discuss 40-year water rights plan, legislative updates, and PacifiCorp updates in yearly messages to city managers.	High	11 to 15	None	None	None	More than 15	High	Less than $50,000	None	Low	None	None	No
Promote Secondary Water Systems - Visit each City council once every 5 years to promote secondary water sytems for new developments.	None	6 to 10	Medium	Low	None	8 to 15	Medium	Less than $50,000	None	Low	None	Low	No
Northern Utah Water Conference - Continue to plan and organize the conference with presentations on key water topics including the promotion of new technologies and environmental flows	Medium	0	Low	Low	None	More than 15	High	Less than $50,000	None	Medium	Low	Low	No
Water Fair - Each year at the water fair, provide education to 4th grade students about how water comes to homes from source, through distributions to tap.	None	0	None	Low	None	More than 15	High	Less than $50,000	None	Medium	None	None	Yes
Secondary Water Education - Invite other cities and districts to present to the CWD Board on changing over to secondary water systems, differences between wholesale and retail secondary supply, past experiences, and lessons learned.	None	6 to 10	Medium	Low	None	More than 15	High	Less than $50,000	None	None	None	None	No
40 Year Plan Council Presentations - Meet with the councils of smaller cities to explain 40 year water right plans, and provide assistance preparing 40 year plans	Medium	11 to 15	Medium	Medium	Low	More than 15	High	Less than $50,000	None	High	None	None	Yes
Drought Contingency Planning - Provide information to the cities about the benefits of a drought contingency plan.	Low	1 to 5	None	Low	Low	More than 15	High	$50,001 to $100,000	Medium	Medium	None	Low	No
Water Conservation Projects													
Secondary Water System Maintenance Plan - Inform the city councils that have private secondary water systems of the need for a long term plan for maintenance and replacement of those systems.	None	0	Low	Medium	Low	More than 15	High	Less than $50,000	None	None	None	Low	No
Weather Stations - Install 4 weather stations at strategic locations and promote incentives/rebates (such as smart controllers) to reduce over-watering.	None	0	None	Low	Low	More than 15	High	more than $150,000	Medium	Low	None	None	No
Install Additional Snowtel Sites - Install 4 additional snowtell sites at strategic locations to have a better understanding of snowpack conditions.	Low	0	None	None	Low	More than 15	High	more than $150,000	Medium	Low	None	None	No
Local Workshops/Classes - Help promote outdoor conservation at 3 annual workshops. Discuss local scapes, spread the word about possible sprinkler checks and other topics.	None	0	None	Low	Low	More than 15	High	Less than $50,000	None	High	None	None	No
Demonstration Garden - Create a water conservation demonstration garden (Partner with USU)	None	0	None	Low	Low	More than 15	High	$50,001 to $100,000	Low	High	None	None	No

OTHER PROJECT ALTERNATIVES	Water Supply		Water Conservation			Implementation					Environment		
	Protect Bear River development water allocation	Provide adequate reliable future supply	Match use of water to the water quality	Conserve water		Promote collaboration and focus on regional projects	Build relationships with local entities as a trusted resource and advocate	Minimize costs		Inform public about current water situation and future anticipated problems	Maintain or improve environmental quality		Protect water quality and drinking water sources
	METRICS (methods of measurement)												
	Increased focus on or progress towards a plan for the Bear River water allocation	Additional water entities assisted in increased supply (number)	Potential increase in residential units with secondary water (number)	Potential increase of conserved water (acre-ft)	Identified volume of water lost through inefficiencies or waste (acre-ft)	Entities that benefit (number)	Increased level of exposure to and interaction with a varied range of entities (number)	*Capital Costs ($)	Potential for grant money	Residents that understand how long water supplies will last (number)	Potential for increase in water to maintain or improve wildlife habitat	Potential for increase in water supply or quality to maintain or improve fish flows in natural streams	Enhances water source protection (yes/no)
	COLOR KEY												
	None	0	None	None	None	less than 3	None	more than $150,000	None	None	None	None	No
	Low	1 to 5	Low	Low	Low	3 to 7	Low	$100,001 to $150,000	Low	Low	Low	Low	
	Medium	6 to 10	Medium	Medium	Medium	8 to 15	Medium	$50,001 to $100,000	Medium	Medium	Medium	Medium	
	High	11 to 15	High	High	High	More than 15	High	Less than $50,000	High	High	High	High	Yes
Water Quality Projects													
Water Quality Monitoring - Periodically monitor quality of natural channels within District.	None	0	None	None	None	More than 15	High	Less than $50,000	None	None	None	High	No
Ground Water Monitoring - Monitor groundwater quality within the District	None	0	None	None	None	More than 15	High	Less than $50,000	None	None	None	None	Yes
Other Study Projects													
Quantify Environmental Water Demands - Complete a study along the Blacksmith Fork River to quantify its environmental water needs.	Low	0	None	None	None	More than 15	High	$50,001 to $100,000	Medium	None	High	High	Yes
Mapping of Water Usage Types - Map current culinary versus secondary water usage areas.	None	6 to 10	Medium	Medium	Medium	More than 15	High	Less than $50,000	None	None	None	Low	No
Optimizing Field Drains Investigation - Study Irrigation techniques using headgates on existing field drains to hold water in the soil.	None	0	None	Low	Low	8 to 15	Medium	Less than $50,000	None	None	None	None	No
Irrigation Succession Planning - Identify strategies for future management of irrigation companies.	None	0	None	None	None	More than 15	High	Less than $50,000	None	None	None	None	No
Sprinkler System Checks- Provide free checks of sprinkler systems in the District to identify inefficiencies and provide guidance on how to imporve efficiencies.	None	0	None	Low	Low	More than 15	High	Less than $50,000	Low	None	None	None	No
Other Projects													
Study Benefits of Riparian Meadows - Near lower part of valley	None	0	None	None	None	8 to 15	Medium	Less than $50,000	Low	None	High	High	Yes
Board Training - Identify where the board needs individual training what areas of training. Training program. What inforamtionshould the board be hearing about at different times over the next 5 years. Continuing ed for the board.	Medium	0	Low	Low	Low	More than 15	High	Less than $50,000	None	None	Low	Low	No
Beaver Dams Implementation Study - Study impact of constructed beaver dams on Davenport Creek, work with landowners for access and complte a 10 year study.	None	0	None	None	None	8 to 15	Medium	$50,001 to $100,000	Low	None	Medium	Medium	No
Water exchange website - Create a page on the district web site that acts as a water rights classified. (look at Utah Water Exchange Website)	Low	0	None	None	None	More than 15	High	Less than $50,000	None	None	Low	Low	No
Plan to Aquire CWD Water Rights - Develop a plan to purchase rights made available through conservation if other locals will not purcchase.	Low	0	None	None	None	More than 15	High	more than $150,000	None	None	None	None	No
Irrigation Contact List - Improve irrigation company contact list and website information	None	0	None	None	None	More than 15	High	Less than $50,000	None	None	None	None	No
Evaluate Small Cache Reservoir Sites - Evaluate sites for small (less than 5000 acre-feet) reservoirs	High	11 to 15	Medium	Medium	None	More than 15	High	more than $150,000	Low	None	None	None	No

Appendix 6-A

5-Year Action Plan Table

Complete table outlining the 5-year action plan including projects, priorities accomplished, potential budget plan, and funding sources.

CACHE WATER DISTRICT

Cache Water District 5-Year Action Plan

*Proposed Actions						Related 5-Year Priorities	Estimated Budget Plan					Potential Grant Sources
Focus Areas	2020	2021	2022	2023	2024		2020	2021	2022	2023	2024	
Water Banking	Participate in DWRe water banking pilot program to investigate leasing options to address municipal needs, sustain agriculture, and improve instream flows etc.	Participate in DWRe water banking pilot program to investigate leasing options to address municipal needs, sustain agriculture, and improve instream flows etc.	Create a water bank (website, management, etc.) and begin advertising.	Continue management and implementation of bank. Hire part time water bank coordinator.	Continue management and implementation of bank.	Protects Water Rights and Supplies Banks Water Rights Provides Adequate Reliable Irrigation Supply Guides Water Legislation Improves Understanding of Environmental Water Needs	$ 10,000	$ 10,000	$ 10,000	$ 50,000	$ 50,000	BOR Water Marketing Strategies Grant - DWRe obtained grant for 2020-2022
Multi-Jurisdictional Secondary Water	Obtain funding for Crockett pressure irrigation Project. Start Crockett environmental process. Support other secondary water opportunities.	Crockett environmental study. Mapping of secondary water systems. Support other secondary water opportunities.	Crockett environmental study. Mapping of secondary water systems. Support other secondary water opportunities.	Support Crockett design. Feasibility study for another secondary system. Support other secondary water opportunities.	Begin Crockett construction. Feasibility study for additional secondary system. Hire a part time project coordinator. Support other secondary water opportunities.	Protects Water Rights and Supplies Provides Adequate Reliable Irrigation Supply Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs	$ 25,000	$ 75,000	$ 75,000	$ 50,000	$ 100,000	NRCS Watershed Operations Grant BOR Water and Efficiency Grant BOR Field Conservation Services Grant
Bear River Development	Review the current DWRe Bear River Development report as it applies to Cache Water District.	Funding for study of environmental demands along streams.	Evaluate environmental demands along rivers.	Evaluate environmental demands along rivers. Begin a feasibility evaluation on potential local reservoir sites.	Continue reservoir feasibility evaluations.	Protects Water Rights and Supplies Protects Bear River Allocation Provides Adequate Reliable Irrigation Supply Guides Water Legislation Improves understanding of Environmental Water Needs	$ 5,000	$ 25,000	$ 100,000	$ 100,000	$ 100,000	BOR Basin Studies Program Applied Science Tools Grant
	Maintain communication with DWRe with regard to long term plans for CWD.											
Multi-Jurisdictional ASR Program	Obtain funding for Green Canyon and Logan Island ASR evaluation.	Evaluate Green Canyon and Logan Island ASR projects.	Create water development agreements for an ASR project if studies show favorable outcomes.	Support and coordinate design of ASR system(s). Evaluate other ASR sites.	Support and coordinate construction of ASR system(s). Evaluate other ASR sites.	Protects Water Rights and Supplies Protects Bear River Allocation Provide Adequate Reliable Irrigation Supply Provides Funding and Technical Assistance	$ 25,000	$ 25,000	$ 25,000	$ 50,000	$ 50,000	Utah Geological Survey
Irrigation Delivery Efficiencies	Prioritize canal seepage study areas, obtain funding, and measure seepage losses along major canals in Cache County in cooperation with canal companies.	Continue seepage loss studies. Evaluate return flows to rivers or adjacent riparian areas for canals with high seepage losses. Prioritize areas to pipe or line.	Provide information and support to irrigation companies for grants to line or pipe the segments found with the most seepage loss and fewest impacts to stream flows and natural riparian areas.	support and coordinate design of improvements. Begin grant assistance for other projects.	Support and coordinate construction of Improvements.	Protects Water Rights and Supplies Provides Adequate Reliable Irrigation Supply Conserves Water Provides Funding and Technical Assistance Improves understanding of Environmental Water Needs	$ 30,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	BOR Water and Energy Efficiency Grant
State Committees and Legislation	Continuing Actions: Monitor legislative activity, provide information on new water related bills including secondary metering bill (S.B. 52). Participate in Utah Water Task Force, Bear River Development meetings and TMDL meetings. Assist in drafting new water bills.					Protects Water Rights and Supplies Protects Bear River Allocation Investigates Water Banking Provide Adequate Reliable Irrigation Supply Guides Water Legislation	Covered in Salary	Covered in Salary	Covered in Salary	Covered in Salary	Covered in Salary	NA
Conservation	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow campaign.	Conduct secondary water audits with USU. Participate in slow the flow. Demonstration garden planning. Hire part-time conservation coordinator.	Conduct secondary water audits with USU. Participate in slow the flow campaign. Demonstration garden.	Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs	$ 20,000	$ 25,000	$ 30,000	$ 65,000	$ 75,000	BOR Water Conservation Field Services Program
	Conduct water-wise landscaping classes and inform residents with regard to existing conservation rebate programs and incentives.											
Local Outreach	Continuing Actions: Meet annually with city managers, city councils and the Logan City Water Board to promote 40-year water right plans, give legislative updates, and discuss other key water issues such as source protection. Meet with cities and irrigation companies that express interest in secondary water systems. Plan annual Northern Utah Water Conference and participate in annual local water fair.					Protects Water Rights and Supplies Protects Bear River Allocation Investigate Water Banking Conserves Water Provides Funding and Technical Assistance Improves Understanding of Environmental Water Needs	$ 10,000	$ 10,000	$ 20,000	$ 20,000	$ 20,000	BOR Water Conservation Field Services Program
Other	Assist with other opportunities as they arise and as they fit within the purposes of CWD.					To be determined	$ 50,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	
						Totals	**$ 175,000**	**$ 320,000**	**$ 410,000**	**$ 485,000**	**$ 545,000**	

*Actions that affect finances, infrastructure, or property owned by other entities will require coordination and agreement with those entities.