

# **PROCEDURES FOR DEPLETION ESTIMATES**

**April 19, 2016**

## HISTORY OF REVISIONS

November 23, 1993 – Initially adopted

November 13, 2012 – Amended procedures relative to Appendix C

April 15, 2014 – Revised

April 19, 2016 – Revised



## BEAR RIVER COMMISSION

### PROCEDURES FOR DEPLETION ESTIMATES

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#### I. INTRODUCTION

The Amended Bear River Compact was ratified by Congress in 1980 and established depletion amounts to which states were entitled. The Amended Compact did not spell out in detail how depletions would be calculated. Instead, the Amended Compact directed that these depletion calculations would be completed in accordance with "Commission-approved procedures." In November of 1989, the Commission adopted interim approved procedures with an understanding that with time and experience, the States may choose to amend the approved procedures.

The phrase "Commission-approved procedure" is found twice within the Amended Bear River Compact relative to depletion calculations. These places are as follows:

Article V.C.: "Water depletions permitted under provisions of subparagraphs (1), (2), (3), and (4) above, shall be calculated and administered by a *Commission-approved procedure*."

Article VI.B.: "Water depletions permitted under this Paragraph B shall be calculated and administered by a *Commission-approved procedure*."

These procedures will set out how water depletions will be determined. These procedures are set forth as general guidelines to be used by the states to report to the Bear River Commission (Commission) the additional depletions that have occurred as provided for under the Amended Bear River Compact. The Commission will account for depletions forward from January 1, 1976. A Commission-approved mapping project was completed and approved April 1992 to establish base data from which future maps and tabulations of new depletions could be prepared.

To account for the irrigation requirements of crops grown in the Bear River Basin, the Commission contracted with Utah State University, in cooperation with the University of Idaho and the University of Wyoming, to estimate irrigation depletions for subbasins within the Bear River basin. A map of the subbasins and Compact division boundaries is shown in Appendix A. Appendix B shows the amount of depletion per acre that was estimated for each subbasin. The following procedures will describe methods for determining depletions for new irrigation, supplemental irrigation and municipal and industrial uses.

Depletions from both surface water and groundwater sources will be reported. In order for groundwater depletions to be exempt from compact allocation, the state must provide documentation acceptable to the Commission to show the source of water for the depletions is not tributary to the Bear River.

## II. DEPLETION PROCEDURES

### A. Irrigation Depletion

#### 1. New Irrigated Lands

Depletion amounts from new irrigated lands, put in production since January 1, 1976, will be determined by multiplying the acreage brought into production by the irrigation depletion of the crop mix within a subbasin. Under the direction of the Commission, in 2015 the TAC completed an effort to update the crop mix for each subbasin. These updated crop mix values were then multiplied by updated crop evapotranspiration rates (ET) from *Research Report No. 213*, 2011, Utah State University, Logan, Utah by Robert W. Hill, J. Burdette Barker and Clayton S. Lewis. These updated values will replace the values reported in Table 15 of Research Report #125, by Robert W. Hill, Charles E. Brockway, Robert D. Burman, L. Niel Allen and Clarence W. Robinson, Utah Agricultural Experiment Station, Utah State University, in cooperation with the University of Idaho and the University of Wyoming, January 31, 1989 which were used in prior depletion estimates.

The computed and updated depletion values are based on the weighted average crop mix for new lands irrigated since January 1, 1976 for each subbasin. These depletion values by subbasin are summarized in Appendix B. Depletion values from Appendix B will be used unless modified by the Commission. Modifications will require supporting information, and appropriate adjusted tables to verify depletion values. Any modifications made by a state will be documented to the satisfaction of the other two states. Justification as to why the modification was desirable will be included in the documentation and approved by the Commission.

An example depletion calculation for new acreage brought into irrigated agricultural production is made as follows:

Example area: Thomas Fork Subbasin

Criteria: 40 new acres of irrigation brought into production

40 acres x 1.00 acre-feet\* = 40.0 acre-feet of annual depletion

\*(Based on Estimated Depletion from Appendix B)

By definition, depletion by the native vegetation or dryland crops is equal to the effective precipitation. No adjustment of the calculated depletion to account for

prior use of the land, such as dryland agriculture converted to irrigation, will be required. Lands classified by the Commission as "meadow/wetland" which are converted to irrigated lands will not be assessed an additional depletion.

## 2. Supplemental Supplies from New Water Development

### a. Project Developments

To evaluate supplemental use of water on lands irrigated prior to 1976, any change in use will require documentation from the state proposing the change in use and quantifying the additional depletion. The documentation should address the area, extent of lands to receive supplemental supply, source of the water, and other necessary information. This paragraph refers to areas of land whose supplemental supplies are being developed as a project to supply supplemental water. Depletion estimates will be made from system design and operation studies submitted to and approved by the Commission.

### b. Other Development

The depletion estimate assigned to the smaller supplemental rights or filings will be made by each state in a manner acceptable to the Commission. Such estimates may be made by reviewing historic delivery data, examining pump and power records, reviewing documents found in the water right records, interviewing water users, installing monitoring and measuring devices or other acceptable methods. Estimates for each supplemental right (either individually or by averaging other water rights in cases where no other information is available) will be made and tabulated and a report submitted to the other states for review prior to acceptance by the Commission.

Any supplemental filing or right that is supplementing lands with an original supply right having a priority date post January 1, 1976, need not have a depletion allocation assigned to it.

## 3. Irrigation Depletion Accounting Procedure

Each state will be responsible for obtaining, analyzing, and reporting its own data. An accepted standard mapping and database manager will be used. All map and tabular information will be submitted in a form and format approved by the Commission.

The following data elements should be used in developing the data for the state reports:

- a. State
- b. Compact division

- c. Subbasin from Appendix A
- d. New acreage put into production or acreage receiving supplemental supply
- f. Irrigated land, in acres, taken out of production (negative acreage value for banking, as described under II.D.)
- g. Irrigation depletion in acre-feet per acre from Appendix B
- h. Depletion by Compact section: This value is the sum of acreage within a section. A section may have a negative acreage value if a majority of the land was taken out of production. The acreage values from elements "e" and "g" are multiplied by the irrigation depletion (element "h") and shortage rate (element "f") for supplemental, and input to element "i."
- i. Division totals: This is the summation of all the depletion attributable to a state by Compact division. Compact division boundaries are shown on the approved 1976 base maps.
- j. Number of acres held in water rights banked by State and Compact division

## **B. Municipal Depletion**

The definition for "municipal" use in the calculation of depletions is "any organization that supplies potable water and is required to report its activity as per the National Safe Drinking Water Act." The Amended Bear River Compact specifically exempts self-supplied domestic and stockwater use in the Upper and Central divisions from depletion charges. In order to be consistent, this exemption is extended to the Lower Division as well.

The increased or decreased depletion attributed to municipal uses since January 1, 1976, will be calculated, tabulated, and reported as provided for under Section F.

In preparing past municipal depletion estimates, the Commission has found that the availability and quality of system specific water usage and depletion data varies considerably within the Basin. It therefore directed the TAC to develop a common, population based method for estimating municipal depletions. The TAC gathered data for about 65 public and community water systems within the Basin and estimated per capita depletions considering such factors as:

1. Measured inflow and outflow from the system
2. Types of water uses from the system
3. Whether or not outside watering was provided by the system
4. Type of waste-water disposal method
5. Published depletion values associated with the different identified water uses

Upon completion of the effort, a weighted average depletion rate of **0.11 acre-feet per capita** was calculated. This average value will be updated from time to time as directed by the Commission.

In making depletion estimates, each state will estimate the change in the number of people connected to a public or community water system since January 1, 1976 and multiply that number by the basin average depletion rate of 0.11 acre-feet per capita. If water system specific population data are unavailable, county or other suitable population data or estimates may be substituted. Depletions estimates will be made by each state for above Stewart Dam and within the Lower Division and submitted to and approved by the Commission.

### **C. Industrial Depletion**

Changes in industrial use not accounted for under municipal depletion will be accounted for by the states, and a total increase or decrease in water use by division and state will be compiled. Reports produced by each state should include the following information elements:

1. Name of the industrial or commercial establishment
2. Type of use
3. Total diversion in acre-feet prior to January 1, 1976, estimated or known
4. Diversion rate in acre-feet as of current reporting date
5. Total diversion increase or decrease in acre-feet since January 1, 1976 (decrease will be a negative value)
6. Total depletion increase or decrease in acre-feet since 1976
7. Location: latitude and longitude and/or section, township, and range (quarter-quarter section optional but preferred) for place of use
8. State and division

These data will be reported in such a way that totals for divisions within a state will be shown.

Where data are not available to document use as of January 1, 1976, current use data may be used and a mathematical calculation made to determine water use changes since January 1, 1976. The Commission will require that documentation be submitted which outlines the process the state used to determine the depletion. Documentation will be reviewed and approved by the Commission.

### **D. Banking Procedures**

When water uses with a pre-1976 state water right are discontinued, the state may transfer the depletion from that water right to uses with post-1976 priorities without a new depletion charge, or the water may be "banked." Each state will be responsible for maintaining an accounting system documenting the transferred water right and the post-1976 priorities to offset any new depletion. Any pre-1976 depletions that have not been "re-appropriated" to a post-1976 water right may be "banked."

Prior to banking allotments approved by the Commission, the state requesting the allotments will prepare a document for presentation to the Commission showing the process by which the water will be accounted. This report will include the procedures used and provide data, including water use, place of use, associated water rights, and previous depletions. Banked water must be approved by the Commission.

#### **E. Reservoir Evaporation**

There will be an accounting for any change in net evaporation as a result of increased storage. Any decrease in evaporation from reservoir abandonment or reduced storage may be banked. Evapotranspiration from inundated lands may also be included in determining net evaporation at the storage site. The state accounting for the net evaporation change will use acceptable procedures, and those procedures will be reported to the Commission.

#### **F. Reporting Requirements**

##### **1. Reporting of Depletion Amounts**

###### **a. Background**

As a part of the base mapping project completed by the Commission in 1992, an estimation was made of the changes in irrigation, municipal and industrial uses in each Compact division from 1976 to 1990. These estimates were reported to the Commission at their April 1992 meeting. There was wide variation in the percentages of allocation being put to beneficial use in the various divisions. Idaho's portion of the Central Division was the closest to reaching the allocation amount, with 64 percent of their allocation being depleted. At the other end of the spectrum was the Lower Division, where between 2-6 percent of their allocation to Utah and Idaho is being depleted. Because of this dichotomy, the reporting requirements for the Compact divisions will vary.

###### **b. Reporting Intervals**

Every five years, or as determined by the Commission, a review of the changes in depletions since 1976 occurring in the Central Division portion in Idaho will be determined. Every ten years, or as determined by the Commission, a determination of the depletion changes occurring in the Upper Division, the Wyoming portion of the Central Division, and the Lower Division will be made.

The determinations will include depletions from both new irrigation development and supplemental irrigation, and municipal and industrial uses.

The determinations may utilize aerial photography, satellite imagery, or other remote sensing data for the estimation of any changes in land use since 1976. Municipal and industrial uses will be calculated as described in these procedures. An updated map showing the changes will be produced if the Commission determines that the changes were significant enough to warrant an update.

Each state will submit a report summarizing the information required in Section II. The report will also include a comparison of total depletions and the Compact allotments by division for each state. A report will be sent by the states to the Engineer-Manager, as directed by the Commission. The Engineer-Manager will circulate the report to Commission members four weeks prior to the Commission meeting at which the report is to be presented. If the report is acceptable, it will be adopted by the Commission as the official depletion estimate record. If there are questions regarding the states' methodology or total depletion estimates, the concerns will be addressed by the states and a report will be resubmitted at the next Commission meeting.

If a mapping update is deemed necessary by the Commission, the update will show the new lands added and lands taken out of production since January 1, 1976. This information will be provided by each state using an acceptable database manager and sent to the Engineer-Manager. Each state will document how the map products were derived and how the information was verified. At the Commission's direction, map information will be compiled and merged to form updated 1:100,000 scale maps.

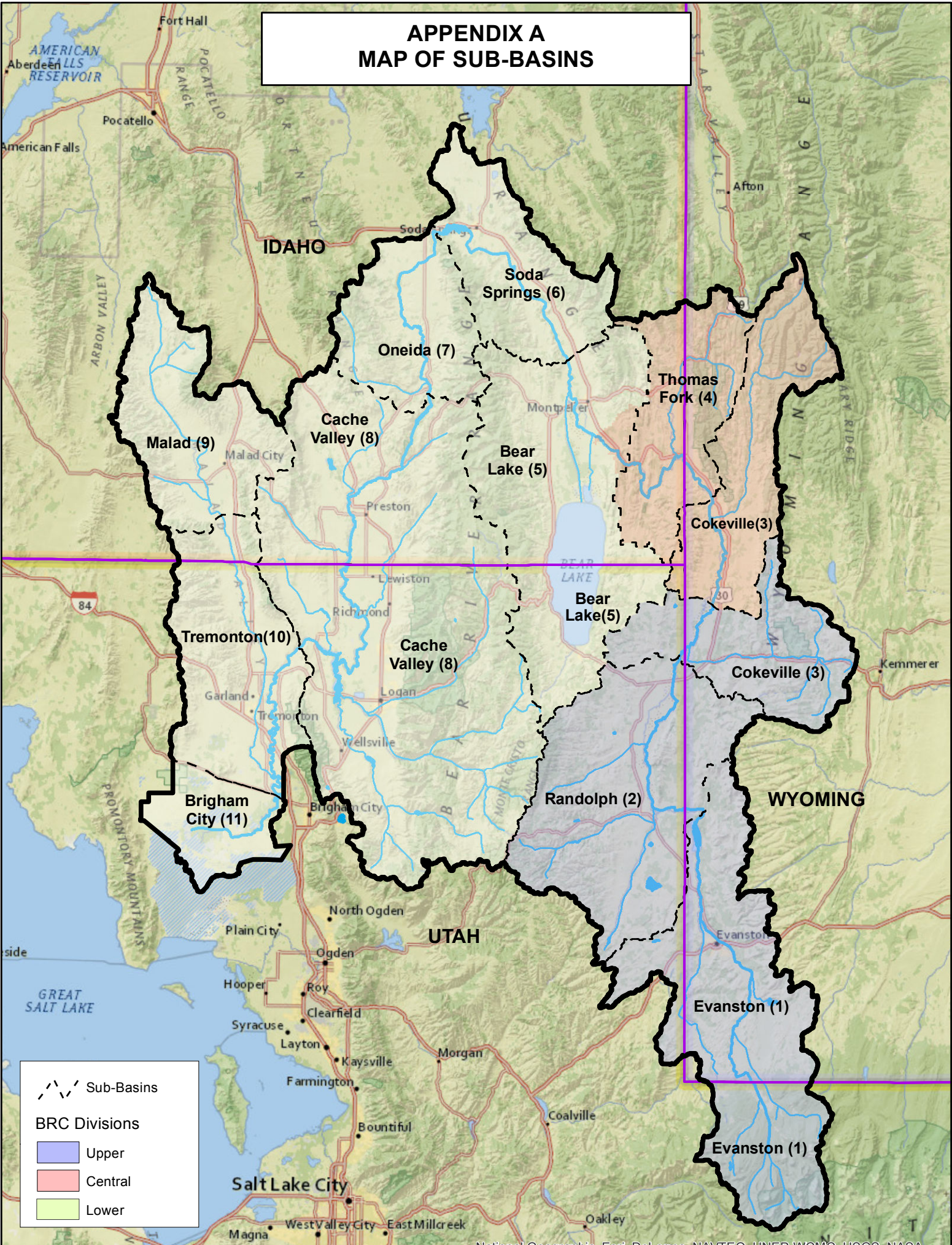
There may be a variety of future potential uses for Bear River water by the three states that are not presently known. It is not the intent to limit future uses with these depletion procedures. Depletion from uses such as out-of-basin exports, depletion from wildlife or aesthetic uses will be estimated by the respective states as new uses occur. The Commission-approved procedures will be revised as necessary to accommodate these new uses.

### **III. CONCLUSIONS**

The Commission was to establish "Commission-approved procedures" for estimating depletion as mandated by the Amended Bear River Compact. These procedures may be revised by the Commission at a regular or annual Commission meeting should changes in these Commission-approved procedures be necessary.



# APPENDIX A MAP OF SUB-BASINS



## APPENDIX B

### ESTIMATED DEPLETION FOR POST JANUARY 1, 1976 LANDS FOR SUBBASINS OF THE BEAR RIVER BASIN

Based on Average (2010-2014) Crop Mixes  
and Updated ET Rates from  
USU Research Report 213 (2011)

	SUBBASIN										
	Evanston 01	Randolph 02	Cokeville 03	Thomas Fork 04	Bear Lake 05	Soda 06	Oneida 07	Cache Valley 08	Malad 09	Tremonton 10(b&c)	Brigham City 10(a)
AF/A	0.45	0.88	0.87	1.00	1.07	0.85	0.70	1.34	1.24	1.39	1.63