CACHE COUNTY
WATER MASTER PLAN

Prepared August 2013

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CACHE COUNTY WATER MASTER PLAN — Executive Summary

Cache County's population is growing and consequently increasing stress on its most valuable resource, water. The County population has grown nearly 30 percent since 2000, and is projected to double by approximately 2050, placing progressively more stress on water resources. Any plan to address this reality should have the following purposes:

1. **Evaluate existing water resources and demands;**
2. **Determine future water demands;**
3. **Educate and build consensus;**
4. **Create a plan for the future; and**
5. **Establish a plan and system to manage water resources in the County.**

The recommendations in this master plan are founded on extensive analysis and evaluation of technical data and feedback from county, municipal, irrigation and environment stakeholders. This collaborative process informed the creation of an objective criterion which was used to assess and evaluate dozens of options and resulted in the proposed solutions.

Problem Statement

Cache County will not be able to protect and use its water resources efficiently without a water master plan and management system that empowers it to maximize the benefit of its existing resources and secure the Bear River water allocation.

Opportunity

Create a plan and management system that protects and conserves Cache County's long-term agricultural, environmental, and municipal water interests with an emphasis on securing its allocation entitlements pursuant to the Bear River Water Development Act.

Recommendations

Recommended Projects and Studies

Dozens of projects were evaluated using the objective criteria. The following projects are recommended based on how well they meet the objectives.

- Implement a water conservation program to conserve 25% by year 2025
- Evaluate environmental water demands and prioritize critical areas
- Bank water rights made available through agricultural to municipal conversion or through Bear River development

- Develop Bear River water through:
  1. Aquifer Storage and Recovery to develop 5,000 to 20,000 acre feet
  2. Above ground storage reservoirs to develop up to 60,000 acre feet
- Start a canal rehabilitation program
- Construct secondary water systems

These projects:

- Develop the Bear River water allocation
- Preserve agriculture
- Extend supply for future municipal growth
- Improve understanding of environmental water needs
- Improve water efficiencies

Management System

Create a Water Conservancy District

A water conservancy district is the most viable management system to realize the stated goals and objectives, and implement the recommended projects. It also incorporates the key purposes of the water master plan. More specifically, a conservancy district:

- Protects the Bear River water allocation through planning and development
- Provides a stronger voice for Cache County on water legislation issues
- Promotes water conservation
- Provides representation for both irrigators and drinking water users
- Functions as a water bank
- Facilitates cooperation between communities and irrigation companies to complete regional projects
- Provides a funding source to plan for and help complete needed regional water projects
- Allows individual communities and irrigation companies to manage their own water systems
- Provides a local governing water board that is 100% focused on water issues.

More details of how the analysis was completed and how the recommendations were determined are given in the master plan report.

1 INTRODUCTION

1.1 Project Background

Cache County, like many other counties in Utah, is growing and with that growth it is essential to have a plan to manage efficiently one of its most important resources, water. In comparison to many of the other counties in Utah, Cache County is relatively rich in water. Many of the water resources have been developed and used in the past for a number of different purposes, with the primary use of the water being agricultural production irrigation. The water has also been used to beautify the valley with trees and green scape. As the population increased in the valley, more water was utilized to meet municipal and industrial needs. It is projected that the population in the County will double by the 2050 reaching a population of more than 230,000. Cache County residents need a plan to protect, manage, utilize and conserve their water resources as efficiently as possible to meet current and future needs. These future needs fall into three main categories:

- Municipal and Industrial (M&I)
- Agricultural
- Environmental

It has been said "the demise of several civilizations has been traced directly to failed regional water management" (Peru, Mesopotamia) (Artzy and Hillel 1988: Ortloff et al. 1985). As the population increases, a regional plan for Cache County residents to maintain this resource is vital to meet the needs of the three categories.

1.2 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 of 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. **Bear River water can only be developed though water storage projects.**

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

The Jordan Valley Water Conservancy District and the Weber Basin Water Conservancy District have begun plans to develop their Bear River allocation.

1.3 Groundwater Management Plan

In 1999, the Utah Division of Water Rights (DWRi) completed a ground water study and determined that the surface water and ground water resources in Cache County are physically connected. A groundwater management plan was implemented that limited total future ground water withdrawals to a preliminary volume of 25,000 acre feet per year, and requires (typically) that replacement water be provided for any withdrawals. Once the initial 25,000 acre feet of water has been withdrawn from the ground, the State Engineer will re-evaluate the situation to determine if additional withdrawals will be allowed.

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

Cache County needs a plan to have a stronger voice amongst these organization and others on water legislation issues such as the Bear River Development Act.

1.5 Purpose of Master Plan

Cache County will not be able to protect and use its water resources efficiently without a water master plan and management system that empowers it to maximize the benefits of its existing resources and secure the County's Bear River water allocation.

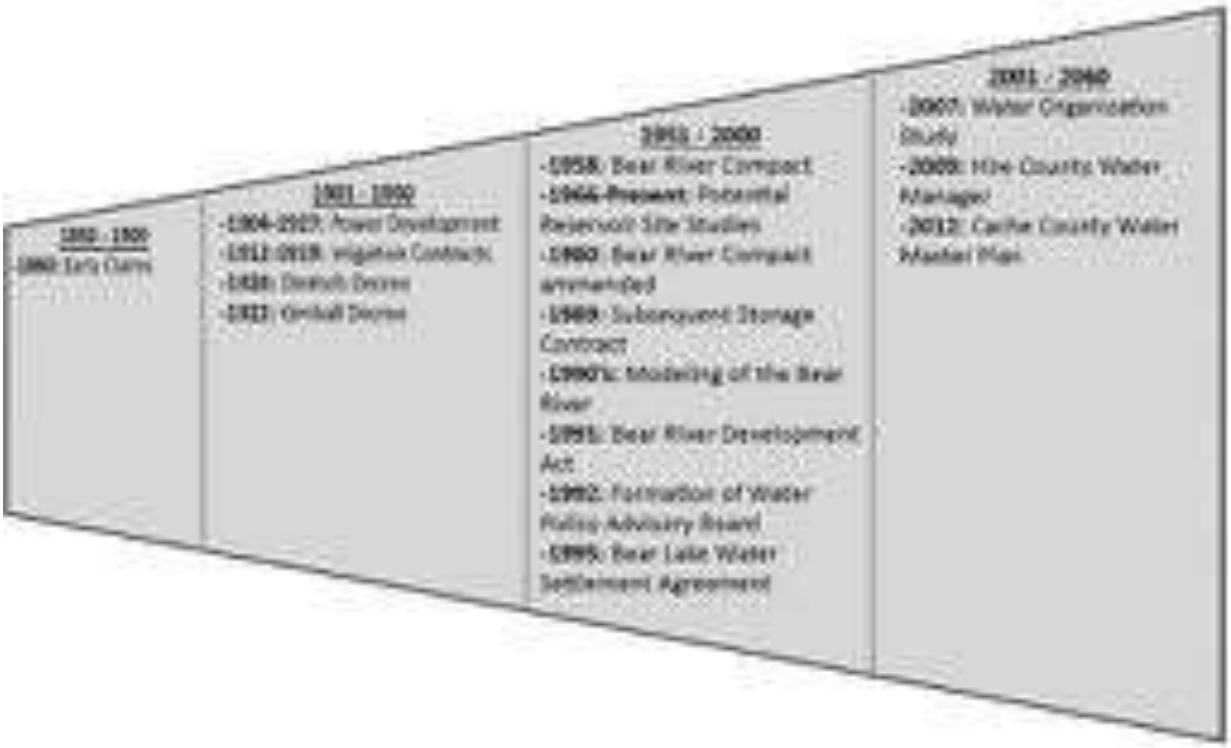
The following goals were set for the master plan:

- Evaluate existing water resources and their regional use
- Determine existing and future water demands across the County and make recommendations on future projects
- Educate and build consensus with stakeholders
- Set goals and have a plan for the future based on stakeholder input
- Recommend and create a prioritized schedule to complete future reports, actions and projects. Prepare conceptual opinions of probable costs to complete the evaluated water improvement projects
- Provide a plan to fund water improvement projects
- Demonstrate how fiscal resources can meet the funding needed to complete the planned projects
- Develop a recommendation for the organizational structure needed to manage water resources in the County
- Develop a plan that will help the County gain a greater voice with the state legislature on water issues

1.6 Cache County Water History

Cache County is more diverse because of the efforts that have been made in the past to develop water. Figure 1.1 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.

Figure1. 1: Major Water Milestones



1.7 Master Plan Process

The process used to develop this master plan involved the following components:

- **Public Process** – A public process was followed that involved interviews with key stakeholders, formation of a steering committee and periodic meetings with the Steering Committee during the development of the plan. This process is explained in greater detail in Section 2.
- **Supply and Demand Projections Coordination** – The Division of Water Resources participated in this project by evaluating the municipal and industrial supply and demands. The process and results are given in greater detail in Sections 3 and 4.
- **Technical Analysis of Alternatives** – An evaluation of potential projects and management structures was completed based on objective criteria developed through the public process and is explained in Section 5
- **Conclusions and Recommendations** – The overall conclusions and recommendations of the master plan are given in Chapter 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 design of a comprehensive water strategy. Water stakeholders include those representing agricultural, environmental and municipal interests. The team implemented a strategic stakeholder involvement campaign with key stakeholders in the planning process.

This strategy has helped regional water leaders feel ownership in the process of evaluating existing water resources and demands, determining future water demands, educating and building consensus, deciphering which management structure best meets the county's needs, and ultimately creating a plan for the future. The strategy involved executing a situational assessment, developing and consulting with a steering committee, updates to the County Council and holding additional meetings with other entities for a comprehensive understanding of issues at hand.

A comprehensive list of stakeholders that have participated in the public process through interviews or attendance at planning meetings is given in Appendix 2-A.

2.2 Situational Assessment

One of the first steps of the master plan was to conduct interviews with key stakeholders in order to gain an understanding of their water concerns and positions on Cache County water issues.

2.2.1 Goals of Interviews

The goals of the interviews were to:

- Gather information about each of the water systems in the County
- Identify water concerns
- Understand the water development priorities
- Understand views about various water strategies for the future
- Identify water goals
- Understand positions with regards to development of the Bear River
- Hear stakeholder views of potential water management options

2.2.2 Stakeholders Interviews

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

- Cache County
- Public community culinary water systems in Cache County
- Representatives from the Logan River, Bear River, Little Bear River and Summit Creek water commissions and other irrigators
- Division of Water Rights (North Logan Office)
- PacifiCorp
- Utah Association of Special Districts
- Bear River, Weber Basin and Jordan Valley Water Conservancy Districts
- State representatives
- Rich County

A complete list of interviews conducted can be found in Appendix 2-B-i. Figure 2.1 shows the locations of the interviews.

Figure 2.1 Location of Interviews

2.2.3 Irrigation Stakeholder Meeting

There are many irrigation companies in Cache County, many of which are very small. Because of time limitations, not all of these irrigation companies were interviewed individually as part of the situational assessment. An open house meeting was held on May 24, 2012 with representatives from the irrigation companies. At the open house, the irrigators were asked about the same water issues that other stakeholders were asked during the interviews. Representatives of 55 irrigation companies were invited. The complete list of irrigators that were invited and a list of those that attended are given in Appendix 2-B-ii. Representatives of the irrigation companies listed in the appendix were invited to come to the steering committee meetings or to have the river commissioners represent them at the meetings.

2.2.4 Summary of Information Gathered From Interviews

The interviews and the meeting with the irrigation stakeholders provided valuable information about the key water issues, needs and concerns. A summary of the key points is given in Appendix 2-B-iii.

2.3 Steering Committee Meetings

The stakeholders that were interviewed were asked to participate on a steering committee that met four times over the course of a year. They were also asked if there were other people that should be interviewed or involved in the meetings. The purpose of the Committee was to provide input and guidance during the creation of the master plan and recommendations. The purposes of the Committee meetings were to educate and build consensus. The Committee is made up of people with agricultural, environmental, and municipal water backgrounds. Many of the Steering Committee members attended all of the meetings, but some could not attend some of the meetings. A list of who attended each meeting is given at the beginning of all the meeting minutes included in Appendix 2-C. Meetings were held on the following dates:

- July 18, 2012
- October 25, 2012
- January 16, 2013
- April 24, 2013

2.3.1 July 18, 2012 Meeting

The purpose of this meeting was to review synthesized data collected through the key interviews and meetings with water stakeholders. Ground rules were established for future committee meetings, the key themes that came from the situational assessment were presented, and input was received from the committee on topics that should be covered in future meetings. A full copy of the meeting minutes is found in Appendix 2-C-i.

2.3.2 October 25, 2012 Meeting

At the second meeting, the following items were included:

- A review of preliminary forecasted water supplies and demands based on the evaluation completed by Division of Water Resources (DWRe)
- Overview of Bear River Development Act and current development plans and activities

- A panel discussion to gain better understanding of conservancy and special service districts. The panel was made up of representatives from Weber Basin Water Conservancy District, Bear River Water Conservancy District, the attorney for the Utah Association of Special Districts (UASD) and the executive director of UASD

A complete copy of the meeting minutes is included in Appendix 2-C-ii.

2.3.3 January 16, 2013 Meeting

The focus of the third meeting was on education of Bear River operations and future supply and demand projections. The following items were included:

- Presentation about Bear River water management by PacifiCorp
- Split of the committee into two groups with about half attending a presentation given by Neil Allen (USU Irrigation Extension) about water Banking. The other half of the committee listened to a presentation about Aquifer Storage and Recovery that was given by Paul Inkenbrandt (Utah Geological Survey)
- Updated supply and demand projections from DWRe
- An instant poll conducted using electronic polling equipment

The results of the poll and the rest of the meeting minutes are included in Appendix 2-C-iii.

2.3.4 April 24, 2013 Meeting

The fourth steering committee meeting was used to present the preliminary results of the master plan and receive feedback from the Steering Committee. The minutes are included in Appendix 2-C-iv.

2.4 County Council Meetings

Periodic updates on the master plan progress were given to the County council at County Council meetings. Updates were given on:

- July 10, 2012
- December 11, 2012
- February 12, 2013

Summaries of the updates are given in Appendices 2-D-i, 2-D-ii, 2-D-iii.

2.5 Additional Meetings

Other meetings were held during the master plan to increase understanding of key water issues among a larger group of people and to receive more input. Valuable input was received by meeting with the following groups of people:

2.5.1 Bear River Small Pumpers Meetings

- March 1, 2012 – Introduced master plan
- March 6, 2013 – Master plan progress update, received input on value of having additional water for irrigation in the late summer.

2.5.2 City Managers Meeting

The City Managers in the county met with the project team on May 11, 2013. A master plan update was provided and valuable feedback was received.

2.5.3 Northern Utah Mini Water Users Conferences

The master plan team gave a presentation at the Cache County Mini Water Users Conference on March 28, 2012. The goal of presentation was to provide an introduction to the master plan process and encourage interaction and buy-in from the audience, many of whom would be involved in the process. Copies of the presentation slides from the meeting are given in Appendix 2-E-i.

A master plan update was given at the Northern Utah Mini Water Conference on April 4, 2013. The presentation slides can be found in Appendix 2-E-ii.

2.5.4 North Cache Conservation District Meetings

Water master plan updates were given to the North Cache Conservation District on April 4, 2012 and, again, on July 11, 2012.

2.5.5 Meetings with USU Staff Members

USU staff members have provided valuable input for the master plan. On November 7, 2012, the project team met with USU faculty members to present what had been completed on the master plan up until that time. The meeting was used to receive feedback on the master plan evaluation process. Notes from the meeting are given in Appendix 2-E-iii. A follow-up meeting with a smaller group of faculty members was held on November 30, 2012. Notes from the meeting are given in Appendix 2-E-iv.

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3 WATER SUPPLY AND DEMAND INVENTORY

3.1 Introduction

In order to plan to meet future water needs, a clear picture of the current water supply and demands is required. In Cache County, the water needs can be split into three main categories.

- Municipal and Industrial (M&I)
- Agricultural
- Environmental

It is important to understand each of these water categories to manage water supplies efficiently. Each of the three categories is explained more in depth below.

3.2 Municipal & Industrial (M&I)

Currently there are 23 M&I water systems in the County of varying size. Many of these systems are experiencing growth. DWRe is continually evaluating M&I water supply and demands for different areas of the state and has developed a process to complete the evaluations. As part of this master plan effort, the Utah Division of Water Resources (DWRe) has evaluated Cache County's existing and future M&I water supplies and demands.

3.2.1 Evaluation

The M&I evaluation includes supply and demand estimates for the following water uses:

- Residential
- Culinary indoor
- Culinary outdoor
- Secondary outdoor
- Commercial
- Institutional
- Industrial

The evaluations are based on yearly reports that each water system submits to the Division of Water Rights and from information gathered during interviews conducted by DWRe. These interviews are referred to as data collection and analysis meetings. A full description of the methodology and assumptions used in the evaluation is given in Appendix 3-A-i. The description given in the appendix comes from a portion of a DWRe report prepared in November 2007 entitled "Municipal and Industrial Water Supply and Uses in the Bear River Basin."

3.2.2 Existing Populations

The existing supply and demand estimates are based on countywide populations given for the 2010 census. This population was 112,656. Of this population, DWRe estimates that 107,326 people were connected to public water systems. The difference of 5,330 people is assumed to be served by private wells.

Water system boundaries do not match exactly with municipal boundaries. Because of this fact, the populations used in the evaluation of the individual systems are often times different from the populations of the municipalities.

3.2.3 *Evaluation Results*

A countywide summary of the existing demand versus the supply is given in Table 3.1. A table showing the results of the evaluation for each of the individual water systems is given in Appendix 3-A-ii.

Table 3.1: Countywide Summary of Existing Demand versus Supply

Countywide Summary of Existing Demand vs. Supply									
		DEMANDS				SUPPLY			
BASE YEAR 2010	Population Served by Public Water Systems	Potable Total (Ac-ft/yr)	Secondary Total (Ac-ft/yr)	M&I Total (Ac-ft/yr)	Total (GPCD)	Reliable Potable Supply (Ac-ft/yr)	Secondary Supply (Ac-ft/yr)	Total Supply (Ac-ft/yr)	Total Supply Surplus (Ac-ft/yr)
COUNTY TOTALS	107,326	25,677	7,037	32,713	272	54,586	7,037	61,623	28,909

The potable supply estimates are based on the reliable potable supply. The reliable potable supply is an estimate of the total annual supply available for use assuming that wells typically operate for half of the year and that spring flows vary during a given year. An in-depth definition of reliable supply is given on page 18 of Appendix 3-A-i.

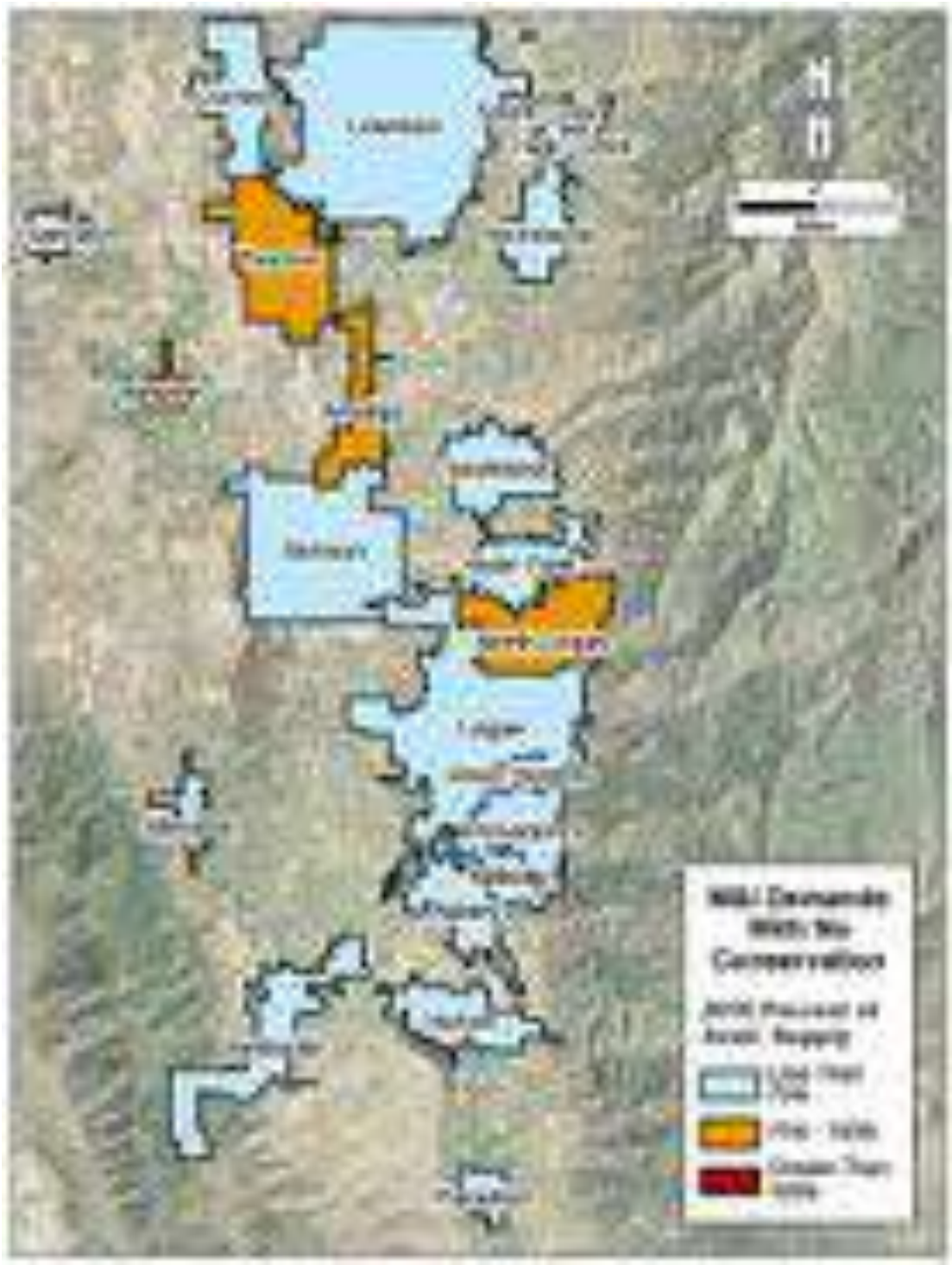
Currently, the developed water supply is adequate on a County-wide annual basis with approximately 29,000 acre feet of surplus water. However, there are a few individual systems that may be experiencing peak water demand days during the late summer when their demands are very close to, or that exceed the available supply. An evaluation to estimate the peak day supply of each individual system has not been completed as part of this plan. Each individual water system should continually monitor its supply to ensure that the peak day demands can be met. Figure 3.1 shows the status of each of the M&I water systems at year 2010. The following categories are represented on Figure 3.1:

- Systems that have annual demands that are less than 75% of their annual reliable supply are shown in light blue.
- Systems that have annual demands that are between 75% and 100% of the annual reliable supply are shown in orange.
- Systems that have annual demands that exceed their annual reliable supply are shown in red.

Currently there are no systems that have annual demands that exceed the annual supply. There are four systems that are shown in orange indicating that the annual demands are greater than 75% of the annual reliable supply. These systems are approaching, or may already have experienced days when the peak demand exceeds the available water supply. These systems have enough supply year to year, but may not have enough supply to meet peak day demands at certain times of the year. There may

even be some systems that are shown in blue that occasionally get close to having shortages on peak demand days, but on a year-round basis have adequate supplies. Again, all of the systems are different with different use patterns and should continually monitor their own capacity to meet peak demands.

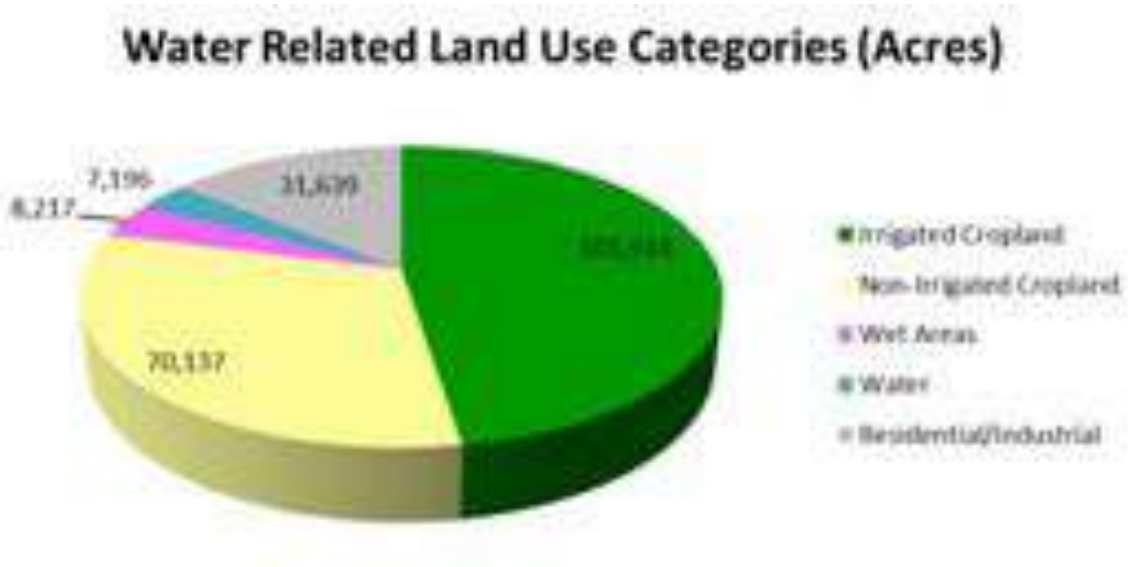
Figure 3. 1: M&I Demand Map in 2010



3.3 Agricultural

Agriculture makes up a very large part of the water use in Cache County. The County includes more than 100,000 acres of cropland and more than 90 individual irrigation companies. Many of the irrigation companies are quite small, but they are all needed to distribute water throughout a large portion of the County. This water is critical to support a large share of the economy in the County. Figure 3.2 gives the approximate acreages for the different water related land use categories in Cache County. The figure illustrates how large the agriculture areas are compared with the other land use areas. The data for the pie chart is based on information given in the Bear River Basin Land Use Inventory (Utah Division of Water Resources, 2009).

Figure 3.2: Water Related Land Use Categories



3.3.1 Irrigation Demands

With so much irrigated land, the agricultural water demands are much greater than the M&I water demands. A breakdown of the flood irrigated acres and sprinkler irrigated acres along with the estimated annual volumes of water needed for those acreages is given in Appendix 3-B.

Ideally,more than 300,000 acre feet per year are needed for irrigation of the areas that are currently being irrigated in the County.

3.3.2 Irrigation Supply

The amount of irrigation water supply available for agriculture purposes varies year to year depending on many things including snow pack, rainfall, summer temperatures and other factors. In order to quantify how much irrigation water it available, the average amount of water diverted off of each of the major rivers over the last 10 years has been evaluated. Table 3.2 provides a summary of the average diversions based on annual volumes recorded over the last 10 years on the Utah Division of Water Rights web page or based on phone calls to river commissioners or irrigation company representatives.

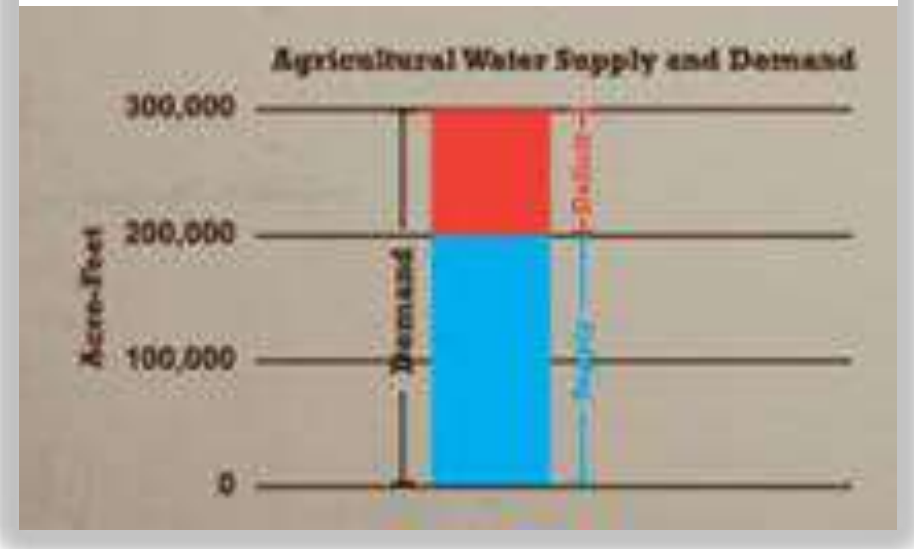
Table 3. 2: Historic Irrigation Average Annual Water Diversion Volumes

*Historic Irrigation Average Annual Water Diversion Volumes		
Blacksmith Fork River		River Total (Acre Feet/Year)
Nibley Blacksmith Fork Canal	9,850	
		9,850
High Creek		
Coveville	510	
Hill Ditch	10	
Lewiston	10	
Mountain Home	40	
Richmond Lower	50	
Richmond Upper	190	
		810
Little Bear River		
Big Spring	1,400	
East Fork	11,240	
Pole Creek	590	
Porcupine Creek	350	
Davenport	1,610	
Hyrum Canal	7,230	
LB Below Paradise	30,580	
		53,000
Logan River		
8th Ward Canal	19,000	
Hyde Park and Smithfield Irr Co.	13,490	
Logan Northern (Lower)	10,660	
Providence Pioneer Canal	512	
Providence Logan Irr Co.	1,280	
		44,940
Lower Bear River		
Cub River Irrigation Co.	19,820	
Total Pumps	9,950	
West Cache	38,510	
		68,280
Summit Creek		
	7,110	
		7,110
	Annual Average Total	**183,990**

*Volumes are based on annual volumes recorded over the last 10 years on the Utah Division of Water Rights web page or based on phone calls to river commissioners or irrigation company representatives.

The average diversion volumes are indicative of the amount of water that is available for irrigation use on an average water year. There are some irrigation water sources such as wells that may not be included in the annual average total. Figure 3.3 provides a representation of the volume of irrigation water that is needed for efficient agricultural production versus the volume of irrigation water is typically available for use on a given year in the County.

Figure 3. 3: Agricultural Water Supply and Demand

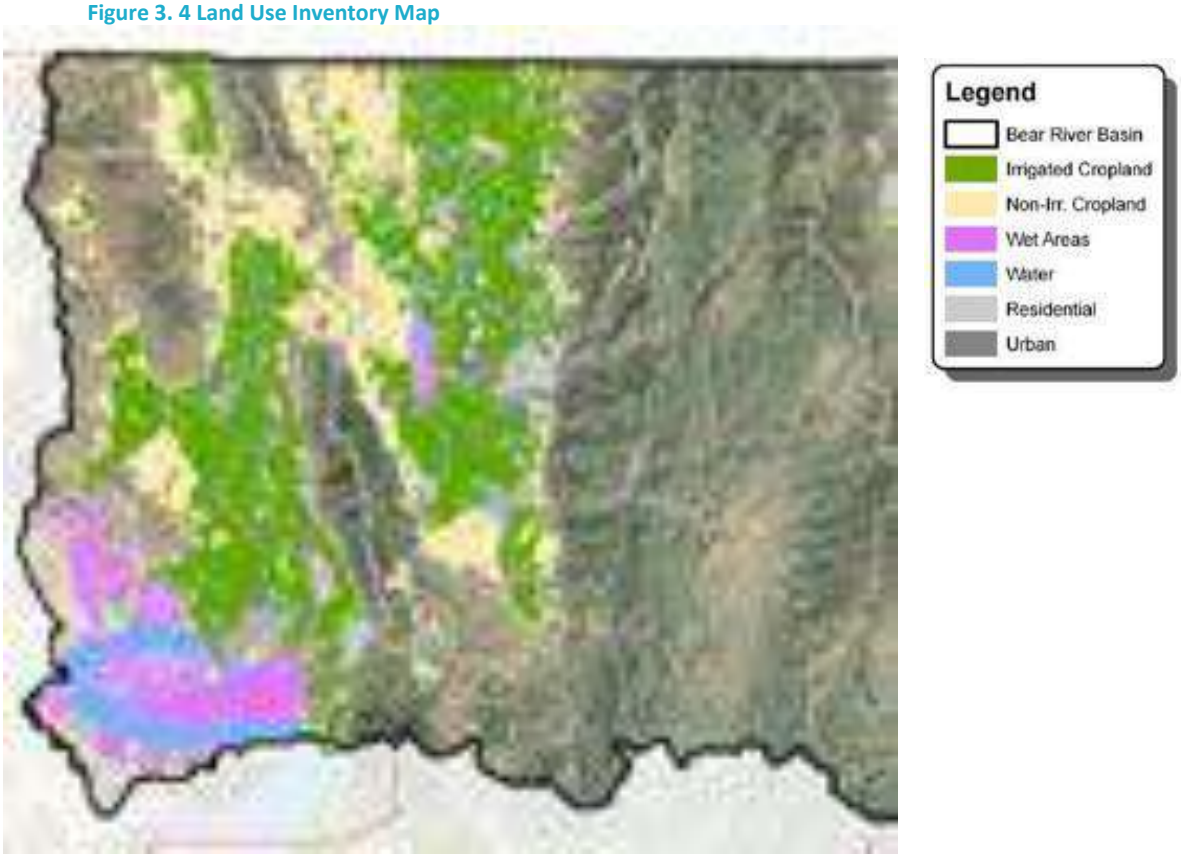


Irrigators in Cache County typically do not have adequate water supply in the later months of the irrigation season. They have expressed that on many years their production is limited due to water shortages at the end of the irrigation season. They typically, depending on their location, could use another half foot to one foot of water per year to improve production. There are roughly 35,000 acres of land that are irrigated off of the Logan River and approximately 26,000 acres irrigated in Cache County off of the Bear River. To provide an additional half foot of water over these two areas would require an annual volume of approximately 30,000 acre feet. There are other areas served off of different rivers that often experience shortages and could use additional water as well. For example, there are many irrigation water users on the Blacksmith Fork River, which experiences periods of no flow.

3.3.3 Non Irrigated Acres

There are approximately 70,000 acres of cropland around the edges of the valley, mostly along the foothills that are currently not being irrigated. These areas are not irrigated mostly because they are located above existing water delivery channels. If they were to be irrigated, they would require approximately 245,000 acre feet of water. These areas correspond closely with many undeveloped areas on the benches that are buildable and are shown in yellow on the land use inventory map shown in Figure 3.3. The figure shows a large part of Cache County and some of Box Elder County. Most of the valley floor is irrigated cropland.

Figure 3. 4 Land Use Inventory Map



Division of Water Resources, Bear River Basin 2009 Water Related Land Use Inventory

3.3.4 Irrigation Delivery Systems

Many of the irrigation canals in the County were constructed over a century ago. These canals are old and often times not adequately maintained. In areas that have had more development, maintenance has been made very difficult due to encroachment of homes and business along the canals. Because of inadequate maintenance, many of the canal banks are over grown and falling apart. Safety is a concern in many areas that need to be repaired or improved.

The irrigation canals in the valley are important and provide many benefits. The canals need to be maintained as they provide the water that is needed to sustain agriculture. They also can provide a water source for existing and potential future secondary water systems, which extend the culinary water supply for new growth.

3.4 Environmental

Water plays a major role in shaping the environment for the residents that live in Cache County. The environment is very dependent upon adequate water supplies and proper management of the water. During this master plan process, it has become very evident that there are a lot of unknowns about the environmental water needs in Cache County.

Some key questions are:

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

More information needs to be gathered to quantify and prioritize environmental water needs in the County. A preliminary environmental and ecological water uses fact sheet is given in Appendix 3-C (Utah State University, 2013). The fact sheet includes the key questions listed above and gives an overview for a potential pilot study to determine where rivers and riparian areas provide environmental benefits, how they are connected, and quantify the volume and timing of water needed to maintain these benefits.

3.5 Endangered Species

Currently there are no endangered species on the federal list in Cache County, but there are some species that are listed as threatened or as candidates. Table 3.2 gives a current summary of the threatened species and the species that are listed as candidates in Cache County. (Department of the Interior, 2013)

Table 3.3: Threatened and Endangered Species in Cache County

Threatened and Endangered Species in Cache County		
COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS
Canada lynx	Lynx Canadensis	Threatened
Greater Sage-grouse	Centro cercus Urophasiamus	Candidate
Least chub	Iotichthys Phlegethontis	Candidate
Maguire primrose	Primula Maguirei	Threatened
Ute ladies'-tresses	Spiranthes Diluvialis	Threatened
Western yellow-billed cuckoo	Coccyzus Americannus Occidentalis	Candidate

Additional information for the species listed in the table along with lists for other counties in Utah are given in Appendix 3-D. The list is always changing and should be checked whenever a project is being planned. It is the responsibility of the sponsors of the projects to take actions to protect these species.

4 WATER SUPPLY AND DEMAND FORECASTING

4.1 Introduction

In the future, the water demands in Cache County will change as the population increases, as changes in agricultural areas are made, and, potentially, as variations in the climate occur. It is important that the County has a plan that allows for a secure future water supply to meet the M&I, agricultural, and environmental needs.

4.2 Future M&I Demands

The Division of Water Resources (DWRe) completed an evaluation of the future water demands for each of the 23 M&I systems in the County. The projections estimate the annual demands from 2010 to 2060. The evaluation is based on the process and assumptions that are defined in Appendix 3-A-i. For the future projections, it is assumed that the total water supply for each system will remain the same until 2060. The demands are projected to increase based on the population growth for each water system.

4.2.1 M&I Evaluation

From the existing evaluation, an estimated average water use per-capita per-day is calculated for each water system. This is calculated by dividing the total M&I water use for each system by the number of people projected to be served by the system in a given year. The average use per capita per day is based on total water use in the systems, which include the following categories.

- Residential
  - Culinary indoor
  - Culinary outdoor
  - Secondary outdoor
- Commercial
- Institutional
- Industrial

As growth projections are made, the projected population is multiplied by the contribution per-capita to estimate the future annual demands. The estimated future demands are compared with the existing reliable supply and used as a tool to estimate when additional water supply and/or water conservation will be needed.

4.2.2 Population Projections

The population projections for the master plan are based on the projections for each community prepared by the Governor's Office of Planning and Budget (GOPB). GOPB utilized 2010 census data and assigned a growth rate to each County for each of the next five decades (to 2060). Bear River Association of Governments (BRAG) worked with GOPB to make adjustment to the projections for each community to follow past growth trends. To identify the growth trends, BRAG used population records from the last three decades to identify what percent of total County population each community has included over time. These population trends were projected forward for each of the next five decades. A table that lists the population projections for each of the communities and for the County as a whole is given in Appendix 4-A-i.

DWRe utilized the population projections to evaluate the future demands for each of the water systems. The boundaries for the water systems do not correspond exactly with the boundaries of communities. For this reason, many of the projected populations for the water systems are different from the projections for the communities. The populations that are projected for each of the water systems can be seen in the supply and demand projection tables in Appendix 4-A-ii.

The Countywide population in 2010 was 112,656. Of this population, DWRe estimates that 107,326 people were connected to public water systems. The difference of 5,330 people is assumed to be served by private wells. For the future growth and water demand projections, DWRe assumes that all of the growth will be connected to a public water system. DWRe assigned a large portion of the projected growth in unincorporated areas to be added to the Benson Culinary Water System. It is likely that some of this growth will be spread out over other areas of the County. However, it is difficult to estimate where the growth will actually occur.

4.2.3 Supply and Demands Assuming No Additional Water Conservation

With the population projections from BRAG, DWRe was able to complete an evaluation to compare the existing reliable water supplies to the projected demands for each water system. A countywide summary of the supplies versus the estimated future demands based on current per-capita water use is given in Appendix 4-A-ii. The appendix includes summary tables for each community on the following years: 2010, 2020, 2025, 2030, 2040, 2050, and 2060.

Maps that show the status of each of the M&I water systems at the above listed time frames are included in Appendix 4-A-iii. The following categories are represented on the Maps:

- Systems that have annual demands that are less than 75% of their current annual reliable supply are shown in light blue.
- Systems that have annual demands that are between 75% and 100% of the current reliable supply are shown in orange.
- Systems that have annual demands that exceed their current annual reliable supply are shown in red.

Systems that are shown in orange at any given time frame indicate that the annual demands will be greater than 75% of the current annual reliable supply. These systems may experience days when the peak demand exceeds the available water supply. These systems probably have enough supply year to year but may not have enough supply to meet peak day demands at certain times of the year. All of the systems are different with different use patterns and should continually monitor their own capacity to meet peak demands.

Table 4.1 gives a summary of the number of communities that are projected to have shortages at the indicated future time frames.

Table 4.1: Summary of M&I System Shortages without Conservation

Summary of M&I System Shortages without Conservation							
Year	2010	2020	2025	2030	2040	2050	2060
Number of Systems with Projected Annual Shortages	0	4	6	8	11	16	17
Number of Systems with Projected Demands Greater than 75% of Annual Supply	4	10	12	15	17	18	18

4.2.4 State Conservation Goal

In 2000, the state of Utah set a goal to reduce the amount of water used per-capita throughout the state 25% by 2050. In the third Steering Committee meeting held during this water master plan, DWRe indicated that statewide water use per-capita has been reduced by approximately 18% since 2000. Cache County has not done as well with an estimated water use reduction of approximately 6%. Recently the Governor shortened the time frame to achieve the 25% conservation goal by 2025 instead of 2050.

4.2.5 Supply and Demands Assuming 25% Conservation

DWRe created a set of water projections assuming that Cache County will reach the state goal of 25% conservation by 2025. A Countywide summary of the supplies versus the estimated future demands based on the assumption that the 25% conservation goal will be achieved is given in Appendix 4-A-iv.

Maps that show the status of each of the M&I water systems at each of the future time frames assuming that the 25% conservation goal is met are included in Appendix 4-A-v.

Table 4.2 gives a summary of the number of communities that are projected to have shortages at the indicated future time frames if the state goal to conserve 25% by 2025 is reached.

Table 4.2: Summary of M&I System Shortages with 25% Conservation by 2025

Summary of M&I System Shortages With 25% Conservation by 2025							
Year	2010	2020	2025	2030	2040	2050	2060
Number of Systems with Projected Annual Shortages	0	2	3	4	5	8	12
Number of Systems with Projected Demands Greater than 75% of Annual Supply	4	8	7	11	14	16	16

4.2.6 Overall summary of Future M&I Supply and Demands

Table 4.3 provides a comparison of the projected number of communities that will have annual water shortages at years 2030 and 2060 and an estimate of how much additional water supply will be needed on a Countywide basis at those times. The table compares the projections based on using water at the current per-capita usage rates to the projections assuming that Cache County conserves 25% by year 2025.

Table 4.3: Water Projections Summary Table

Water Projections Summary Table		
	No Conservation	25% Conservation
Number of Communities with Annual Water Shortages by Year 2030	8	4
Number of Communities with Annual Water Shortages by Year 2060	17	12
Additional Annual Water Supply Needed on a County Wide Basis by Year 2060 (Acre-Feet)	20,000	0
Number of Communities with Projected Demands Greater than 75% of Annual Supply by Year 2030	15	11
Number of Communities with Projected Demands Greater than 75% of Annual Supply by Year 2060	18	16

Many agreements and a great deal of pipe infrastructure would be needed to share resources very efficiently to meet demands.

If no additional conservation is achieved, on a countywide basis, more water supply will be needed near 2040. There are very few communities in the County that are currently interconnected to help utilize the County water supply efficiently across the County. By 2030, more than one-third of the municipal water systems will have annual water shortages and more than half will be approaching potential peak day shortages.

4.3 Future Agricultural Water Needs

Additional water for irrigation is needed now during the late parts of the summer in many areas (See Figure 3.3). This is due to a lack of water storage on many of the rivers that supply irrigation water and to needed maintenance of water delivery systems. There are approximately 50,000 acres of land in Cache County that are currently irrigated off of the Bear River and the Logan River alone that often times could use another half-foot of water to one foot of water per year to improve crop production (Pumpers, 2013). During multiple meetings throughout this master plan, the project team has received feedback indicating that many irrigators would be willing to pay $100 to $200 per acre foot per year to supplement water supplies for existing irrigated lands.

Growth will continue in Cache County and good water planning is needed in order to preserve the agricultural lands.

4.4 Future Environmental Water Needs

The environmental water demands need to be quantified and prioritized by region in order to understand the current and future water needs. The environment needs to be maintained or improved in the future (see section 3.4).

4.5 Changes in the Climate

The climate is obviously a very important factor when evaluating the amount of water supply that is available in Cache County. There are many uncertainties with regard to what weather patterns Cache County will experience in the future. Some climate studies have been conducted on a very large regional level, but very little work has been done with a focus on potential changes specifically within Cache County. Some potential effects of climate change may be:

- Decreased annual runoff
- Earlier runoff
- More rain and less snow
- Higher potential for flooding
- More potential for drought

In the future, more evaluation is needed to understand how water demands will change with potential changes in the climate. It is possible that the environmental water demands will increase because of the need to provide a reliable stream of water in the natural water channels for fish and wildlife.

As mentioned above, there are uncertainties associated with climate change projections. Cache County needs a plan that considers contingencies with regards to the water supplies that will be needed in the future in order to account for some of the uncertainties associated with climate change.

4.6 Sources of Water to Meet Future Needs

There are three main future water sources in the County:

- Improved conservation of water
- Conversion of agricultural water to M&I water
- Development of Bear River water allocation

A combination of all of these sources is needed to provide a secure of supply of water to meet the future needs.

4.6.1 Water Conservation

Water conservation is a tool to extend the service of the available and future water supplies. Based on the evaluation completed by DWRe, reducing the amount of M&I water that is used per capita in Cache County by 25%, will save approximately 21,000 acre feet of water by 2060. If the conservation goal is reached, the reliable water supply can be extended close to 2060 on a countywide basis.

More than half of the individual M&I systems will still have annual water shortages by 2060 even if the conservation goal is met. However, in the near future conservation could be of great benefit to many communities that are currently close to having demands that exceed the available supply.

4.6.2 Conversion from Agricultural Water to M&I Water (Groundwater Management Plan)

To meet future increased water demands, water could be converted from agricultural uses to municipal uses. In order to accomplish this, typically, surface water rights are converted to groundwater rights.

Cache County has significant volumes of groundwater. However, the limiting factor regarding ground-water development in Cache Valley is not the amount of water, which is physically available within the aquifers, but rather the amount of ground water, which can be withdrawn without impairing prior downstream surface water rights. It has been determined that the ground water and surface water in Cache County are hydrologically connected.

Surface water users generally have higher priority water rights over users that pump water from the underground aquifers. Over time, depletion of the underground aquifers reduces surface flow so that senior surface users could get deprived of water by junior pumpers.

The ground water management plan was created to help protect the rights of Bear River water users downstream and others that have rights to the ground water here in Cache County. The plan explains that based on a USGS study that measured data and created model simulations, the surface and ground water within Cache Valley are connected. Because of this fact, the plan outlines some guidelines to be followed by the Division of Water Rights in managing the groundwater resources in Cache Valley. These guidelines are given in the 1999 Interim Cache Valley Ground-Water Management Plan. A copy of the plan is included in Appendix 4-B.

Total future ground water withdrawals are limited to a preliminary volume of 25,000 acre feet per year, and typically require that replacement water be provided. Once the initial 25,000 acre feet of water has been withdrawn from the ground, the state engineer will re-evaluate the situation to determine if additional withdrawals will be allowed.

It is estimated that since year 2000, approximately 4,000 to 5,000 acre feet of water have been withdrawn from the ground. This source of water does have impacts on agriculture as it requires that existing irrigated agricultural lands be taken out of production to allow for additional M&I water to supply new development.

There are approximately 70,000 acres of developable land around the edges of the County on the benches that are currently not being irrigated. These are in areas that are very suitable and desirable for homes, but do not have any associated water rights. If these areas are to be developed, the water rights will have to come from taking irrigated agricultural lands out of production or from water made available through Bear River development.

4.6.3 Development of Bear River Water Allocation

In 1991, 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. Table 4.4 gives the volumes of water that were allocated and who received an allocation.

Table 4.4: 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

This water is available for use through development of storage facilities. Currently, during peak demand periods of most years, principal water sources are fully appropriated and there is not sufficient flow in surface sources to meet the demand of all existing surface water rights.

The BRDA is defined in Utah Code Annotated 73-26-201. In the code it states that water developed by projects, except water reserved for wildlife or public recreation, shall be made available by contract exclusively to the entities listed in Table 4.4. In addition, a county or conservancy district that purchases or leases developed water may lease the water to any person. Construction cannot start on a project until contracts have been made for the sale of 70% of the developed water and all environmental permits are in place.

4.6.4 Needs for Bear River Water Allocation

The Bear River allocation is important because it can meet many existing and future water needs including the following:

- Agricultural
  - Supplement annual water supplies for the 105,000 acres that are currently being irrigated.
  - Preserve prime agricultural areas by providing another source of water for future M&I demands.
  - Irrigate approximately 15,000 acres of dry crop land.
- Environmental
  - Increase late summer flows in streams and maintain riparian areas.
- Municipal
  - Provide a source to meet the M&I needs that are projected within the next 30 to 50 years depending on the amount of water that is conserved between now and then.
  - Provide for water exchange agreements to be executed, which allow stored water to go down the rivers to keep downstream water users whole and allow for more M&I groundwater withdrawals.

One of the main priorities from the Steering Committee is to protect the Cache County Bear River allocation. Development of the Bear River will allow the County to keep more current agriculture lands in production and develop some of the areas around the edges of the valley that are not being irrigated.

4.6.5 Current Bear River Development Plans

Conceptual planning is being done now to evaluate alternatives to develop Bear River Water for use along the Wasatch Front. Many storage facilities are being evaluated along with potential pipe alignments to convey water from Box Elder County to Salt Lake County. It is projected that the Bear River water will be needed along the Wasatch Front by 2035. DWRe came to the Steering Committee meeting in October and gave an update on the Bear River Development Project. Notes from the presentation are given in Appendix 2-C-ii.

5 ANALYSIS OF ALTERNATIVES

5.1 Introduction

Water planning is very important in order to help preserve and develop the water that is needed now and for the future. In order to make recommendations for future actions, an evaluation of alternatives was completed. 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. The evaluation is based on conceptual data and is a living document that may be updated over time as more detailed information is made available.

The planning evaluation of alternatives has been completed following two main steps:

1- **Project Evaluation:** What water projects need to be completed in Cache County to meet current and future water needs?
2- **Management Evaluation:** What type of water management system should be organized to complete the identified water improvement projects and meet other management needs?

Objectives were identified for use in the evaluation of potential projects and management systems based on information gathered in the key stakeholder interviews, stakeholder meetings and based on the projected water supply needs.

5.2 Project Objectives

Many objectives were identified for use in the evaluation of projects. The objectives are divided into the following three categories:

- Supply
- Implementation
- Environment

5.3 Metrics

Metrics define how well a given alternative meets each objective. Initially, many metrics were evaluated to measure how well the objectives are met by the proposed projects. During the evaluation, process some metrics were changed or removed based on information that dictated that such a change be made. For example, the following environmental metric was included preliminarily:

Project complies with the environmental process (yes/no)

This metric was removed during the evaluation process because any project that is constructed will be required to comply with the environmental process. Table 5.1 shows the objectives used in the analysis and the corresponding metrics. Some objectives have more than one metric.

Table 5.1: Objectives and Metrics For Evaluation of Projects

Objective Type	Objective	Metric (method of measurement)
Water Supply	Protect Bear River water allocated to County	Water put to beneficial use or in approved non-use status (acre-feet)
		Bear River water developed (acre-feet)
	Provide adequate reliable future culinary supply	Additional communities with adequate culinary supply to year 2060 (number)
	Provide adequate reliable irrigation supply now and in the future	Reliable late season irrigation supply added (acre feet)
	Maintain existing irrigation delivery systems	Canals dredged, lined, or reconstructed (linear feet)
	Keep rights to water that is converted from Ag to M&I uses in Cache County	Amount of converted water that is banked (Acre-Feet)
	Match use of water to the water quality	Residential units with secondary water (number)
	Conserve water	Volume of water conserved (acre feet/year)
Implementation	Promote collaboration and focus on regional projects	Entities that benefit (number)
	Minimize costs	Capital Costs ($)
		Debt service and operation and maintenance costs for 50 year life cycle ($ per acre feet per year)
		Potential grant money available (yes/no)
	Educate public about Bear River development	Additional County residents that understand Act (number)
	Educate 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)

5.4 Key Objectives

The objectives used to evaluate the alternatives were not weighted because of the diversity of the stakeholders. What is very important to one stakeholder may not be as important to another stakeholder. However, during the stakeholder input process it became evident that there are a few key objectives that were important to a large group of the stakeholders. These are:

- Protect the Bear River development water that is allocated to Cache County
- Focus on regional projects that benefit multiple water entities and let individual water systems continue to manage their own systems
- Educate the public
- Maintain or improve the quality of our environment

5.4.1 Protect Bear River Allocation

Developed Bear River water is needed currently to improve habitat for wildlife and to provide late season irrigation water to many areas. It will be needed in the future for municipal water or for exchanges for municipal water. Developed Bear River water could potentially be leased to others.

5.4.2 Focus on Regional Projects

Individual communities can focus on local water issues. The County should focus on projects that involve multiple water entities.

5.4.3 Educate the Public

A constant message from the Steering Committee was that more public education needs to be done. More specifically, people need to be educated about:

- How much water supply is available
- What Bear River development plans are being made in other locations
- How to use water resources more efficiently (conservation)

5.4.4 Maintain the Environment

Water is essential to the environment that is currently enjoyed by the residents of Cache County. Efforts to maintain water supplies for environmental needs such as fish and wildlife habitat must be made. Currently there is a limited amount of data available that quantifies or prioritizes environmental water demands in Cache County.

5.5 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 Steering Committee.

- Bear River Development
  - Aquifer Storage and Recovery (ASR)
  - Reservoirs
- Water Banking
- Secondary Water
- Irrigation Delivery
- Culinary Water Distribution
- Public Education
- Water Conservation
- Water Quality
- Water Studies
- Other
  - Beaver Dams
  - Riparian Meadows

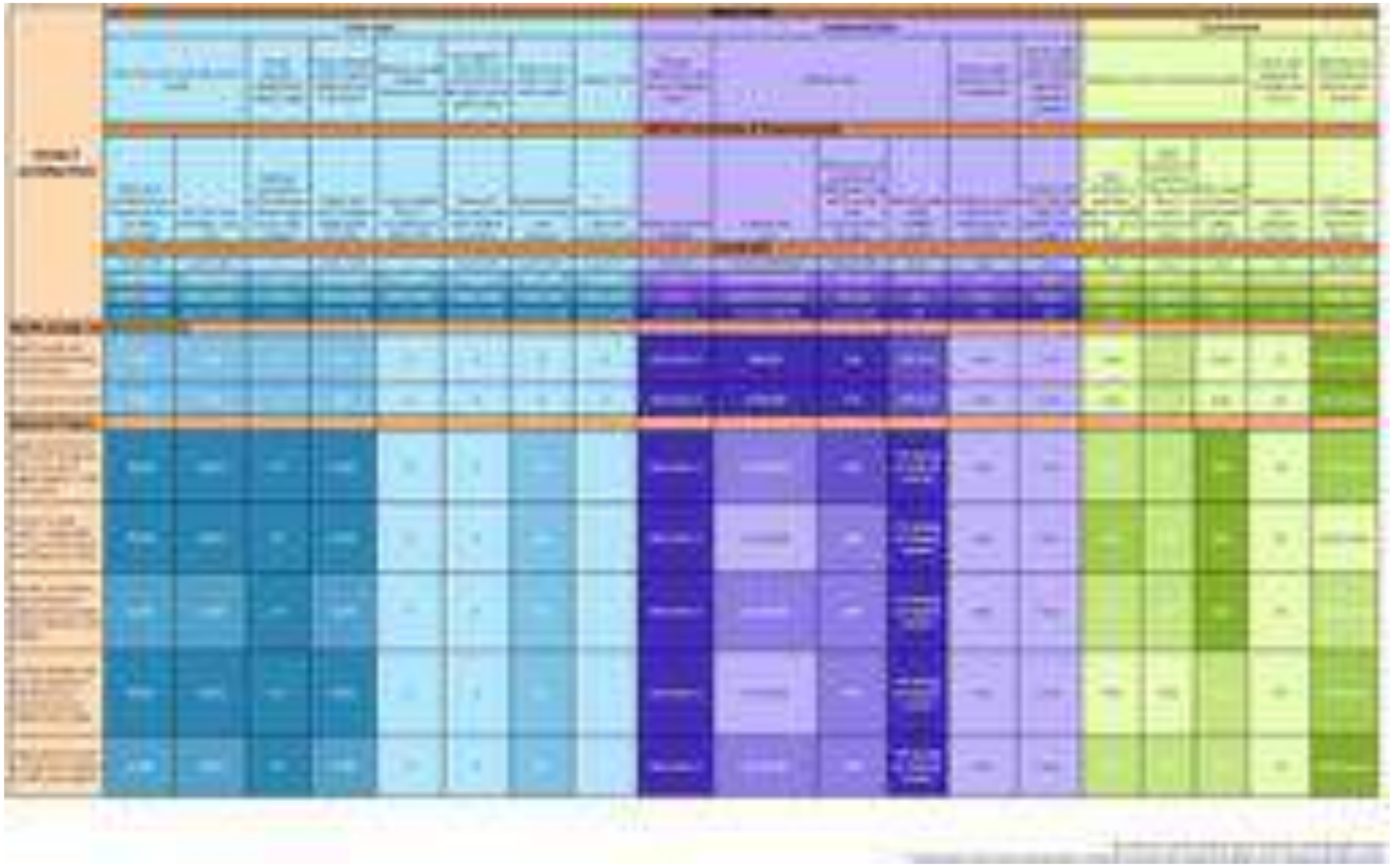
Multiple specific projects were evaluated for each of the types of projects in the list.

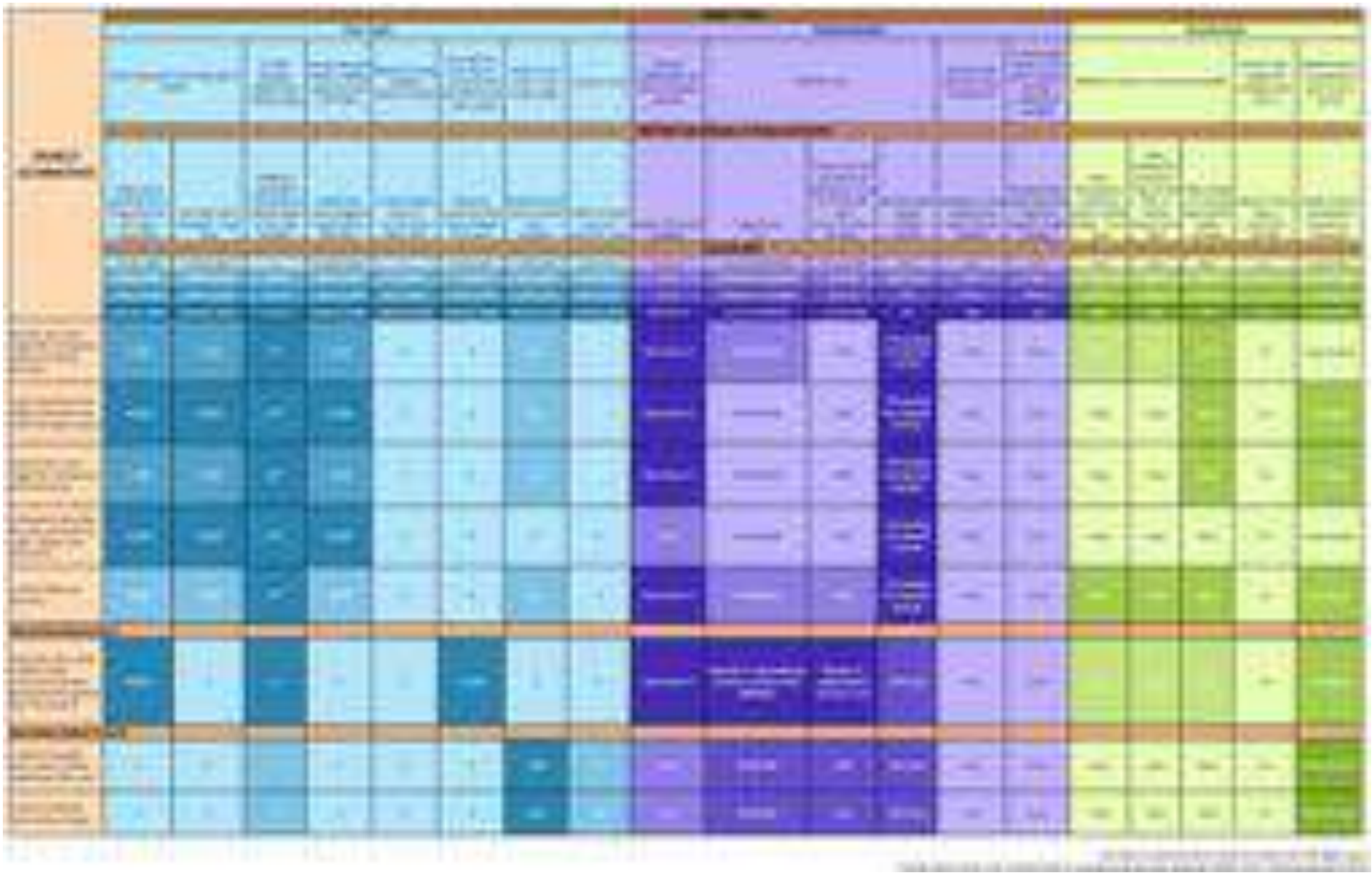
5.6 Explanation of Evaluation of Project Alternatives Table

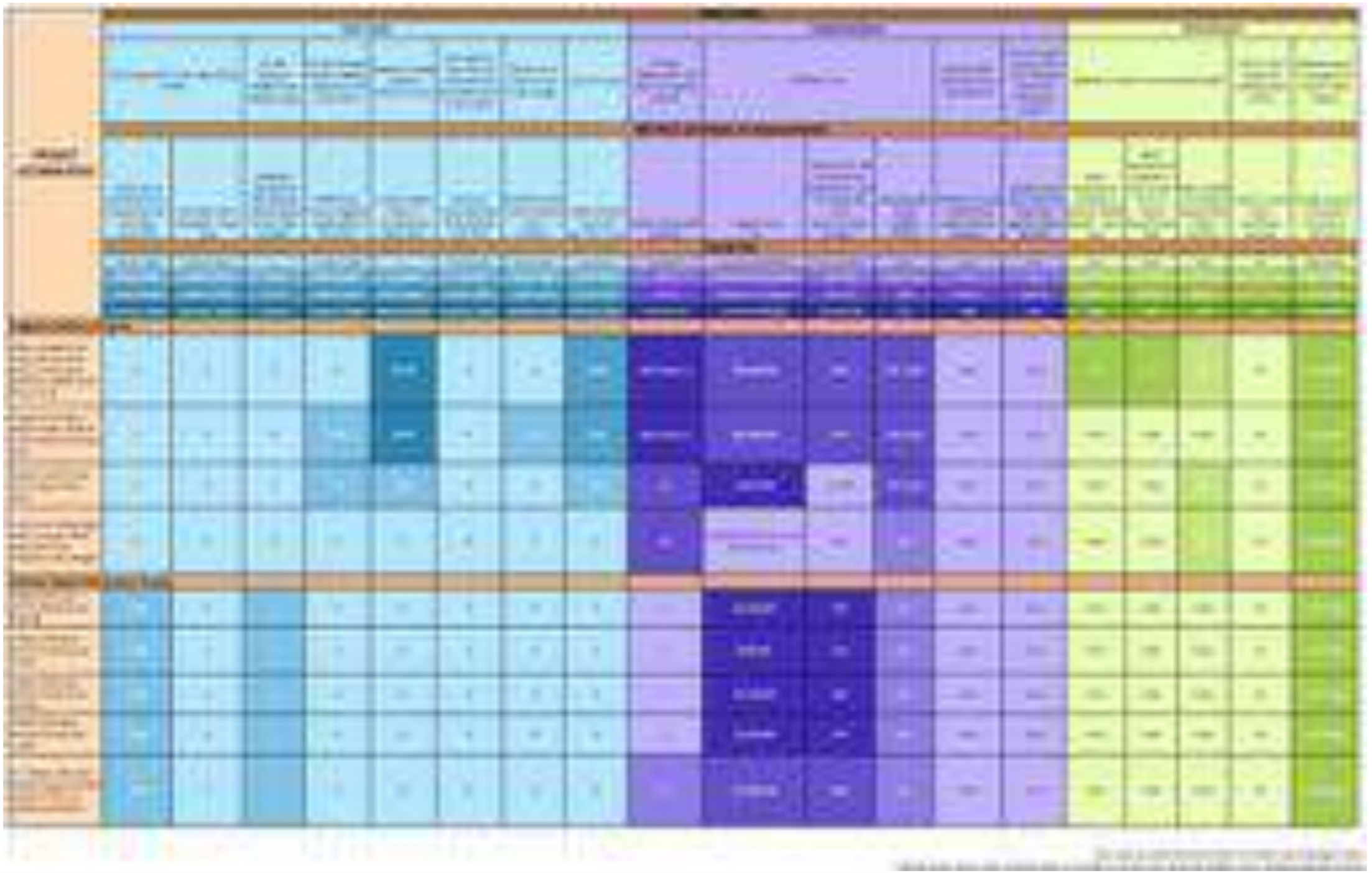
A large table called the Evaluation of Project Table Alternatives (Table 5.2) was created to evaluate specific example projects to determine what types of projects should be done.

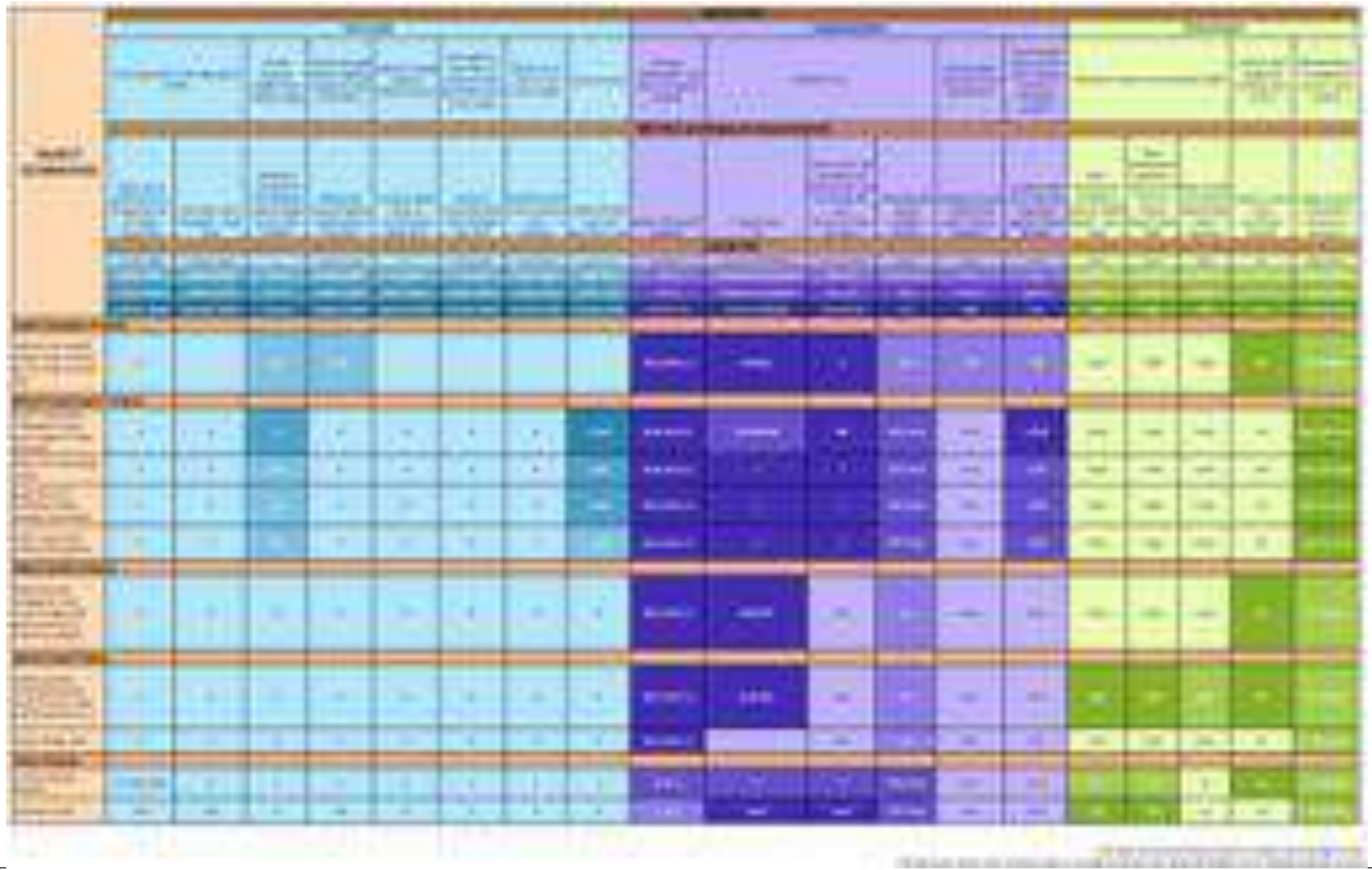
The table contains the information that was used for the evaluation and is located in the next four pages. An explanation of the table components is given immediately following the table. This table is also included in Appendix 5-A.

Table 5.2: Evaluation of Project Alternatives









5.6.1 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.

5.6.2 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 three categories:

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

5.6.3 Metrics

The metrics for each objective are 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.

5.6.4 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.

5.6.5 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.

5.7 Conceptual Project Costs

Cost estimates were created as part of the evaluation of most of the projects. All of 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. All of the estimates include a 50% contingency based on the uncertainty of the estimates and to account for environmental permitting and engineering. A summary of the major assumptions that were used to create the conceptual cost estimates for the projects is found in Appendix 5-B.

5.8 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 ASR
- Environmental water demands in the County

5.9 Recommended Projects

The project team, made up of water engineers, irrigation engineers, planners, and environmental engineers evaluated the projects listed in the table. The projects were not ranked but were rated. Through this evaluation, the following types of projects rose to the top based on how well they meet the objectives and are recommended moving forward:

- Water banking
- Aquifer storage and recovery projects
- Reservoirs (more specifically, reservoirs that add additional irrigation water to areas that are currently being irrigated and do not require new pumps or distribution networks).
- Secondary water systems
- Water conservation programs
- Irrigation canal rehabilitation
- Studies to evaluate and prioritize environmental water demand areas

A brief description of each of these projects and some key points about the projects are given below. Many of the listed projects will need to be studied further to identify specific projects and to evaluate them based on the criteria that has been established.

5.9.1 Aquifer Storage and Recovery (ASR) Projects

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 at a later time in the year or during a dry year to meet demands. Water stored using ASR could be part of the water allocated to Cache County in the BRDA.

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 the 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)

Some of the benefits of ASR that help meet the objectives of the plan are:

- Protects allocated Bear River development water (5,000 to 20,000 acre feet)
- Supplements ground water
- Less costly than storing water above ground
- Provides additional water supply for many communities and irrigators
- Provides a back-up supply during emergencies
- Increases flows in streams to support fish, and riparian habitat during periods of low summer flow

The Utah Geological Survey (UGS) has completed some preliminary studies of potential ASR sites in Cache County, and is continuing some additional studies. More studies are needed to determine the volume of water that can be put into the principal aquifer and stored.

UGS came to the January 16, 2013 Steering Committee meeting and gave a presentation that provided an overview of ASR and talked about specific sites in Cache County that have had some evaluation. A copy of the presentation slides is included with the Steering Committee meeting minutes in Appendix 2-C-iii. Some Cache County sites that could be used for ASR are located:

- Near the mouth of Green Canyon
- In the Logan Island area
- Near the mouth of Providence Canyon
- In Millville along the foothills

5.9.2 Reservoir Development

Build above ground reservoirs to store excess spring runoff water. Reservoirs are used to meet late season irrigation needs for areas that are currently irrigated, environmental needs and future drinking water needs. Some of the benefits of reservoir construction are:

- Uses and protects allocated Bear River development water (Up to 60,000 acre feet)
- Provides additional water supply for many communities and irrigators
- Increased late summer flows for habitat in rivers downstream of the reservoirs

In order to develop the entire Bear River allocation some above ground storage reservoirs will be needed. Development of ASR projects will most likely not store enough water to utilize the Bear River allocation of 60,000 acre feet (Inkenbrandt, 2013).

Specific conceptual reservoir sites were evaluated with different methods of water delivery to determine how well they meet the objectives. The reservoir sites evaluated are at locations that had been evaluated in previous studies. The Reservoir Cost Summary table in Appendix 5-C lists the different reservoirs that were evaluated along with conceptual cost estimates.

Initially, some estimating was done to determine the feasibility of irrigating some of the 70,000 acres of non-irrigated lands that are farmable and are mostly located around the perimeter of Cache County. These areas are typically located above the existing canal systems along the valley benches. In order to feed water to these areas, reservoirs

would need to be built fairly high up in the water shed. The water would then need to be piped to the areas to irrigate. The costs to pipe the water over these distances makes this approach much less feasible than some other approaches. It would be less costly to build the reservoir high up in the water shed, allow the flows to be released down existing natural waterways and then pump the water back up to irrigate the areas above the existing canals. This would also increase summer flows along the natural waterway that is being used to deliver water to the location of the pumps.

Some alternatives were evaluated to assess the feasibility of supplementing irrigation water on lands that are currently being irrigated. There are many areas in the valley that are being irrigated that do not have enough irrigation water in the late summer due to a lack of irrigation water storage. For example there are approximately 50,000 acres of land that are irrigated off of the Logan River and the Bear River. Many of the irrigators have expressed that they would like to have another half foot to a foot of water each year to improve their crop production.

The costs to develop reservoirs that utilize existing delivery systems will be much less than the costs to develop reservoirs that require construction of new water delivery systems.

Prior to constructing a reservoir, a great deal of evaluation needs to be done to analyze the different impacts and benefits that will come with the new reservoir.

5.9.3 Water Conservation Program

Start a campaign to reduce water use in the County by 25% by 2025. Efforts may include holding large water user workshops to promote conservation. Benefits of a water conservation program are:

- Saves 8,400 acre feet of water per year by 2025 and 21,000 acre feet by 2060
- Conserves energy

5.9.4 Bank Water Rights

A water bank is an institution or part of an institution with a goal to move water to where it is needed most within a given region. For example, in Cache County, agricultural land is being developed. Once a piece of agricultural property is developed, less water is needed to meet the demands of that land. The unused water runs down the rivers and out of the County. The rights to the water could be banked for another water user in the region to buy or lease. Water banking provides the following benefits:

- Protects Bear River allocation rights
- Keeps existing water rights for use in Cache County
- Maintains future supply of water rights for Cache County residents
- Makes the water market more transparent and open to citizens use (allows the public to know what water is worth, makes more water available to the general public)

Some ideas of how a water bank would function in Cache County were prepared by Neil Allen (USU Extention) and are included near the end of Appendix 2-C-iii.

5.9.5 Environmental Water Demands Study

A lot of work needs to be done in the County to gain an understanding of the environmental water needs. Some questions that need to be answered are:

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

The environmental water demands study will locate and prioritize wildlife habitat areas and their water demands. Benefits of the study are:

- Help preserve and prioritize critical areas
- Help maintain or improve wildlife habitat

A description of a potential scope of work to complete an environmental water demands study is given in Appendix 3-D.

5.9.6 Construct Secondary Water Systems

Secondary water systems extend the supply of drinking water to support future growth and reduce the overall water costs. Costs are reduced by using untreated water for outdoor watering and preserving higher quality water for domestic use.

In the future, work should be done to install pressure irrigation pipes from existing canals to homes that are using drinking water for the watering of yards. Also, promote secondary water systems for areas that are developed in the future. Perhaps the greatest benefit is to allow for existing drinking water systems to serve more future growth

5.9.7 Canal Rehabilitation Program

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. A canal rehabilitation program should be started to dedicate some resources each year to line, pipe, or restore prioritized segments of existing canals. This program is good because it:

- Benefits many water entities
- Creates more efficient delivery of water to irrigators

5.10 Analysis of Water Management Organizations

The recommended projects identified are regional (effect multiple water entities) and require a regional form of management that can provide the financial means, resources and coordination between existing water entities to be completed. A regional organization is needed to make equitable and efficient use of water. The Bear River allocation is a large regional resource that needs to be managed on a regional level. Watershed boundaries, not just political boundaries, need to be considered when establishing water management boundaries.

5.11 Management Alternatives

Four regional management alternatives have been evaluated:

- County Water Manager with more resources to complete needed projects
- Special Service District
- Water Conservancy District
- Current System–Water Manager

Two of the alternatives are forms of districts, special service or water conservancy. Information about these two types of districts is given in Utah Code Annotated Section 17B and 17D. A summary of the differences between the two types of districts is given in a table in Appendix 5-D. There are four types of local districts included in the table with one of those being a conservancy district. Conservancy districts were the only type of local districts included in the final evaluation of management alternatives because the other types do not fit as well to manage both irrigation and drinking water. The table can be used as a guide to locate sections of the state code that cover specific topics related to districts. The table is not comprehensive and should be used accordingly.

5.12 Management Objectives

The objectives used to evaluate the management alternatives are based on input from the Steering committee and are divided into the following four categories:

- Water Supply
- Governance
- Implementation
- Environment

Table 5.2 shows the objectives used in the analysis and the corresponding metrics that were used to measure how well the objectives are met by a given alternative. Some objectives have more than one metric.

Table 5.3: Objectives and Metrics for Evaluation of Management Structures

Objective Type	Objective	Metric (method of measurement)
Water Supply	Protect Bear River Allocation	Water put to beneficial use or in an approved none use status (acre feet)
Governance	Represent Cache County on water legislation issues	Influence with state water coalition and executive task force (scale)
	Represent all County water users	Entities represented on water board for regional water decisions (number)
	Operate and maintain water systems on a local level	Culinary water systems that make own source, storage, distribution and other local system improvements (number)
	Minimize management costs	*Cost to manage each year ($)
	Fund needed regional water studies and projects	Funding available each year for studies/ projects ($/year)
	Ease of creation	Election required (yes/no)
	Focus on water issues	Board members that are focused on water issues (number)
Implementation	Complete water management projects	Study and develop ASR sites (yes/no)
		Evaluate environmental water demands (yes/no)
		Study and develop above ground storage sites (yes/no)
		Implement water conservation program to achieve 25% water conservation (yes/no)
		Water banking (yes/no)
		Implement canal rehabilitation program (yes/no)
		Secondary water studies and installation (yes/no)
	Promote collaboration	Facilitates cooperation between municipalities and irrigation companies (complete contracts for projects) (yes/no)
		Steering committee members that support organization (percent)
Environment	Maintain or improve environmental quality	Water developed to improve wildlife habitat and fish flows (acre-feet)

5.13 Key Objectives

The objectives used to evaluate the management alternatives were not weighed. However, during the stakeholder input process it became evident that there are a few key objectives in the evaluation of a water management organization that are important to a large group of the stakeholders. These are to represent Cache County on water legislation issues and complete the recommended regional projects

5.13.1 Represent Cache County on Water Legislation 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 Executive Water Task Force
- The Water Development Commission
- The Utah Water Coalition

The **Executive Water Task Force** makes recommendations on:

- Ground water management
- Water right enforcement
- Administration of ground and surface water
- Stream flows and water conservation

The **Water Development Commission** was created to determine the state's role in the protection, conservation, and development of the state's water resources. This Commission makes recommendations to the legislature and governor on:

- How the water needs of the state's growing municipal and industrial sectors will be met
- Impacts of federal regulations and legislation on the ability of the state to manage and develop its water rights
- How the state will fund water projects
- Whether the state should become an owner and operator of water projects
- How the state will encourage the implementation of water conservation programs

The **Utah Water Coalition** is made up of numerous groups involved in the water community but is influenced and sponsored in large part by water conservancy districts throughout the state. The coalition meets frequently and providence input to state legislatures on proposed legislation dealing with water issues in the state.

Water conservancy districts have significant and meaningful influence in water legislation and policy making and are often sought out by both lawmakers and state officials to provide input. One example of water legislation is the Bear River Development Act (BRDA). Cache County needs a plan to have a stronger voice on water legislation issues such as the BRDA.

5.13.2 Complete the Needed Regional Projects

A management structure needs to be in place that has the resources and leadership necessary to collaborate with water entities and complete needed regional projects.

5.14 Explanation of Evaluation of Management Alternatives Table

Table 5.4, Evaluation of Management Alternatives, was created to evaluate the four alternatives. The evaluation is based on the desired objectives including the ability to complete needed regional projects. The table is organized the same way as the table used for the Evaluation of Project Alternatives. A description of each of the areas given in the table is found in Section 5.6 of this report. The evaluation table is also included in Appendix 5-E.

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Table 5.4: Evaluation of Management Alternatives

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5.15 Management Costs

The current budget for the County water department is $185,000. Based on the operating costs of similar existing water districts, the annual water budget to operate a district could be around $350,000 depending on many organizational factors. Many of the cost factors to manage a district are uncertain at this time. The costs could be greater if part time water attorneys and engineering consultants are utilized in a given year. The management costs of the county manager system compared to a district management system are probably closer than they appear. This is because the annual estimated budget for a water district includes some items that may not be accounted for in the $185,000 County water budget such as:

- Annual accounting
- Bank service charges
- Office space
- Printing and reproduction costs
- Insurance
- Employee retirement benefits
- Utility bills
- Travel costs (vehicle fuel and maintenance)

With the above listed items factored in, the costs to manage a district are much closer to the costs of a county water manager system. The main cost differences of having a district may come in the form of paying for board members. Section 17B-1-307 of the Utah Code states that board members can be paid up to $5,000 per year if they are not currently being paid to serve on another municipal or county legislative body.

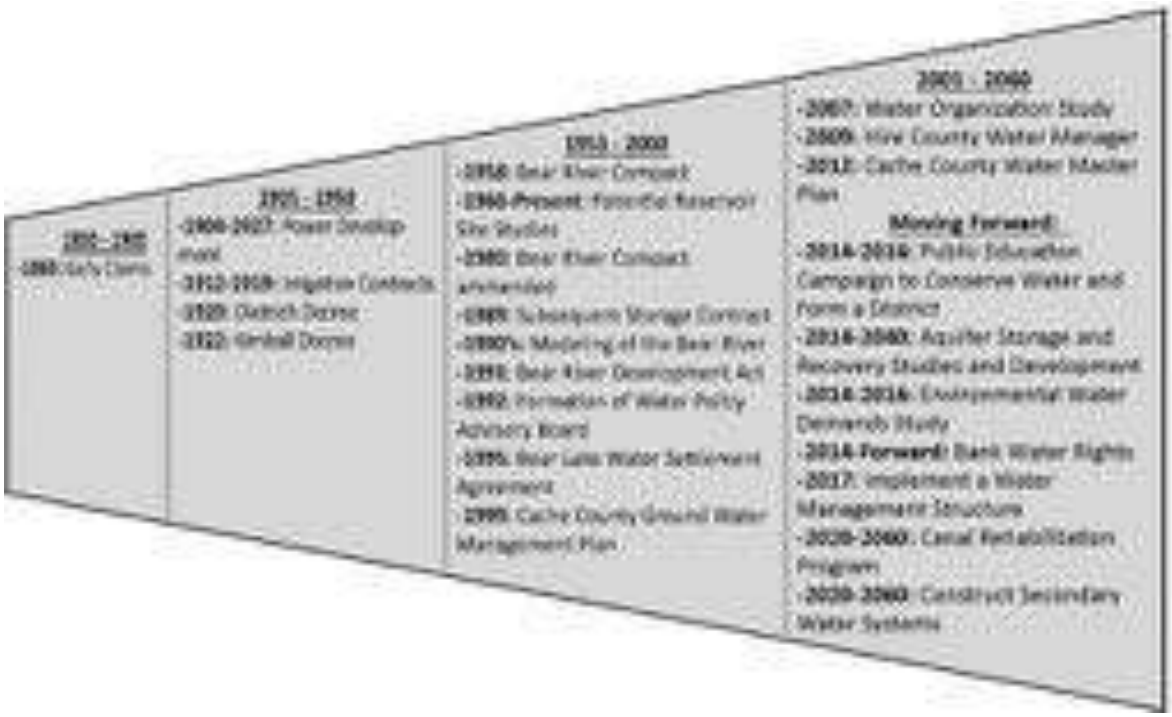
5.15.1 Recommended Form of Management

A conservancy district is the recommended form of management because it is the best organization to meet the objectives identified in Table 5.3. More specifically, a conservancy district:

- Protects the Bear River water allocation through planning and development
- Provides a stronger voice for Cache County on water legislation issues
- Promotes water conservation
- Provides representation for both irrigators and drinking water users
- Allows for banking of water rights
- Facilitates cooperation between communities and irrigation companies to complete regional projects
- Provides a governing board that is 100% focused on water issues
- Allows individual communities and irrigation companies to manage their own water systems
- Provides structure needed to make water purchase contracts and agreements that are needed
- Provides a funding source to plan for and help complete needed regional water projects

A district represents an increase in resources and a greater voice on state water issues. An increase in resources is needed to match the increase in future water needs in Cache County. Figure 5.1 shows how water activity has increased in the County in the past, and how it will continue to increase moving forward.

Figure 5.1: Future Water Demands



In the past a District has not been needed in Cache County, however the water needs have changed. The County is growing, water supplies are limited, water conservation needs to be improved and more water needs to be developed. Additionally, Cache County residents need to be more united on water issues and in utilizing the water resources in order to protect and retain those water resources for continued use in the future. In 2008 a water manager was hired to help manage the increasing water needs. The addition of a County Water Manager was a great start and has helped greatly to meet the increased needs to this point. The County now needs to increase the level of management again to efficiently manage current water resources and to develop additional future water resources. The county manager does not have the authority to write contracts that are required to protect the water resources.

As a separate entity from the County and municipalities, a conservancy district may assess a property tax to meet the increased water needs. The maximum tax allowed by a conservancy district is 0.02%. This tax rate would generate $1,100,000 in annual revenue. Based upon this tax amount:

- The tax on a residence of average value ($104,000) would be a $20.80 per year
- Operational costs of a small district without infrastructure (Based on Bear River Conservancy District 2012 Budget) could be approximately $350,000 to 450,000 annually.
- Remaining budget for studies and projects could be up to $650,000 annually.

5.16 Conservancy District Changes

The County has tried to implement a conservancy district twice previously. Both instances were unsuccessful for various reasons. This prompts the question, what makes it possible to create a conservancy district now? Below are several items that create a more favorable situation for implementation of a district now than in the past.

- **Water conservancy board members can now be elected.** State code was changed in 2010 to allow conservancy district board members to be elected or appointed. Previously, for conservancy districts, board members were appointed. (Utah Code 17B-2a-1005)
- **Conservancy districts are more focused on water conservation.** In 2000, the governor set a goal to reduce the per capita water use 25% by 2050. Since then, many of the conservancy districts have done well at this through commitment of resources to educate the public about water conservation. State-wide, Utah has we have conserved 18%, but only 6% has been conserved in Cache County. Cache County citizens should be more engaged in conservation, especially to be considered for funding of regional projects by UDWRe.
- **County population has changed by more than 30%**. The population for the County given in the 2000 census was 91,391. The 2010 census population for the County was 112,656 with a projected population for 2013 of 120,046. This increase in population results in an increase in demand and reduction in excess supply.
- **Groundwater Management Plan enacted in September 1999**. This Plan limits the amount of water that can be withdrawn from County aquifers. Existing rights (typically agricultural water rights) have to be used as replacement water. A conservancy district will allow for more efficient conversion of water from agricultural to municipal use with the ability to bank water rights. A conservancy district is needed to have the resources and focus to develop the Bear River allocation. The developed allocation will help preserve agricultural land by giving an alternative source for water rights for areas that currently have no water rights (bench areas) as these areas are developed.
- **Bear River development plans for the Wasatch Front have progressed.** Property has been purchased for a pipeline corridor from Box Elder County to Salt Lake County. Reservoir sites in Box Elder County and Cache County are being evaluated for construction by conservancy districts along the Wasatch Front. Reservoir and pipeline projects will not be completed until around 2035 because it takes that long to plan a project of that magnitude.

With the need to protect our existing water resources and provide water for future growth a conservancy district is needed now to generate the funds sufficient to implement the objectives outlined in this plan.

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6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Careful evaluation of Cache County's existing water resources and increasing demands from population growth provide a clear picture of the County's water needs. This clarity provides the foundation to create a solid and sustainable plan for the future that includes a system to manage water resources in the County.

The master plan conclusions are:

6.1.1 General Conclusions

- Citizens of Cache County find water use for agricultural, municipal land environmental purposes important
- Environmental water demands are not known at this time
- Without water conservation efforts, Cache County water demand will exceed supply by 2040
- With water conservation, water supply may be extended 20 years
- Conservation is a cost effective way to extend water resources
- Even with conservation efforts, the Bear River Water Allocation will need to be developed in the future to meet demands
- Long term water supply will only be met by working on regional projects with water purveyors to meet future demands
- Efforts promoting water conservation and ASR should be taken immediately
- Continued education regarding water issues in Cache County are essential to move forward
- A water conservancy district has the best ability to oversee water issues in Cache County
- More resources and effort need to be put toward water development and management in order to secure adequate water supplies in the future
- Regional projects to utilize the Bear River Allocation will take multiple years to develop and fund

6.1.2 Municipal and Industrial (M&I)

- A few communities in Cache Valley are experiencing water supply shortages for municipal purposes now
- By 2030, more than one-third of the municipal water systems will have annual water shortages and more than half will be approaching potential peak day shortages
- Water efficiency projects including canal lining and secondary water systems will further the use of culinary water for municipal purposes
- Individual water systems want to manage their own water systems

6.1.3 Agricultural

- Shortages of irrigation water occur constantly in the late summer
- Water rights are not being fully retained for use in Cache County as agricultural lands are being developed

6.1.4 Environmental

Environmental water demands are not yet quantified and, as a water master plan objective, should be to meet the need.

6.2 Recommendations

In order for the vision of the plan and steering committee to take effect, actions based upon the plan conclusions must be taken. The recommended actions for the County to pursue over the next 50 years are listed below in the 50 year plan. A more specific immediate five year action plan follows and provides the higher priority actions that should be focused on over the next five years. General recommendations and philosophies are also listed to guide the County as water actions are planned and implemented in the future.

6.2.1 50 Year Plan

Following is a list of actions to complete in the next 50 years. Each action item includes a summary description, timeline, approximate cost and potential funding sources to aid with implementation. Some actions will achieve immediate results and benefits while others will take a significant amount of time to implement.

6.2.1.1 Public Education Campaign

Complete a public education campaign to inform the public of the master plan results, benefits of water conservation, determine water conservation programs to implement and the benefits of a water conservancy district in Cache County.

- **Timeline:** 2014 through 2016
- **Approximate Cost:** $300,000
- **Funding:** None at this time

6.2.1.2 Aquifer Storage and Recovery (ASR) (Assume 10,000 acre feet)

Focus on development of ASR sites where feasible. Locations that have had preliminary studies competed are located; in Millville along the foothills; in the Logan Island area (River Park Well); near the mouth of Green Canyon; near the mouth of Providence Canyon.

- **Timeline:** 2014 through 2040
- **Approximate Capital Cost:** $4,000,000 (assuming use of existing wells or infiltration, If additional wells are needed costs could be more)
- **Evaluation, environmental and contracting:** $400,000 (assumed 10% of total cost)
- **Funding:** 50% Grant – WaterSMART Program

6.2.1.3 Environmental Water Demands Study

Locate and prioritize wildlife habitat areas and their water demands.

- **Timeline:** 2014 through 2016
- **Approximate Capital Cost:** $200,000 to $250,000
- **Funding:** None at this time

6.2.1.4 Bank Water Rights

Bank water rights made available during conversion from agricultural to municipal or through Bear River Development.

- **Timeline:** 2014 forward
- **Approximate Cost:** $50,000 to $75,000 per year
- **Funding:** The initial startup of the bank could be covered in the WaterSMART Grant Program but the yearly cost will have to come from the bank or other outside sources.

6.2.1.5 Form a Water Conservancy District

Form a conservancy district that meets the needs of Cache County based on public input received during the information campaign.

- **Timeline:** 2016
- **Approximate Cost:** $30,000
- **Funding:** None. Expenses paid back through district revenue after district formation

6.2.1.6 Implement a Long Term Water Conservation Program

Implementation of the long-term water conservation strategies identified and selected through the public education campaign and other efforts.

- **Timeline:** 2017 Forward
- **Approximate Cost:** $120,000 per year
- **Funding:** 50% Grant for program development - Water Conservation Field Service Program

6.2.1.7 Reservoir Development (Assume 50,000 acre feet)

Plan timing of reservoir development and approach, identify reservoir sites, complete environmental studies, compete needed water contracts for development.

- **Timeline:** 2014 through 2060
- **Approximate Capital Cost:** $230,000,000
- **Evaluation, environmental and contracting:** $23,000,000 over 50 to 60 years (assumed 10% of total cost)
- **Funding:** Entities contracting for agricultural water pay 25% of construction and environmental mitigation costs, State of Utah will pay for 75% of costs.

6.2.1.8 Canal Rehabilitation Program

Develop a program to for canal companies to apply for and receive funding to rehabilitate existing canals for more efficient water usage. Pressure irrigation delivery systems may be included in this program.

- **Timeline:** 2020 forward
- **Approximate Cost:** $2,500,000 to $3,000,000 per year
- **Funding:** WaterSMART Grant Program and participant cost share.

This program could be implemented before 2020 if sufficient funds are available to complete the higher-priority projects.

6.2.2 Immediate Five Year Action Plan

Over the next five years, focus on completing actions as described in this five year action plan. The five year plan concentrates on the following five key objectives that should be addressed in order of priority as listed:

1- Water Conservation
2- District Formation
3- Aquifer Storage and Recovery (ASR) (Bear River Development)
4- Environmental Demand Studies/Storage (Bear River Development)
5- Water Rights Banking

Figure 6.1 provides an overview of the specific actions that should be taken in each of the next five years to meet the objectives. The highest priority objectives are shown at the base of the bars in the chart. The chart gives an indication of the anticipated costs to complete the actions listed for each objective in each year.

Appendix 6-A-i tabulates the 5-year plan with more specifics about what actions should be completed for each objective each year, the expected results of those actions and the estimated costs.

Figure 6.1: 5-Year Action Plan

As mentioned, the objectives and actions at the bottom of the chart in Figure 6.1 have the highest priorities. The two objectives with the highest priority are to improve water conservation and to form a district. These two objectives can be met through a joint public education and consensus building campaign over the next three years. This campaign is recommended to:

- Begin water conservation efforts now in order to enhance awareness amongst the community and further secure the potential for state funding on future water projects
- Educate public with regard to the water needs of Cache Valley and the need for an organization (conservancy district) to represent those needs and protect water allocated for use in Cache Valley
- Create a water conservancy district

The following strategies should be implemented in the three-year public education campaign:

- Use the momentum and organization from the Water Master Plan to meet the goals. This includes continued input from the CCWMP Steering Committee
- Share the knowledge of the Master Plan Team and Steering Committee gained from the master planning process with leaders in each community to create consensus and buy-in
- Invite community leaders to educate their constituents with regard to the goals and promote efforts to attain those goals

- Reinforce efforts by community leaders to reach the goals through County support of educational information and countywide programs to reach the goals
- Promote conservation and education/organizational goals together to reduce time spent and expenses
- A detailed list of tasks for the three year public education campaign is given in Appendix 6-A-ii

6.2.3 General Recommendations and Philosophies

- Participate in state water planning meetings such as the Executive Water Task Force and Bear River Development planning meetings – ongoing
- Review opportunities for partnering with other conservancy districts on water storage projects –ongoing
- Allow existing water systems to continue to function within their service area with a conservancy district to provide regional support and resources for operational needs, interconnection projects and future water development
- Inform the public of the master plan and the results of the plan through wide distribution of the Informational Pamphlet (Copy located in report binder pocket)
- Review the action plan items of this report regularly to make sure the objectives of the plan are being met moving forward

7 BIBLIOGRAPHY

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Utah Division of Water Resources. (2004). *Bear River Basin Planning for the Future.*

Utah Division of Water Resources. (2009). *Bear River Basin 2009 Inventory.*

Utah State University. (2013, May). Identifying Environmental Water Demands for Cache County.

Appendix 2-A

List of Participants

A comprehensive list of stakeholders that participated in the public process through interviews or attendance at planning meetings.

CACHE COUNTY
WATER MASTER PLAN

Individuals Interviewed or that Participated in the Master Plan Stakeholder Process

Individual	Representing
Alan Luce	North Logan City
Ann Armstrong	USU PHD Student
Art Moss	Logan Hollow Canal
Bill Baker	River Heights City
Bill Bower	Citizen
Bill Cox	Rich County Commissioner
Bill Young	Logan City
Bob Barrett	Fish and Wildlife
Bob Fotheringham	Cache County
Bob Oakes	Retired USU Professor
Boyd Humpherys	Providence Pioneer Irrigation Company
Brent Jensen	Hyrum City
Bret Christensen	Richmond Irrigation Company
Brian Carver	BRAG
Bruce Bishop	USU
Bruce Karren	North Cache Soil & Conservation District
Bryan Dixon	Environment
Clair Allen	Web Irrigation Company
Clark Israelson	USU
Claudia Conder	PacifiCorp
Colleen Gnehm	Logan River Commissioner / Logan North Field
Connely Baldwin	Pacificorp
Cory Yeates	Cache County
Craig Buttars	Cache County
Craig Petersen	Cache County
Darek Kimball	Richmond
Darin Evans	Summit Creek Commissioner
Dave Evans	Summit Creek Irrigation Canal
David Beazer	Millville Irrigation
David Rosenberg	USU
David Stevens	USU
David Zook	Nibley City
Don Hartle	Wellsville City
Donna Spillett	Logan Island Irrigation Co.
Doug Clausen	River Heights City
Douglas Jackson-Smith	USU Sociology
Ed Cottle	West Cache Irrigation Co.
Eric Millis	Division of Water Resources
Evan L. Olsen	Water Policy Advisory Board
Gary Larsen	Millville City

Glen Stringham	Blacksmith Fork River Water User
Gordon Younker	Utah Association of Conservation Districts
Gordon Zilles	Cache County
Grant Koford	Amalga Town
Greg Hansen	Little Bear River Commissioner
Jack Draxler	State Legislator
Jeff Gittins	Smithfield Irrigation Co.
Jeff Hall	Lewiston City
Jim Gass	Smithfield City
Jim Watterson	Bear River Commissioner
Jim Williamsen	Spring Creek Water Company
Joan Degiorgio	Nature Conservancy
Joanna Endter-Wada	USU
Joe Fuhriman	Nibley Irrigation
Jon Hardman	Mendon City
Jon White	Cache County / Blacksmith Fork Soil & Conservation District
Josh Runhaar	Cache County
Kathy Robison	Cache County
Keith Shaw	Logan Island Irrigation Canal
Kerry Schwartz	Bureau of Reclamation
Leah Meeks	USU Civil Engineering
Lee Atwood	Paradise Town
Lee Cammack	J-U-B Engineers
LeGrand Bitter	Utah Association of Special Districts
Lyle Hillyard	State Legislator
Lynn Lemon	Cache County
Marisa Egbert	Division of Water Resources
Mark Anderson	Attorney for UASD
Marla Trowbridge	Trenton Town
Marlowe Adkins	Richmond City
Max Pierce	Cornish Town
Mike Grunig	Hyde Park City
Nancy Mesner	USU
Nick Galloway	Benson Water Culinary District
Niel Allen	USU Extension
Paul Inkenbrandt	Utah Geological Survey
Paul James	Hyrum City
Peter E. Kung	Logan River Water Association
Randy Eck	Providence City
Ray Bankhead	Wellsville-Mendon Conservancy District
Richard Bay	Jordan Valley Water Conservancy District
Rick Reese	Benson Irrigation Co.
Roland Jeppson	Spring Creek Water Company

Ron Salvesen	Hyrum City
Sarah Null	USU
Scott Leishman	Wellsville East Field Irrigation Canal
Scott Tripp	Skyline Irrigation Canal
Sharon Vaughn	USFWS Bear River MBR
Steve Allen	Goaslind Spring Water Works Company
Steve Thatcher	Spring Creek Cache Irrigation Co.
Tage Flint	Weber Basin Water Conservancy District
Thad Erickson	Cache County Water Policy Advisory Board
Todd Adams	Division of Water Resources
Tony Jensen	Southwest Irrigation
Val Potter	Cache County
Voneen Jorgensen	Bear River Water Conservancy District
Will Atkin	Division of Water Rights
Zac Covington	BRAG

Appendix 2-B

Stakeholder Interviews

i: Stakeholders Interviewed

A complete list of interviews conducted.

ii: Irrigation Stakeholder Meeting

A complete list of irrigators that were invited and a list of those that attended the meeting.

iii: Summary of Stakeholder Interviews

A summary of key points gathered during the stakeholder interviews.

CACHE COUNTY
WATER MASTER PLAN

Cache County Water KPI Meetings - April 30, 2012 – June 28, 2012

Drinking Water Systems

- **Amalga Town**
- **Benson Water Culinary District**
- **Cornish Town**
- **Goaslind Spring Water Works Company**
- **High Creek Culinary Water System**
- **Hyde Park City**
- **Hyrum City**
- **Lewiston City**
- **Logan City**
- **Mendon City**
- **Millville City**
- **Newton Town**
- **Nibley City**
- **North Logan City**
- **Paradise Town**
- **Providence City**
- **Richmond City**
- **River Heights City**
- **Smithfield City**
- **South Cove Water Supply**
- **Trenton Town**
- **Wellsville City**
- **Division of Water Rights**

Water Commissioners

- **Bear River**
- **Summit Creek**
- **Logan River**
- **Blacksmith Fork River**
- **Little Bear River**

Others

- **Pacific Corp**
- **Utah Association of Special Districts**
- **Bear River Water Conservancy District**
- **Weber Basin Water**
- **JVWCD**
- **Senator Hillyard**
- **Cache County**
- **Rich County**

List of People Invited to Irrigators Meeting

Casey Jensen
Mountain Home Irr. Co.
781 E 12100 N
Cove, UT 84320

Jason Westover
Cub River Irrigation Co.
201 N 2400 W
Lewiston , UT 84320

Ed Cottle
West Cache Irr. Co.
1207 South 400 East
Trenton, UT 84338

Darin Evans
Summit Creek Commissioner
236 S. 200 W.
Hyde Park, UT 84318

David Erickson
Smithfield North Bench Ditch Co.
360 W 7800 N
Smithfield, UT 84335

Jon Meikle
Logan & Northern Irr. Co.
4650 North 1000 East
Hyde Park , UT 84318

Vaughan Richardson
Chambers Spring Irrigation Co.
106 W. 400 S.
Smithfield, UT 84335

Peter Küng
Logan NorthWest Field Irr. Co.
346 N 400 W
Logan, UT 84321

Jim Waterson
Benson Bear Lake Irrigation Co.
4705 W 3800 N
Benson, UT 84335

Jane Davis
Providence Logan Irr. Co.
545 River Heights Blvd
River Heights, UT 84321

Chris Allen
Coveville Irrigation Co.
12616 N 1200 E
Cove, UT 84320

Brett Christensen
Richmond Irrigation Co.
P.O. Box 156
Richmond, UT 84333

Lynn Buttars
Clarkston Irrigation Co.
127 N Main
Clarkston, UT 84305

Joseph Larsen
Newton Water Users Association
Box 94
Newton, UT 84327

Jeff Gittins
Smithfield Irr. Co.
152 W 200 S
Smithfield, UT 84335

Wendell Munk
Bench Irrigation Co.
5228 N 2400 W
Benson, UT 84335

Steve Seamons
Hyde Park Irrigation Co.
260 North 200 East
Hyde Park, UT 84318

Wayne Cardon
Logan Cow Pasture Water Co.
3046 N 4000 W
Benson, UT 84335

Art Moss
Logan Hollow Irrigation Co.
1238 Island Drive
Logan, UT 84321

Ron Zollinger
Spring Creek Water Co.
1000 River Heights Blvd
River Heights, UT 84321

Clair Allen
Webster Irr. Co.
1149 E 12700 N
Cove, UT 84320

Wyndon Ward
Skyline Irr. Co.
565 S 250 E
Richmond, UT 84333

Dan Cooper
Clarkston Town
50 S Main Street
Clarkston, UT 84305

Gilbert Duncan
Smithfield West Bench Irr. Co.
69 N 200 W
Smithfield, UT 84335

Jim Huppi
Logan, Hyde Park, Smithfield
Irrigation Co.
85 Quail Way
Logan , UT 84321

Thomas V Reese
King Irrigation Co.
809 E 400 S
Smithfield, UT 84335

Colleen Gnehm
Logan North Field Irrigation Co.
195 West 1800 North
Logan, UT 84341

Rick Reese
Benson Irrigation Co.
4043 N 2499 W
Benson, UT 84335

Donna Spillett
Logan Island Irrigation Co.
138 W 300 S
Logan, UT 84321

David Olsen
Providence Blacksmith Fork
Irrigation Co.
298 E 2100 S
Providence, UT 84332

Boyd Humpherys
Providence Pioneer Irrigation Co
328 Riverdale Ave
Logan, UT 84321

Steve Thatcher
Spring Creek Cache Irrigation Co.
2727 W 1800 S
Young Ward, UT 84321

Legran Mathews
Millville Irrigation Co.
153 S 200 E
Logan, UT 84321

Scott Leishman
Wellsville East Field Irrigation
& Canal Co.
2808 W 5000 South
Wellsville, UT 84339

Justin J Anderson
Mendon Central Irrigation Co.
166 S 100 E
Mendon, UT 84325

W Wayne Bankhead
Wellsville North Field Irr. Co.
780 S Center
Wellsville, UT 84339

Jeff Clawson
Porcupine Highline Canal Co.
900 E. 6600 S.
Hyrum, UT 84319

Howard Furiman
Clear Creek Ditch Co.
2400 S. HWY 165
Logan, UT 84321

Greg Hansen
Little Bear River Commissioner
538 N. Main Street
Brigham City, UT 84302

Tony Jenson
Logan Southwest Field Irr. Co.
1090 West 1000 South
Logan, UT 84321

Edwin Nelson
College Irrigatin Co.
2352 S Hwy 89-91
Logan, UT 84321

Bob Miller
Millville Canyon Irrigation
P.O. Box 6
Millville, UT 84326

Kay Murray
Mendon South Canal Co.
185 S 100 W
Wellsville, UT 84339

Quinn Murray
Wellsville-Mendon Conservancy
Dist. (canal)
691 S 200 W
Wellsville, UT 84339

Kent Larsen
Hyrum Blacksmith Fork Irr. Co.
462 N Center
Wellsville, UT 84339

Jon Lee
Paradise Irrigation & Reservoir Co.
PO box 156
Paradise, UT 84328

Keith Meikle
Logan, Hyde Park, Smithfield Canal
4614 N. 1000 E.
Smithfield, UT 84335

Glenn Stringham
Blacksmith Fork River
50 S. 100 E.
Millville, UT 84326

Kent Souter
Logan River & Blacksmith Fork
Irrigation Co.
997 S 3200 W
Logan, UT 84321

Roy J Ropelato
Garr Spring Water Co.
304 E 300 S
Millville , UT 84326

Paul Leishman
Nibley Blacksmith Fork Irr. Co.
136 N 100 E
Wellsville, UT 84339

Bill Fletcher
Mendon North Irrigation Ditch
560 N 100 W
Mendon, UT 84325

John Kerr
Wellsville City Irr. Co.
42 N. 100 E
Wellsville UT, 84339

Derle Nielsen
Hyrum Irrigation Co.
155 S. 100 E
Hyrum, UT 84319

Roy Bankhead
Wellsville-Mendon Conservancy
Dist. (canal)
190 East 800 South
Wellsville, UT 84339

Irrigators Meeting June 4, 2012
Attendance

Scott Leishman	Wellsville East Field Irrigation Canal
Ray Bankhead	Wellsville Mendon Conservation District
Art Moss	Logan Hollow Canal
Gordon Younker	Utah Association of Conservation Districts
Boyd Humpherys	Providence Pioneer Irrigation Company
Peter E. Kung	Logan River Water Association
Colleen Gnehm	Logan North Field
Keith Shaw	Logan Island Irrigation Canal
Scott Tripp	Skyline Irrigation Canal
Dave Evans	Summit Creek Irrigation Canal
Rallin Anderson	Logan River Blacksmith Fork Irrigation Company
Bret Christensen	Richmond Irrigation Company
Rick Reese	Benson Irrigation Company
Joe Fuhriman	Nibley Irrigation
Tony Jensen	Southwest Irrigation

Key Themes from Situational Assessment

A. Key Themes
    a. Current Conditions in Cache County
        i. Storage of spring runoff
        ii. There are conflicting views and history of conflicts between some cities about the management of water and tied to specific issues of wastewater treatment, fire protection, redundancy of culinary and secondary systems, etc.
        iii. Cache County does cloud seeding that gives 10-15% more snow pack.
        iv. Working relationships between organizations and individuals have improved in general over the past 10 years. This though is still a major challenge.
    b. Canal Companies
        i. Canal companies struggle to maintain canals, have access to canals, etc.
        ii. Delivery systems are not accurate.
        iii. Problems with storm water management and relationships with cities. History of conflict that ongoing rule changes will likely only exacerbate.
        iv. Agriculture holds the power of water rights today. Drilling new wells is very challenging. As agriculture turns to urban use, how will the water turn from agriculture to urban.
        v. Question about who maintains canals in the cities.
    c. Water Availability
        i. Varying opinions about the need for future water. Those that have plenty today have not thought through potential changes or laws that may come and the potential impacts (i.e. no longer being able to sprinkle with culinary, TMDL's, ESA, etc.).
        ii. Categories
            1. Flood Irrigation. Concerns that piping or changing flood irrigation practice will impact local springs or aquifer.
            2. Pressurized Secondary Water. Piped water has impacts to local springs and aquifer as delivery moves away from non-lined canals and flood irrigation. People know that this is likely their future for irrigation at homes and for agriculture. This though is not part of their master plans.
            3. Culinary. Expensive treated water being used in many cities to irrigate. Water will have to be treated in the future.
            4. Reuse. Central Utah Water Project has a requirement from the federal government to use reclaimed wastewater.
            5. Storm Water. Many identify this as the single biggest water issues between canal companies and municipalities.
        iii. Water development should be paid for by new users and new growth.
        iv. Threats
            1. TMDL's
            2. ESA, Invasive Species

3. Lack of funding for development of water projects

v. Major role of PacifiCorp is management of Bear River water. They are the primary management of this water for irrigation, flood control, etc.

d. Future Organization

i. Conservancy District

1. General lack of understanding about what a District is and how it functions.
2. The county has too many responsibilities and can't effectively focus on water to the extent needed.
3. If cities are going to be part of a District, they don't want to have to pay for a service that they don't see a benefit from.
4. The number one strategy of Districts on the Wasatch Front to maintain water availability is conservation. This is accompanied by aggressive education and outreach about water management.
5. Majority of those interviewed support the creation of a District.
6. Laws to create have been improved (i.e. taxation without representation is no longer an issue).
7. Merging with Box Elder is a definite possibility.
8. Possible to create Box Elder, Cache, and Rich County Conservancy District.
9. Opposition to creation of a District: Those that already have a lot of water (small cities on east side of county).
10. All Districts are moving from taxation to revenue generation from wholesale water distribution.
11. Most work is done in culinary water and pressurized secondary water.
12. Provides a stronger relationship with the state legislature.
13. WBWCD and JVWCD already are buying property and ROW to build their treatment facility and distribution system. Starts in West Haven, Utah.
14. Cities that currently generate revenue with water want to continue to be able to do so.
15. The various water systems in each community need to commonly be connected together within each city and amongst the various communities.
16. Must have representation from all communities

e. Bear River

i. Who will pay? Cost is likely one of the biggest issues.

ii. Bear River Development is happening right now. Demands for the availability of this water vary from 10 to 20 years from today.

iii. Must be managed in conjunction with Idaho and Wyoming as well as PacifiCorp.

iv. West side of Cache County will likely benefit the most from Bear River development.

v. May be some challenges with communities on the east side of the county perceiving having to pay for water development that benefits the people on the west side of the valley.

vi. Must have a Conservancy District before Bear River water is developed. JVWCD and WBWCD both were formed to provide the formal organization to pay back the loan for the development of water that is supplied to both Conservancy Districts.

f. Education
    i. Culture Shift. Water users moving from agriculture to urban. Challenges with this interface. Farmers want to preserve right to farm yet they may want to sell to development if next generation doesn't want to farm, etc.
    ii. The majority of the public is uninformed about water.
    iii. People do not show up to support and provide manpower to manager irrigation water.
    iv. Rights
        1. Keep water rights with property
        2. Developers try to break up water shares
        3. Need for a public education campaign about water rights and shares.

B. List of Priorities
C. Stakeholders and Organizations
    a. Cities:
        i. Logan
        ii. North Logan
        iii. Hyde Park
        iv. Smithfield
        v. Richmond
        vi. Lewiston
        vii. Clarkston
        viii. Nibly
        ix. Hirum
        x. Paradise
        xi. Wellsville
        xii. Mendon
        xiii. Newton
        xiv. Trenton
        xv. Amalga
        xvi. Providence
        xvii. River Heights
        xviii. Millville
        xix.
    b. Counties: Cache, Rich and Box Elder
    c. Water Districts:
        i. Goslind Spring
    d. Conservancy Districts:
        i. Bear River Water Conservancy District

        ii. Jordan Valley Water Conservancy District
        iii. Weber Basin Water Conservancy District
    e. Division of Water Rights
    f. Water Commissions
        i. Blacks Smiths Fork
        ii. Logan River
        iii. Bear River
        iv. Little Bear River
        v. Summit Creek
    g. Bear River Small Pumpers
    h. Summit Creek Water
    i. PacifiCorp
    j. Utah Association of Special Districts
    k. Senator Hillyard
    l. Canal Companies:
        i. Bear River Canal Company
        ii. Cub River Canal Company
        iii. Bear River Pump Company
    m. Bear Lake Preservation Advisory Committee
    n. Bear Lake Watch
    o. Bear River Bird Refuge
    p. Bear Lake Regional Commission
    q. Utah State University
    r. Envision Cache County
    s. Audubon Society

D. Acts, laws and master plans
    a. Bear River Development Act
    b. Bear River Compact
        i. Agreement about how much each state can develop
    c. PacifiCorp (1912)
        i. Encumbrances
    d. Ground Water Management Plan (1999)
    e. State Water Master Plan
    f. Logan City Water Conservation Plan
    g. Endangered Species Act
    h. PacifiCorp litigation about dredging

Appendix 2-C

Steering Committee Meetings

Complete copies of the meeting minutes and presentations for four steering committee meetings that were held.

i: Steering Committee Meeting Minutes – July 18, 2012

Review of synthesized data collected through the key interviews and meetings and establishment of ground rules.

ii: Steering Committee Meeting Minutes – October 25, 2012

Review of preliminary forecasted water supplies and demands, overview of Bear River Development Act and current development plans and activities and panel discussion about districts.

iii: Steering Committee Meeting Minutes – January 16, 2013

Bear River operations, ASR and water banking presentations, update on water supplies and demands and instant pole.

iv: Steering Committee Meeting Minutes – April 24, 2013

Presentation of draft master plan results and feedback from the steering committee.

CACHE COUNTY
WATER MASTER PLAN

CACHE COUNTY

Cache County Water Master Plan

Steering Committee Kick Off Meeting Minutes

7/18/2012

Cache County Water Master Plan
Steering Committee Meeting Agenda
July 18, 2012

Meeting Attendees:

- Roland Jeppson – Spring Creek Water Company
- Jim Williamsen – Spring Creek Water Company
- Gary Larsen – Millville City
- Alan Luce – North Logan City
- Josh Runhaar – Cache County
- David Zook – Nibley City
- Clair Allen – Web Irrigation Company
- Colleen Gnehm – Logan River Water Commissioner
- Bill Young – Logan City
- Grant Koford – Amalga City
- Glen Stringham – Blacksmith Fork
- Bill Baker – River Heights City
- Marlowe Adkins – Richmond City
- Jim Watterson – Benson Bear Lake Irrigation Company/Bear River Water Commissioner
- Lee Atwood – Paradise Town
- S. Bruce Karren – Cub River Irrigation Company/North Cache Conservation District
- Jon Hardman – Mendon City
- Brent Jensen – Hyrum City
- Clark Israelson – Utah State University
- Max Pierce – Cornish Town
- Bill Bower – Citizen
- Donna Spillett – Logan Island Irrigation Company
- Stephen Thatcher – Spring Creek Irrigation Company
- Evan L. Olsen – Water Policy Advisory Board
- Claudia Conder – PacifiCorp
- Jim Gass – Smithfield City
- Greg Hansen – Little Bear Irrigation Company/Little Bear River Water Commissioner
- Will Atkin - Utah Water Rights
- LeGrand Bitter – Utah Association of Special Districts
- Darin Evans – Summit Creek Water Commissioner
- Rick Reese – Benson Irrigation Company
- Don Hartle- Wellsville City
- Jeff Gittins – Smithfield Irrigation Company
- David Rosenberg – Utah State University
- Thad Erickson – Cache County Water Policy Advisory Board

1. **Welcome and Introductions**
    a. Committee members introduced themselves and explained what they would like to get out of the process. Below is a summary of the feedback received:
        i. Ensure people have a stake in the plan
        ii. Desire to have water representation at the state level
        iii. Find out what is going on with the County Water Master Plan
        iv. Protect the aquifer
        v. Protect irrigation water
        vi. Protect municipal rights

vii. Protect water rights
viii. Community development
ix. Find out the results of the Situational Assessment
x. To be a part of the solution
xi. Learn general information about water in Cache County
xii. Discuss federal agency encroachment (USFS)
xiii. Protect water (springs)
xiv. Coordination in case of future water related accidents
xv. History of water in Cache County
xvi. Discuss municipal and agricultural water challenges
xvii. Secure Cache County's share of the Bear River (winter storage)
xviii. Discuss priority rights and Water quality

2. Roles and Responsibilities of Steering Committee

a. Proposed Steering Committee Meetings:
   i. Kickoff Meeting – Cache County Water Overview
   ii. Technical Meeting
   iii. Problem Solving Session
   iv. Review of Draft Water Master Plan
b. Purpose and Goals of the Steering Committee
   i. Provide Guidance For:
      - Future projects
      - Completion of future reports, actions and projects
      - Water improvement funding
      - Organizational structure to manage water in the County
      - Plan to gain a greater voice with the State Legislature
   ii. Educating and building consensus with stakeholders
   iii. The County emphasized that its purpose is not to push committee members in a certain direction, but rather receive guidance on how to confront future water challenges and opportunities.
c. Steering Committee Ground Rules and Communication
   i. Take good minutes and get them back to the committee
   ii. Focus on broader/County issues, not just those from one specific organization
   iii. Communicate effectively outside of the meeting, and don't editorialize information
   iv. Speak with respect
   v. Be aware of time constraints
d. Steering Committee Charter
   i. A Steering Committee Charter will be developed based on the feedback received in the meeting. The charter will be distributed to committee members once it is completed.

3. Brief History of Cache County Water – Bob Fotheringham

a. Brief overview of the history of water in Cache County. Please see the presentation slide entitled "A Historical Overview" for an outline of this discussion.

4. Project Overview – Chris Slater

a. Overview of the Master Plan approach thus far and planned future meetings for the master plan. Please see the presentation slide entitled "Project Overview and Schedule" for an outline of this topic.

5. **Review Situational Assessment**
    a. Review of the assessment interview map, and interviewees
    b. Overview of the key themes derived from the assessment. Please see the presentation slides for an overview. Topics discussed were:
        i. Current Conditions
            - The group discussed the reoccurring themes and perception of conditions derived from the situational assessment.
        ii. Water Availability
            - Water availability varies depending what part of Cache County is being discussed. Water resources differ from the east end of the valley from the west.
        iii. Improvement Strategies
            - Opinions regarding attitudes towards several improvement strategies covered in the situational assessment were discussed. Please see the slide entitled “Improvement Strategies” to see the ratings attributed to the strategies from several situational assessment interviewees.
        iv. Organization and Management
            - The importance of a management system in order to develop Cache County’s allocation from the Bear River development act was discussed. Please see the slides entitled “Organization & Management” and section 8-e of these minutes for more information on this topic.
        v. Conservancy District Support
            - District perceptions, questions and information were discussed. An evaluation of attitudes towards conservancy districts from the situational assessment can be found in the slide entitled “Conservancy District Support.”
        vi. Bear River
            - The Bear River Development Act was discussed, including management requirements and allocation information. Please see the slide entitled “Bear River.”
        vii. Education
            - The importance of education regarding Cache County’s water resources and challenges was discussed. A greater understanding of water rights, priorities and issues by the public will be necessary for Cache County to achieve its goals. See the slide entitled “Education.”

6. **Master Plan Focus and Prioritization**
    a. The committee discussed the lessons learned from the situational assessment tied to Master Plan priorities.
        i. See presentation slide entitled “Priorities”

7. **Potential Roadblocks to Successful Master Plan**
    a. Natural disaster could change resources, priorities and focus of Master Plan
    b. Environmental issues
    c. Lack of education
        i. Discussion on how to better educate people regarding the County’s water challenges and opportunities.

d. Inaccurate information

8. **Feedback from Committee:**
    a. **Storage:** Discussion regarding potential reservoir sites and storage options. Suggestions and topics included:
        i. Revisit the Barrens site.
        ii. Store the water out of state.
            - Utah DWRe could have potential concerns with development of water out of state.
            - There are challenges associated with storing water across state lines.
        iii. Utilize aquifer storage and recovery methods
            - Two sites in the county have been identified where aquifer storage and recovery could work.
        iv. Further information was requested regarding the potential cost of constructing a reservoir.
        v. Building dam(s) in the canyon to take advantage of the potentially compatible geology.
        vi. Consider geology and safety with potential dam sites.
    b. Canal and Storm Water Management
        i. Concerns arose over Cache County canals' continued capacity to carry storm water.
        ii. Responsibility for maintenance and who should be liable if there is a canal breach or other disaster
        iii. Maintenance and improving access to canals
    c. Agricultural/Urban Interface
        i. The importance of balancing water use benefits and rights between agricultural and urban interests.
        ii. Agricultural users should be fairly compensated when water rights are transferred from agricultural uses to other uses.
        iii. Cost sharing challenges and opportunities
        iv. When farmers become developers or sell agricultural land for development, there is a need to transfer water. Discuss about how this should this happen so that it is fair for all parties involved
    d. Bear River Water Development
        i. 60,000 acre feet were allocated to be developed by Cache County or a Water Conservancy District.
        ii. Importance of taking measures to secure the valley's allocation.
        iii. Bear River allocation could potentially benefit the agricultural sector.
        iv. Discussion questions:
            - Should the developed water be managed by the County or through a District?
            - What is the approximate duration of the regulatory process that must be followed to build a reservoir?
            - What is Idaho's long term interest in the Bear River?
            - The public needs to be educated on how the Bear River water is managed. It is a complicated system.
            - What is the current capacity of the reservoirs? Is dredging an option to increase storage capacity?

- The development of the Bear River could provide the opportunity to sell any excess water. Could the water be developed and sold to the Wasatch Front?

e. **Management**
   i. The management of the Bear River Water Development Act allocation is more than just a one person job.
   ii. Only the County or a Conservancy District can develop Cache County's allocated share from the act
   iii. Committee members communicated interest in learning more details about conservancy districts, including:
      - Updated laws and regulations concerning conservancy districts
      - Funding (can you reclaim the cost spent to run a district?)
      - Management protocol
      - How would we keep control?
      - Benefits
      - Can a conservancy district tell an irrigation company what to do with its water?
      - Can we use a special service district to get what we need?
   iv. Need to have a good plan to fund needed projects
   There are new Conservancy District laws
   v. Discussion about how other conservancy districts perceive Cache County and Cache County water users.
   vi. We could use the county to manage water instead of having another layer of government.

f. **General**
   i. The Master Plan should address recommended actions during a prolonged drought.
   ii. Coordinate with Idaho entities that have faced or are facing similar challenges and opportunities and learn from their efforts.
   iii. Can we gather storm water and store it in a reservoir?

g. **Potential Project Road Blocks**
   i. Environmental Issues
   ii. Lack of education of the public.
   iii. Lack of direction
   iv. Lack of community support

9. Next Steps

a. The next meeting will be held in October 2012. Notifications will be sent out prior to the meeting. Some of the items to be part of the next meeting are:

   i. Presentation of water supply and demand projections from the Division of Water Resources study (dependent on progress of the Division).
   ii. Panel discussion to answer the steering committee questions regarding future water management organization for Cache County.
   iii. Rough estimates of reservoir construction cost information to gain a better understanding of PacifiCorp's role in the current management of the Bear River.

Steering Committee Meeting

July 18, 2012

Master Plan Purpose

- Master Plan Purpose
  - Evaluate existing water resources and demands
  - Determine future water demands
  - Educate and build consensus
  - Create a plan for the future
  - Recommend methods to manage water resources in the County

Steering Committee Purpose and Goals Discussion

- Provide Guidance For:
  - Future projects
  - Completion of future reports, actions and projects
  - Water improvement funding
  - Organizational structure to manage water in the County
  - Plan to gain a greater voice with the State Legislature
- Educating and building consensus with stakeholders

Steering Committee Meetings

- Meeting 1: Kickoff Meeting – Cache County Water Overview
- Meeting 2: Technical Meeting
- Meeting 3: Problem Solving Session
- Meeting 4: Review of Draft Water Master Plan

Steering Committee Ground Rules

Steering Committee Charter


CACHE COUNTY
WATER MASTER PLAN
A Historical Overview
1850-1900
• 1860: Early Claims
1901-1950
• 1904-1927: Power Development
• 1912-1919: Irrigation Contracts
• 1920: Dietrich Decree
• 1922: Kimball Decree
1951-2000
• 1958: Bear River Compact
• 1966-Present: Potential Reservoir Site Studies
• 1980: Bear River Compact amended
• 1989: Subsequent Storage Contract
• 1990's: Modeling of the Bear River
• 1991: Bear River Water Development Act
• 1995: Bear Lake Water Settlement Agreement
• 1999: Cache County Ground Water Management Plan


CACHE COUNTY
WATER MASTER PLAN
Project Overview and Schedule
2012
• March 1: Bear River Small Pumpers Meeting
• March 8: Team Kickoff Meeting
• March 28: Presentation at Utah Mini Water Users Conference
• April 4: Attend North Cache Conservation District Meeting
• April 30: Started Stakeholder Interviews
• May 29: Irrigation Stakeholder Meeting
• June 4: Report to Joint Council (Logan City, Cache County)
• July 10: Report to County Council
• July 18: Steering Committee Meeting #1
• September: Supply and Demand Data from DWRe
• October: Steering Committee Meeting #2
• October: County Council Update
2013
• January: Steering Committee #3
• January: County Council Update
• April: Steering Committee Meeting #4 - Review Draft Master plan
• May: Present Plan to County Council

Situational Assessment

Assessment Key Themes

Current Conditions

- Storage of spring runoff
- Differing views on water history, management and issues
- Delivery systems may not be accurate in measuring available and deliverable water
- Working relationships have improved in the last 10 years
- Canal maintenance is a challenge
- Challenges with storm water management
- Challenges tied to the conversion of agricultural rights for urban use

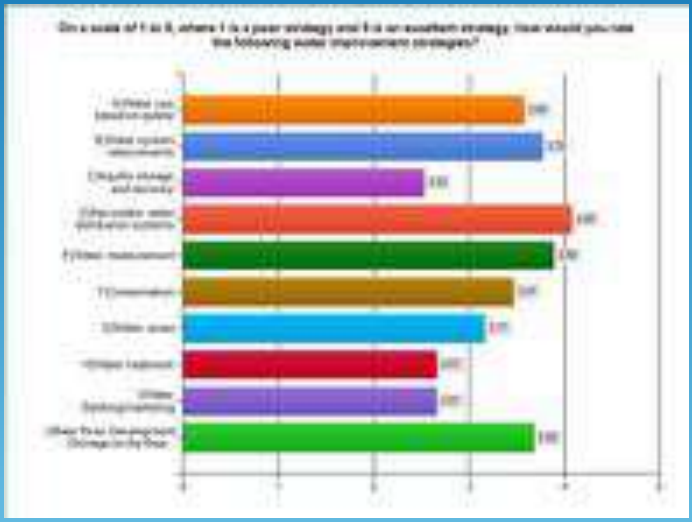


Water Availability

- Varying opinions about the need for future water. Those that have plenty today have not thought through potential changes or laws that may come and the potential impacts (i.e. no longer being able to sprinkle with culinary, TMDL's, ESA, etc.).
  - Flood Irrigation
  - Pressurized Secondary Water.
  - Culinary
  - Reuse
  - Storm Water

Improvement Strategies

(19 Respondents)



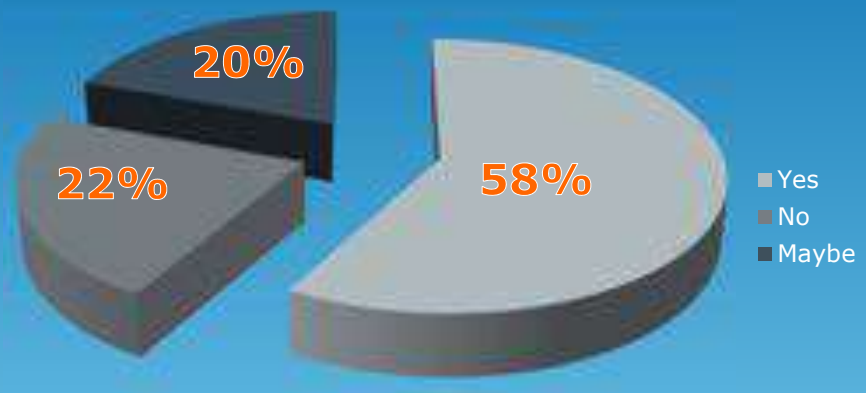
Organization & Management

- Concerns about legislative representation with current system.
- There needs to be a management system that protects Cache County's current and future water resources at the local and state level.
- PacifiCorp plays major role in current management of Bear River

Organization & Management

- Most common management system recommendations included
  - Form a Conservancy District (Merge with Box Elder, Multi-County)
    - Laws to create and manage a district have changed
  - Form a County-based organization with municipal/irrigation representation.
  - Remain the same (County Manager)
- General lack of understanding of what a district is and how it functions
- The County has too many responsibilities, and can it manage water to the extent needed

Conservancy District Support



Bear River

- Bear River Development is happening now!
- High support for development of Bear River.
- How do we develop it and who pays?
  - Pay based on allocation.
  - Use grants to help pay.
  - Everyone in County pays.
  - New development helps pay.
- West side of County likely benefits the most.
- Must be managed in conjunction with other stakeholders (PacifiCorp, Wyoming, Idaho, etc.).
- In order to develop a resource on the scale of Cache County's Bear River allocation, the Bear River Water Development Act requires that the development be managed by the County or a Conservancy District.

Education

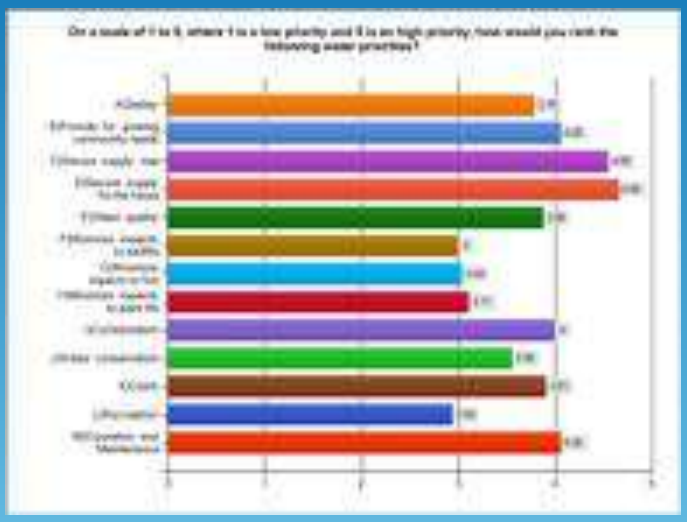
- The majority of the public is not informed enough about water.
- Cache County is experiencing a culture shift. Change from agricultural to urban/commercial
- Rights
  - Keep water rights with property
  - Developers try to break up water shares
  - Need for a public education campaign about water rights and shares.
- Lack of future public support for system maintenance



Master Plan Focus and Prioritization

CACHE COUNTY WATER MASTER PLAN

Priorities



Other priorities included: public education, water rights security, conversion of water rights and accountability.

Potential Road Blocks Discussion

Next Steps

- Share the information from today, and bring us feedback
- Schedule next meeting – What do you need?
- We will send the Charter and meeting minutes for your review.
- Please take the Steering Committee Evaluation Survey before leaving!

Thank You!

CACHE COUNTY

Cache County Water Master Plan

Steering Committee No. 2 Meeting Minutes

10/25/2012

Cache County Water Master Plan
Steering Committee Meeting Agenda
10/25/2012

Meeting Attendees:

- Marisa Egbert – State DWRe
- Bob Oaks – Groundwater Consultant
- Clair Allen – Web Irrigation Co.
- Marla Trowbridge – Trenton Town Co.
- Don Hartle- Wellsville City
- Jim Williamson – Spring Creek Water Co.
- Alan Luce – North Logan City
- Will Atkin – Water Rights
- Scott Tripp – City Creek Irrigation
- Sharon Vaughn – USFWS Bear River MBR
- Todd Adams – Utah Water Res.
- Eric Millis – Utah Water Res.
- Gary Larsen – Millville City
- Darek Kimball – JUB Engineers/Richmond
- Claudia Conder – Pacificorp
- Legrand Bitter – UASD
- David Zook – Nibley City
- David Rosenberg – USU
- Rick Reese – Logan River Benson
- Lee Atwood – Paradise Town
- Kerry Schwartz – Bureau of Reclamation
- Bob Fotheringham – Cache County
- Josh Runhaar – Cache County
- Andrea Armstrong – USU
- Mark Anderson – UASD
- Connely Baldwin – Pacificorp
- Max Pierce – Cornish Town
- L . Bruce Karren – NCCD
- Zac Covington – BRAG
- Thad Erickson – Water User
- Jon Hardman – Mendon City
- Glen Stringham –Water User
- Voneene Jorgensen – BRWCD
- Donna Spillett – Logan Island Irrigation Company
- Leah Meeks – USU Civil Engineering
- Jim Gass – Smithfield
- David Beazer – Millville Irrigation
- Bill Young – Logan City
- Randy Eck – Providence City
- Jon White – Cache County
- Lee Cammack –J-U-B Engineers
- Chris Slater - J-U-B Engineers
- Trevor Datwyler - J-U-B Engineers
- Dan Adams – The Langdon Group
- Joshua Palmer – The Langdon Group
- Tage Flint - WBWCD

1. **Welcome and Introductions**
2. **Meeting Purpose and Agenda Review**
3. **Review Meeting Requests from Meeting #1**
    a. Discuss formation of a Water Conservancy District
    b. Clarification of the current laws regarding the formation of Water Conservancy Districts.
4. **Review of Preliminary DWRe Data – Todd Adams (see attached slides)**
    a. Forecasted Water Supplies and Demands (Refer to slide 3 of the Population Projections and Water Demands presentation attached to these minutes)
        i. DWRe does not do population projections, but uses the governor's office numbers. 2008 was the last population projection. A draft of the 2010 population projection numbers was released four months ago. The estimated projection for year 2060 is

268,731. They have not broken the numbers out by communities yet, just Cache County as a whole. The projected population numbers for the communities may still change in the next few months.

ii. Based on the data that was compiled in 2008:
    1. The projected total potable municipal and irrigation water demand in Cache County for year 2060 was 71,000 acre-feet.
    2. The State of Utah set a goal in year 2000 to reduce water demand by 25% by the year 2025. If that goal is met, and based on the 2008 data, we will need 53,000 acre-feet at year 2060.

iii. Based on the new preliminary population projections that were released four months ago, the estimates DWRe and J-U-B have put together for this project are:
    1. 57,000 acre-feet needed by 2060.
    2. 43,000 acre-feet needed if the goal of 25% water conservation is reached.

iv. The water supply is currently projected to stay at 52,500 acre-feet per year. This does not account for any secondary water supplies.

v. As mentioned, the statewide water conservation goal of 25% reduction was set in the year 2000. Currently Utah has achieved 18% water use reduction since the year 2000.

vi. 2010 population values are being published currently. The current supply is roughly 52,500 ac feet. This is provisional data.

vii. If individual cities have population values different than the governor's office is projecting, this can be modified in the model by contacting the Division of Water Resources or Chris Slater at JUB, but the bottom line (overall population) for Cache County has to remain the same.

viii. The secondary water is calculated based on green space, lot size, and evapotranspiration, etc. since there are not meters on most secondary systems.

b. Does transferring the water shares from the canal company to the City reduce the diversion right the canal company has?
    i. Yes, this could reduce the right.
    ii. As the cities grow, the conversion from agricultural water rights to municipal water rights will be a complicated issue to deal with.

c. Any additional questions for Todd Adams at the Department of Water Resources should be written on the meeting evaluation form. The presentation will be emailed to the group as well.

5. Bear River Water Development Act Update – Eric Millis (See attached slides)

a. Current status: In 1991 the Bear River development act was passed by the state legislature. The amount of water available for development in the Bear River Basin and in the state of Utah was divided as listed below.
    i. Cache County or a Conservancy Dist. in Cache County – 60,000 acre-feet per year
    ii. BRWCD (area of Box Elder County)– 60,000 acre-feet per year
    iii. WBWCD (area of Weber and Davis County) – 50,000 acre-feet per year
    iv. JVWCD (area of Salt Lake County)– 50,000 acre-feet per year

b. The majority of the need is projected to occur around year 2035, though Cache and Box Elder may have an earlier need. The development of projects takes a long time.

c. Since the Washakie Reservoir site was investigated 20 years ago, advances in science have shown that the site is not ideal due to site constraints, water quality issues etc. Additional sites are being investigated.
d. Reservoir sites:
    i. 45 possibilities.
    ii. The list has recently been reduced to nine sites.
    iii. Currently in the process of working with the involved agencies and putting together a combination of reservoirs that meet the criteria.
    iv. Current sites being investigated:
        1. Whites Valley
        2. Fielding
        3. Washakie
        4. Cub River,
        5. Above Cutler,
        6. Hyrum enlargement
        7. Temple Fork,
        8. Willard – north side of reservoir,
        9. East side of Promontory.
    v. There would need to be a pipeline to tie these reservoirs together. A recommended alignment has been developed.
e. Answers to Questions:
    i. Willard Reservoir: will be an additional reservoir. Increasing the capacity of the existing reservoir is a separate issue.
    ii. The correlation between the reservoirs outside of Cache Valley and in the Valley would be done by exchange.
    iii. Water would probably not be pumped from Promontory to Cache County. It would be taken from the Bear River in Cache County in the form of an exchange.
    iv. The sites up Blacksmith Fork were removed from the short list because of the low water supply and high environmental impacts.
    v. Finances:
        1. It's expensive no matter where the reservoir is built.
        2. Where are the finances going to come from to build these reservoirs?
            a. This is being discussed in the legislature right now. The need will be the driving factor for the reservoirs. They will be built when needed, so it fits the need of everyone involved in the project.
    vi. Aquifer Storage and Recovery (ASR):
        1. Can water be stored under the ground or does it have to be reservoir?
            a. This is being looked at now.
    vii. Balance all three entities (Rich County, Cache County, Box Elder County)
        1. The water in Bear Lake is what immediately benefits Cache County.
        2. How do the reservoirs west of the valley benefit Cache County?
            a. The water stored in the reservoirs west of Cache Valley will reduce the demand on the Bear River, leaving more water in Bear Lake that can in turn be used in Cache County via exchange.

viii. Studies on ASR are currently being completed. Hopefully in the next month the results will be presented at the county council meeting.

6. Organizational Structure – Alternatives and Panel Discussion

a. Evaluation Criteria ***(refer to the attached proposed metrics table)***

b. Presentation of Management Alternatives (county wide or multiple smaller districts)
   i. Form a Conservancy District
   ii. Form a Special Service District
   iii. County management with more staff and resources
   iv. Continue with current system (County Water Manager)

c. Panel:
   i. Tage Flint (General Manager - WBWCD)
   ii. Mark Anderson (Attorney for UASD)
   iii. Voneene Jorgensen (General Manager – BRWCD)
   iv. Legrand Bitter (Executive Director UASD) –

d. Utah Association of Special Districts (UASD)
   i. Created in 1989
   ii. 400 districts throughout Utah
   iii. 120 districts in Utah that provide water service, 24 are water conservancy district.
   iv. Functions as a resource for districts
   v. Contact LeGrand Bitter at UASD with concerns and questions.
   vi. Provides training on statutory framework for organizing districts.
   vii. Acts as legislative representative.

e. Cache County conservancy district history
   i. Conservancy district has been turned down twice.
   ii. Have the rules changed?
   iii. Should we re-evaluate this?
   iv. This was largely turned down in the past due to taxation. Conditions may have changed relating to water development
   v. Why it failed in 1980's and 1990's: Did not pass because of taxation issue of appointed board, they could not be voted out. Taxation without representation. The creation procedure has changed since then.

f. There are two different ways to form a district (See Utah Code Annotated Title 17B):
   i. Petition to County or municipality to request the service desired.
      1. Must be signed by 33% of registered voters by total private land area and be equivalent to at least 25% of the value of the total property. 25% by value
   ii. Through City Councils
      1. Go to city councils, convince them that this is desired by the community.
      2. Have councils pass a resolution for the process. The resolution can spell out how the board of trustees is to be appointed. Specify they are to be appointed, elected, etc. The people behind the movement get to choose whether they want the officials appointed or elected.
      3. Hold public hearings etc.

4. There is a protest period of 60 days – threshold for protest is much lower than for petition. If 25% of registered voters protest, it is turned down. Or if voters with 25% area and 15% value protest, then it is turned down. If not protested, then it goes to next election. If needed signatures are obtained in petition, doesn't have to go to election.

g. Conservancy District:
    i. Functions independent and separate from other government entities.
    ii. Governed by own board of officials.
    iii. Can tax, but tax rate is limited by state code. Tax authority sits with the elected board of trustees.
    iv. To form, you must show that over half of the people are in favor. If you can show that about 67% are in favor by doing a petition, you may not be required to take a vote.
h. Special Service District:
    i. Functions under the control of the governing body (the county or municipality where the district is located)
    ii. Governed by elected officials. The county or municipality that creates the Special Service District has control. They may appoint a board.
    iii. Cannot tax unless voted for by the public
    iv. To form, an election is not required, but public hearings are.
i. Which option will get the job done best? Get the funding, representation, etc?
    i. Whichever option the state approves.
j. To get taxing authority project must be approved by voters.
k. Partnering with another district?
    i. Yes, can be annexed into district.
    ii. Still have to have public hearings etc.
    iii. Doesn't abbreviate the process much, but is slightly simpler.
l. Boards
    i. Weber Basin and Bear River Water Conservancy Districts have appointed boards.
    ii. None of the special service districts have elected boards currently in the state.
    iii. The BRWCD has 10 board members, 1 board member from each of 8 different geographical regions in the district and 2 board members that represent the irrigation companies.
m. Funding: Does it all come from property tax or where?
    i. BRWCD –
        1. Water revenue, impact fees, and property taxes fund the district.
        2. Because they are a young water conservancy district, they have bonded 5 times for projects.
        3. When getting a water revenue bond, have to engineer projects so that water revenue will pay back bonds.
        4. Property taxes can be used to fill in the gap as needed. The costs come up front but the revenue comes in time.
        5. Bonded with DWR on low interest loans paid back in time.
        6. Always been able to meet obligations thus far.
        7. Nobody likes taxes, but everyone likes water.
        8. BRWCD tax is $23/year.

    ii. Young districts are dependent on property taxes to begin with because of the high upfront cost of infrastructure.
    iii. WBWCD tax revenue is less than 25% of the total revenue.
n. A water management plan could be used as a land use planning tool amongst communities. What influence does the board think they have on the land use planning?
    i. The district doesn't have much say on the land use planning; just a resource to provide water once the land is developed.
o. Example: Mendon needs more water. They don't have a source. How does the district handle this? If water district has a line that is 5 miles from this location, what obligation does the district have to run a line out there?
    i. If they are not a taxed area of the district, the district has little obligation to run infrastructure to them. If it is taxed, then they have obligation.
    ii. Willard example:
        1. Came to BRWCD district to see if they could provide water for 800 acre development.
        2. The district applied for water rights, designed infrastructure, and built the system.
        3. Growth was going well until 2008, and then all development stopped.
        4. Now there is a brand new water system ready for when development picks up again.
    iii. Can county/municipalities develop their own sources in areas where districts exist?
        1. Yes – they can still develop their own sources, but it's often cheaper to go with the district.
        2. There is a stipulation for districts that says they have to monitor the wells for 2 years to ensure that the district isn't negatively affecting surrounding wells.
    iv. In unincorporated areas if a district installs a water line past a home, the homeowner can connect to the new line if desired and if they have paid the associated fees (impact etc.).
p. How do existing canal companies, cities retain control when a district is formed?
    i. WBWCD does not hold potable water, just secondary so they're not competing with the cities ever.
q. It might be possible to form a special district in Cache County; a water conservancy district has a negative connotation with the name.
    i. Doesn't have to be a water conservancy district, it can be an improvement district.
r. Small City: Which is better of alternatives? Special district, conservancy district, county manager etc.
    i. In the case of WBWCD, the district was formed to develop water supply for communities that couldn't do it on their own. Most of them receive water from outside their city limits. It was a tool to go outside of their municipality and supply the water from a longer distance away.
    ii. Bear River Development Water:
        1. Communities can't act on their own to get any of this water.
        2. The state engineer has said there is no more water.
        3. If you want to be part of the Bear River Development Act, you better have a district of some sort.
    iii. Without the WBWCD, growth on the Wasatch front would have been stopped due to lack of water.

s. Is there one of the options (special district, water conservancy district, etc.) that would be preferred for participating in the Bear River Development Act?
    i. They could both work, but the County option is not a preferred option generally.
        1. Counties do not typically provide municipal type services.
        2. Once a municipality acquires a water right, it cannot sell it.
        3. A district can hold, trade, and exchange water rights much more efficiently than a municipality.

7. Next Steps

a. Meeting #3 Goals
b. Review of PacifiCorp Management Responsibilities
c. Future Water Development Strategies

Steering Committee Meeting

OCT. 25, 2012

Master Plan Purpose

- Master Plan Purpose
  - Evaluate existing water resources and demands
  - Determine future water demands
  - Educate and build consensus
  - Create a plan for the future
  - Recommend methods to manage water resources in the County

Steering Committee Ground Rules

- Steering Committee Ground Rules and Communication
  - A. Take good minutes and get them back to the committee
  - B. Focus on broader/County issues, not just those from one specific organization
  - C. Communicate effectively outside of the meeting, and don't editorialize information
  - D. Speak with respect
  - E. Be aware of time constraints

Items From Last Meeting

1. Further information was requested regarding the potential cost of constructing a reservoir.
2. Committee members communicated interest in learning more details about water management alternatives (which will be covered in our panel discussion), including:
   - A. Updated laws and regulations concerning conservancy districts
   - B. Funding (can you reclaim the cost spent to run a district?)
   - C. Management protocol
   - D. How would we keep control?
   - E. Benefits
   - F. Can a conservancy district tell an irrigation company what to do with its water?
   - G. Can we use a special service district to get what we need?

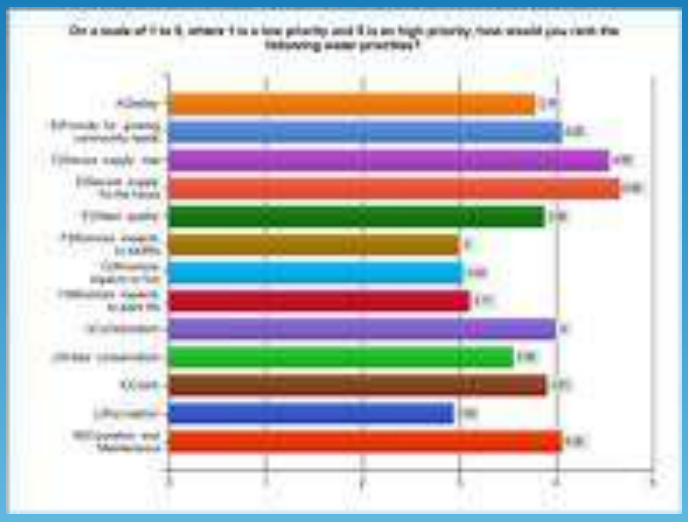
Forecasted Water Supply and Demand

Todd Adams - Utah Department of Water Resources

Bear River Development Act Information

Eric Millis - Utah Department of Water Resources

Evaluation Criteria Discussion



Other priorities included: public education, water rights security, conversion of water rights and accountability.

Proposed metrics to measure achievement towards water management objectives

OBJECTIVE	METRIC(S)
Water Supply	
Provide secure water supply now	• Number of Cache County communities with water moratoriums in 2012
Provide secure water supply in the future	• Number of Cache County communities with water moratoriums in 2032 • Number of communities in 2032 that can still provide water should a source fail
Provide for growing needs of communities	• Meet the demands of each community's forecasted growth through 2032
Implementation	
Fund water improvement projects	• Cache County uses Bear River water allocation (acre-feet developed) • Number of water system interconnects • Communities that benefit pay for improvement project
Minimize costs of management	• Cost of management (dollars/acre-foot of developed water)
Governance	
Operate and maintain water systems on a local level	• All water wholesaling done through contract • Number of communities represented on a decision making board • Each community can still make water source, storage, distribution and other local system improvements
Governance (continued)	
Represent all water users in the County	• Acre-feet of water developed/saved for agricultural, municipal, environmental, hydro power, recreation and other beneficial uses.
Represent Cache County on water legislation issues	• Legal standing according to state law • Money and resources to lobby
Promote collaboration	• Number of interconnects • Number of interlocal agreements • Number of contracts
Protect water rights	• Acre-feet of approved new, change, and re-use applications
Additional Objectives	
Educate the public	• Per capita water use • Money, people and facilities available to work with Cache County citizens on water rights and water conservation
Protect water quality	• Projects comply with existing TMDLs
Maintain or improve environmental quality (for fish, wildlife, people)	
Others?	

Potential Alternatives

- Form a Conservancy District (County wide or multiple smaller districts)
- Form a Special Service District
- County management with more staff and resources
- Continue with current system (County Water Manager)



Panel Discussion

- Weber Basin Water Conservancy District – Tage Flint
- Utah Association of Special Districts – LeGrand Bitter
- Bear River Water Conservancy District – Voneen Jorgensen
- Utah Association of Special Districts – Mark Anderson

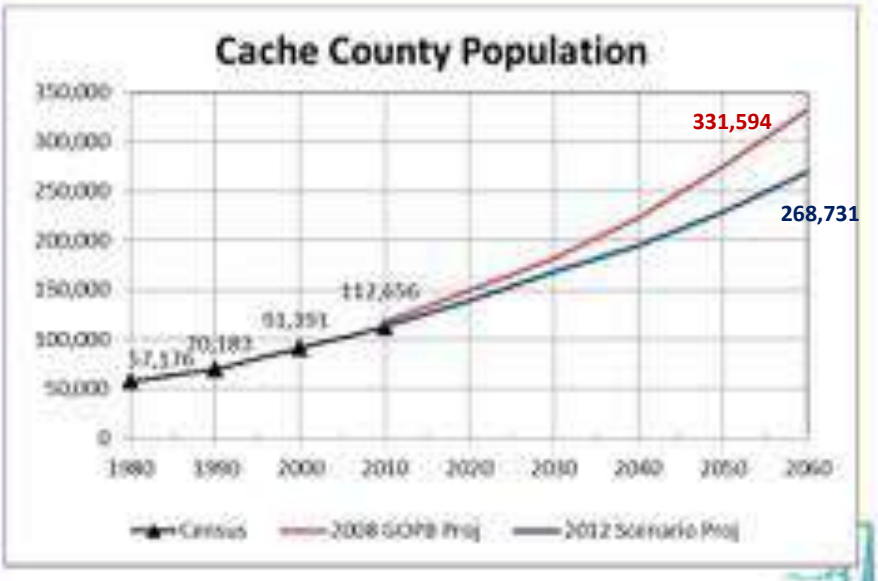
Next Steps

- Meeting #3 Goals
- Review of PacifiCorp Management Responsibilities
- Future Water Development Strategies

CACHE COUNTY
WATER MASTER PLAN



Population Projections & Water Demands



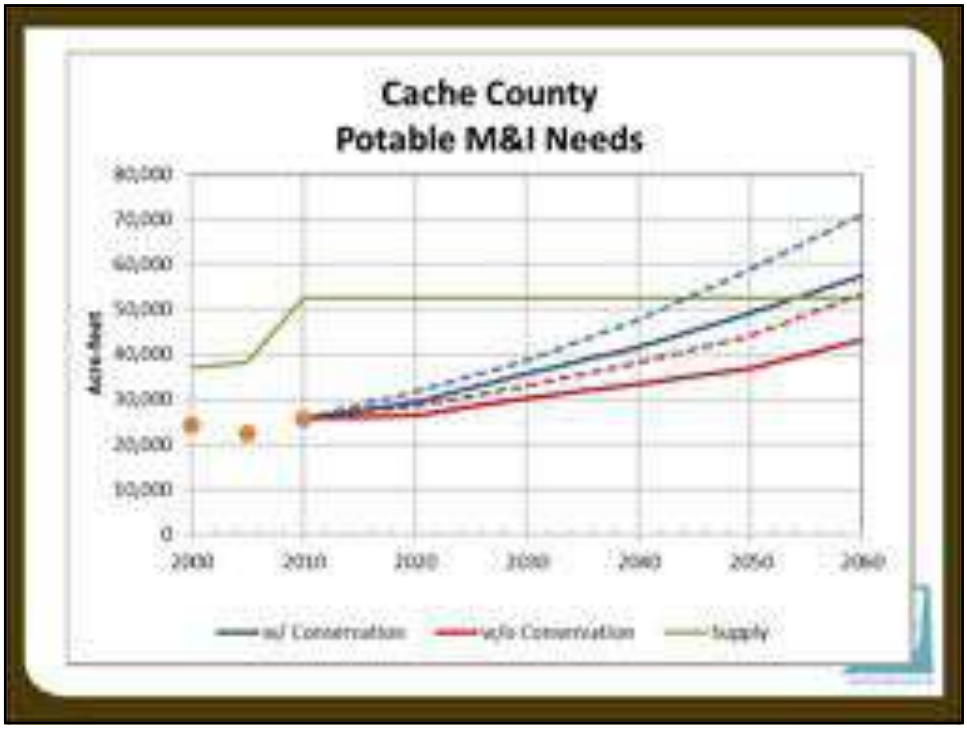
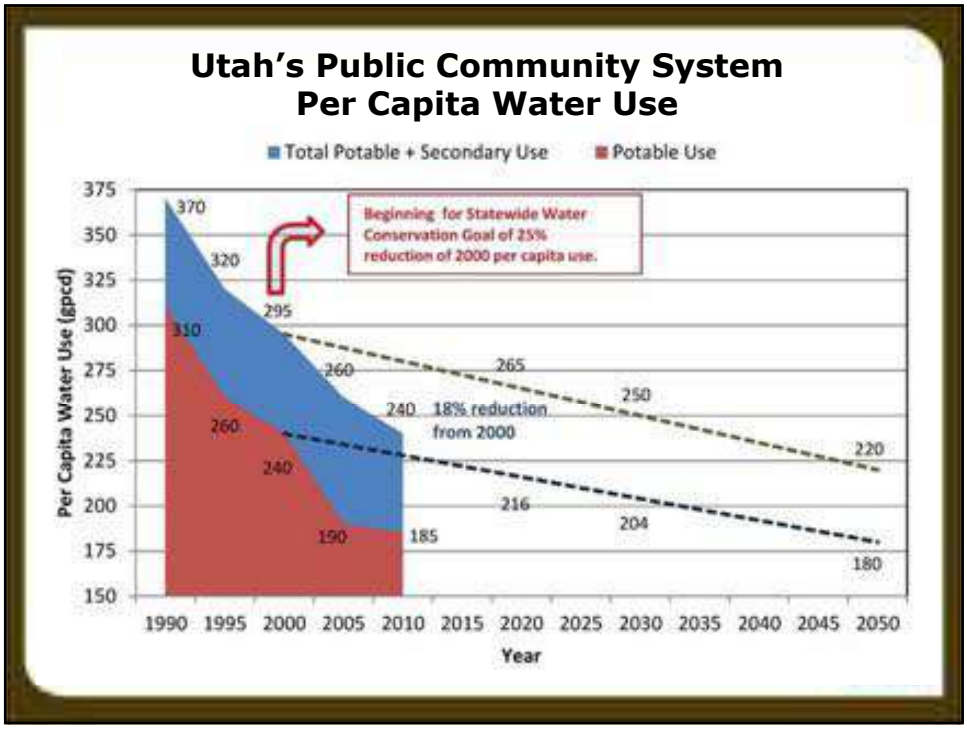


TABLE 10 (continued)
PROJECTED CULINARY M&I DEMAND AND SUPPLY
FOR PUBLIC COMMUNITY WATER SYSTEMS
Bear River Basin
(acre-feet /year)

Name	Reliable System/ Source Capacity	2020 Population	2020 Demand*	2020 Surplus Deficit ()	2050 Population	2050 Demand*	2050 Surplus Deficit ()
Cache County							
Amalga Municipal Water System	559	567	649	(90)	950	900	(341)
Benson Water Culinary District	147	577	105	42	1,048	164	(17)
Clarkston Municipal Water System	471	826	387	84	1,530	615	(144)
Cornish Municipal Water System	99	257	85	14	576	162	(63)
Gosslind Spring Water Works Co.	401	60	11	390	60	9	392
High Creek Culinary Water System	64	85	19	45	85	16	48
Hyde Park Culinary Water System	1,244	3,787	467	777	6,573	695	549
Hyrum City Water System	4,771	8,457	2,703	2,068	14,049	3,848	923
Lewiston Culinary Water System	705	2,457	705	0	4,175	1,026	(321)
Logan City Water System	13,758	59,587	16,455	(2,697)	87,166	20,632	(6,874)
Mendon Culinary Water System	294	1,782	204	90	1,997	196	98
Millville City Water	454	1,973	390	64	3,352	568	(114)
Newton Town Water	158	1,045	171	(13)	1,555	218	(60)
Nibley City	406	4,238	617	(211)	4,549	567	(161)
North Logan Culinary System	2,986	9,043	1,275	1,711	12,555	1,517	1,469
Paradise Town	190	1,093	160	30	1,688	212	(22)
Providence City Corp. Water	3,748	13,512	2,972	776	17,888	3,373	375
Richmond City	919	2,592	448	471	4,562	676	243
River Heights City Water System	1,208	1,657	573	635	3,328	987	221
Smithfield Municipal Water System	2,311	12,601	2,052	259	16,899	2,359	(48)
South Cove Water Supply	182	73	19	163	202	16	166
Trenton City	577	595	96	481	999	138	439
Wellsville City	4,022	3,574	583	3,439	6,068	848	3,174
County Totals		**130,458**	**31,145**	**8,529**	**191,854**	**39,743**	**(69)**

Utah's Public Community System Per Capita Water Use



Bear River Development Project

Cache County Water Master Plan Steering Committee
October 25, 2012

Current Status

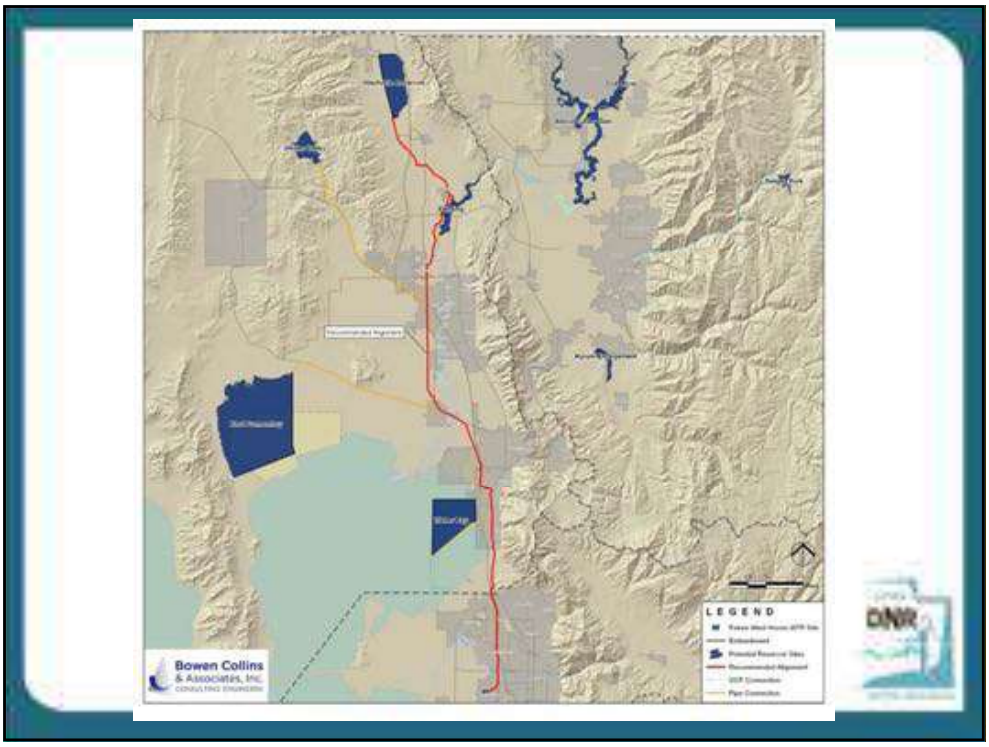
- Majority of the need is 2035 though Cache and Box Elder may have an earlier need
- Objects on the calendar are closer than they appear
- Realities of the Washakie Reservoir site investigation
- Agencies involved are meeting to define a project that works for all
  - Reservoir Sites
  - Pipeline Alignment

Involved Agencies

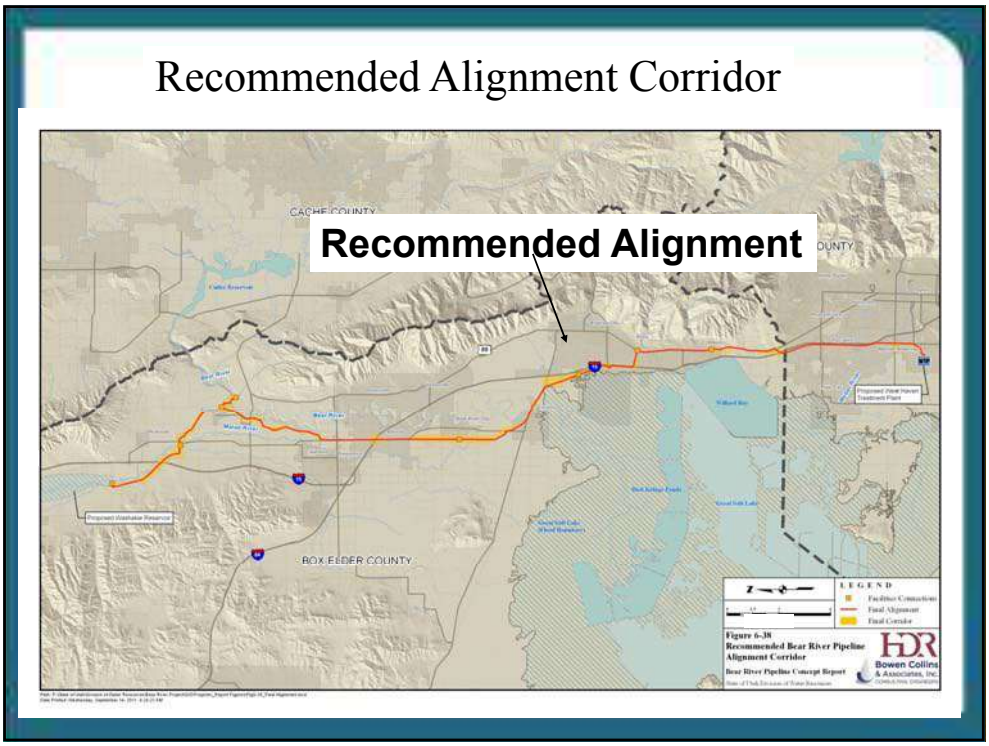
- Cache County
- Bear River Water Conservancy District
- Weber Basin Water Conservancy District
- Jordan Valley Water Conservancy District
- Bowen-Collins Associates with HDR Engineering is our consultant

Reservoir Selection Criteria

- Need at least 240,000 ac-ft of storage
- Phasing of site development
- Social considerations essential
- Overall cost is essential
- Overall project performance is essential



Recommended Alignment Corridor



Questions?

CACHE COUNTY

Cache County Water Master Plan

Steering Committee No. 3 Meeting Minutes

1/16/2013

Cache County Water Master Plan
Steering Committee Meeting Minutes
1/16/2013

Meeting Attendees:

- Clark Israelsen – USU Extension
- Paul Inkenbrandt – Utah Geological Survey
- Brent Jensen – Hyrum City
- Evan Olsen – Young Ward
- Mike Grunig – Hyde Park City
- Doug Jackson-Smith – USU
- Niel Allen – USU Extension
- Colleen Gnehm – Logan River
- Stephen Thatcher – Young Ward
- Eric Klotz – Utah Division of Water Resources
- Ron Salvesen – Hyrum City
- Joan Degiorgio – The Nature Conservancy
- Bryan Dixon – Environmentalist
- Paul James – USU
- Zan Murray – J-U-B ENGINEERS
- Marisa Egbert – State DWRe
- Marla Trowbridge – Trenton Town Co.
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- Trevor Datwyler - J-U-B Engineers
- Dan Adams – The Langdon Group
- Joshua Palmer – The Langdon Group

1. Welcome and Introductions

2. Operation of the Bear River – Claudia Conder, PacifiCorp

a. **See appendix for attached slides from presentation.**
b. Priorities are first irrigation, then power, and finally, flood control.
c. In 2000, there was a three state agreement (merger agreement) that took place to maintain historic practices to alleviate state concerns about change to operations.
d. If a conservancy district is formed, and a reservoir is created on a tributary to the Bear River, would Pacific Corp be involved in managing the reservoir?
    i. Not necessarily, but they would likely be interested in the process.
e. Considering the costs associated with pumping water into Bear Lake, is it profitable to produce power today?
    i. Power is secondary to irrigation. Even without the power, the operation is necessary for irrigation purposes.

3. Breakout Sessions

a. Aquifer Storage and Recovery - Paul Inkenbrandt, UGS

i. See appendix for attached slides from presentation

b. Water Banking - Niel Allen, USU Irrigation Extension Specialist

i. See appendix for attached slides from presentation

ii. The following questions were asked during the presentation

1. Can water banking be done with Native American tribes that have water rights along the Bear River?
    a. Their water rights are treated differently. Some tribes lease their water rights; some have recently sold their rights. It takes a lot of agreements to make it work.
2. Bear River is already kind of a water bank, how does Cache County work into that system?
    a. There are a lot of laws concerning the Bear River already that must be taken into consideration. If there are communities that need the water, unless they're big enough to build the facilities themselves, they're very limited. A conservancy district gives people more flexibility to share the water as needed. Change applications can be formal and informal. A formal agreement with the state is not necessary if only area water is used.

iii. After the meeting, Niel Allen compiled some ideas for a Cache County water bank which are attached.

4. Breakout Session Lessons Learned

a. ASR
    i. ASR solution is more suited to peaking changes, could be used in high water years, or as climate changes occur. It could be used to shift storage from snowpack to underground storage.
b. Water Banking
    i. Reasonable use – People are storing water on the south end of the Colorado river (a lot of water)
    ii. We really don't have that much room for storage (in the ground)
c. PacifiCorp Presentation
    i. Differences between storage and storage capacity

5. Lunch

6. Review of Updated Data from DWRe (See presentation slides 9 and10)

a. Two types of systems:
    i. Public Community Water Systems with at least 15 connections and 60 people living year round
    ii. Public Non-community Water Systems - enough public goes to these systems that the State wants to regulate them: Beaver Mountain, Sherwood Hills, USU, etc.
b. State Engineer sends out a water audit to each community water system every year in January
    i. Due in April

ii. The State gets about 85% response
iii. Every five years DWRe does a more detailed survey of water systems
iv. Demands are split into the following categories to arrive at more comprehensive numbers and estimates
    1. Residential
    2. Commercial
    3. Institutional
    4. Industrial

c. Population
    i. Difficult to estimate, census helps
    ii. Can divide into census tracks
    iii. Utah is the second highest water user in the country
d. Secondary use
    i. Rarely metered at the customer level and sometimes not at the source either
    ii. Estimated by asking secondary company (usually don't know, but can help make some guiding assumptions)
    iii. Don't count agricultural use, since it is modeled separately
    iv. Ask culinary system what percentage of users use potable water for outdoor irrigation
    v. Get average lot size and irrigation size, then multiply by water use (24" to grow grass in Utah) total to get municipal and industrial total.
e. Source
    i. As population grows, this tells us how much you can deliver to the users **(See the figure on slide 10 of the attached meeting presentation slides)**
f. Reliable Supply vs. Maximum Supply
    i. Maximum Supply
        1. What a system can provide to a growing water system
g. Lower curve **(See the figure on slide 10 of the attached meeting presentation slides)**
    i. Typical water use pattern
h. Wells, spring, and surface sources:
    i. Springs
        1. Maximum water supply is the lesser of the water right, or average yearly supply of the spring
        2. If you had a water right of 100 ac-ft/yr but the source only produces an average 50 ac-ft/yr, DWRe will use 50 acft/yr.
        3. Ask the water supplier how much they use the spring. If it's used all the time, then it's considered a reliable supply = 100% maximum supply. If used less, then the result is a lower percentage.
    ii. Surface
        1. Less of the water source or the treatment capacity. Reliable = maximum
    iii. Wells
        1. 50% maximum supply = reliable supply. Example: if 100 ac ft/yr is the max supply, DWRe will use 50 ac-ft/yr in projections.
i. This model is not a tool for designing a water system, but is good for planning purposes.

j. Why don't we use the minimum spring flow rather than the maximum supply?
    i. This is evaluated based on input from the staff of the water systems. Will look at more after the meeting with individual cities.
k. Future demands based on projected growth in unincorporated areas of Cache County are added to existing non-community water systems like Benson and High Creek.
l. Showed maps that indicate which water systems have adequate source capacity, in each of the next 5 decades, to meet projected demands assuming no additional conservation in the future **(See attached meeting presentation slides 11-16).**
m. Showed maps that indicate which water systems have adequate source capacity, in each of the next 5 decades, to meet projected demands assuming 25% conservation over the next 50 future years **(See attached meeting presentation slides 17-22).**
n. The model is based on total volume within a year, not a peak day.
o. The model is based on the assumption that you are doing nothing to increase your water supply into the future. You may have means to make improvements to your water supply. Further development of water rights etc.
p. Non-use water rights may or may not be used in these calculations based on what the city reports to the state. In conservation plans the state is getting more information on the non-use rights.
q. Conservation: Cache County is not conserving right now, our per capita use staying the same or maybe even going up
r. Can you send maps of what the cities' sources are (springs, wells etc…)?
    i. Yes.
s. We want to evaluate efforts needed to ensure a sustainable water supply in the future
t. Regional projects take a lot of time to develop
u. Does the data include water that a community may own in an irrigation company?
    i. Kind of. Not in the potable supply, but it helps you with the secondary demand.
v. As we develop more supply, what impact might that have on the riparian areas, rivers etc. (environmental concerns)? How does this enter into the calculations?
    i. As we think about the future of Cache Valley, we want to maintain the environment, riparian areas.
w. Legislator's goal is to get 25% conservation by 2060, if we're already at 18% state wide, what is a realistic goal? Could we conserve more than 25%?
    i. Possibly, but the low hanging fruit is easier to attain due to the efficiency measures. The first 18% of conservation might have been a lot easier to attain than the next 7%.
x. What is going on in Cache County? Why are we not conserving more?
    i. Most communities have more management.
    ii. Other communities that have conservancy districts have a conservation requirement
    iii. Cache County still has large rural lots, with secondary systems. Water is relatively cheap, so there is not much incentive to conserve right now.
y. Trenton has incentives to repair leaks such as free aerators for bathroom and kitchen sinks.
z. Logan's water use per capita was 300 gallons per day (gpcd) in the 90's. With tank replacements and water line replacements, usage has decreased to 240 gpcd in recent years. Logan is showing a significant decrease, why is county increasing?
    i. Culinary use is going down, but secondary is going up

aa. Irrigated acres in Cache County
    i. Map that shows irrigated acres and non-irrigated acres in Cache County **(see meeting presentation slide 23)**
    ii. There are some irrigable lands in the county that currently are not being irrigated **(see meeting presentation slide 24).**

7. Evaluation of Future Alternatives and Actions

a. Project alternatives:
b. The first part of evaluating alternatives is to identify objectives
c. Based on input from the steering committee these objectives have been identified **(See meeting presentation slide 25)**
d. The objectives can be separated into four main categories:
    i. water supply
    ii. implementation
    iii. environment
e. Metrics (methods of measurement) are needed to be able to measure and quantify how well a given alternative meets the objectives.
f. Aquifer storage and recovery (ASR) at the mouth of Green Canyon is listed in the table **(see meeting presentation slide 28)**
    i. As an example, ASR would help put water to beneficial use, which is the first metric given in the table.
    ii. We can look at the other metrics listed from left to right across the table to see how well the ASR project helps meet those metrics.
g. Question: Are the examples on the sheet just random examples, or the best, or the worst?
    i. We have not had time to evaluate alternatives yet. These are some preliminary ideas that we have listed; we'd like any additional input from the steering committee.
    ii. The actual evaluation of the alternatives will be more in depth.
h. Can we send project ideas?
    i. Yes. Send the ideas to Chris Slater
i. Once we have identified some project alternatives, we need to evaluate what kind of water institution (water management structure) will allow us to implement the alternatives and meet other objectives that have been identified that are tied to water governance.
j. Potential institutions: is there a water institution (management structure) that should be in place to help us achieve the objectives?
k. Can you send out the last spreadsheet in minutes?
    i. Yes (*see attached DRAFT copies of the evaluation of alternative tables. The potential institutions table cannot be filled in until the first table is completed. Both tables are draft copies and do not represent a comprehensive evaluation of the alternatives)*
l. If our goal is 25% conservation, do we have an objective that is conservation?
m. List of proposed dams in the plan?
    i. There are about 55 dams that the Division of Water Resources is looking at preliminarily.
n. How many are in Cache County?

        i. About half of them.
    o. Education is important as the process moves forward

8. Instant Poll Survey

a. The meeting participants answered a list of questions about water issues and needs using instant poll machines
b. The poll questions and responses are located in the appendix

9. Next Meeting

a. The next steering committee meeting is tentatively scheduled to be held on **April 24th 2013**
b. The time and place for the meeting will be sent to all of the steering committee members as we get closer to April.

CACHE COUNTY
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Steering Committee Meeting

Jan. 16, 2013

CACHE COUNTY
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Meeting Agenda

- **Welcome and Introduction (10 min) -** Dan Adams
- **Operation of the Bear River - presentation (20 minutes) –** Connely Baldwin
- **Breakout discussions (20 min.) -** Dan Adams
  - **Aquifer Storage Recovery** - Paul Inkenbrandt
  - **Water Banking** - Niel Allen
- **Items learned from breakout discussions (10 min.) -** Dan Adams
- **LUNCH (20 min.)**
- **Review of updated data from DWRe (25 minutes) –** Todd Adams & Eric Klotz
- **Discussion about evaluation of future alternatives and actions (25 min.) –** Chris Slater
- **Instant poll survey (20 minutes) –** Joshua Palmer
- **Next meeting – April or May 2013 (5 minutes) –** Dan Adams

Master Plan Purpose

- Master Plan Purpose
  - Evaluate existing water resources and demands
  - Determine future water demands
  - Educate and build consensus
  - Create a plan for the future
  - Recommend methods to manage water resources in the County

Steering Committee Ground Rules

- Steering Committee Ground Rules and Communication
  - A. Take good minutes and get them back to the committee
  - B. Focus on broader/County issues, not just those from one specific organization
  - C. Communicate effectively outside of the meeting, and don’t editorialize information
  - D. Speak with respect
  - E. Be aware of time constraints

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Operation of the Bear River

Connely Baldwin - PacifiCorp

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Breakout Sessions

Aquifer Storage and Recovery
Paul Inkenbrandt

Water Banking
Niel Allen

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Breakout Session
Lessons Learned Discussion

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Review of Updated DWRe Data

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Supply Demand Calculations

DEMANDS						SUPPLY			
YEAR	Population	Potable Total (Ac-ft/yr)	Secondary Total (Ac-ft/yr)	M&I Total (Ac-ft/yr)	Total GPCD	Reliable Potable Supply (Ac-ft/yr)	Secondary Supply (Ac-ft/yr)	Total Supply (Ac-ft/yr)	Total Supply Surplus (Ac-ft/yr)

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Water Supply Demand Chart

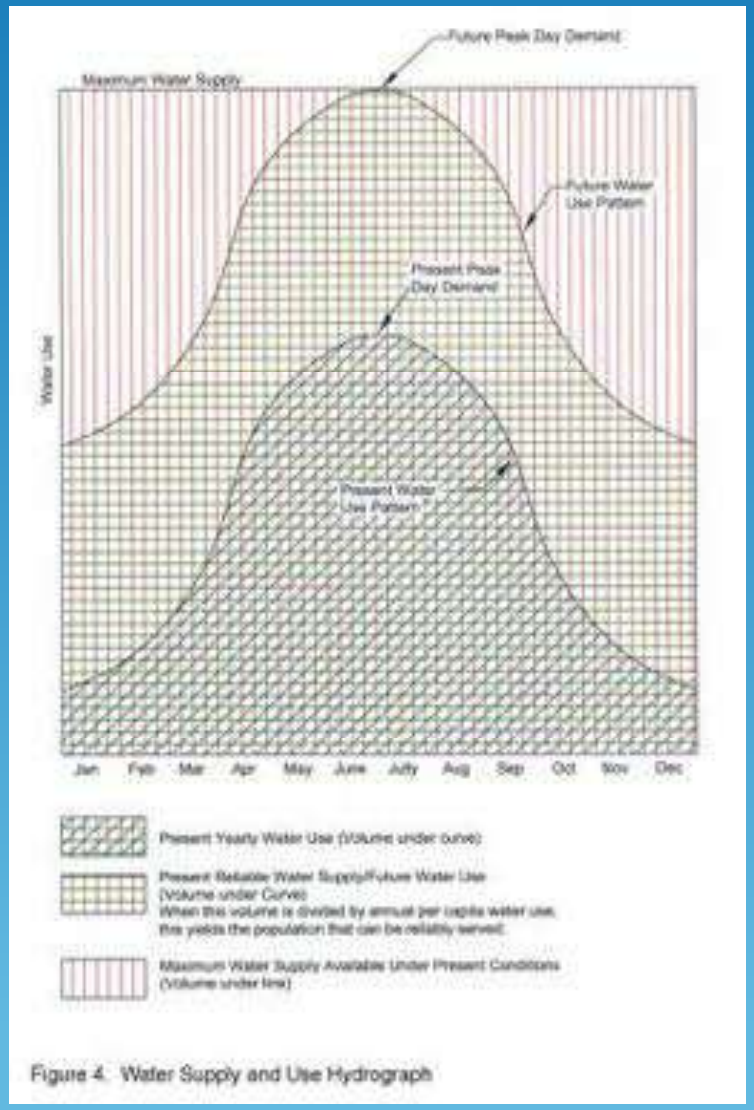

Figure 4. Water Supply and Use Hydrograph

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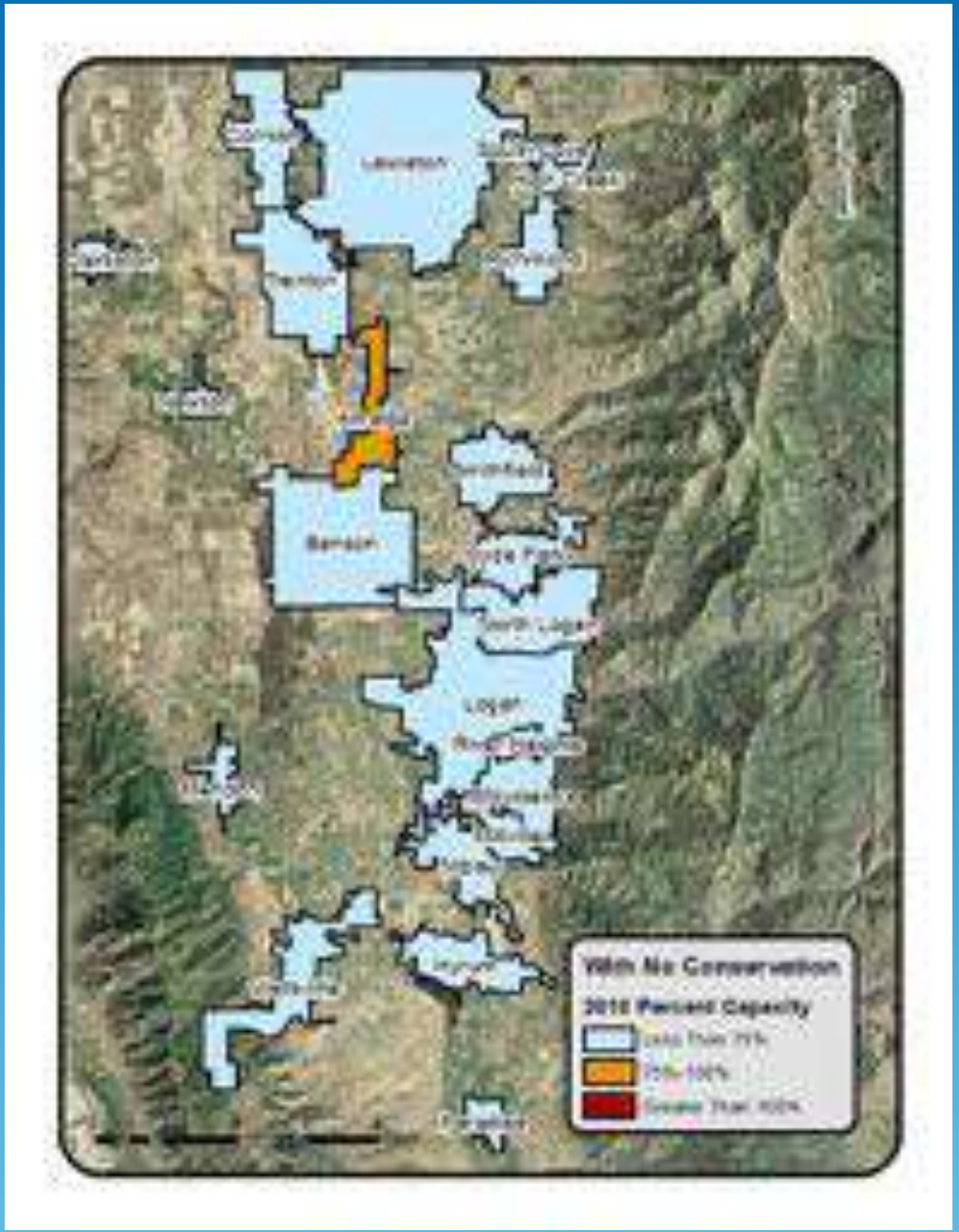

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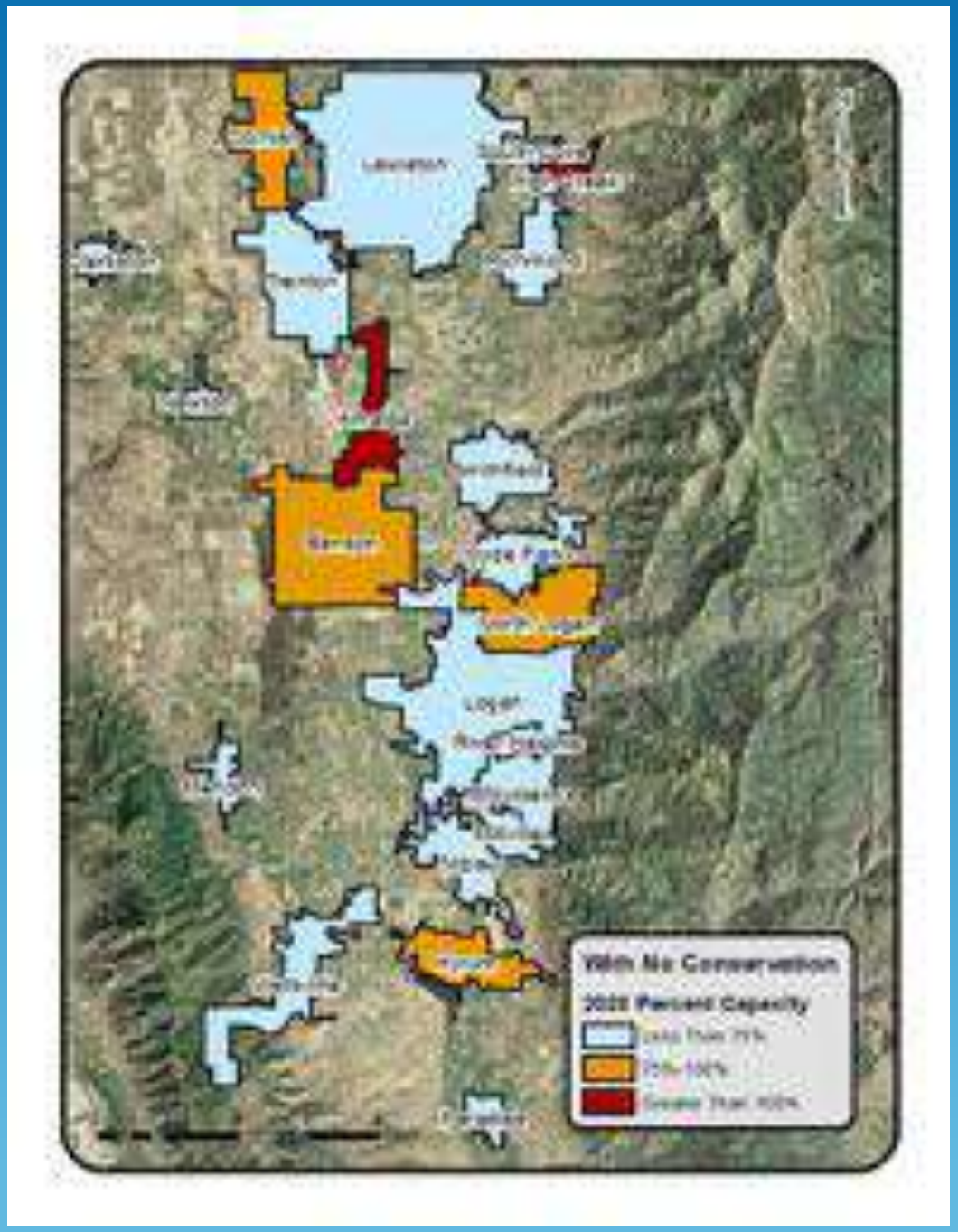

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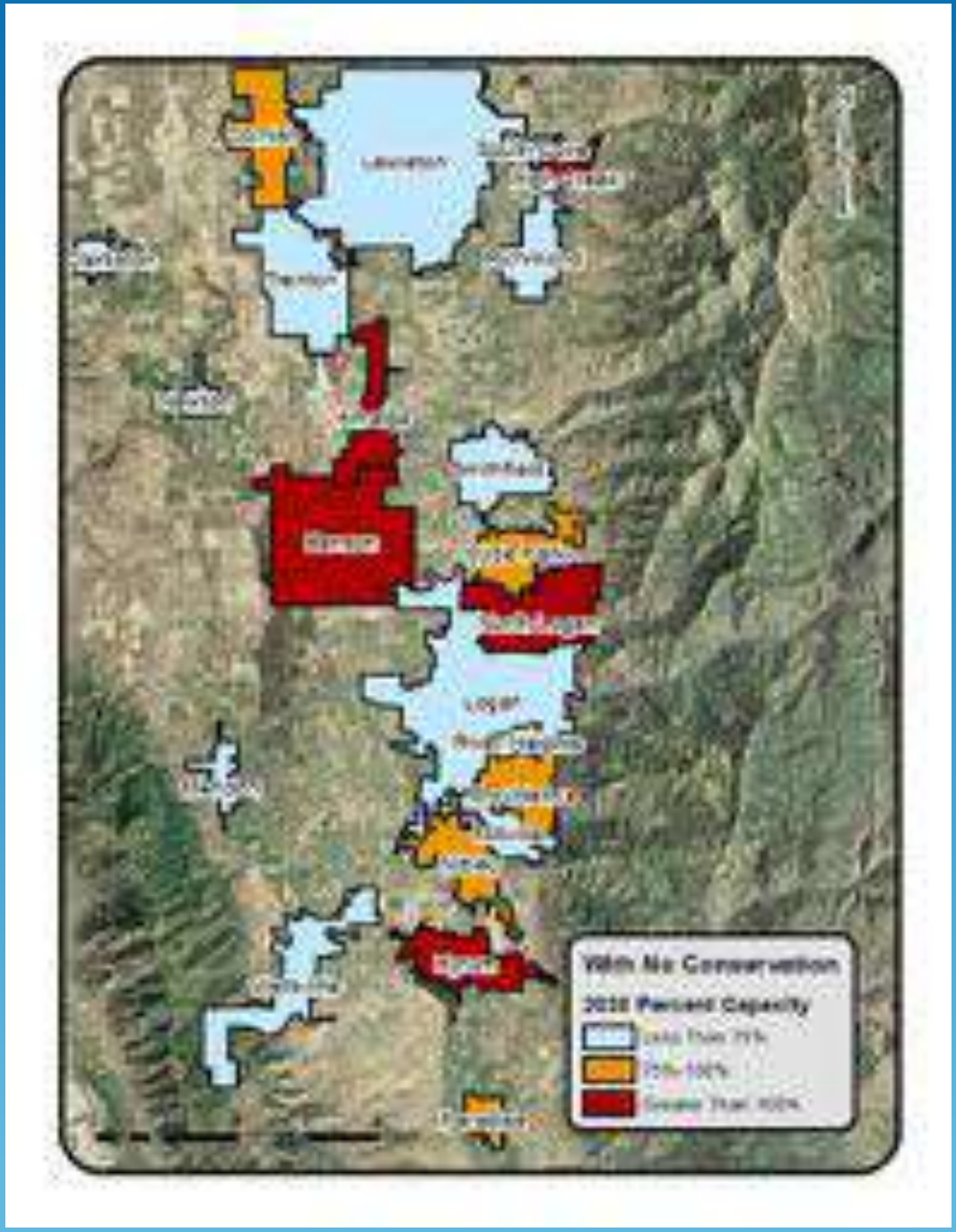

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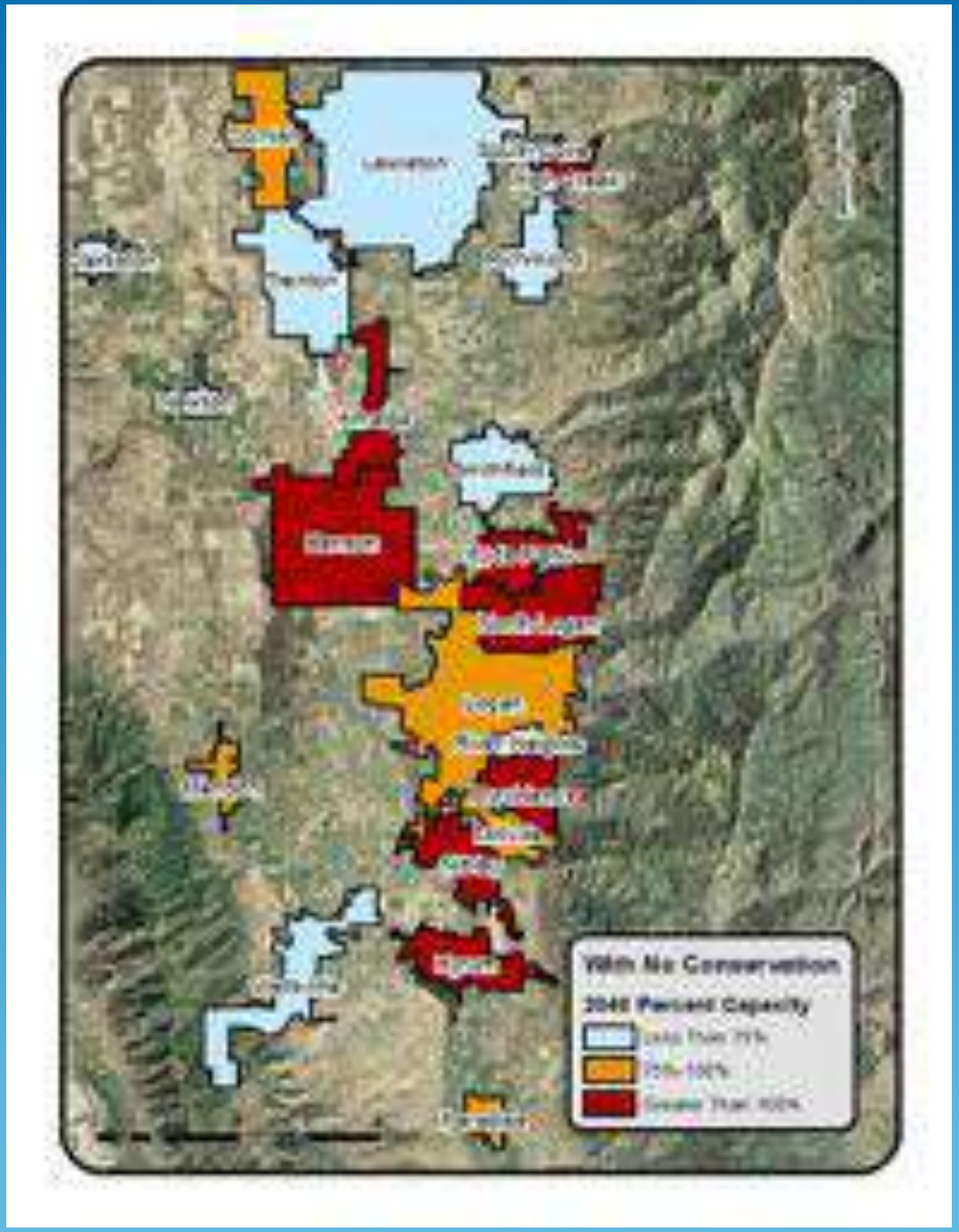

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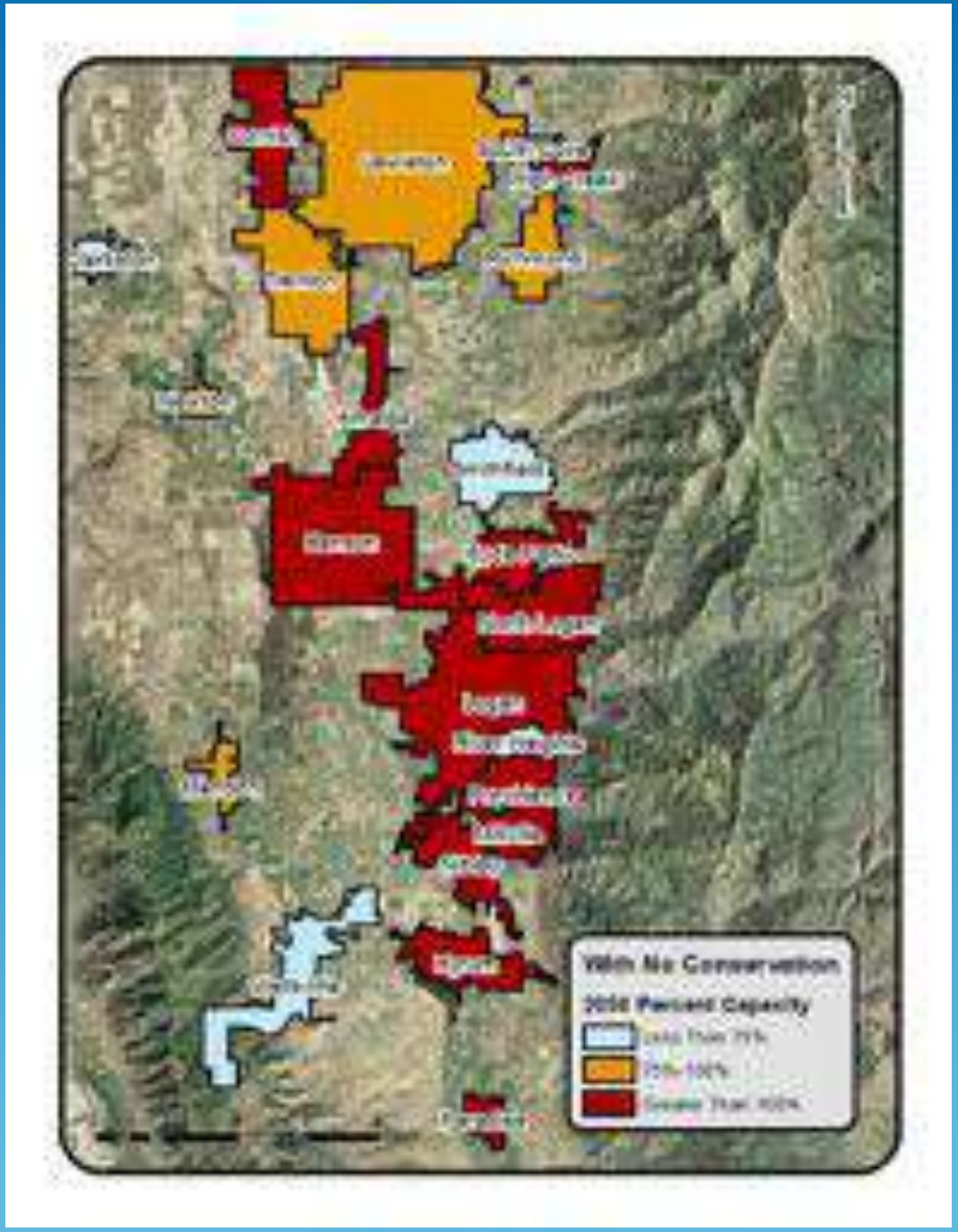

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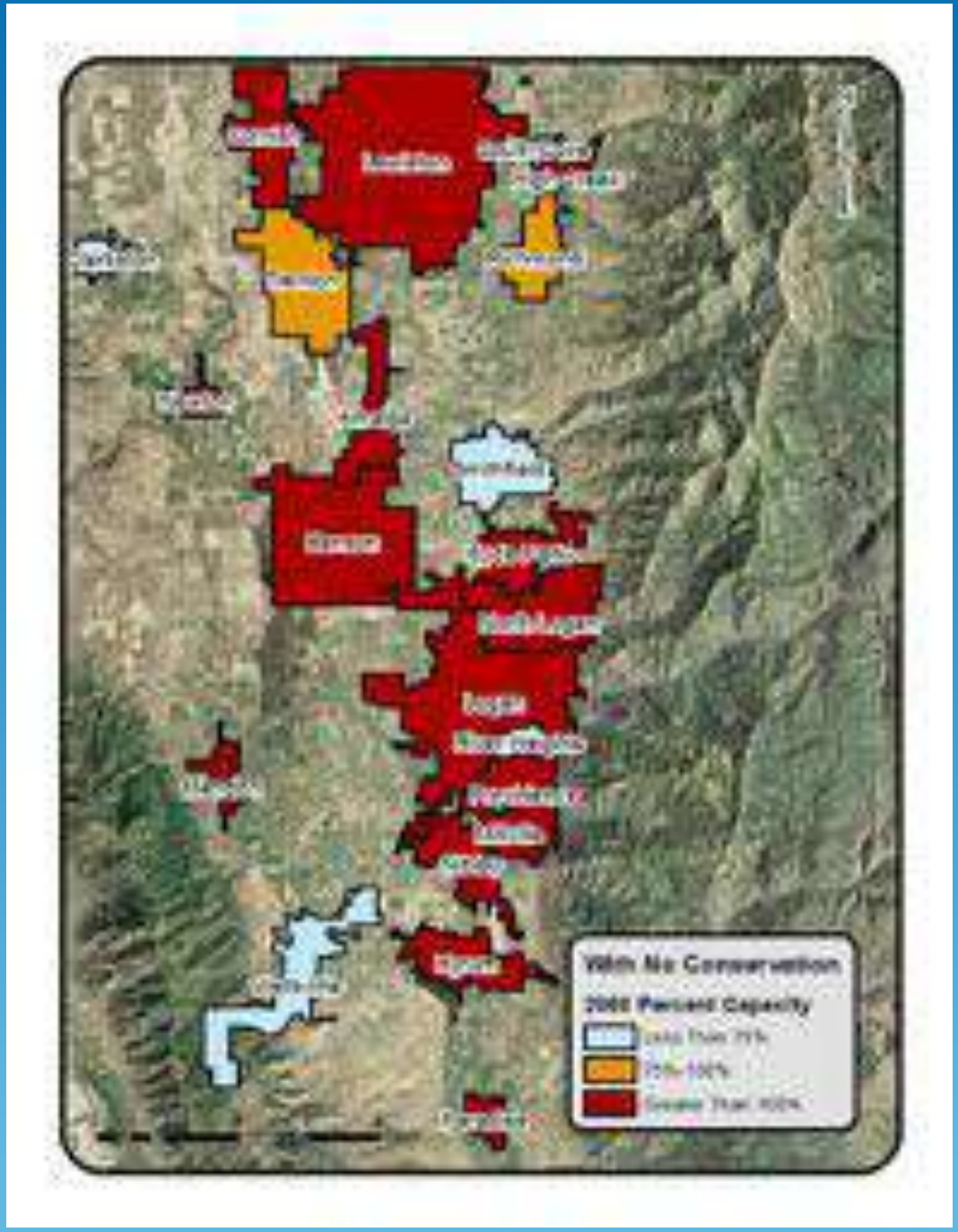

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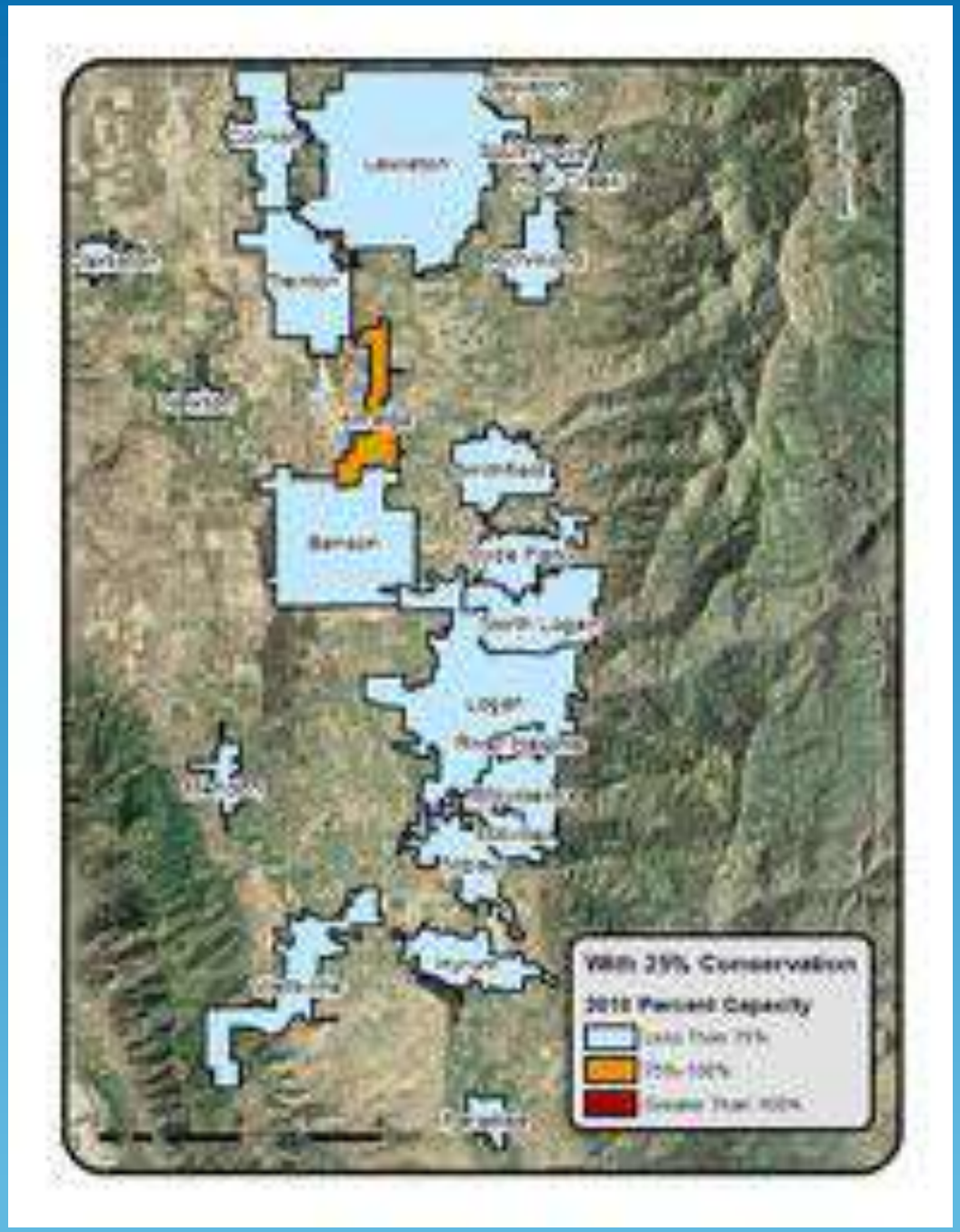

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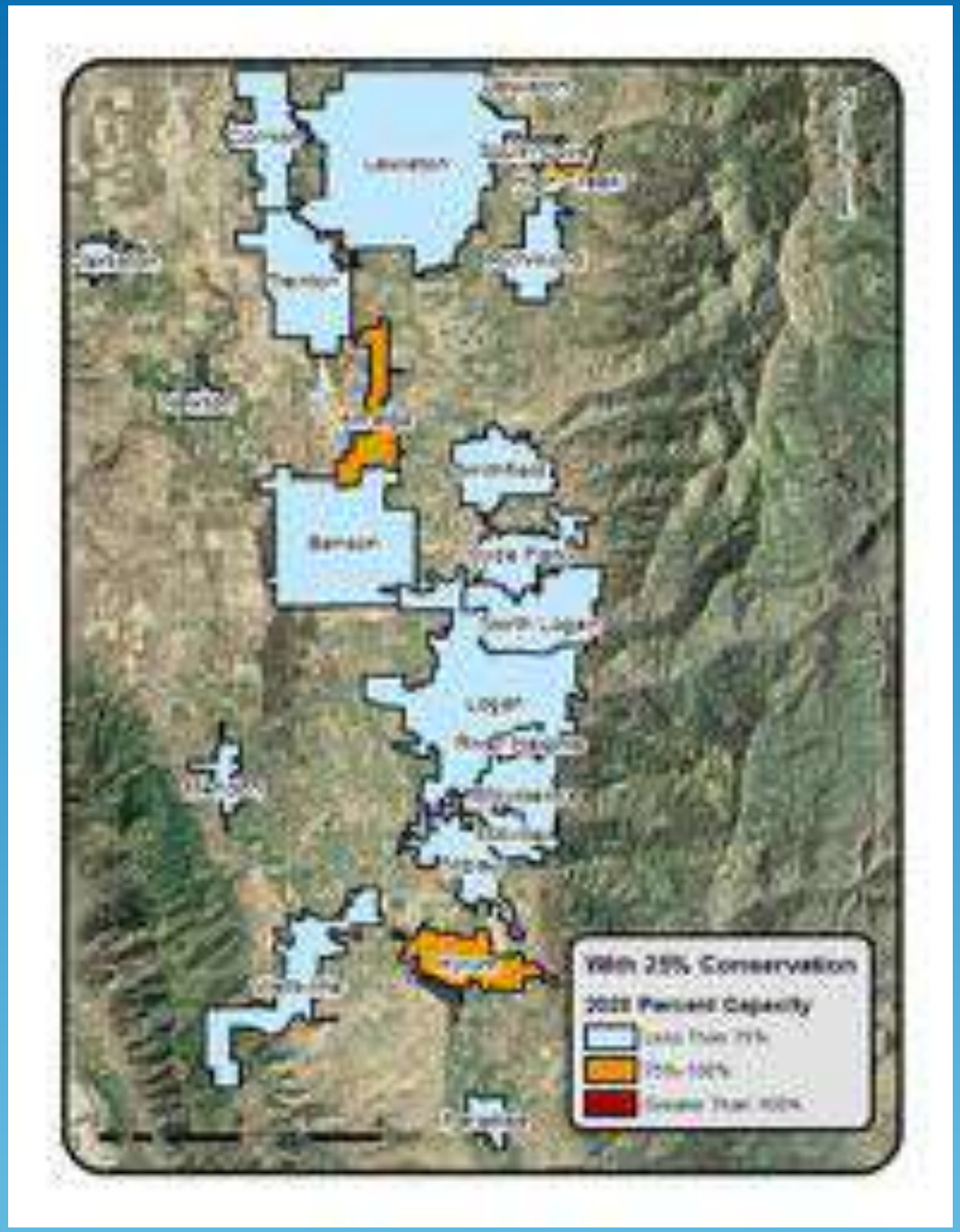

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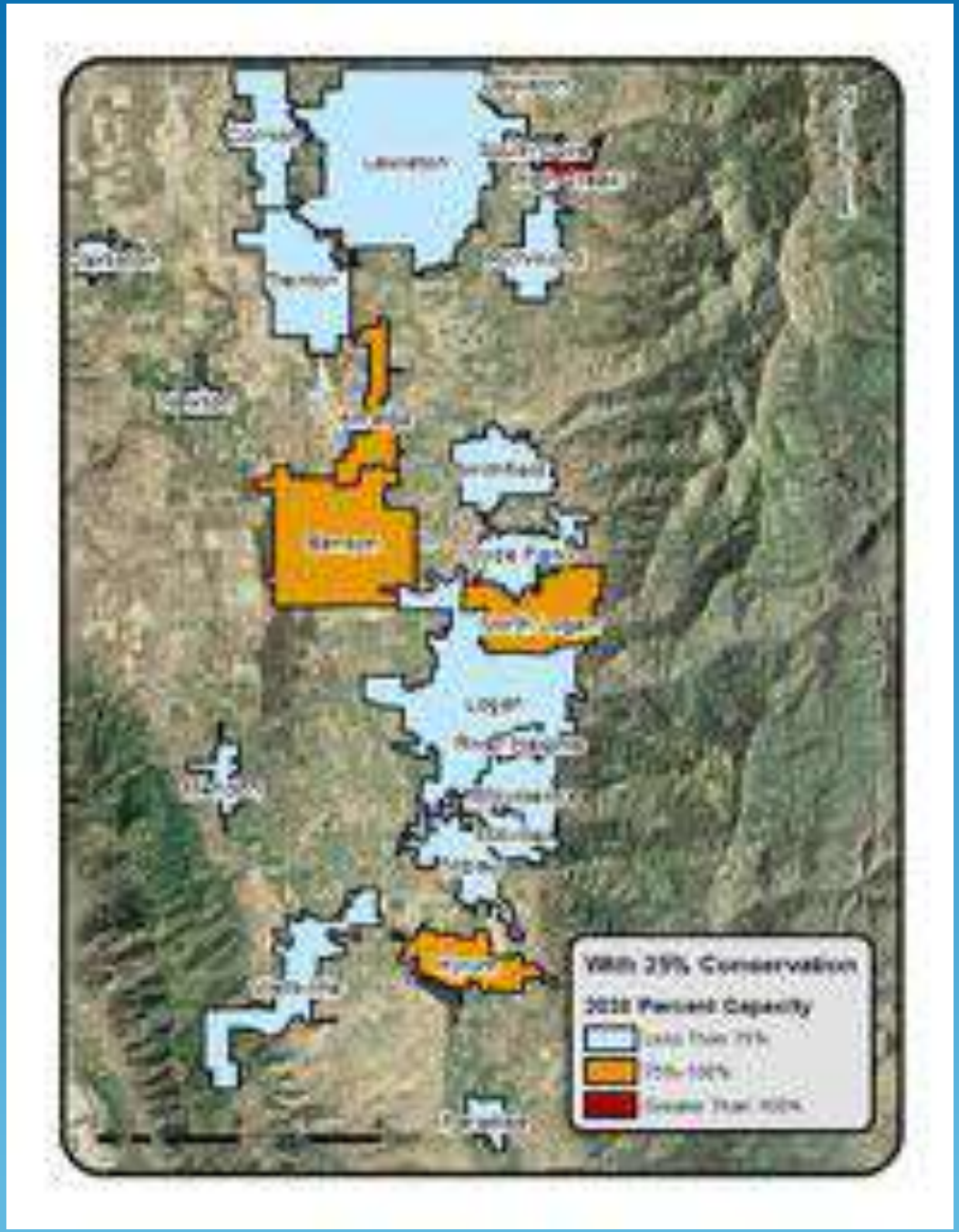

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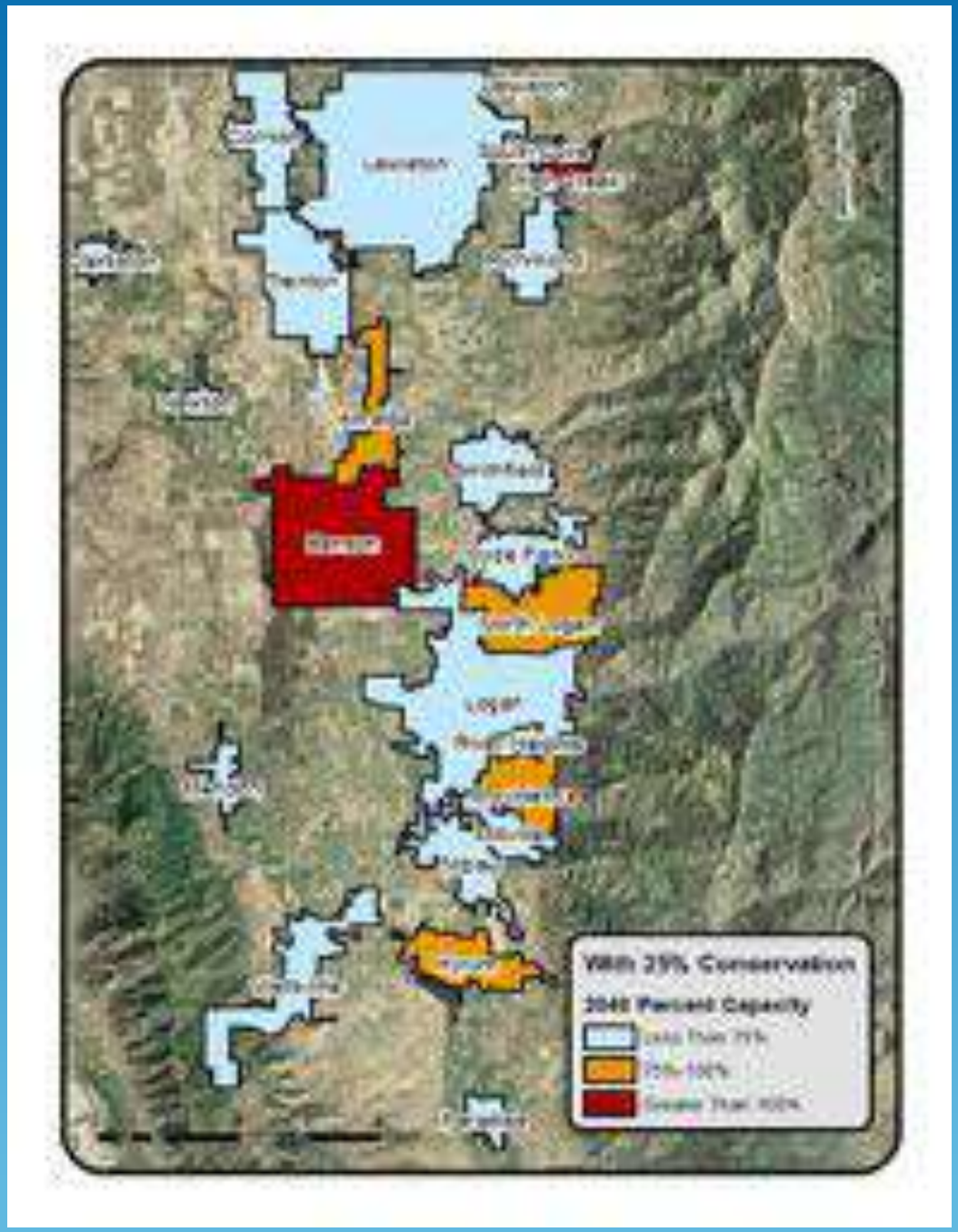

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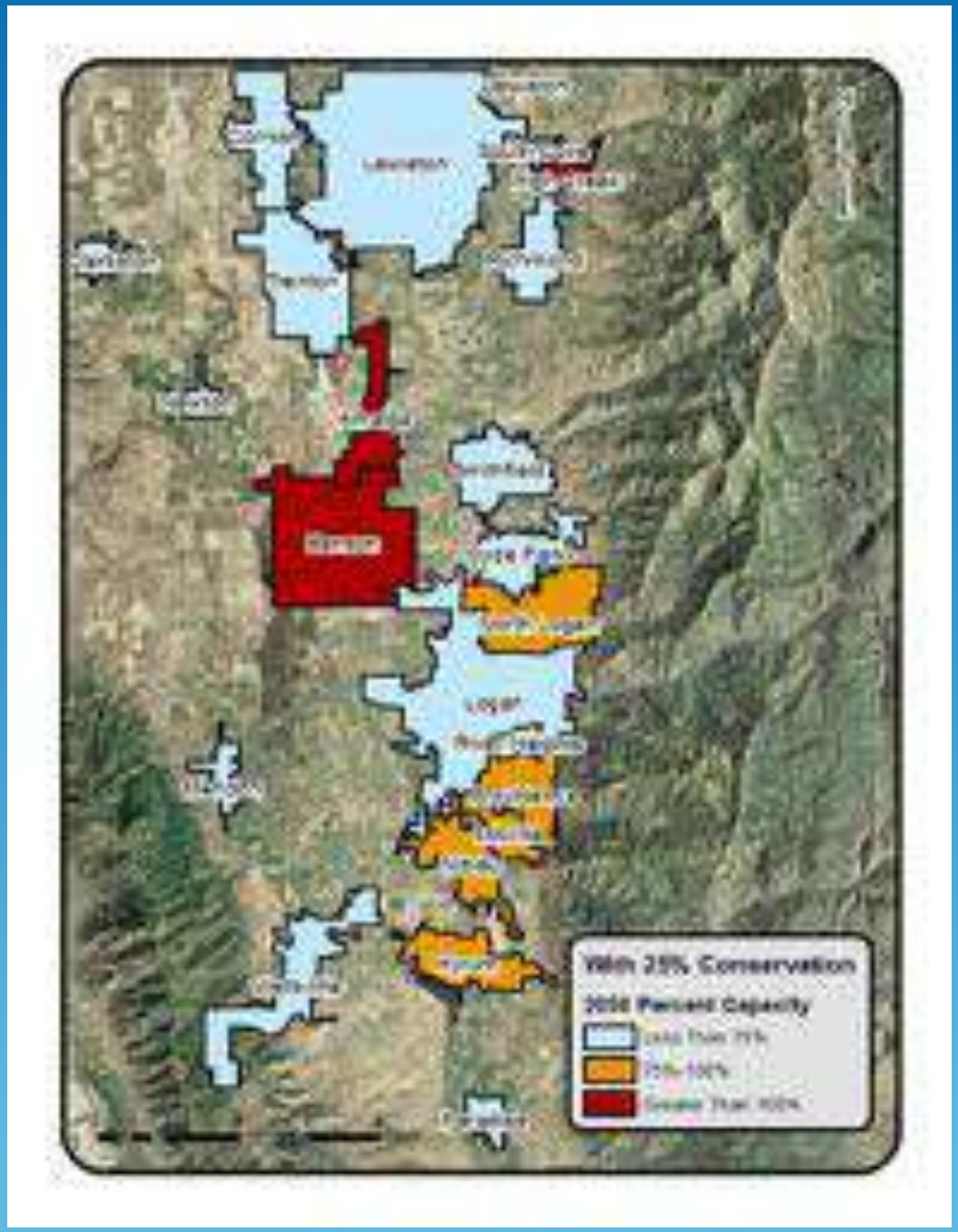

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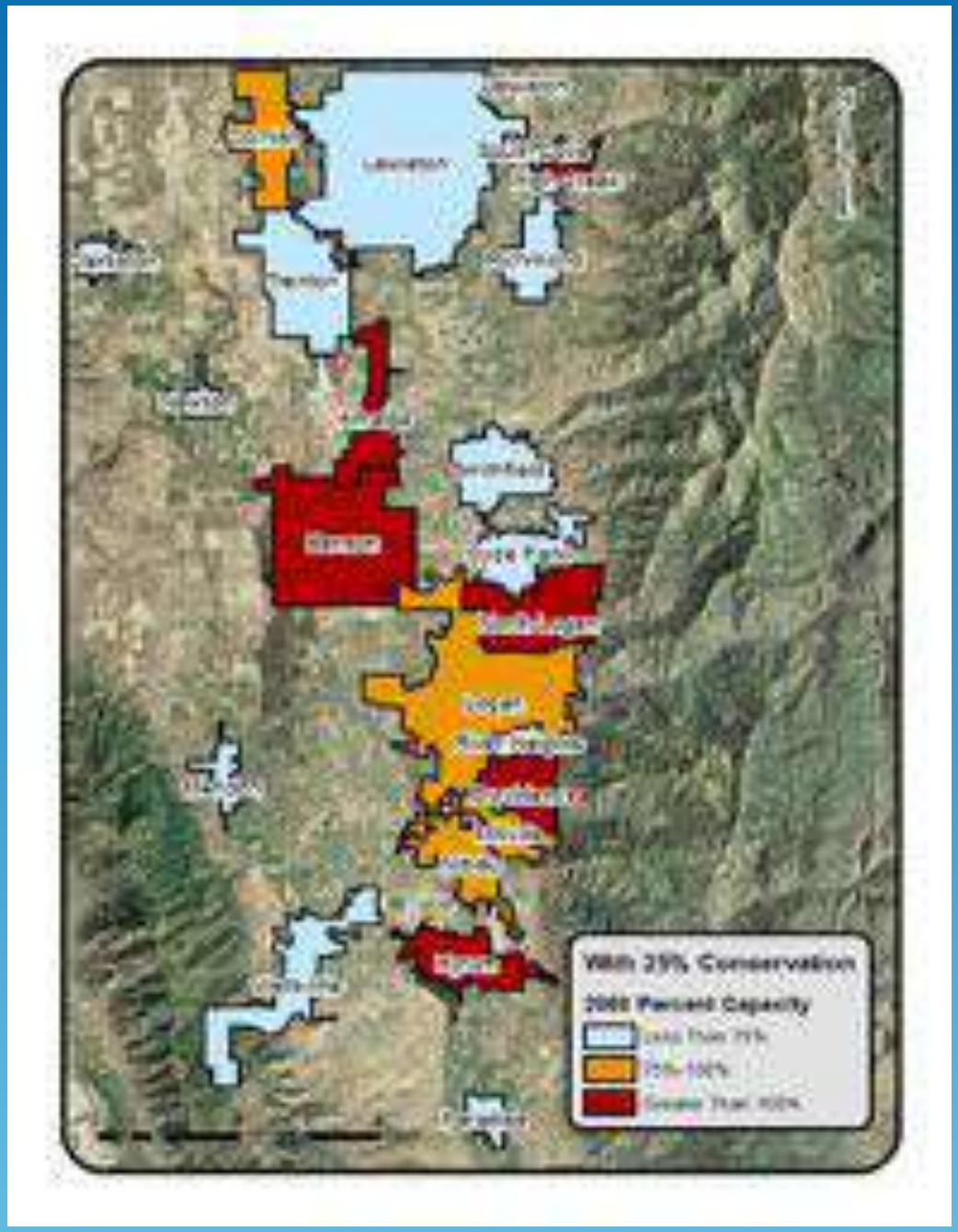

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Water Related Land Uses

Source: Division Of Natural Resources Bear River Basin 2009 Water Related Land Use Inventory

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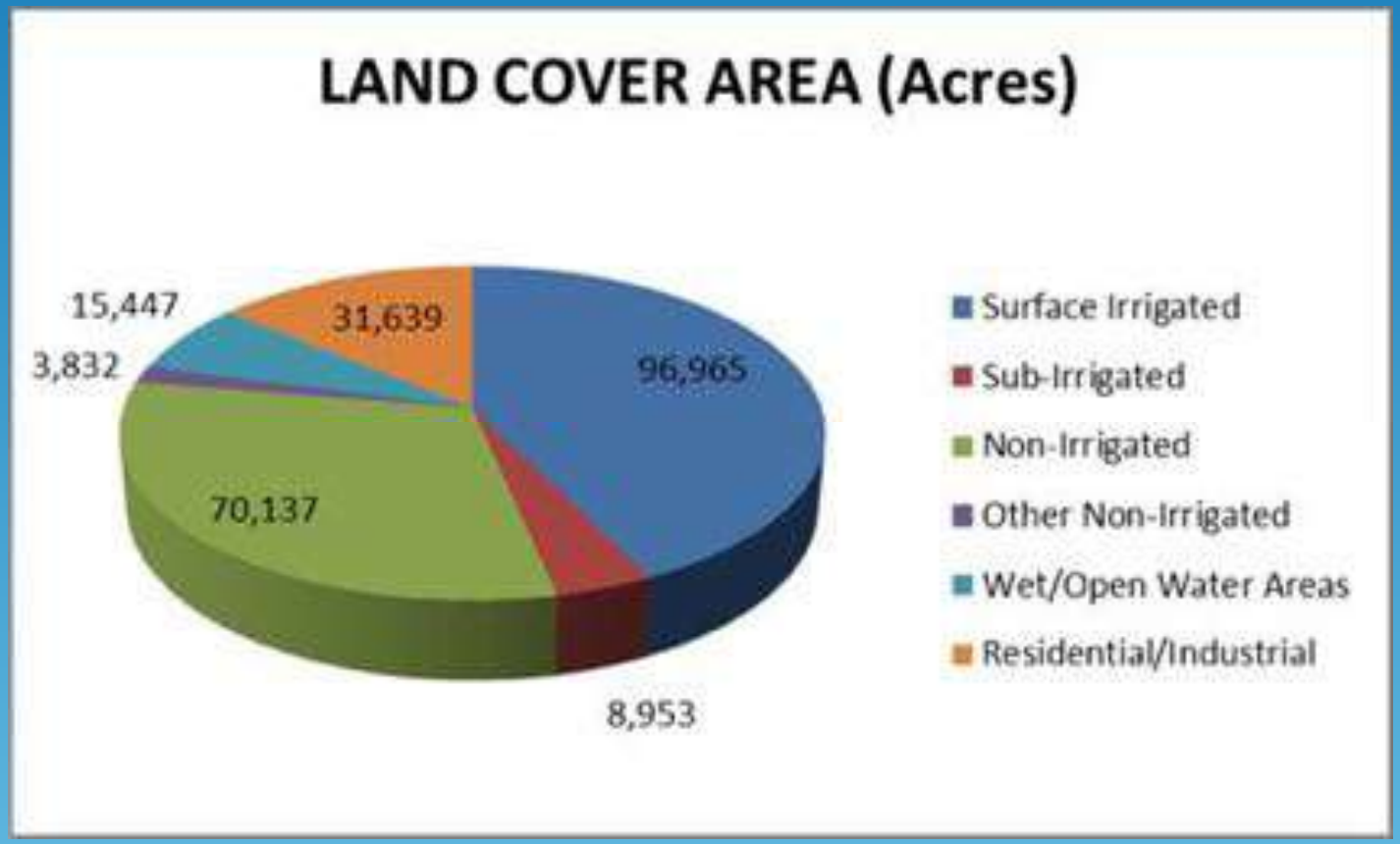
Water Related Land Uses



Source: Division Of Natural Resources Bear River Basin 2009 Water Related Land Use Inventory

Evaluation Alternatives & Future Actions

Project Alternatives

OBJECTIVES											
Water Supply						Implementation				Environment	
Protect water allocated to County and provide for future needs	Provide adequate reliable future culinary supply	Provide adequate reliable irrigation supply now and in the future	Provide adequate irrigation storage capacity	Maintain existing irrigation delivery systems	Make efficient use of available water resources	Minimize costs to develop water	Promote collaboration and focus on regional projects	Keep existing water rights owners whole	Educate the public about the current water situation and any future anticipated problems	Protect water quality and drinking water sources	Maintain or improve environmental quality

Evaluation Alternatives & Future Actions

Project Alternatives

OBJECTIVES																	
Water Supply									Implementation				Environment			
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METRICS (methods of measurement)																	
Water put to beneficial use or in approved non-use status (acre-feet)	Bear River water developed (acre-feet)	Redundant sources for community systems (number)	Communities with adequate supply to year 2060 (number)	Reliable irrigation supply added (acre days)	Average yield from storage facilities (acre-feet per year)	Canals dredged, lined, or reconstructed (linear feet)	Residential units with secondary water (%)	Residential water use (gallons per capita per year)	Development cost ($ per acre feet per year)	Entities involved in a project (number)	Water rights applications without protest or with resolved protest (number)	Providers that can explain how long their water supply will last (number)	County residents who can state where their water comes from (number)	Complies with required environmental processes (yes/no)	Enhances water source protection (yes/no)	Water developed to maintain or improve wildlife habitat (acre-feet)	Riparian environment protected (acres)

Evaluation Alternatives & Future Actions

Project Alternatives

PROJECT ALTERNATIVES	OBJECTIVES																	
	Water Supply									Implementation				Environment			
	Protect water allocated to County and provide for future needs		Provide adequate reliable future culinary supply		Provide adequate reliable irrigation supply now and in the future	Provide adequate irrigation storage capacity	Maintain existing irrigation delivery systems	Make efficient use of available water resources		Minimize costs to develop water	Promote collaboration and focus on regional projects	Keep existing water rights owners whole	Educate the public about the current water situation and any future anticipated problems	Protect water quality and drinking water sources		Maintain or improve environmental quality	
	METRICS (methods of measurement)																
	Water put to beneficial use or in approved non-use status (acre-feet)	Bear River water developed (acre-feet)	Redundant sources for community systems (number)	Communities with adequate supply to year 2060 (number)	Reliable irrigation supply added (acre days)	Average yield from storage facilities (acre-feet per year)	Canals dredged, lined, or reconstructed (linear feet)	Residential units with secondary water (%)	Residential water use (gallons per capita per year)	Development cost ($ per acre feet per year)	Entities involved in a project (number)	Water rights applications without protest or with resolved protest (number)	Providers that can explain how long their water supply will last (number)	County residents who can state where their water comes from (number)	Complies with required environmental processes (yes/no)	Enhances water source protection (yes/no)	Water developed to maintain or improve wildlife habitat (acre-feet)	Riparian environment protected (acres)
Water Storage Projects																		
Aquifer storage and recovery at mouth of Green Canyon	✓	✓	✓	✓							✓	✓			✓			✓

CACHE COUNTY WATER MASTER PLAN

Evaluation Alternatives & Future Actions

Project Alternatives

PROJECT ALTERNATIVES	OBJECTIVES																	
	Water Supply									Implementation					Environment			
	Protect water allocated to County and provide for future needs		Provide adequate reliable future culinary supply		Provide adequate reliable irrigation supply now and in the future	Provide adequate irrigation storage capacity	Maintain existing irrigation delivery systems	Make efficient use of available water resources		Minimize costs to develop water	Promote collaboration and focus on regional projects	Keep existing water rights owners whole	Educate the public about the current water situation and any future anticipated problems		Protect water quality and drinking water sources		Maintain or improve environmental quality	
	METRICS (methods of measurement)																	
	Water put to beneficial use or in approved non-use status (acre-feet)	Bear River water developed (acre-feet)	Redundant sources for community systems (number)	Communities with adequate supply to year 2060 (number)	Reliable irrigation supply added (acre days)	Average yield from storage facilities (acre-feet per year)	Canals dredged, lined, or reconstructed (linear feet)	Residential units with secondary water (%)	Residential water use (gallons per capita per year)	Development cost ($ per acre feet per year)	Entities involved in a project (number)	Water rights applications without protest or with resolved protest (number)	Providers that can explain how long their water supply will last (number)	County residents who can state where their water comes from (number)	Complies with required environmental processes (yes/no)	Enhances water source protection (yes/no)	Water developed to maintain or improve wildlife habitat (acre-feet)	Riparian environment protected (acres)
Water Storage Projects																		
Aquifer storage and recovery at mouth of Green Canyon	✓	✓	✓	✓							✓	✓			✓			✓
Construct Temple Fork reservoir	✓	✓		✓	✓	✓		✓	✓		✓				✓			✓
Construct Cub River near Richmond reservoir	✓	✓		✓	✓	✓		✓	✓		✓				✓			✓
Irrigation Projects																		
Construct secondary water system in Logan	✓	✓				✓		✓	✓			✓			✓			✓
Enclose Crockett Canal east of Logan Center Street					✓		✓		✓		✓	✓			✓			
Culinary Water Projects																		
Interconnect Mendon and Wellsville	✓		✓	✓							✓	✓			✓		✓	✓
Other																		
Water bank -- trade, exchange, or lease water rights to meet changing needs	✓										✓	✓			✓		✓	
Visit each city council to discuss their water outlook									✓		✓		✓		✓	✓		

Evaluation Alternatives & Future Actions

Potential Institutions

POTENTIAL INSTITUTIONS	OBJECTIVES																			
	Water Supply		Governance						Implementation								Environment			
	Protect water allocated to County and provide for future needs		Represent Cache County on water legislation issues	Represent all County water users	Operate and maintain water systems on a local level	Protect existing water rights holders	Minimize management costs	Fund needed regional water projects	Promote collaboration	Complete water management projects							Protect water quality and drinking water sources		Maintain or improve environmental quality	
	METRICS (methods of measurement)																			
	Water put to beneficial use or in an approved non-use status (acre-feet)	Bear River water developed (acre-feet)	Money available to lobby with the legislature ($)	Entities represented for regional water decisions (number)	Systems that make own source, storage, distribution and other local system improvements (number)	Water rights applications without protest or with resolved protest (number)	Cost ($ per year per $100,000 of property ownership)	State money available/ reserved for County water users ($)	Funding for water improvement projects ($)	Water systems that support institution (number)	Aquifer storage and recovery at mouth of Green Canyon (yes/no)	Construct Temple Fork reservoir (yes/no)	Construct Cub River near Richmond reservoir (yes/no)	Construct secondary water system in Logan (yes/no)	Enclose Crockett Canal east of Logan Center Street (yes/no)	Interconnect Mendon and Wellsville (yes/no)	Water bank -- trade, exchange, or lease water rights to meet changing needs (yes/no)	Visit each city council to discuss their water outlook (yes/no)	Projects that comply with required environmental processes (%)	Completed projects that enhance water source protection (number)	Water developed to maintain or improve wildlife habitat (acre-feet)	Riparian environment protected (acres)
1. County Management with more staff and resources	✓	✓			✓	✓				✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
2. Special Service District	✓		✓		✓	✓		✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓
3. Water Conservancy District	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4. Continue with current System					✓	✓								✓	✓			✓				

PacifiCorp in the Bear River Basin:

The co-development of irrigation and hydropower. How a power company came to be an irrigation supplier

January 16, 2013

PACIFICORP ENERGY
A DIVISION OF PACIFICORP

Overview

- Brief History and Background
- Law of the River: Major Agreements
- Operations

PACIFICORP ENERGY
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Context – Bear Lake and Bear River Hydro Plants

Brief History

- Late 1890s - Increasing electricity demand exceeded supply of small tributary hydro plants and lead to the use of Bear River for hydro power generation
- 1907 Grace Idaho hydroelectric plant on the Bear River completed.
- 1907 Bear Lake permit issued by federal government, BUT was subject to irrigation as primary use for the water.

Brief History - continued

- 1912 Utah Power and Light formed - irrigation deliveries from Bear Lake cemented by an agreement to deliver 900 cfs during the summer to Bear River Canal Company in Box Elder County.
- Other agreements followed and today about half of Bear Lake water is delivered to Bear River Canal Company.
- Bear Lake water is supplemental to natural flow, but vital. Needed every year except rare very high flow years.

Timeline of Bear River Development

- 1907 Grace
- 1917 Lifton Pumps
- 1917 Cove
- 1921 Oneida
- 1924 Soda
- 1927 Cutler

Law of the River: Major Agreements

- 1898 Original federal legislation governing Bear Lake development – "power, as subsidiary to … irrigation"
- 1955 Bear River Compact (amended in1980) established "irrigation reserve"
- Early 1970s and mid 1980s Two flood-related lawsuits imposed duty to operate Bear Lake also for flood control.
- 1995 Bear Lake Settlement Agreement (amended and restated in 2004) – established annual irrigation allocation (rationing)
- 2000 "Three-State" Agreement (aka Merger Agreement) – "maintain historic practices" to alleviate state's concerns about change to operations

PACIFICORP ENERGY
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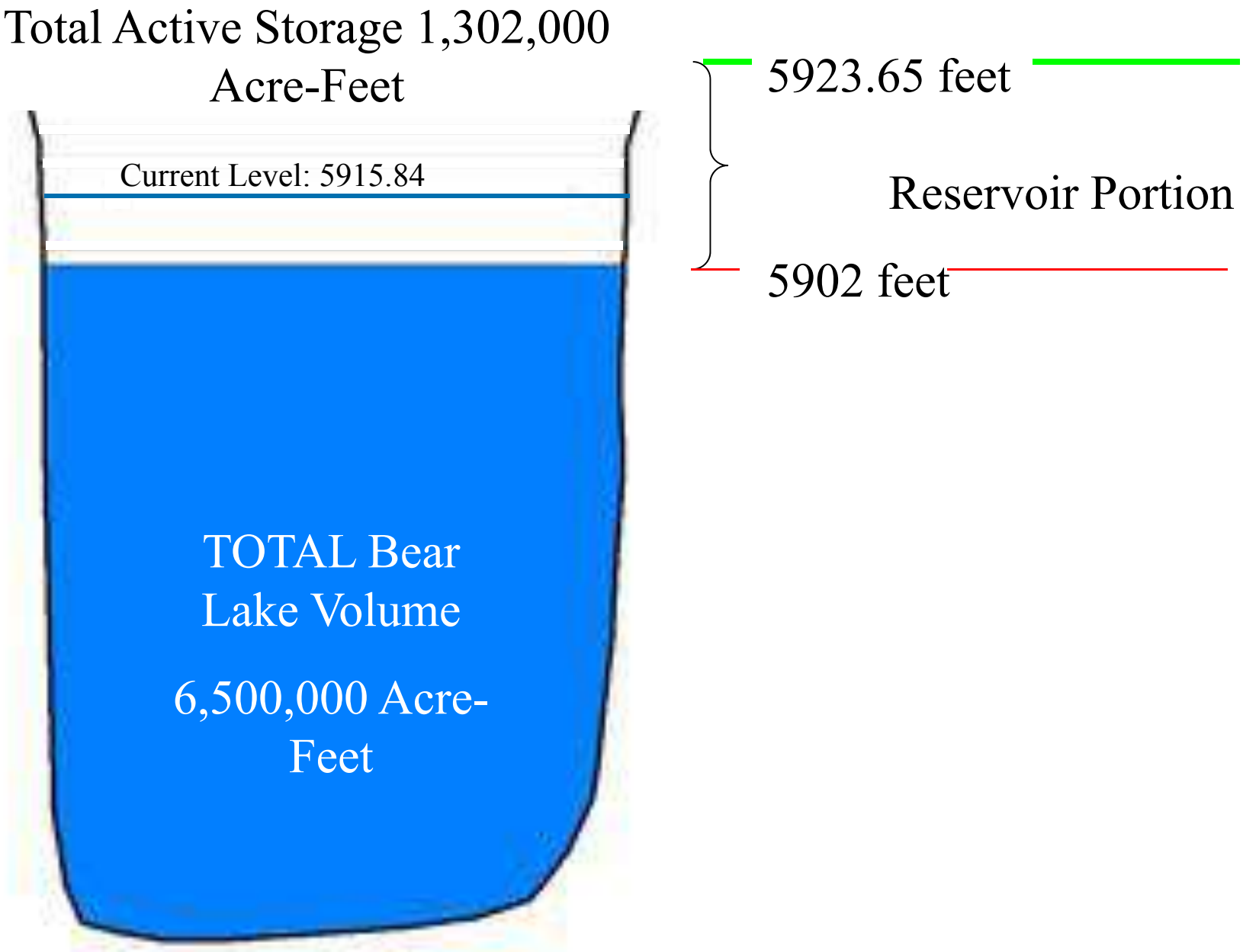
Current Operations

- Power releases from Bear Lake are subsidiary to irrigation (and now flood control)
- Irrigation coordination to conserve Bear Lake storage water
- Hydropower at Soda Springs, (Last Chance), Grace, Oneida and Cutler plants.

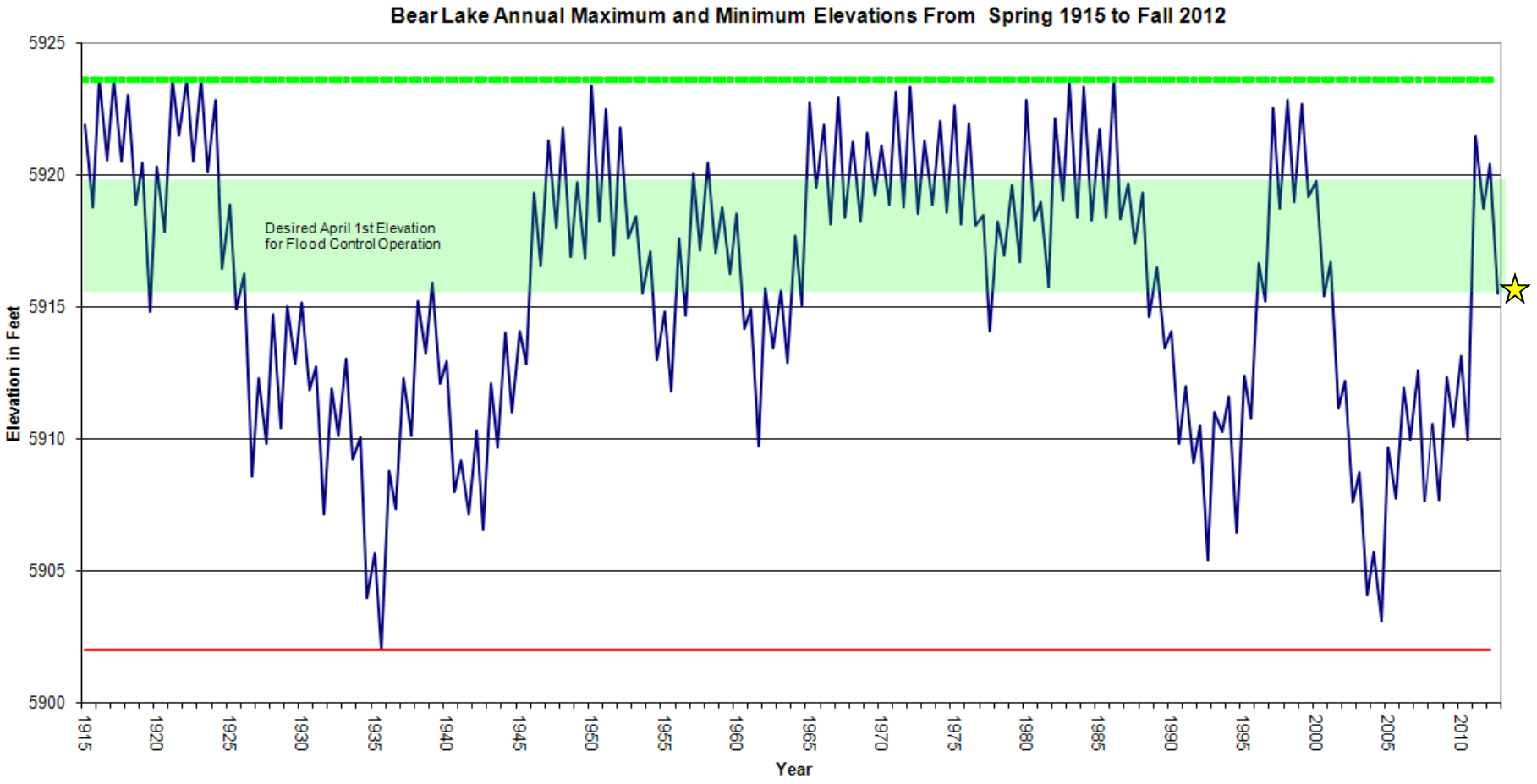
Timeline of Typical Bear Lake Operations

- Winter through Spring Runoff – Store all water possible up to flood control target
- Late Spring – Pass inflow for irrigation or flood control
- Summer – Pump Bear Lake to release for irrigation or flood control
- Fall – evaluate need to evacuate flood control storage
- Winter – store for irrigation or release for flood control based on target elevation. Releases must be steady and unchanging in the coldest months due to downstream icing concerns.

Bear Lake Volumes and Key Elevations



Bear Lake Historical Annual Max/Min Elevation



PACIFICORP ENERGY
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Cache Valley Aquifer Storage And Recovery

Paul C. Inkenbrandt
paulinkenbrandt@utah.gov

Cache County

UTAH DNR GEOLOGICAL SURVEY

Outline

- What is Aquifer Storage and Recovery (ASR)?
- Where is ASR being used?
- Can we use it in Cache Valley?
- How much water can we store?
- Where does the water go?
- What needs to be done?

What is Aquifer Storage and Recovery (ASR)?

- Use and management of aquifers as water storage sites
- Adding surface water to the subsurface
- AKA Conjunctive Use

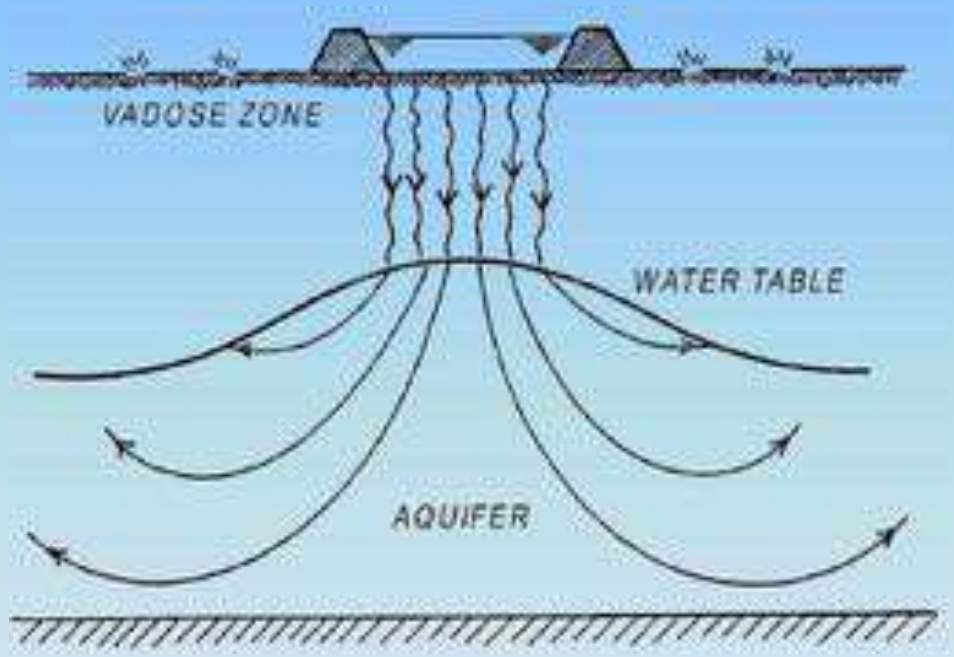
- Two ways to store water:
  - Infiltration area/pit
  - Injection well

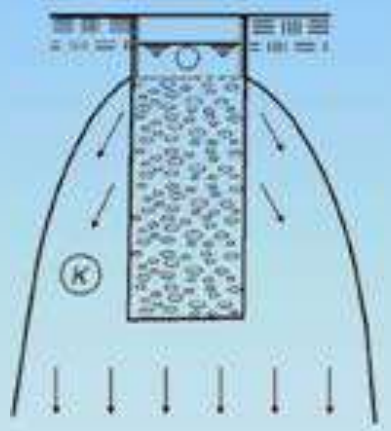
What is Aquifer Storage and Recovery (ASR)?

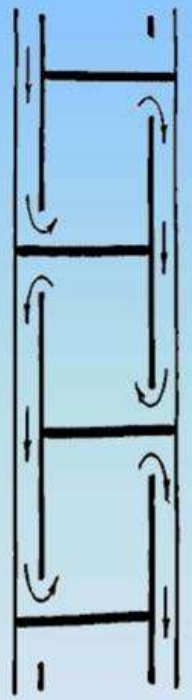
Surface spreading/infiltration area

Induce recharge by infiltrating water into known recharge zones where vertical permeability is high

Maintenance – sedimentation in basins







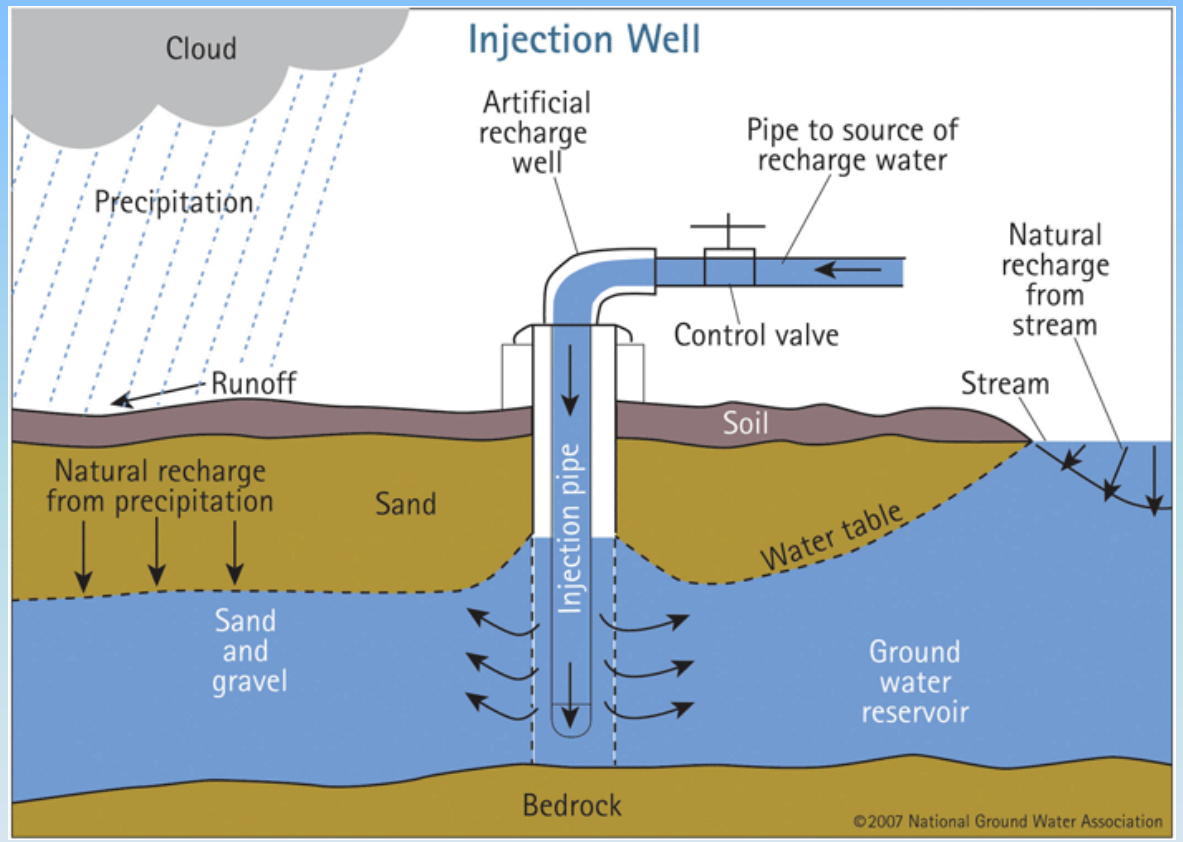
Bouwer, 2002

What is Aquifer Storage and Recovery (ASR)?

Injection well

Induce recharge injecting water into a well

Maintenance – clogging of screen



What is Aquifer Storage and Recovery (ASR)?

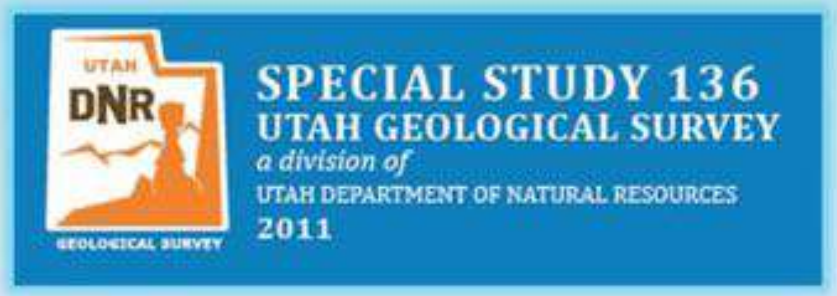
http://www.ngwa.org/Fundamentals/hydrology/Pages/Principles-of-induced-infiltration-and-artificial-recharge.aspx

- **Conserve and dispose of runoff and flood waters**
- **Supplement the quantity of groundwater available**
- **Reduce or eliminate decline in the water level of groundwater reservoirs**
- **Store water to reduce costs of pumping and piping**
- **Store water in off-seasons for use during the growing seasons**
- **Remove suspended solids by filtration through the ground**

Where is ASR being used?

- Jordan Valley Water Conservancy District (Utah County)
- Brigham City Corporation (Box Elder County)
- Washington County Water Conservancy District (Washington County)
- Leamington Town (Millard County)
- Weber Basin Water Conservancy District (Weber County)

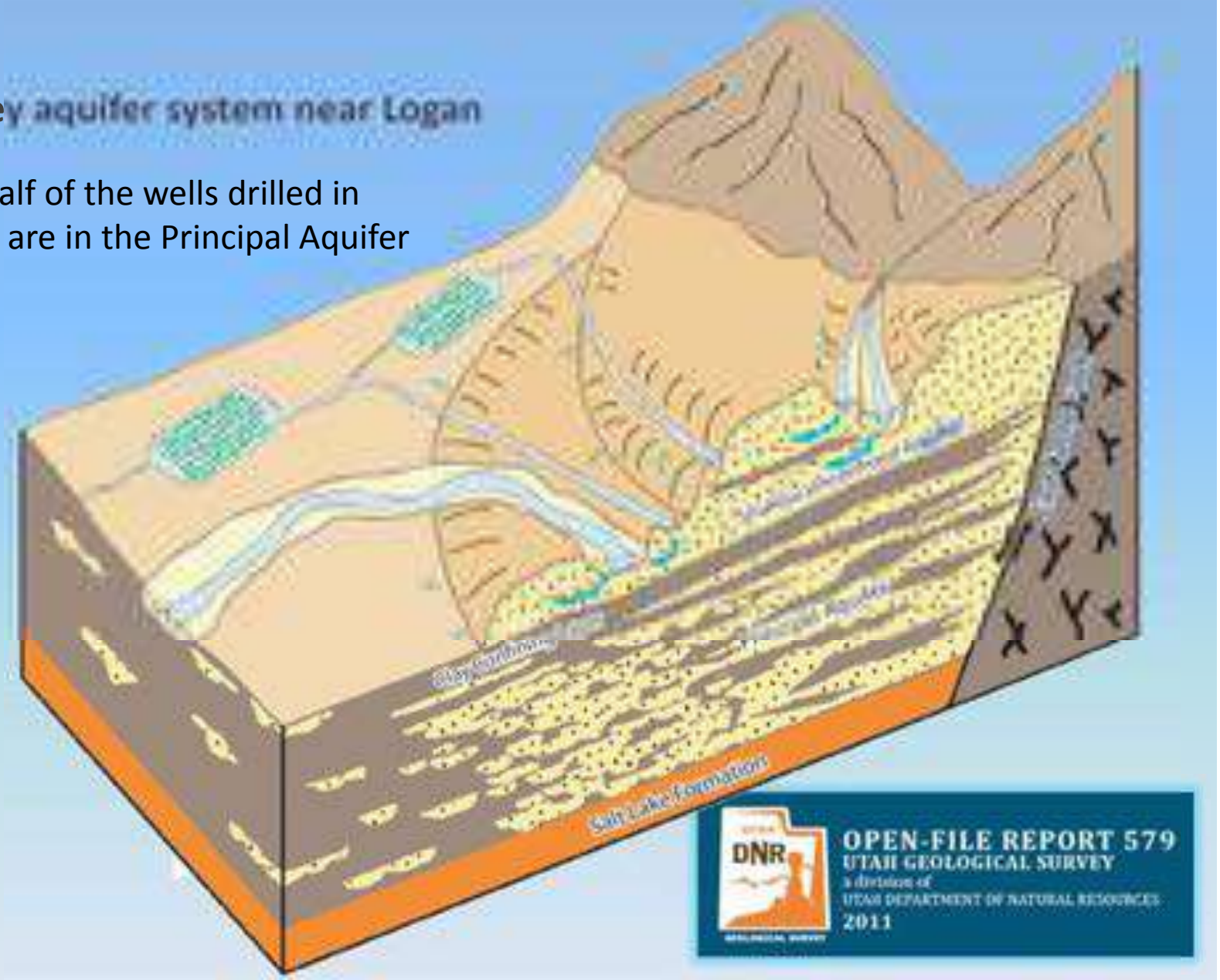
http://www.waterrights.utah.gov/groundwater/asr/ASRlist.asp
http://le.utah.gov/UtahCode/section.jsp?code=73-3b



Can we use it in Cache Valley?

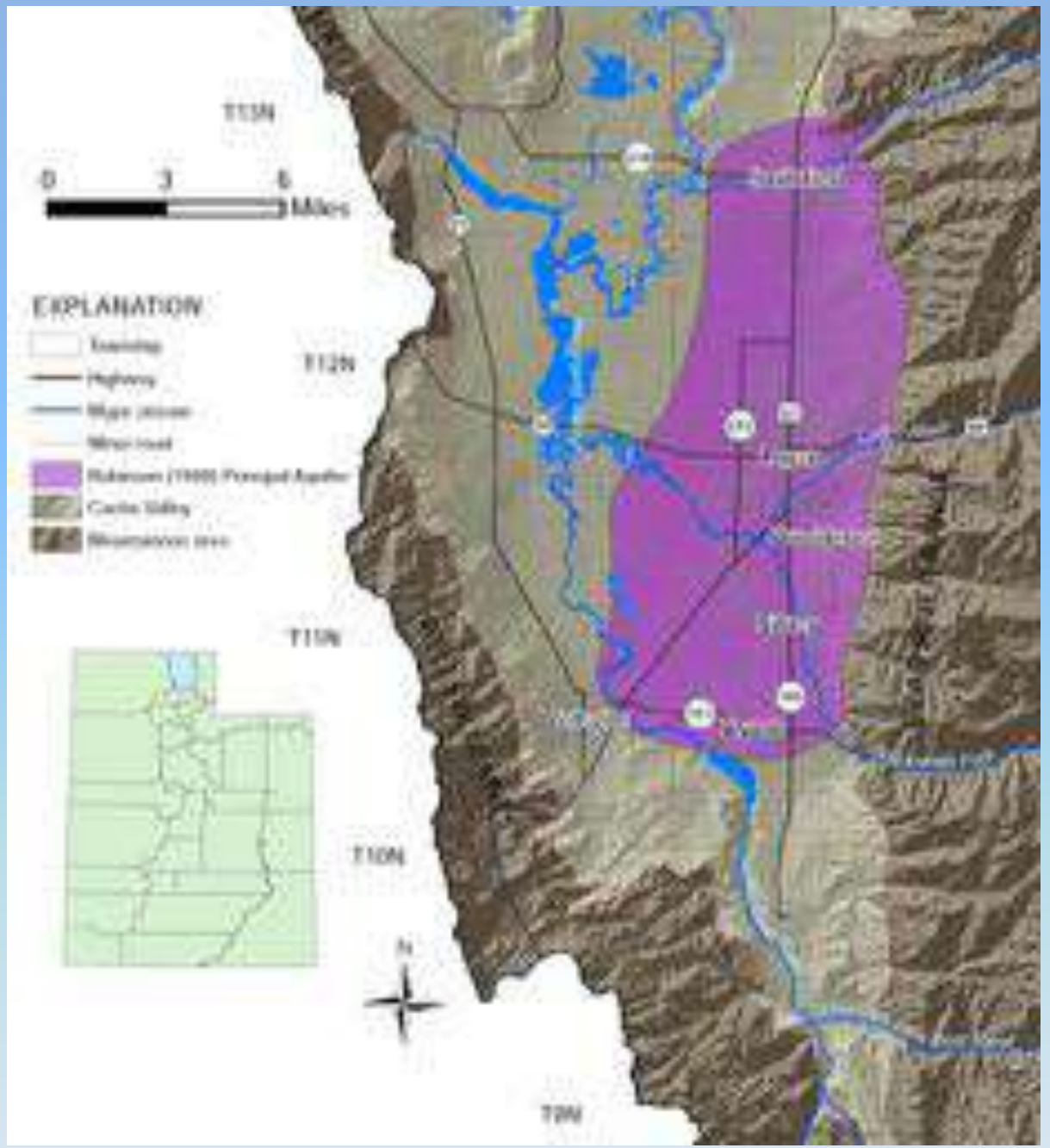
Cache Valley aquifer system near Logan

More than half of the wells drilled in Cache Valley are in the Principal Aquifer

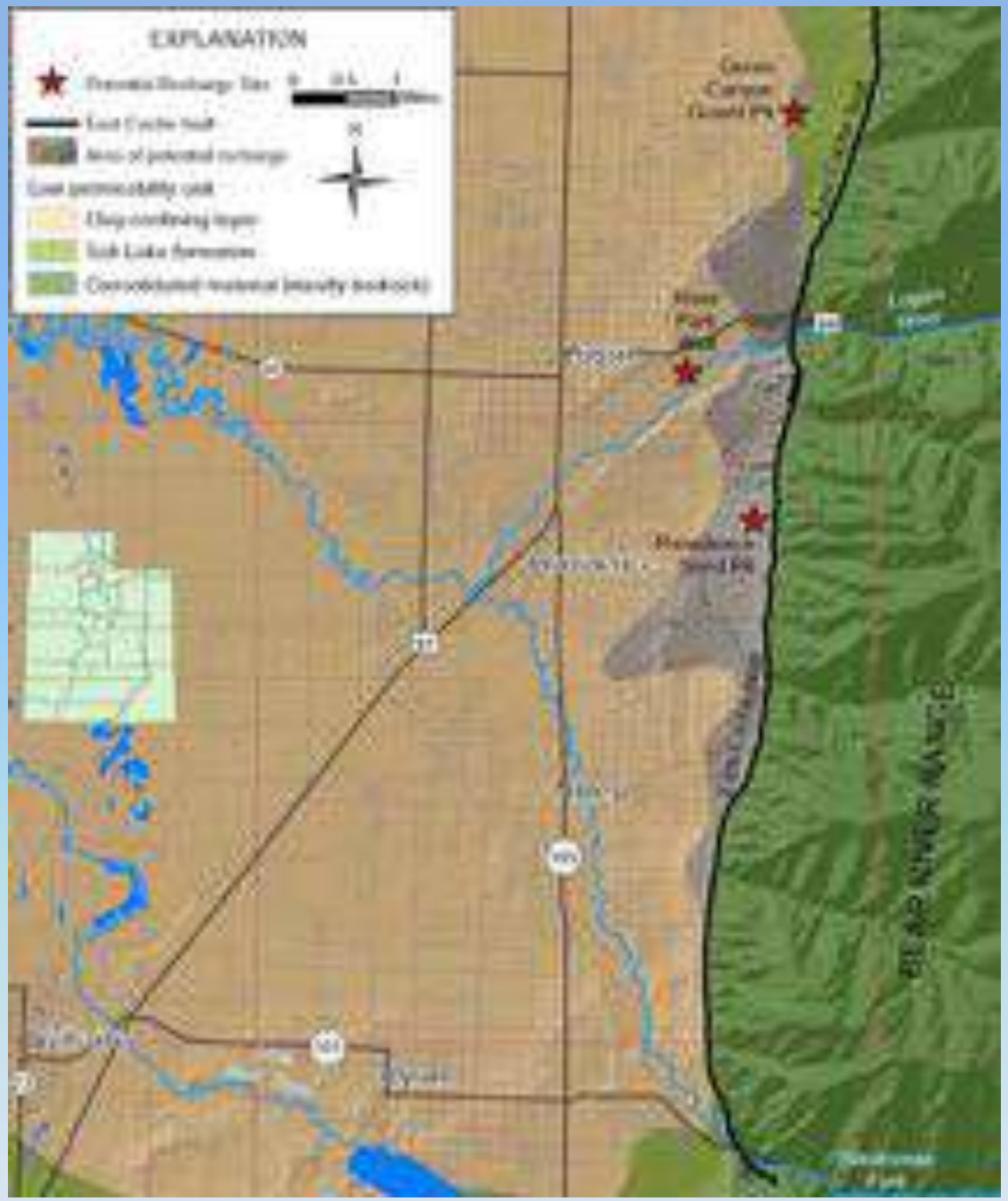


Can we use it in Cache Valley?

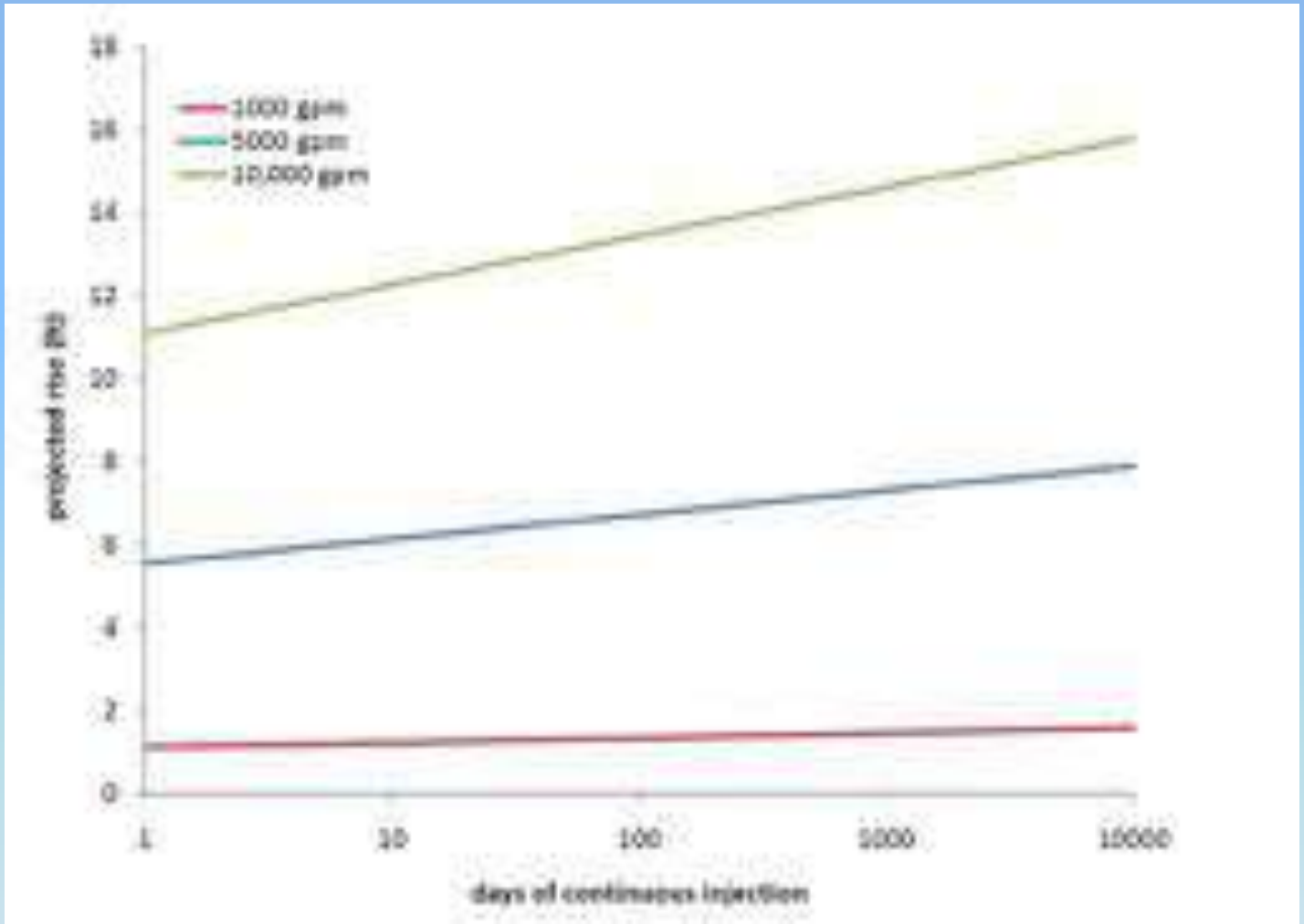
Has potential to benefit:
Smithfield
Hyde Park
N. Logan
Logan
River Heights
Providence
Millville
Nibley
Hyrum



Can we use it in Cache Valley?

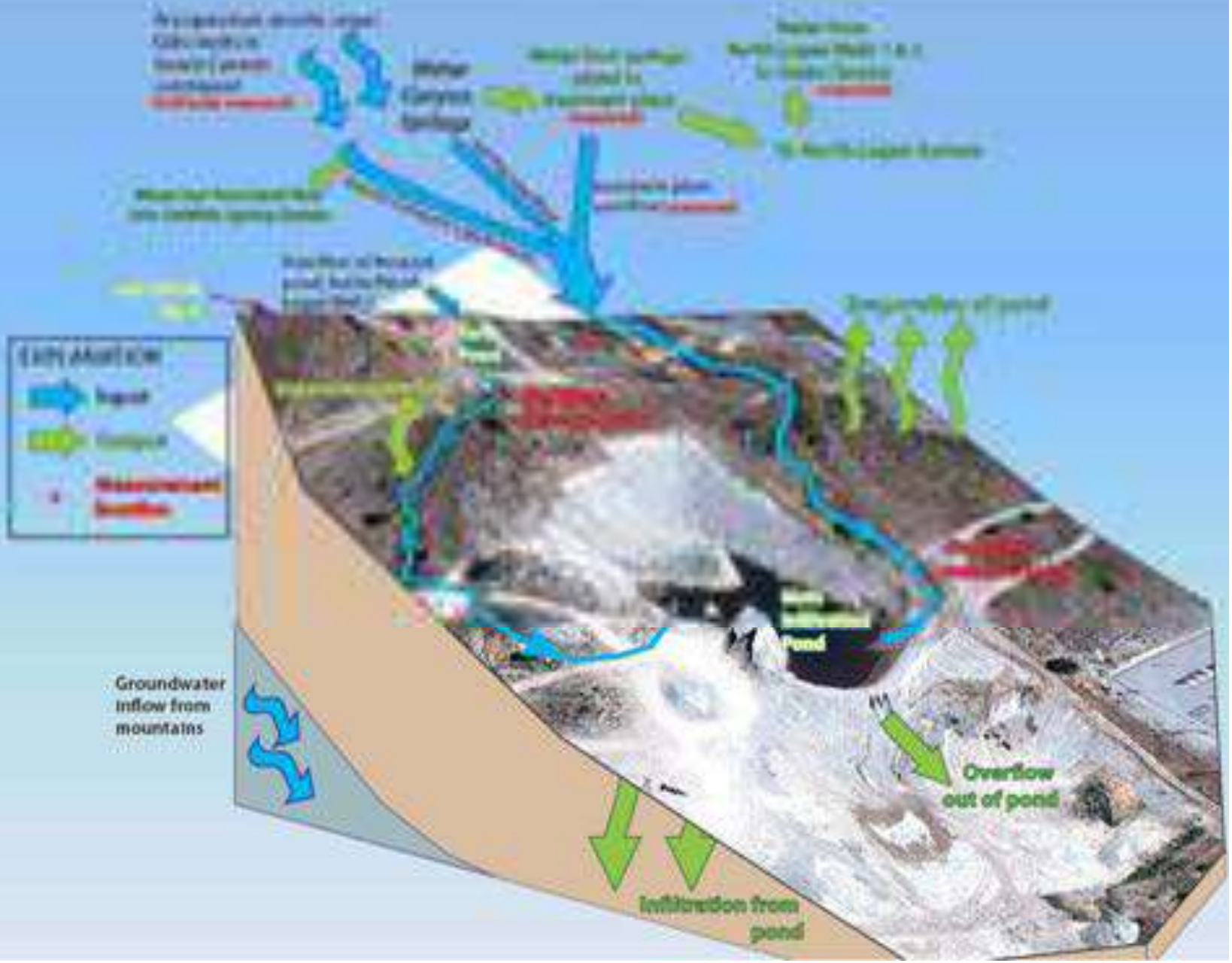


How much can we store?



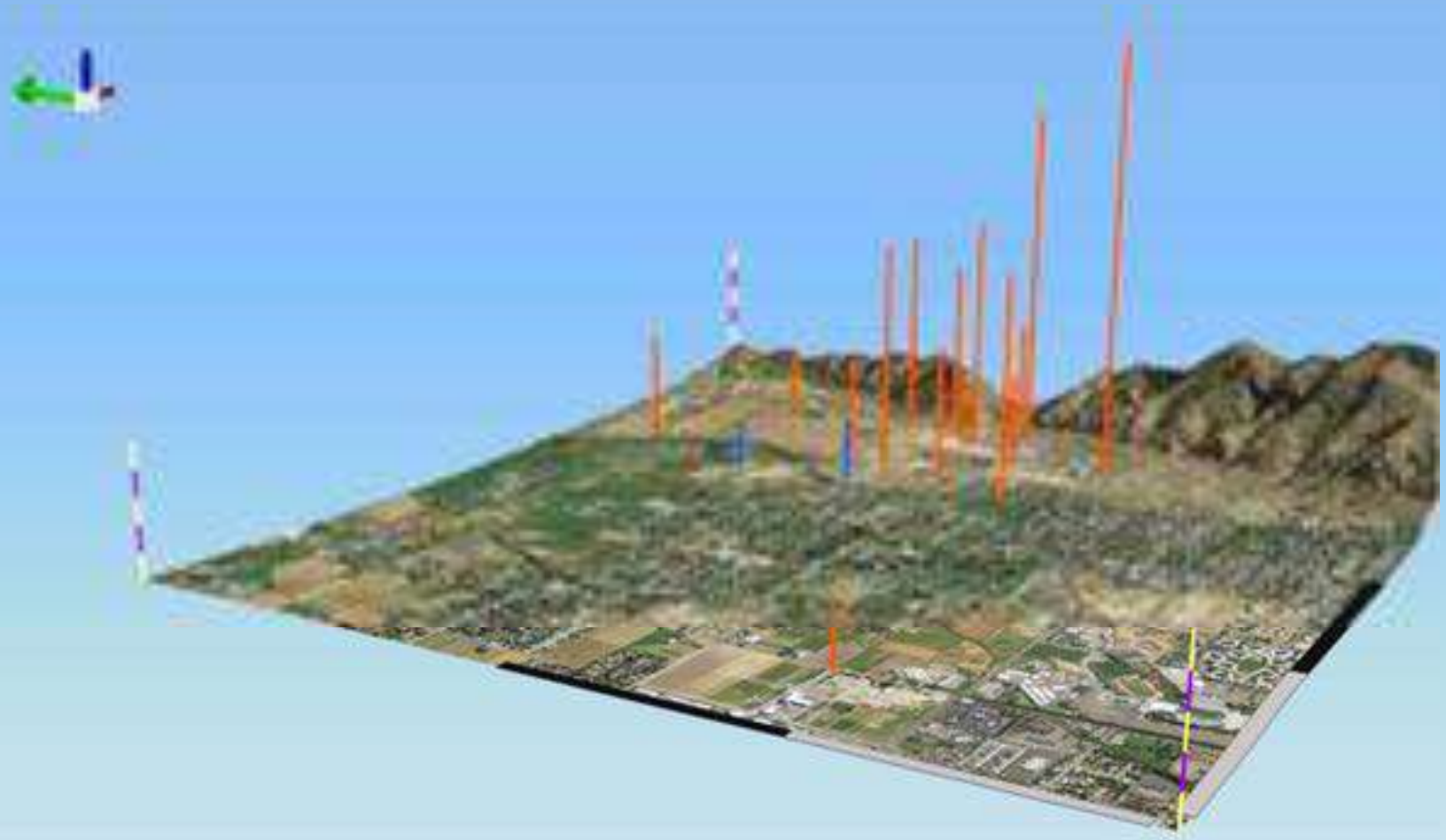
The estimate for storage capability depends on the extent of the confining layer, the distribution of storativity, and the amount of pumping from other wells.

Where does the water go?



Where does the water go?

Where does the water go?



What needs to be done?

- Examine possibility of using Logan wells
  - Injection test
  - Chemistry Samples
- Further explore the gravel pit
  - Observation well
  - Chemistry
  - Flow measurement and control

Questions?

Water Banks

Presentation to
Cache Valley Water Master Plan
Steering Committee

January 16, 2013

By Niel Allen
Irrigation Extension Specialist
Utah State University

What are Water Banks?

- An institutional mechanism that facilitates the legal transfer and market exchange of surface, groundwater, and storage water rights.
- Water banks can pool water supplies from willing sellers and make them available to willing buyers.
- Water banks can provide administrative and technical functions, for example:
  - Determine feasibility of transfers, leases, or sales.
  - Establish quantity of bankable water.
  - Identify who can participate in the bank, if necessary.
  - Set contract terms and/or prices.
  - Facilitate legal and regulatory requirements.

Examples Water Banks (Transfer/Leases/Market)

- Irrigation Company – Renting or Selling of Shares to others
  - Same Purpose of Use (irrigation).
  - Same Place of Use (Company water right).
  - Same Period of Use (defined irrigation season).
  - Same Point of Diversion (canal or pipeline heading).
  - Same diversion and Consumptive Use (CU) of water.
  - Recognized and approved by irrigation company.
  - Can be part of by-laws.
  - In general, no approval by State Engineers Office required.

Examples (Storage Bank)

- Arizona Water Banking Authority (Groundwater Storage)
  - Existing depleted aquifers
  - $15-36/ac-ft to store and $122-163/ac-ft to deliver
  - Direct recharge or in-lieu recharge.
  - Central Arizona Water – store unused allocation
  - Southern Nevada Water Authority (SNWA) Water
    - Storage agreement that includes water exchange
    - Currently SNWA has stored 600,000 of 1,250,000 AF agreement. The water is from Nevada's unused Colorado River water allocation (four times annual allocation).
    - When Nevada uses the water it will be by exchange
    - SNWA also participates in groundwater banks with MWD (70,000 AF) and local groundwater (330,000 AF)

Examples Water Banks (Transfer/Leases)

- Between Irrigation Companies, Water Districts, Indian Tribes, Water Agencies, etc.
  - Imperial Irrigation District (seller) and San Diego County Water Authority (buyer)
    - Different POD, POU, Beneficial Use (Irrigation to Municipal)
    - No permanent Transfer of Use (however is long-term)
    - Colorado River Intentionally Created Surplus Criteria
    - Involves many water users, State and Federal agencies
  - Moapa Indian Reservation (seller) and Southern Nevada Water Authority (buyer)
    - Different POD, POU, Beneficial Use (Irrigation to Municipal), different Period of Use
    - Many agencies involved including State Engineer's Office

State Examples (Transfer/Market)

- California State Water Bank
  - State operated
  - Used primarily during drought
  - Generally Northern California to Southern California
- Idaho Water Rental Pool (Idaho Water Supply Bank)
  - On average only 11 percent of deposited water is rented (approx. $17/ac-ft)
  - Shoshone Bannock Tribe Water Right
    - Irrigation and Instream Flow
  - Payette River