BEAR RIVER COMMISSION

106 West 500 South
Suite 101
Bountiful, Utah 84010-6203
801-292-4662
801-524-6320 fax

MINUTES

BEAR RIVER COMMISSION
ANNUAL MEETING
ONE HUNDRED TWENTY-SIXTH COMMISSION MEETING
APRIL 21, 2015

I. Call to order – The annual meeting of the Bear River Commission was called to order by Chairwoman Jody Williams at 1:30 p.m. on Tuesday, April 21, 2015, at the Bear River Migratory Bird Refuge in Brigham City, Utah. This was the one-hundred twenty-sixth meeting of the Commission. Williams asked the Commissioners and audience to introduce themselves. An attendance roster is attached to these minutes as Appendix A.

Sue Lowry then presented a resolution of appreciation for Jade Henderson who had recently retired from the position of Division Superintendent in Cokeville. The resolution was read and unanimously approved by the Commission. Lowry noted that Kevin Payne had been appointed by the Governor as the new Division Superintendent.

Williams then addressed the agenda for the meeting. The agenda was approved and a copy is attached to these minutes as Appendix B.

II. Election of Officers – Williams opened nominations for new officers for the Bear River Commission. Nominations were made for Gordon Thornock to be elected as Vice Chair, Eric Millis to continue as Secretary and Randy Staker to continue as Treasurer. The nominations were unanimously approved by the Commission.

III. Approval of minutes of last Commission meeting – Williams asked if there were any changes to the draft minutes of the previous Commission meeting held on November 25, 2014, in Salt Lake City, Utah. Lowry made a motion to approve the minutes with one slight edit. The motion was seconded and passed.

IV. Reports of Secretary and Treasurer – In Randy Staker's absence Eric Millis presented both reports. He handed out a sheet showing income and expenditures for FY2015 to date (see Appendix C). He noted that payments had been received from all states and all water quality agencies. Expenses to date totaled $111,412.89, leaving a cash balance of $126,540.61. Millis then addressed the Commission budget with a handout showing the approved budget for FY2015 and proposed budgets for FY2016 and FY2017 (see Appendix D). He pointed out increases in certain line items for FY2016 and a decrease in stream gaging costs due to a change in payment for the Corinne gage. Regarding the budget for FY2017, Millis pointed out that there was a suggested increase in state assessments from $40,000 to $45,000, following seven years without an increase. He noted that this FY2017 budget would not

be voted on until the following year. As action needed to be taken on the FY2016 budget, a motion was made to accept the FY2016 budget as presented. The motion passed.

V. Welcome/Overview of the Bear River Migratory Bird Refuge – Chairwoman Williams introduced Karl Fleming, the Acting Deputy Manager of the Bear River Migratory Bird Refuge and thanked him for hosting the Commission meetings. Fleming gave a little history of the Refuge which was established in 1928 and was the first refuge in the State of Utah. He noted the importance of the Refuge for migratory birds, including certain endangered species. He welcomed the Commission to their facilities.

VI. 2015 Water Supply Outlook – Troy Brosten from the NRCS Snow Survey gave a presentation on the water outlook for the Bear River Basin (see Appendix E). Brosten reported that as of April 1st, the forecasted streamflow in the Bear River Basin was anywhere from 10 to 67 percent of normal and the average reservoir storage was 50 percent of capacity. As of April 20th, the snow water projections were 50 percent of normal with the snow coming off two to four weeks ahead of normal. Brosten showed graphs of snow water equivalent and streamflow forecasts for several locations in the Basin, as well as reservoir storage numbers.

At this point in the meeting, Eric Millis had to be excused and Todd Adams took his place as an alternate.

VII. Cache Valley's Water Master Plan – Bob Fotheringham then gave a report on Cache County's Water Master Plan (see Appendix F). In the process of master planning, they found two topics that were most important to the people of Cache County. The people in the county wanted to be involved in water conservation efforts and also wanted to protect their interest in Bear River development water. In 1991 Bear River water was split into four different allocations, with Cache County getting 60,000 acre-feet. The other 160,000 acre-feet was split between three downstream conservancy districts. There is a great interest in water development in the county, and Fotheringham explained the public process they have been implementing. Looking out to the year 2060, he anticipates the need for an additional 20,000 acre-feet for municipal and industrial use. Additional water is also needed for agricultural use as they have only been able to supply about two-thirds of what is needed for a full supply each year. A third priority for Cache County residents is environmental water demands. Fotheringham suggested that the best thing they can do to deal with their water needs is to create a water conservancy district. The cost of creating a district and taking steps to protect and manage their water will bring great financial benefits down the road as the economy grows. Without water the economy will stagnate. Fotheringham discussed the process of creating a water conservancy district and governing such an entity. There have been concerns expressed about creating a water conservancy district, and they have been addressing those concerns and creating bylaws that will deal with them and give the public more confidence in the plan. Fotheringham explained that they will continue to educate and do some public polling to see if they have the votes they need. They would like to do it by petition, which requires 67 percent, rather than resolution.

VIII. USGS Bear Lake Reports – Jack Barnett passed around copies of the attachment to Memorandum BR2015-13 which he referred to during his presentation (see Appendix G). He reminded the Commission that starting back in 1996, the U.S. Geological Survey started a study of Bear Lake as a result of a determination that Bear Lake might be the best place in the United States to take cores and try to find out if the sediments in the lake could be used to analyze recent climate change. The studies were more successful than they had hoped and they found cores that took

them back 250,000 years. As a result of these studies, there were 14 reports that were combined and published by the Geological Society of America as their *Special Paper 450.* There is a lot of technical information contained in these reports. It was the Commission's desire to summarize this information in a format that could be more easily understood. With the support of the Commission, the Utah Geological Survey prepared a booklet entitled *Why Is Bear Lake So Blue?* It was a nice booklet, but it didn't quite meet the Commission's objectives. Jack Barnett explained that at the urging of Don Barnett, he wrote a synopsis of each of these 14 reports, the introduction, and another 3 related reports. Barnett briefly reported on the content of each of these reports.

Lowry noted that there was a discussion on this topic in the Management Committee meeting and in a committee meeting held earlier in the morning. It was determined that it would be a good idea to make these reports available on the WIS website as well as the Commission website. A motion was made to this effect and it was seconded and passed.

The Commission then took a short break.

IX. Records & Public Involvement Committee Report – Charles Holmgren reported on discussions in the Records & Public Involvement Committee meeting. He noted that Curtis Stoddard had been elected as the new chair for the committee. Don Barnett gave a report for Cory Angeroth as he was not able to attend the committee meeting. Angeroth reported to the Commission that the Evanston gage was dropped through the winter but has been picked up by the National Streamflow Information Program and is now being operated by the Wyoming USGS Water Science Center. Holmgren mentioned that the Corinne gage is now totally funded by U.S. Fish & Wildlife Service and will no longer be going through the Commission. The three state water quality agencies continue to participate in funding for the gages. The river commissioners talked about real-time gage changes on the river, including two new gages in Idaho, two in Utah and a new gage in Wyoming.

Holmgren reported that the Bureau of Reclamation will no longer provide technical support for the online gages. Stonefly is offering to provide support, but there is no cost estimate yet. He mentioned that Jack Barnett discussed the benefits of real-time gages and that he is asking for more dialogue on the subject to be included in a report. It was suggested that Roger Hansen from the Bureau of Reclamation be recognized in these write-ups as he was instrumental in the development of real-time gaging on the river system. The committee discussed the possibility of getting a more detailed and larger map of gages on the river.

The committee discussed the 18th Biennial Report and considered using a collage of photos of real-time gaging on the cover of the report. There is a need for additional information to finish the report and the overview. Jack Barnett shared publications of interest, including the USGS 2015 calendar which contains several photos from Bear River Basin sites. Barnett also gave a brief report about John Wesley Powell and his views in the 1800's on the potential impact of development on irrigation in the Bear River Basin. David Cottle reported on the Bear Lake Research Library which is being funded by the Merlin Olsen Memorial Fund. There are 609 studies included at the Quinney Library at Utah State University and at Bear Lake Watch. There was also some discussion about the Pixley gage and how USGS is attempting to get better quality data from that gage.

X. Operations Committee Report – Sam Lowham announced that Blair Francis was elected as the new chair for the Operations Committee. Regarding river operations, there has been some

unofficial regulation taking place to try and get water into the reservoirs. It is expected that official regulation will start before long. Lowham discussed reservoir levels which were helped by the fall rains.

Connely Baldwin reported on PacifiCorp operations (see Appendix H). He noted that as of April 20, Bear Lake elevation was 5913.38 ft. with the hope that it might reach 5913.8 ft. The Bear Lake storage irrigation allocation of 224,000 acre-feet was declared on April 7th. Baldwin explained that Alexander Reservoir will be drawn down during the summer to replace the spill gates. He reported that they had determined to stay on a scheduled release for the boater float program with an allowance for some flexibility. PacifiCorp continues to implement their land management plans on the 2,000 acres associated with their hydroelectric generation plants, managing for big game, small game and recreational access. They are continuing their Bonneville Cutthroat Trout habitat restoration projects, as well as their conservation hatchery program which they are extending into additional reaches.

XI. Water Quality Committee Report – Walt Baker reported on the discussions of the Water Quality Committee the previous day. They had an update on their cooperative monitoring agreement which has been in place for some time. This program continues to be very valuable for all three states. Baker mentioned that Wyoming completed a sediment TMDL which they submitted to EPA, but there has been no word on it in six months. Utah will be initiating the Lower Bear River TMDL from Cutler to the Great Salt Lake, focusing on nutrients and dissolved oxygen. This will be contracted out.

Baker reported that Wyoming is looking at nutrient criteria, beginning with reservoirs. Idaho is working on a fairly significant initiative and they are in the process of receiving delegation from EPA to administer the Federal NPDES surface water discharge permit program. Idaho is also developing human health criteria for fish consumption. In the Willard Spur in Utah they have been doing some concentrated studies replicating in the field the impacts of nutrient loadings. This is the last year of a three-year effort. Baker reported that included in the implementation of their Great Salt Lake strategy is a concentrated monitoring effort, as well as looking at the wetlands. They are trying to develop numeric criteria for four toxic pollutants which may lead to additional studies. They are also looking at the hydrology of the lake where the footprint continues to decrease and is within a foot of the historic low. This has ramifications on industry, recreation, lake habitat, etc. He explained that most of the wastewater in the State of Utah ends up in the Great Salt Lake. They are looking at what it takes to sustain the ecosystem of the lake. They are also looking at toxins in Farmington Bay.

Baker mentioned that the Union Pacific Railroad is building a bridge on the causeway that separates the more saline north arm of the Great Salt Lake from the south arm. They have had two massive culverts on that causeway which have subsided over time, requiring constant rebuilding and reconstructing. As they felt they were going to lose aspects of that causeway, a certification was issued allowing them to pull the culverts out. However, the culverts are critical to the communication between the two arms of the lake with respect to the success of the brine shrimp industry and the mineral extraction work. The construction of this 150-foot span bridge should replicate the communication between the two areas. They are presently stalled on the project because of some disagreements, but are hopeful that the work will continue soon.

Another item noted by Baker was the effort to keep septic tanks from being used around Bear Lake. They have been successful at this for many years, but currently there is a proposed development on

the east side of the lake which would include septic tanks and drain fields. Idaho has a policy that you can't be within a mile of the lake with septic tanks, but Utah has not had such a policy. They are trying to come up with a solution.

XII. Management Committee Report – Lowry explained that the last depletions report was accepted previously by the Commission. The TAC has been charged with learning from the last effort how to streamline future updates. The TAC has also been working on four topics and has made good progress on two of them. One more is in the works, but the most difficult topic is how to determine the amount of depletion associated with supplemental supply rights where water is being additionally placed onto lands that have a pre-1976 water right. The Management Committee had a lengthy discussion on this topic but didn't really come to any definite conclusion. It was determined that the Management Committee would have a conference call on the subject in early June, prior to the next meeting of the TAC, so they could provide better direction on how the TAC should proceed.

XIII. Engineer-Manager's Report – Don Barnett had no particular items to report, but asked if the Commissioners had any assignments or questions they would like the TAC to consider when they meet.

XIV. State Reports – Wyoming – Lowry reported that results of Wyoming's multi-year Weather Modification Program study were released in December. The results were impressive enough that the Legislature added $1.4 million to begin an operational cloud seeding program in the Big Horns, the Laramie, the Medicine Bow and the Sierra Madre ranges. In addition, a separate $650,000 was appropriated as Wyoming's share to participate in the cloud seeding program in the Wind River Range, where other states and entities are also participating. Lowry mentioned that Barry Lawrence has been the project manager for the Wyoming Water Development Commission. She suggested that, if the Commission agreed, he could give a more thorough report on the project at the November meeting. As other states have also been involved, it was suggested that Utah could also participate in this report in November.

Lowry then reported that the Governor's water strategy had been released in January. One of his programs, called the "Ten in Ten," involved having ten relatively significant water projects in the next ten years. Lowry also mentioned that the Basin Advisory Group dealing with Upper Bear River Basin planning would be meeting the following week in Evanston. They would be talking about the weather modification program, as well as a new study that the Water Development Commission is getting ready to launch in June to do a watershed study within the Bear River Basin.

XIV. State Reports – Idaho – Gary Spackman mentioned that in an earlier discussion of Bear River gages, he had looked at the map and determined that there was a dearth of real-time gaging reporting in Idaho. At the state caucus, Josh Hanks reported that there are approximately 20 gages that don't show up on the map. He explained that there were 57 gages, 20 of which are real-time. It was determined that Hanks will relay that information to Jack Barnett to be included on the map.

Spackman also mentioned their failed attempts at initiating a Bear River adjudication this year. The input from public meetings was positive and the State of Idaho honestly thought that the legislature would authorize it this year. Apparently there were some influential people who were able to convince some of the legislators that this was not the year. There is still hope that the legislature will take it up next year.

Spackman explained some issues he has dealt with involve conjunctive management outside the Bear River Basin. He thought it would be of interest to the Commission in view of the reports of significant amounts of water development that will be needed for growth in the Bear River Basin in future years. He has been embroiled in a couple of contested cases for conjunctive management having to do with senior surface water users calling for their water against junior groundwater users. One is a senior aquaculture water right holder in the Hagerman area in Idaho. Spackman issued several orders last year that required curtailment and mitigation. The deadline on January 19th passed without the requirements for mitigation being satisfied. The court gave the groundwater users some reprieve and they finally put it together, but had they not, it would have resulted initially in the curtailment of 157,000 acres and could have expanded to 350,000 acres of curtailment. He is working on another case currently where he issued an order that found that there was a demand shortfall to some senior surface water users on the Snake River of 89,000 acre-feet, and the groundwater users have two weeks to submit information of mitigation or a curtailment order will be issued affecting approximately 85,000 acres of irrigated farmland. When you start talking about water with those kind of numbers, the size and impact is unimaginable. Spackman was emphasizing the fact that water management is upon all of us and something like this could come to pass in the Bear.

Spackman ended by expressing appreciation to Jade Henderson as he was retiring. He noted that Henderson had been very helpful to the State of Idaho in their interstate relationships and that the relationships between the three states have been enhanced by contact in the Bear River Commission.

XIV. State Reports – Utah – Todd Adams reviewed some items that Eric Millis asked him to report on for Utah. He mentioned that they had been called into the Governor's office several times this year to talk about water supply and drought efforts and what messages should go out to the public. Utah is also working on a new statewide water plan which should be coming out within the next several months. There is a water strategy group that has grown from a "gang of six" to a "mob of forty." It has evolved into a planning process by a group called Envision Utah. This group has developed a survey that suggests five different scenarios for the future. They are seeking public input to determine what the citizens of Utah would like to see happen as Utah heads into the future. Their goal is to get 50,000 responses, and they are making good progress on that effort. Adams wasn't sure where the Governor would go with the results of this survey in terms of his water strategy.

XV.A. Activities of the Bear River Water Users Association – Carly Burton noted that PacifiCorp's allocation to the Bear River Water Users Association is 90 percent of the maximum allocation, which is pretty amazing given the water conditions this year. There are many river basins that are getting much less. His concern was how to optimize the use of storage to get through the irrigation season. He felt it would take cooperation, communication and conservation.

XV.B. Bear Lake Watch – Claudia Cottle from Bear Lake Watch expressed appreciation to the group for their participation in the celebration of the 20th anniversary of the Bear Lake Settlement Agreement. She also discussed the issue of the vacant land that is exposed as the lake level goes down at Bear Lake and how that land will be managed. She was hopeful that people would be supportive of whatever management strategies might be developed to preserve that land.

XVI. Next Commission Meeting – Chairwoman Williams noted that this meeting included some extracurricular activities that are not generally a part of the Commission meetings. She expressed

gratitude to the people and entities for their hospitality and extra efforts that benefited the group. Williams indicated that the next meeting of the Commission is scheduled for November 17, 2015, at the Utah Department of Natural Resources building in Salt Lake City.

The Commission meeting was then adjourned.

ATTENDANCE ROSTER

BEAR RIVER COMMISSION
ANNUAL MEETING
Bear River Migratory Bird Refuge
Brigham City, Utah
April 21, 2015

IDAHO COMMISSIONERS
Gary Spackman
Kerry Romrell
Curtis Stoddard

WYOMING COMMISSIONERS
Sue Lowry
Gordon Thornock
Sam Lowham
Erick Esterholdt (Alternate)

FEDERAL CHAIR
Jody Williams

UTAH COMMISSIONERS
Eric Millis
Charles Holmgren
Blair Francis
Joseph Larsen (Alternate)

ENGINEER-MANAGER & STAFF
Don Barnett
Jack Barnett
Donna Keeler

OTHERS IN ATTENDANCE

IDAHO
Jeff Peppersack, Department of Water Resources

UTAH
Walt Baker, Department of Environmental Quality
Will Atkin, Division of Water Rights
Carl Mackley, Division of Water Rights
Todd Adams, Division of Water Resources
Troy Brosten, NRCS Snow Survey
Jim Watterson, River Commissioner
Ron Hoffman, River Commissioner

WYOMING
Mike Johnson, State Engineer's Office
Kevin Payne, State Engineer's Office
Travis McInnis, State Engineer's Office

OTHERS
Connely Baldwin, PacifiCorp Energy
Claudia Conder, PacifiCorp Energy
Cory Angeroth, U.S. Geological Survey
Karl Fleming, U.S. Fish & Wildlife Service
Voneene Jorgensen, Bear River Water Conservancy District
Claudia Cottle, Bear Lake Watch
David Cottle, Bear Lake Watch
Carly Burton, Bear River Water Users Association
Brent Rose, Bear River Water Users Association
Bob Fotheringham, Cache County
Scott Clark, Barnett Intermountain Water Consulting

BEAR RIVER COMMISSION ANNUAL MEETINGS
April 20-21, 2015

Water Quality Committee Meeting
Bear River Migratory Bird Refuge Visitor Center
2155 W. Forest Street, Brigham City, Utah

All Other Meetings
Bear River Migratory Bird Refuge Visitor Center
2155 W. Forest Street, Brigham City, Utah

COMMISSION AND ASSOCIATED MEETINGS

April 20

10:00 a.m.	Water Quality Committee Meeting – Conference Room	

April 21

9:00 a.m.	Records & Public Involvement Committee Meeting – Conference Room	Holmgren
10:00 a.m.	Operations Committee Meeting – Conference Room	Lowham
11:15 p.m.	Informal Meeting of Commission – Conference Room	D. Barnett
11:30 p.m.	Lunch and celebration of 20-year anniversary of the Bear Lake Settlement Agreement	PacifiCorp/Bear River Water Users Association/ Bear Lake Watch
1:30 p.m.	Commission Meeting – Auditorium	Williams

PROPOSED AGENDA
ANNUAL COMMISSION MEETING

April 21, 2015

Convene Meeting: 1:30 p.m.
Chairman: Jody Williams

I.	Call to order	Williams
	A. Welcome of guests and overview of meeting	
	B. Recognitions	
	C. Approval of agenda	
II.	Election of officers	Williams
	A. Vice Chair	
	B. Secretary	
	C. Treasurer	
III.	Approval of minutes of last Commission meeting (November 25, 2014)	Williams
IV.	Reports of Secretary and Treasurer	Millis/Staker
	A. 2015 Expenditures to date	
	B. Adoption of 2016 budget	
	C. Other	
V.	Welcome/Overview of the Bear River Migratory Bird Refuge	Barrett
VI.	2015 Water Supply Outlook	Brosten
VII.	Cache Valley's Water Master Plan	Fotheringham
VIII.	USGS Bear Lake Reports	J. Barnett
	BREAK	
IX.	Records & Public Involvement Committee report	Holmgren
X.	Operations Committee report	
	A. Committee meeting	Lowham
	B. Anticipated Operations and Regulation in 2015	
	C. PacifiCorp operations	Baldwin
XI.	Water Quality Committee report	Baker
XII.	Management Committee report	Lowry
XIII.	Engineer-Manager's report	Barnett
XIV.	State reports	
	A. Wyoming	Lowry
	B. Idaho	Spackman
	C. Utah	Millis/Adams
XV.	Other / Public comment	Williams
	A. Activities of the Bear River Water Users Association	Burton
	B. Bear Lake Watch	Cottle
	C. Other	
XVI.	Next Commission meeting (Tuesday, November 17, 2015, at Utah DNR)	Williams

Anticipated adjournment: 4:00 p.m.

BEAR RIVER COMMISSION

STATEMENT OF INCOME AND EXPENDITURES

FOR THE PERIOD OF July 1, 2014 to April 14, 2015

INCOME	CASH ON HAND	OTHER INCOME	FROM STATES	INCOME
Cash Balance 07-01-14	109,266.42			109,266.42
State of Idaho			40,000.00	40,000.00
State of Utah			40,000.00	40,000.00
State of Wyoming			40,000.00	40,000.00
Water Quality		8,151.00		8,151.00
Interest on Savings		536.08		536.08
TOTAL INCOME TO 14-Apr-15	109,266.42	8,687.08	120,000.00	237,953.50

DEDUCT OPERATING EXPENSES

		APPROVED BUDGET	UNEXPENDED BALANCE	EXPENDITURES TO DATE
Stream Gaging/USGS Contract		48,540.00	-	48,540.00
	SUBTOTAL	48,540.00	-	48,540.00
EXPENDED THROUGH COMMISSION				
Personal Services	BIWC	61,700.00	10,283.30	51,416.70
Travel (Eng-Mgr)		1,200.00	859.52	340.48
Office Expenses		1,600.00	1,417.88	182.12
Printing Biennial Report		1,000.00	1,000.00	-
Treasurer Bond & Audit		1,400.00	1,300.00	100.00
Printing		1,600.00	1,412.40	187.60
Realtime Web Hosting		8,400.00	1,184.01	7,215.99
Clerical		8,000.00	4,570.00	3,430.00
Contingency		2,000.00	2,000.00	-
	SUBTOTAL	86,900.00	24,027.11	62,872.89
TOTAL EXPENSES		135,440.00	24,027.11	111,412.89
CASH BALANCE AS OF 04/14/15				126,540.61

BEAR RIVER COMMISSION

DETAILS OF EXPENDITURES

FOR PERIOD ENDING April 14, 2015

790	BIWC	10,283.34
791	VOID	
792	Stonefly Tech	1,800.00
793	BIWC	5,459.34
794	VOID	
795	VOID	
796	USGS	48,540.00
797	Stonefly Tech	1,800.00
798	BIWC	5,949.93
799	BIWC	5,291.42
800	Stonefly Tech	1,800.00
801	BIWC	5,493.81
802	BIWC	6,850.67
803	Stonefly Tech	15.99
804	VOID	
805	BIWC	5,460.44
806	BIWC	5,446.93
807	Stonefly Tech	1,800.00
808	BIWC	5,321.02
809	C N A Surety	100.00
	TOTAL EXPENSE	111,412.89

BANK RECONCILIATION

Cash in Bank per Statement 04/14/15	(41.16)
Plus: Intransit Deposits	
Less: Outstanding Checks	
Total Cash in Bank	(41.16)
Plus: Savings Account-Utah State Treasurer	126,581.77
	126,540.61

BEAR RIVER COMMISSION

APPROVED BUDGET FOR FY2015 AND PROPOSED BUDGETS FOR FY'S 2016 & 2017

	FY2015 APPROVED BUDGET	FY2016 PROPOSED BUDGET	FY2017 PROPOSED BUDGET
	-INCOME-	**-INCOME-**	**-INCOME-**
BEGINNING BALANCE	109,266.42	102,777.42	102,668.42
IDAHO	40,000.00	40,000.00	45,000.00
UTAH	40,000.00	40,000.00	45,000.00
WYOMING	40,000.00	40,000.00	45,000.00
WATER QUALITY	8,151.00	8,314.00	8,254.00
INTEREST ON SAVINGS	800.00	800.00	800.00
TOTAL INCOME	238,217.42	231,891.42	246,722.42
	-EXPENDITURES-	**-EXPENDITURES-**	**-EXPENDITURES-**
STREAM GAGING-U.S.G.S.	48,540.00	40,755.00	41,270.00
PERSONAL SERVICES CONTRACT	61,700.00	63,088.00	63,719.00
TRAVEL	1,200.00	1,200.00	1,200.00
OFFICE EXPENSES	1,600.00	1,600.00	1,600.00
BIENNIAL REPORT	1,000.00	1,000.00	1,000.00
TREASURER'S BOND & AUDIT	1,400.00	1,400.00	1,400.00
PRINTING	1,600.00	1,600.00	1,600.00
REALTIME WEB HOSTING*	8,400.00	8,400.00	8,400.00
CLERICAL	8,000.00	8,180.00	8,262.00
CONTINGENCY	2,000.00	2,000.00	2,000.00
TOTAL EXPENDITURES	135,440.00	129,223.00	130,451.00
	102,777.42	102,668.42	116,271.42

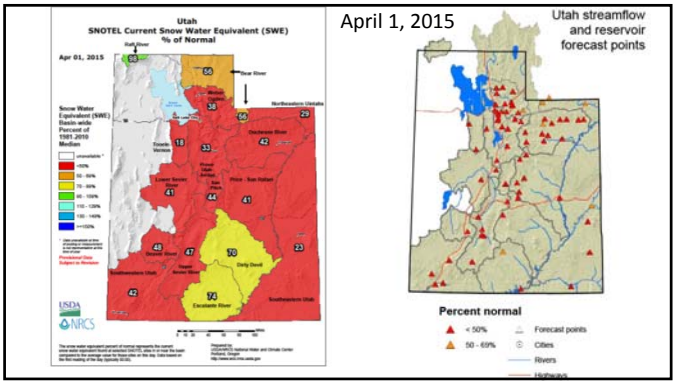
Notes: *There is the possibility of an increase in the web hosting. Stonefly may or may not take over the services that were being provided, at no cost to the Commission, by the Bureau of Reclamation. They are no longer able to do the work.

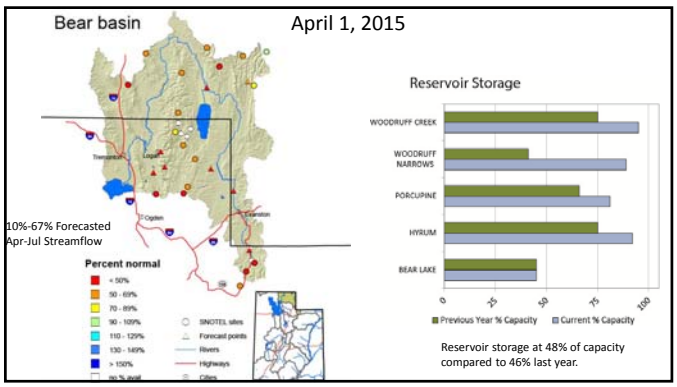
A discussion on increasing the annual assesment may be necessary.

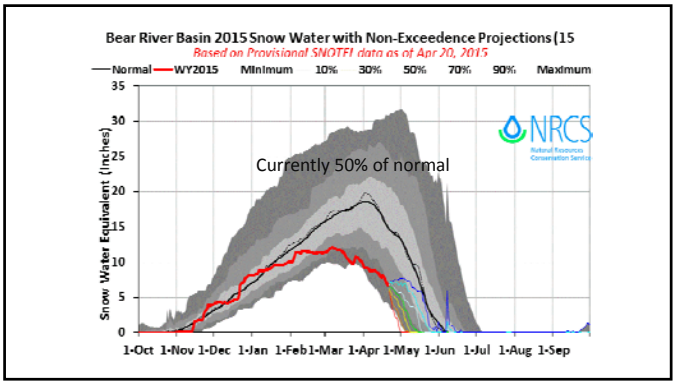
2015 Water Supply Outlook Report

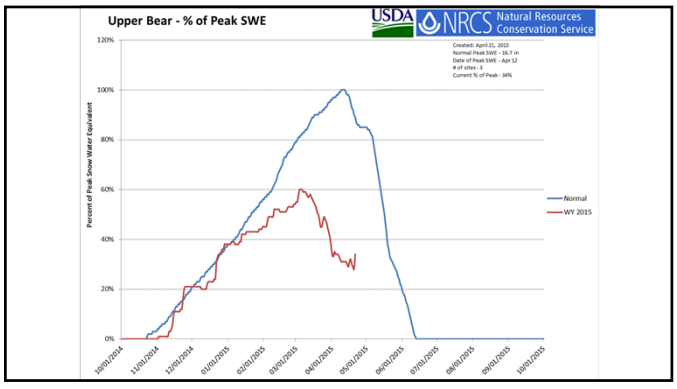
April 21, 2015

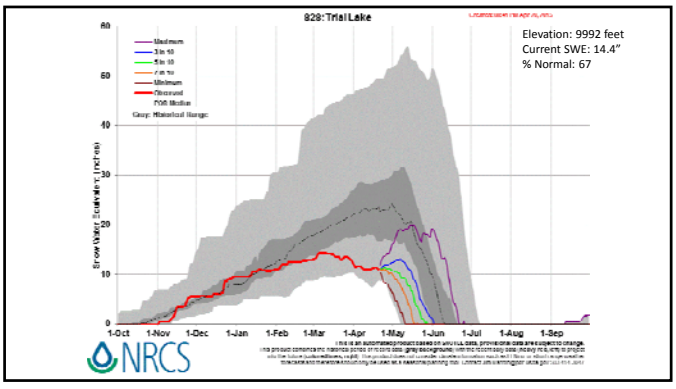
Troy R. Brosten, NRCS/Snow Survey

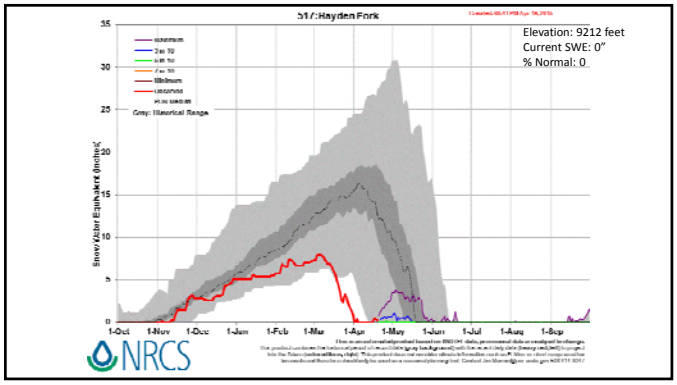


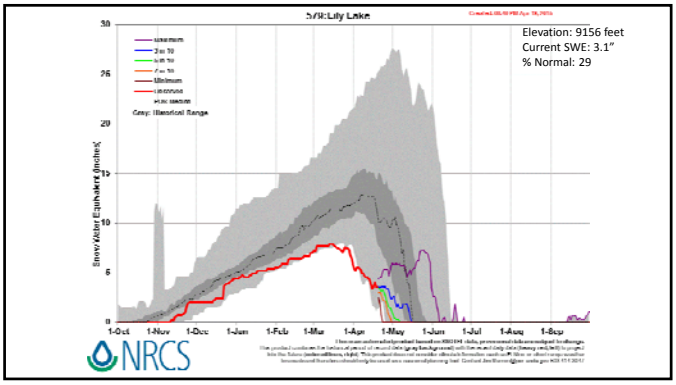


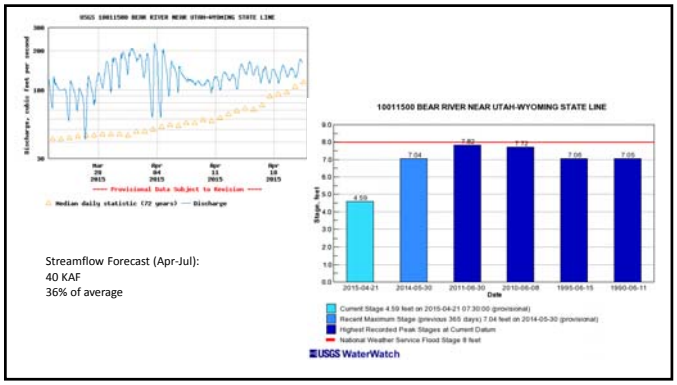




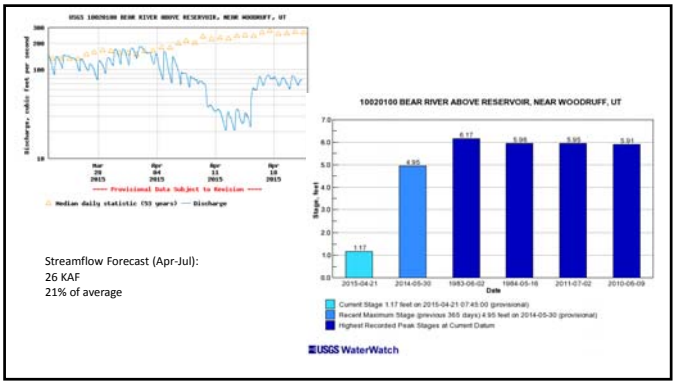




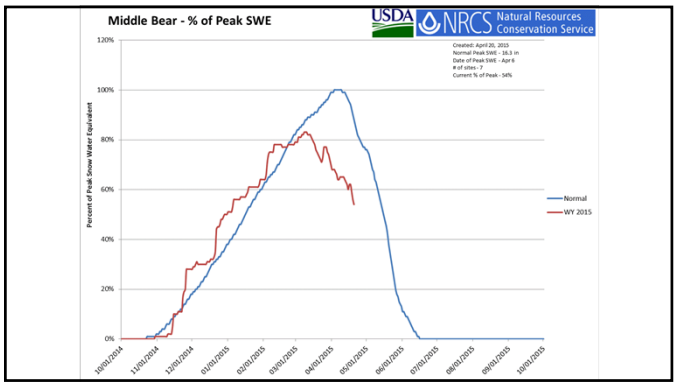


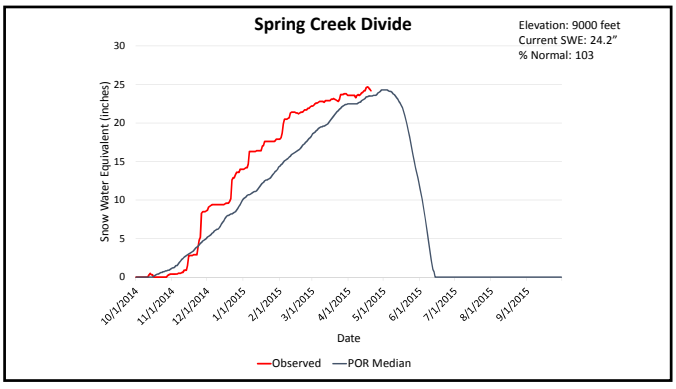


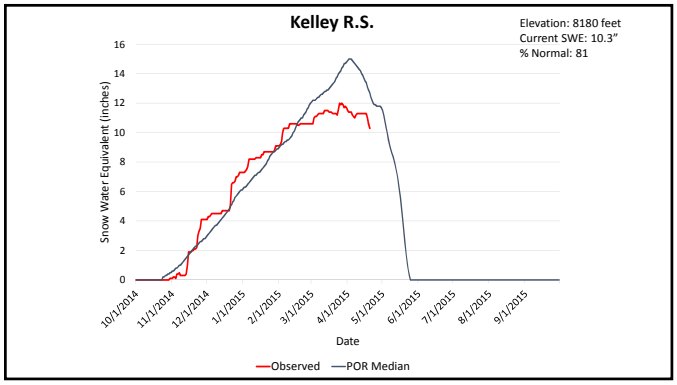
Streamflow Forecast (Apr-Jul):
40 KAF
36% of average

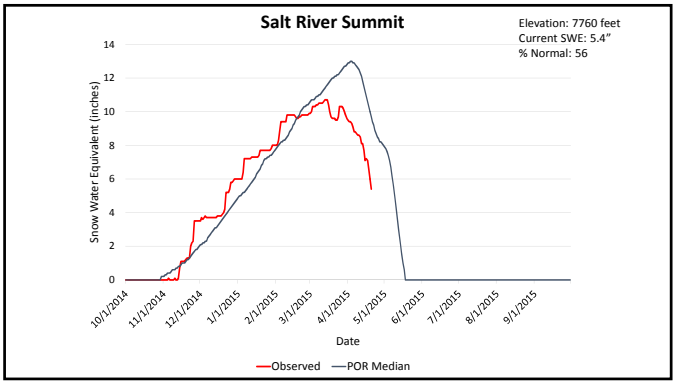


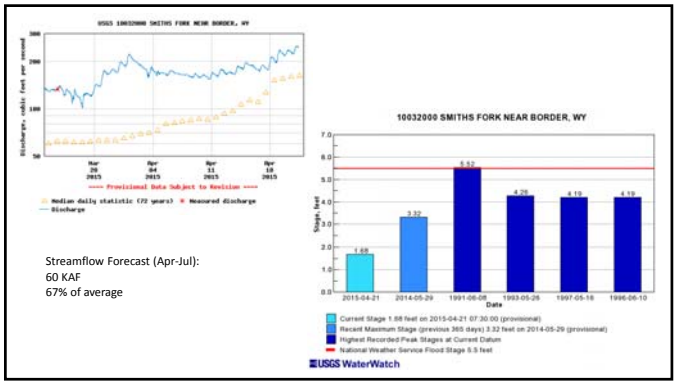
Streamflow Forecast (Apr-Jul):
26 KAF
21% of average

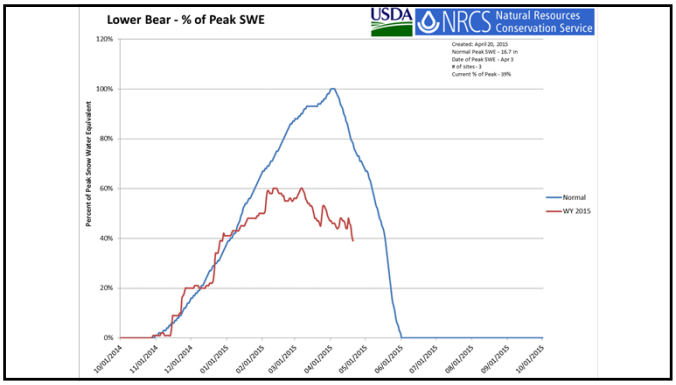


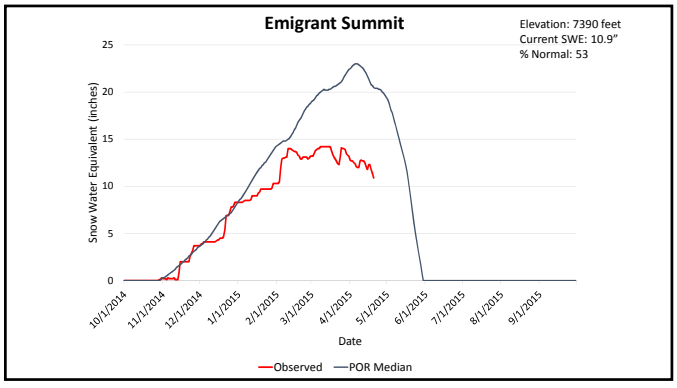


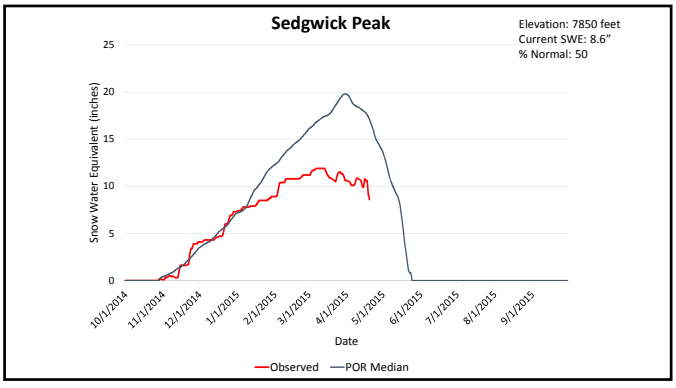

Kelley R.S.
Elevation: 8180 feet
Current SWE: 10.3"
% Normal: 81
Snow Water Equivalent (inches)
Date
Observed
POR Median

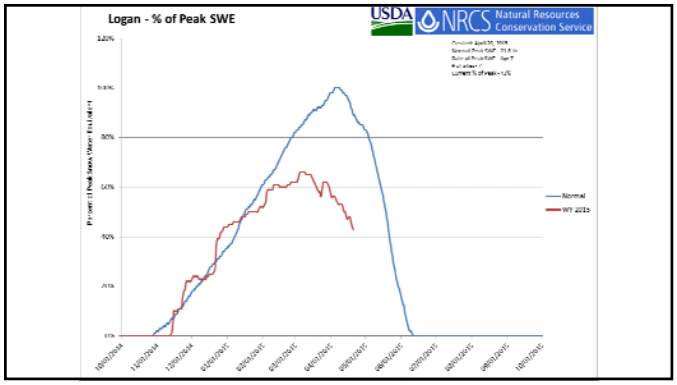

Salt River Summit
Elevation: 7760 feet
Current SWE: 5.4"
% Normal: 56
Snow Water Equivalent (inches)
Date
Observed
POR Median

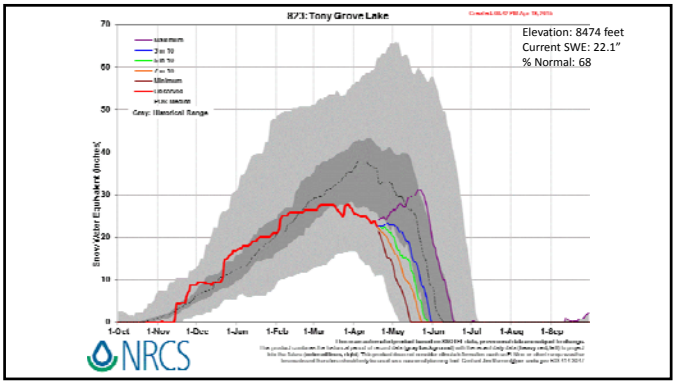

10032000 SMITHS FORK NEAR BORDER, WY
Streamflow Forecast (Apr-Jul):
60 KAF
67% of average
USGS WaterWatch

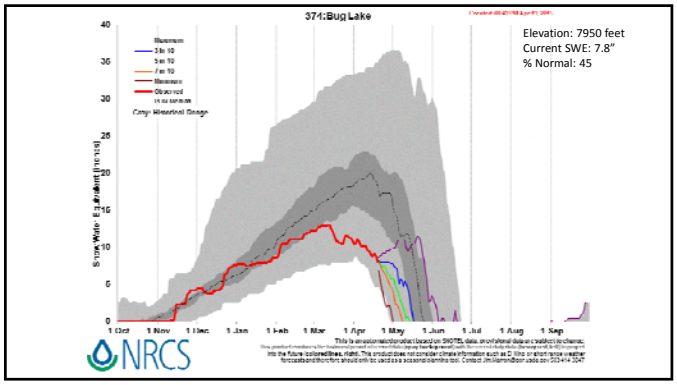

Lower Bear - % of Peak SWE
USDA NRCS Natural Resources Conservation Service
Percent of Peak Snow Water Equivalent
Normal
WY 2015

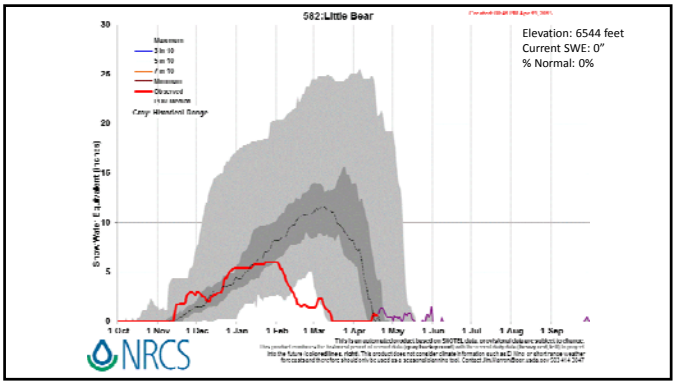

Emigrant Summit
Elevation: 7390 feet
Current SWE: 10.9"
% Normal: 53
Snow Water Equivalent (inches)
Date
Observed
POR Median

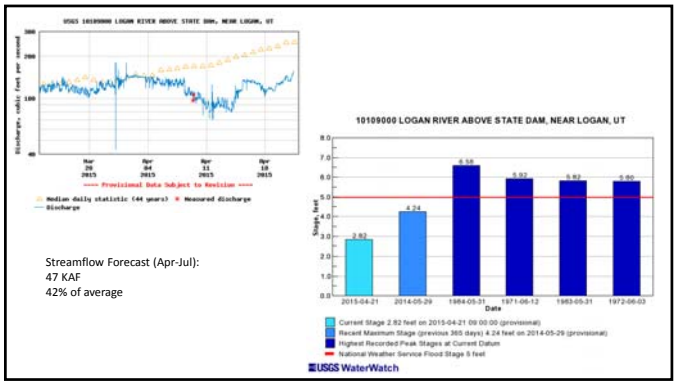

Sedgwick Peak
Elevation: 7850 feet
Current SWE: 8.6"
% Normal: 50
Snow Water Equivalent (inches)
Date
Observed
POR Median

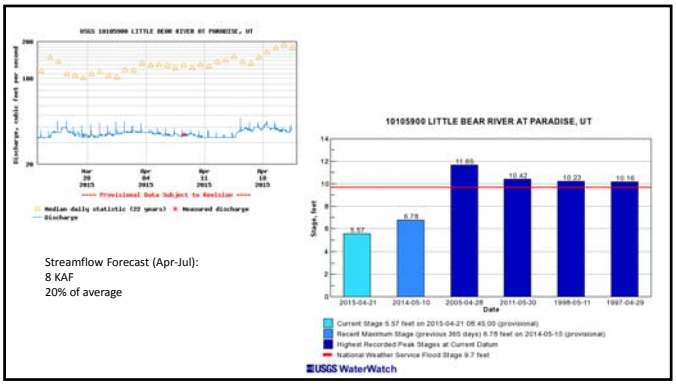

Logan - % of Peak SWE
USDA NRCS Natural Resources Conservation Service

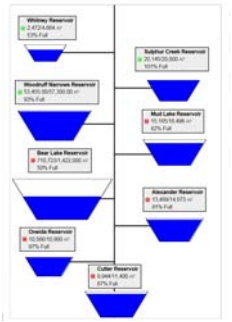

873: Tony Grove Lake
Elevation: 8474 feet
Current SWE: 22.1"
% Normal: 68
Snow Water Equivalent (inches)
NRCS


371:Bug Lake
Elevation: 7950 feet
Current SWE: 7.8"
% Normal: 45
NRCS


582:Little Bear
Elevation: 6544 feet
Current SWE: 0"
% Normal: 0%
NRCS

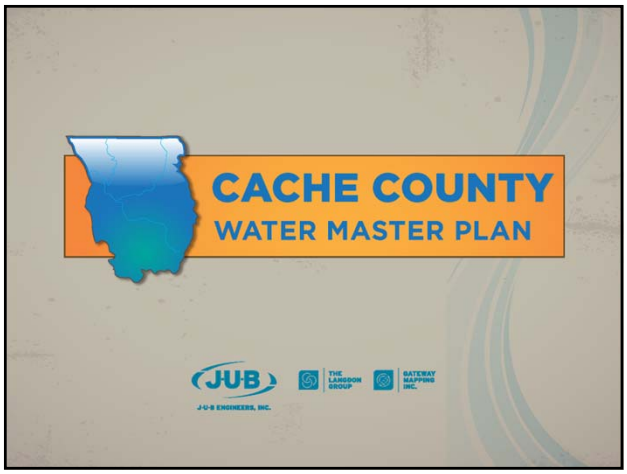

10109000 LOGAN RIVER ABOVE STATE DAM, NEAR LOGAN, UT
Streamflow Forecast (Apr-Jul):
47 KAF
42% of average
USGS WaterWatch

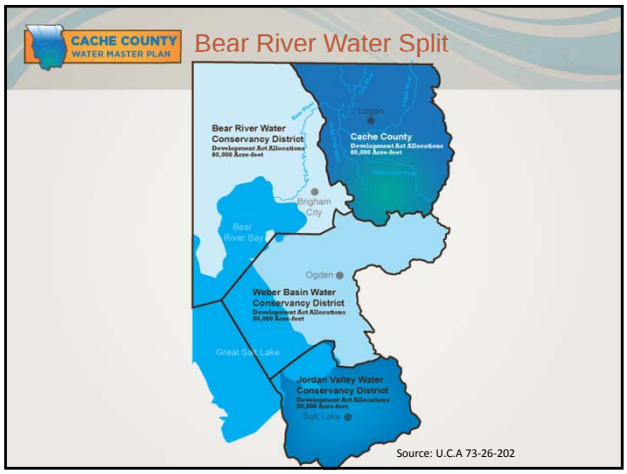

10105900 LITTLE BEAR RIVER AT PARADISE, UT
Streamflow Forecast (Apr-Jul):
8 KAF
20% of average
USGS WaterWatch

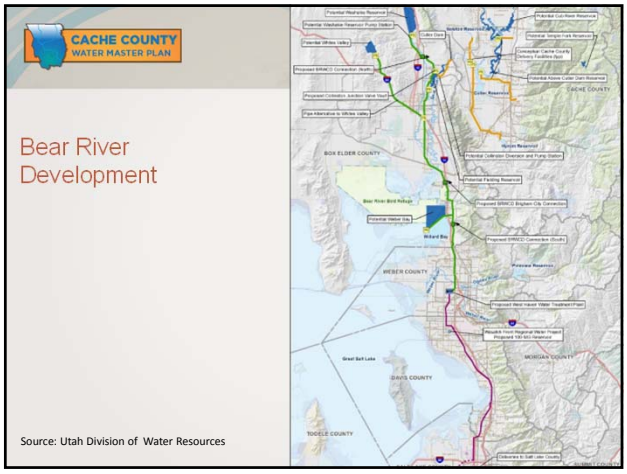


Summary

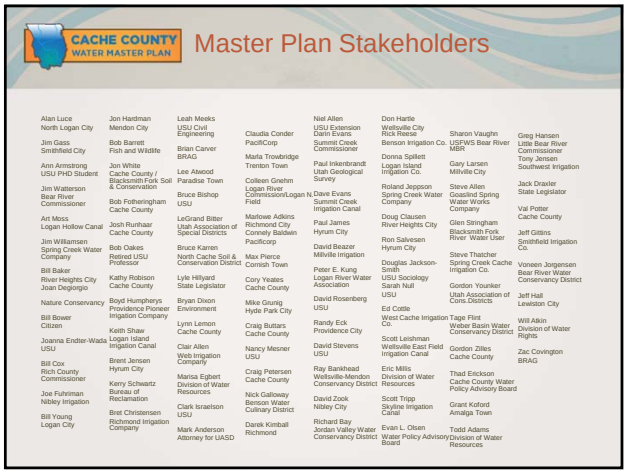
- Bear River Basin SWE currently at 50% of normal.
- Reservoir storage at 50 (smaller reservoirs are >75% full).
- Forecasted Apr-Jul streamflow 10 – 67% of average.
- Streamflow peak will likely occur ~2 weeks early (weather dependent).
- Low snowpack + warm temperatures = inefficient runoff.

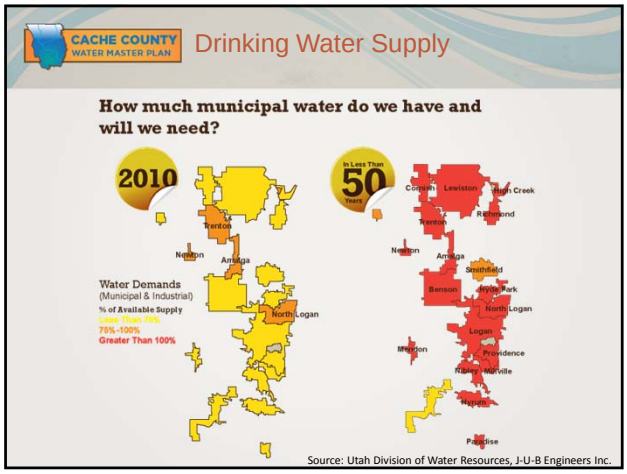

CACHE COUNTY
WATER MASTER PLAN
JUB
J-U-B ENGINEERS, INC.
THE LANGDON GROUP
GATEWAY MAPPING INC.


CACHE COUNTY
WATER MASTER PLAN
Bear River Water Split
Bear River Water Conservancy District
Development Act Allocations
60,000 Acre-feet
Cache County
Development Act Allocations
60,000 Acre-feet
Logan
Brigham City
Bear River Bay
Ogden
Weber Basin Water Conservancy District
Development Act Allocations
50,000 Acre-feet
Great Salt Lake
Jordan Valley Water Conservancy District
Development Act Allocations
50,000 Acre-feet
Salt Lake
Source: U.C.A 73-26-202

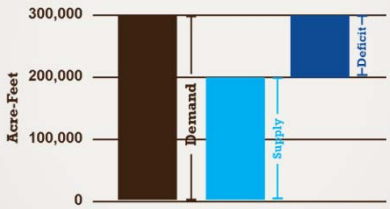

CACHE COUNTY
WATER MASTER PLAN
Bear River Development
Source: Utah Division of Water Resources


CACHE COUNTY
WATER MASTER PLAN
Moving Forward
Public Process
2012
• Stakeholder interviews
• Reports to councils
• Steering committee
2013
• Steering committee meeting
• Reports to councils
• Meeting with mayors
• Presented findings
• Final report
2014
Assessment of Implementation
• Coordination with County and stakeholders
2015 - 2016
Implementation
• meetings with cities and groups
• city council presentations committees
• Steering committees
• Information Dissemination
• Meetings with water policy makers
Consensus Building
• Water Conservancy District Creation


CACHE COUNTY
WATER MASTER PLAN
Master Plan Stakeholders
Alan Luce
North Logan City
Jim Gass
Smithfield City
Ann Armstrong
USU PHD Student
Jim Watterson
Bear River Commissioner
Art Moss
Logan Hollow Canal
Jim Williamsen
Spring Creek Water Company
Bill Baker
River Heights City
Joan Degiorgio
Nature Conservancy
Bill Bower
Citizen
Joanna Endter-Wada
USU
Bill Cox
Rich County Commissioner
Joe Fuhriman
Nibley Irrigation
Bill Young
Logan City
Jon Hardman
Mendon City
Bob Barrett
Fish and Wildlife
Jon White
Cache County / Blacksmith Fork Soil & Conservation
Bob Fotheringham
Cache County
Josh Runhaar
Cache County
Bob Oakes
Retired USU Professor
Kathy Robison
Cache County
Boyd Humpherys
Providence Pioneer Irrigation Company
Keith Shaw
Logan Island Irrigation Canal
Brent Jensen
Hyrum City
Kerry Schwartz
Bureau of Reclamation
Bret Christensen
Richmond Irrigation Company
Leah Meeks
USU Civil Engineering
Brian Carver
BRAG
Lee Atwood
Paradise Town
Bruce Bishop
USU
LeGrand Bitter
Utah Association of Special Districts
Bruce Karren
North Cache Soil & Conservation District
Lyle Hillyard
State Legislator
Bryan Dixon
Environment
Lynn Lemon
Cache County
Clair Allen
Web Irrigation Company
Marisa Egbert
Division of Water Resources
Clark Israelson
USU
Mark Anderson
Attorney for UASD
Claudia Conder
PacifiCorp
Marla Trowbridge
Trenton Town
Colleen Gnehm
Logan River Commission/Logan N. Field
Marlowe Adkins
Richmond City
Connely Baldwin
PacifiCorp
Max Pierce
Cornish Town
Cory Yeates
Cache County
Mike Grunig
Hyde Park City
Craig Buttars
Cache County
Nancy Mesner
USU
Craig Petersen
Cache County
Nick Galloway
Benson Water Culinary District
Darek Kimball
Richmond
Niel Allen
USU Extension Darin Evans
Summit Creek Commissioner
Dave Evans
Summit Creek Irrigation Canal
Paul James
Hyrum City
David Beazer
Millville Irrigation
Peter E. Kung
Logan River Water Association
David Rosenberg
USU
Randy Eck
Providence City
David Stevens
USU
Ray Bankhead
Wellsville-Mendon Conservancy District
David Zook
Nibley City
Richard Bay
Jordan Valley Water Conservancy District
Don Hartle
Wellsville City
Rick Reese
Benson Irrigation Co.
Donna Spillett
Logan Island Irrigation Co.
Roland Jeppson
Spring Creek Water Company
Doug Clausen
River Heights City
Ron Salvesen
Hyrum City
Douglas Jackson-Smith
USU Sociology
Sarah Null
USU
Ed Cottle
West Cache Irrigation Co.
Scott Leishman
Wellsville East Field Irrigation Canal
Eric Millis
Division of Water Resources
Scott Tripp
Skyline Irrigation Canal
Evan L. Olsen
Water Policy Advisory Board
Sharon Vaughn
USFWS Bear River MBR
Gary Larsen
Millville City
Steve Allen
Goasland Spring Water Works Company
Glen Stringham
Blacksmith Fork River Water User
Steve Thatcher
Spring Creek Cache Irrigation Co.
Gordon Younker
Utah Association of Cons Districts
Tage Flint
Weber Basin Water Conservancy District
Gordon Zilles
Cache County
Thad Erickson
Cache County Water Policy Advisory Board
Grant Koford
Amalga Town
Todd Adams
Division of Water Resources
Greg Hansen
Little Bear River Commissioner
Tony Jensen
Southwest Irrigation
Jack Draxler
State Legislator
Val Potter
Cache County
Jeff Gittins
Smithfield Irrigation Co.
Voneen Jorgensen
Bear River Water Conservancy District
Jeff Hall
Lewiston City
Will Atkin
Division of Water Rights
Zac Covington
BRAG


CACHE COUNTY
WATER MASTER PLAN
Drinking Water Supply
How much municipal water do we have and will we need?
2010
In Less Than 50 Years
Water Demands
(Municipal & Industrial)
% of Available Supply
Less Than 75%
75%-100%
Greater Than 100%
Trenton
Newton
Amalga
North Logan
Cornish
Lewiston
Clarkston
Richmond
Smithfield
Benson
Hyde Park
Logan
Providence
Millville
Nibley
Paradise
Source: Utah Division of Water Resources, J-U-B Engineers Inc.

Agriculture Water Supply & Need



Source: Average based on annual volumes recorded by Division of Water Rights over last 10 years

Environmental Water Supply & Need

- Quantify environmental water demands
- Incorporate Best Management Practices (BMP's) and other measures to maintain or improve our environment and wildlife habitat.

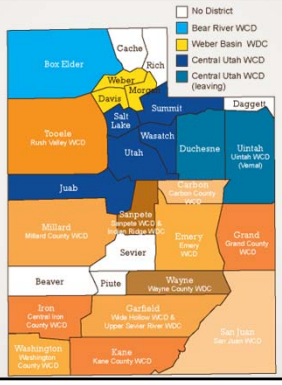
Primary Recommendations of Water Master Plan

- Improve Water Conservation
- Protect and Develop Bear River Water Rights

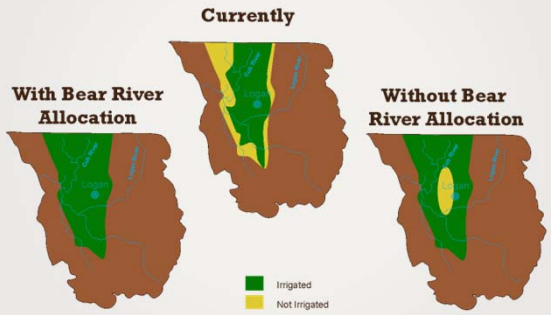
How Can We Conserve and Protect Our Water?

Achieves Objective: ○ Effective ◑ More Effective ● Very Effective	Continue with Current System (Water Manager)	Water Manager with more Resources (Additional funds and staff for projects)	Special Service District	Water Conservancy District
Water Supply Protect Bear River allocation	○	◑	◑	●
Governance Represent all County water users	○	○	◑	●
Implementation Promote collaboration	○	◑	●	●
Environment Maintain or improve environmental quality	○	◑	●	●

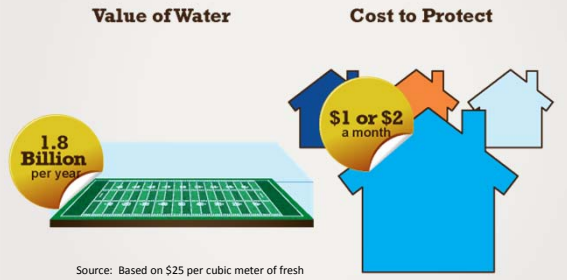
Who has a District?



Why is Bear River Water Important?



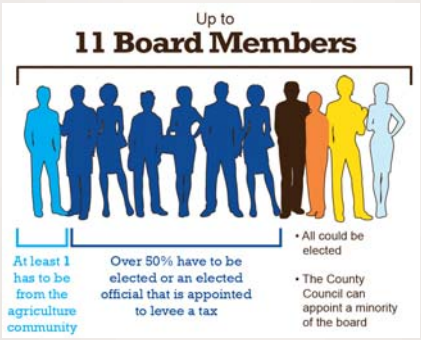
Estimated Value of Bear River Water and Cost to Protect It



Source: Based on $25 per cubic meter of fresh water given in Real Value Of Water study prepared by Applied Analysis

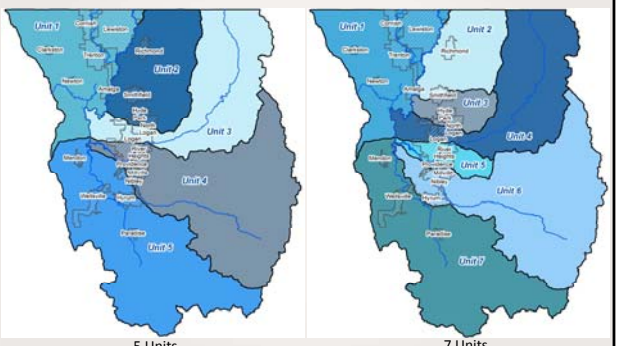
Source: Based on draft Joint Resolution prepared by Fabian Law, Utah Code Ann. 17B-2a-1006

How is a District Governed?



Source: Utah Code Ann. 17B-2a-1005

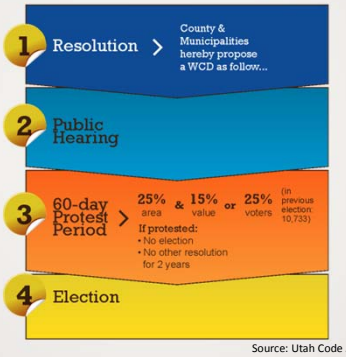
District Units?



5 Units

7 Units

How is a District Created?
Resolution

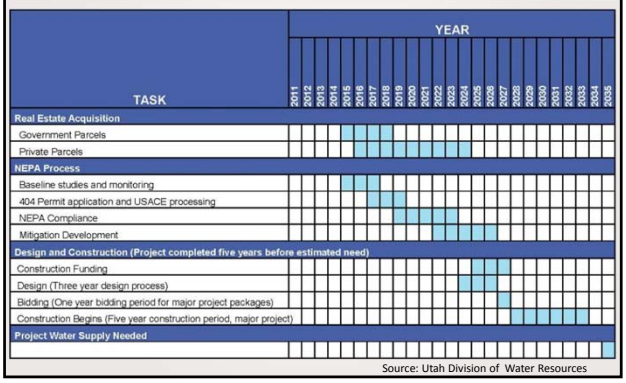


Source: Utah Code Ann. 17B-1 Part 2

How is a District Created?
Petition

Source: Utah Code Ann. 17B-1 Part 2

Bear River Development Schedule (DWRe)



Source: Utah Division of Water Resources

District Purpose

The purpose of a district in Cache County is to protect and conserve our water interests. The primary interests in this regard are:

- Secure our Bear River allocation
- Promote water conservation
- Safeguard adequate amounts of water for the future

Responses to Concerns
A District Will Not:

- "Pool" existing water rights from municipalities or irrigation companies
- Interfere with local management of water systems
- Build a castle on the hill (spend irresponsibly)
- Manage rights of individual cities, irrigation companies, or other private rights

Responses to Concerns
A District Will:

- Protect our Bear River water rights
- Improve water conservation
- Facilitate regional water projects where needed
- Keep remaining water here
- Provide a governing board that is focused only on water issues
- Unify our county into a stronger voice
- Provide more clout with the state legislature on water issues that affect us
- Provide representation for all citizens

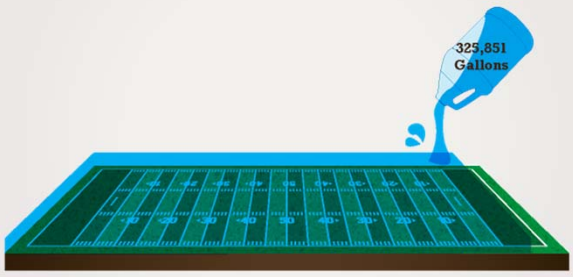
Why Now? What has Changed?

- More than half of district board members must be elected
- Groundwater management plan enacted in September 1999
- Bear River development has started on the Wasatch Front
- A Conservancy district will provide community focus for water conservation
- County population has increased by more than 30% since 1999 and will double between now and 2060

What Next?

- Questions
- Input

What is an Acre Foot of Water?



Cache County Annual Water Volumes

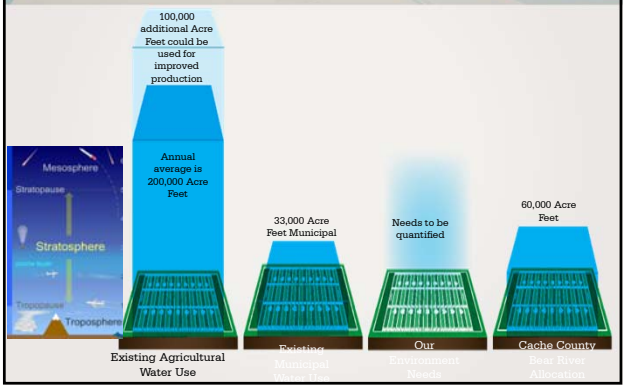
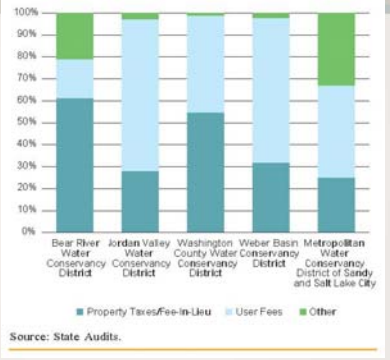


Figure 6: Rate Structures of Selected Water Conservancy Districts



Source: Utah Foundation Report 723, Sept 2014

Master Plan Overview

How Can You be Informed & Involved?

- https://www.cachecounty.org/water/
- jking@langdongroupinc.com

A SUMMARY OF THE
USGS STUDIES OF BEAR LAKE AND ITS CATCHMENT
Jack Barnett
April 2015

The Clinton administration determined it was important to learn from science what could be observed about climate change. One of the efforts suggested by the USGS was authorized. The plan was to look for a lake where long-term records could be obtained from the sediments in the lake bottom. After searching for the best lake, agreement was reached that Bear Lake would be the place to look.

Several millions of dollars were authorized to be spent and a large and impressive group of scientists were employed to conduct many studies. This team of scientists was led by Joseph G. Rosenbaum. Just for ease of reference, I will refer to the studies and team as a group as the "Rosenbaum studies or team."

In 1996 the first effort began with the acquiring of three cores from the bed of Bear Lake. More coring was to follow. These cores were sliced into many samples and sent to several experts and geologic laboratories. The project was authorized to use collected information to go back a few tens of thousands of years and study past climates. While the cores were being examined, other scientists looked for more clues in the landscape around Bear Lake.

It was quickly learned that the Rosenbaum team had hit the jackpot. They learned that in parts of the Bear Lake bed sedimentation had occurred at a very slow rate. This meant that a very short section of core could take one back a long period of time into the Lake's history. In fact, they determined that they had cores that took the sediment record back as much as 250,000 years. For the team this created a problem as the study was authorized to only look back a few tens of thousands of years, yet they had very valuable information that needed to be studied. They worked around this issue and, with time, several papers were prepared.

Reading early drafts of these papers led the Bear River Commission to conclude that it would be most important for the findings to be published and preserved. The Commission also came to the conclusion that all of the papers were very technical and written in such a way that most residents of the area would find the reports difficult to understand. With time, there were 18 papers prepared and 15 of them were published in 2009 by the Geological Society of America as that Society's "Special Paper 450."

The Commission searched for a way to have a qualified team write a summary report that could be easily read and understood. None of the technical authors stepped forward. With the approval of the USGS, the Commission worked with the Utah Geological Survey to have a desired publication prepared. This effort resulted in a UGS publication titled "Why is Bear Lake So Blue?" This brief booklet does use some facts from the Rosenbaum publications and it answers some intriguing questions, but it fell far short of the Commission's goal. As of this writing, the Commission's objective has not been reached.

There is a copy of all 18 papers in the Bear River Commission library and the Commission also has an electronic copy of all 18 papers. The following is this writer's attempt to identify at least some of the key findings of each report. The introductory report and the following 14 reports listed are found in the GSA paper. The last three were not published by the GSA.

REPORTS PREPARED BY THE USGS ON THE BEAR LAKE CATCHMENT

A. ***Introduction to Paleoenvironments of Bear Lake, Utah and Idaho, and its catchment.*** Joseph G. Rosenbaum and Darrell S. Kaufman.

This brief paper is, as the title indicates, an introduction to the many studies. It describes the work done and some of the conclusions. It was not intended to be a summary of all the findings.

1. ***Climatic and limnologic setting of Bear Lake, Utah and Idaho.*** Walter E. Dean, et al.

This short paper describes the Lake as it is today. It discusses the water chemistry of the spring-fed Lake as it was before the diversion of the Bear River into the Lake and the change in chemistry when the River was diverted about 100 years ago into the Lake.

2. ***Geology and geomorphology of Bear Lake Valley and upper Bear River, Utah and Idaho.*** Marith C. Reheis, et al.

The report describes the Lake as being in a fault-bounded valley. It tells of periods when the Lake was much higher than the present level. The Bear Lake Valley once filled to as far north as the Nounan Narrows, and the current Lake is a small remnant of the larger Lake with a drop in elevation of about 80 feet.

3. ***Late Quaternary sedimentary features of Bear Lake, Utah and Idaho.*** Joseph P. Smoot.

This report describes the clay, sands and gravels deposited (sediments) in and around the Lake over an extended period of time. It describes how changes in Lake chemistry also change minerals deposited. This gives an indication as to when the Lake was connected to the River.

4. ***Isotope and major-ion chemistry of groundwater in Bear Lake Valley, Utah and Idaho, with emphasis on the Bear River Range.*** Jordon Bright.

This investigation looks at the chemistry of the groundwater reaching the Lake. It also analyzes isotopes in the water. It is concluded that when the River is not flowing into the Lake, 99 percent of the dissolved minerals in the Lake come from streams and springs draining the Bear River Range to the west of the Lake; hence, very little water reaches the Lake from the Bear Lake Plateau to the east of the Lake.

5. ***Radiocarbon ages and age models for the past 30,000 years in Bear Lake, Utah and Idaho.*** Steven M. Colman, et al.

The report, using radiocarbon dating, looks at pollen, ostracods and carbon found in the Lake sediments as revealed by the core samples. This allows for the creation of age models over the last 30,000 years. The age model is referred to as the backbone in reconstructing past environments. Ostracods are very small bean-shaped animals, with some being just visible to the naked eye. Their forms have changed with time, which make them good guide fossils.

6. ***Allogenic sedimentary components of Bear Lake, Utah and Idaho.*** Joseph G. Rosenbaum, et al.

The study looks at the mineralogy, chemistry and magnetic properties of the sediments in the Lake found in the cores. It identifies carbon-rich deposits brought to the Lake by waters from the Bear River Range when the River did not flow into the Lake. It also describes quartz-rich layer deposits by the River into the Lake as the River drains from its headwaters in the Uinta Mountains. Iron-rich red layers are also identified as coming from the River during ice age glacial melt.

7. ***Endogenic carbonate sedimentation in Bear Lake, Utah and Idaho, over the last two glacial-interglacial cycles.*** Walter E. Dean.

This investigation looked at the carbon-rich sediments deposited over the last two periods between the last two glacial periods. It discusses sediments over the last 220,000 years. Looking more recent in time, it notes that chemistry started to change about 11,000 years ago, indicating a withdrawal of River waters from the Lake. The chemistry of minerals would infer that, for the most part, the River did not flow into the Lake from 7,000 years ago until man diverted the River into the Lake about 100 years ago. Most of the time, however, over the last 220,000 years, the River was connected to the Lake.

8. ***Ostracode endemism in Bear Lake, Utah and Idaho.*** Jordon Bright.

The author found that Bear Lake is one of few lakes worldwide with its own unique species of ostracods. These are called endemic species and there is a correlation with the endemic fish species found in Bear Lake. There is an implication that the environmental setting in the Lake has been somewhat stable for hundreds of thousands of years despite changing climates. This stability can be attributed to the stable flow of streams and groundwater from the Bear River Range to the west of the Lake.

9. ***A 19,000-year vegetation and climate record for Bear Lake, Utah and Idaho.*** Lisa A. Doner.

This study analyzes pollen found in the cores taken from the Lake. Glacial and non-glacial periods can be identified. Pollen is a good indicator of climate change. The pollen from the

cores indicated a warm and dry period from 12,000 to 7,500 years ago. Generally, the past 7,500 years have been more wet and cool.

10. ***A 19,000-year record of hydrologic and climatic change inferred from diatoms from Bear Lake, Utah and Idaho.*** Katrina A. Moser and James P. Kimball.

Diatoms are single-celled algae. Their growth in the Lake is changed as Lake levels change and as the Lake may be covered with ice. Diatoms can be used to track changes in sediments carried into the Lake. The study concludes that from 19,000 years ago to 14,000 years ago there is a good fossil diatom record, perhaps because of increased turbidity of water coming into the Lake from glacier-fed streams and ice cover. The record of the diatoms indicates that the Lake was tied to the River from 14,000 years ago to 7,600 years ago. There is a suggestion of drier conditions from 3,000 years ago to the present.

11. ***The glacial/deglacial history of sedimentation in Bear Lake, Utah and Idaho.*** Joseph G. Rosenbaum and Clifford W. Heil, Jr.

It is noted that the Bear River is the largest river in the Great Basin and, at times in the past, it has contributed to Bear Lake. The cores can be used to determine where the majority of the sediments in the Lake come from as the sediments from the River draining the Uinta Mountains are different from the sediments contributed to the Lake by local streams. The sedimentary record indicates glaciation, and it was found that, as to the Lake, maximum glaciation occurred as Lake Bonneville reached its greatest size about 20,000 years ago. Glacial sediments are also found in Bear Lake that predate the rise of Lake Bonneville. Drier conditions may have occurred at Bear Lake when Lake Bonneville was falling.

12. ***Sedimentary constraints on late Quaternary lake-level fluctuations at Bear Lake, Utah and Idaho.*** Joseph P. Smoot and Joseph G. Rosenbaum.

Evidence of the lake-level history of Bear Lake for the past 25,000 years is of three types. Shorelines carved into the land above the modern Lake level is one indicator, but is only preserved in some areas. Grain size in Lake cores is another indicator. Sedimentary texture is also a tool. A model was created to include all three indicators. Two maps were created, one showing grain size in the sediments of the Lake when the Lake was at maximum historical elevation, and the other when the Lake elevation was about 80 feet below the historic level. Using this approach, the elevation of the Lake can be determined at various times in the past. For example, the model shows that prior to 18,000 years ago, the Lake level was stable and near the modern level and probably overflowing. However, between 17,500 years ago and 15,500 years ago, the Lake was about 132 feet below the modern level. Several Lake levels higher than the modern Lake level are also indicated between 8,500 and 700 years ago.

13. ***Paleomagnetism and environmental magnetism of GLAD800 sediment cores from Bear Lake, Utah and Idaho.*** Clifford W. Heil, Jr., et al.

Ancient records of the earth's magnetism are also a tool. The authors divided the sedimentary sequence in Bear Lake into zones. As the Lake becomes more saline because of the reduction of fresh water inflow and/or increased evaporation, different minerals can form. For example, as the Lake becomes more saline, pyrite is formed. Magnetic features can be used to compare climate over large areas; however, the Bear Lake record only suggests feasible possibilities of this type of correlation between Bear Lake catchment and areas far removed.

14. ***A quarter-million years of paleoenvironmental change at Bear Lake, Utah and Idaho.*** Darrell S. Kaufman, et al.

Bear Lake was found to be one of the longest-lived lakes on the North American continent. The cores indicate a spring-fed alkaline lake where carbonate-bearing sediments have accumulated continuously. A continuous, almost 400-foot core contains evidence of hydrologic and environmental change over the last two glacial-interglacial cycles. Precipitation of carbon-rich minerals has been occurring and there are massive silty clay and marl deposits. The core indicates the influence of the River and Lake level changes. During most of the last quarter-million years, the River has been tributary to the Lake. The paper provides a figure that shows four maps of various lake levels and Lake and River relationship. One of these shows a small and isolated lake and another shows a much-expanded Bear Lake with its outlet far to the north near Nounan.

****

The following three papers were not published in the GSA Special paper 450, but may be found in the Commission's library.

15. ***Unusual Holocene and late Pleistocene carbonate sedimentation in Bear Lake, Utah and Idaho, USA.*** Walter Dean, et al.

"Bear Lake hydrology combined with evaporation created an unusual situation that produced large amounts of aragonite, but no evaporate minerals." This statement by the authors explains the reason for the writing of the paper. The salinity of the Lake increased about 11,000 years ago and aragonite became the dominant mineral accumulating in the bottom sediments. Lake forming aragonite is usually found in small saline lakes where salinity varies considerably; however, other evidence indicates that the chemistry of the Lake has remained fairly constant for a long period of time.

16. ***A continuous 250,000 yr. record of oxygen and carbon isotopes in ostracode and bulk-sediment carbonate from Bear Lake, Utah-Idaho.*** Jordan Bright, et al.

Oxygen and carbon isotopes were analyzed from the almost 400 foot long core and they indicated dramatic fluctuations in the Lake's hydrologic budget over the last 250,000 years. During most of the time, the Lake was fresher than the modern Lake. Brief intervals that are an exception to this finding can be identified in the isotope record in the core.

17. ***Age model for a continuous, ca 250-ka Quaternary lacustrine record from Bear Lake, Utah-Idaho.*** S. M. Colman, et al.

The sediments sampled by the almost 400 foot drill core from the Lake comprise one of the longest lake sediment sequences recovered from an existing lake and the age dates back beyond the age of radiocarbon dating. Using other information found in the core, an age dating model was created. This age model represents the best estimate of the chronology of deposition in Bear Lake and might be used to address paleoclimate questions, including the relationship of the Bear Lake area to other areas.

SUMMARY OF WATER YEAR 2014 BEAR LAKE OPERATIONS AND IRRIGATION ALLOCATION FOR 2015

Date	Hydrologic Information/Event	Contents (% of Full) Discharge (% of Normal)
10-01-13	Bear Lake Beginning Elevation - 5,912.65 ft.	664,460 af (47%)
11-16-13	Bear Lake Low Elevation - 5,912.32 ft. (see note 1)	642,778 af (45%)
	Rainbow Inlet Canal Discharge	163,000 af (62%)
	Bear River Discharge Below Stewart Dam	2,160 af
	Bear Lake Net Runoff (Computed Total Inflow less Lake Evaporation)	180,000 af (56%)
06-11-14	Bear Lake High Elevation - 5,914.14 ft.	763,335 af (54%)
	Outlet Canal Releases; 10/1/13-10/4/13, 10/24/13-10/26/13, 5/24/2014 - 9/26/2014	202,000 af
07-14-14	Outlet Canal Maximum Release - 1,543 cfs	
	Bear Lake Storage Release (see note 2)	108,000 af
09-30-14	Bear Lake Ending Elevation - 5,912.28 ft.	640,155 af (45%)
	Bear Lake Settlement Agreement "System Loss" Volume (see note 3)	15,500 af

Notes
1 Low contents prior to start of storage.
2 Net irrigation storage release from Bear Lake, subtracting Rainbow inflow and the decreed adjustment for the natural yield of Bear Lake and Mud Lake area.
3 Due to uncontrolled flow from (welcome) rain events. Whenever water flows below Cutler during the irrigation season any storage water in the system at Cutler is the first water out. Natural flow goes to irrigators.

Current Status

Bear Lake elevation as of April 20, 2015 was 5914.38 feet. The seasonal low elevation of 5912.32 feet occurred on November 16, 2013. The causeway is open and the water is entering Bear Lake. The Bear Lake Outlet Canal is currently closed.

Irrigation

Bear Lake Storage Irrigation Allocation of 224,000 acre-feet was declared on April 7, 2015.