

# **PROCEDURES FOR DEPLETION ESTIMATES**

**April 18, 2023**

## HISTORY OF REVISIONS

November 23, 1993 – Initially adopted

November 13, 2012 – Amended procedures relative to Appendix C

April 15, 2014 – Revised

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April 18, 2023 – Revised



# BEAR RIVER COMMISSION

## PROCEDURES FOR DEPLETION ESTIMATES

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### I. INTRODUCTION

Congress ratified the Amended Bear River Compact (Amended Compact) in 1980. The Amended Compact established depletion amounts for each state bound by the compact. 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 Bear River Commission (Commission) adopted interim approved procedures with an understanding that with time and experience, the states could choose to amend the approved procedures.

The phrase "Commission-approved procedure" is found twice within the Amended 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*."

In fulfillment of the Amended Compact, these procedures establish the methods the states will use to determine depletions. These procedures are set forth as general guidelines to be used by the states to determine and report to the Commission the additional depletions as allowed by the Amended Compact. The Commission is required to account for depletions forward from January 1, 1976. The Commission approved and finalized a mapping project in April 1992 to establish base data from which the states could prepare future maps and tabulations of new depletions.

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 illustrating the subbasins and compact division boundaries is shown in Appendix A. Appendix B summarizes the depletions per acre estimated for each subbasin. The following narrative describes the methods used by the states to determine depletions for new irrigation, supplemental irrigation and municipal and industrial uses. These procedures are adopted for the purpose of providing direction and common methods for the states to make depletion estimates pursuant to the compact allocations and nothing

herein is intended to direct, control or otherwise limit state water officials in their administration or accounting of water rights and water usage.

The states will report depletions from both surface water and groundwater sources to the Commission. For groundwater depletions to be exempt from compact allocation, a state must establish and document to the Commission that the source(s) of water supplying the depletions are 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 rate of the crop being irrigated on each field. These values will be summed, and an area-weighted average depletion rate for added acres will be calculated. For irrigated lands retired from irrigation, the number of acres retired will be multiplied by an area-weighted average depletion rate computed from the pre- and post-January 1, 1976 acres within a given subbasin. These depletion values by subbasin are summarized in Appendix B. Depletion values from Appendix B will be used unless modified by the Commission. Future modifications will require supporting information, and appropriate adjusted tables to verify depletion values. Any modifications to depletion values must be documented to the satisfaction of the Commission. Justification as to why the depletion values were modified will be documented in the report 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 1.17 acre-feet/acre\* = 46.8 acre-feet of annual depletion

\*(Based on Estimated Depletion from Appendix B)

Similar calculations will be made for lands which were irrigated prior to January 1, 1976 which have since been retired from irrigation, except that the “Subtracted” depletion value will be used for the respective subbasin. The calculated subtraction depletion value will then be subtracted from the new or added depletion value to

determine the net irrigation depletion change since January 1, 1976 for each subbasin.

These procedures define depletions by native vegetation or dryland crops as equal to the effective precipitation. These procedures do not require adjustment of the calculated depletion to account for prior use of the land, such as dryland agriculture converted to irrigation. Under these procedures, lands classified by the Commission as "meadow/wetland" which are converted to irrigated lands, are not assessed an additional depletion.

## 2. Supplemental Supplies from New Water Development

### a. Storage and Other Large 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 any additional depletion. The documentation shall 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 delivered by a project such as Woodruff Narrows Reservoir. The states will use system design and operation studies submitted to and approved by the Commission to estimate related depletions.

### b. Other Supplemental Irrigation Development

The depletion estimate assigned to smaller supplemental rights or filings will be calculated by each state in a manner acceptable to the Commission. For depletions associated with the use of supplemental irrigation water rights, each state will apply the factor of 40% of the full supply depletion rate to acres irrigated with a post-1976 supplemental water right.

Lands placed to beneficial use after January 1, 1976, are assigned a full depletion value. Consequently, any supplemental water right that supplies water to such lands will not be assigned an additional supplemental depletion.

## 3. Irrigation Depletion Accounting Procedure

Each state is responsible for obtaining, analyzing, and reporting its own data. States shall use agreed-upon standards for mapping and data management. States must

submit all map and tabular information in a form and format approved by the Commission.

States shall report the following data:

- a. State from which the data are derived.
- b. Compact division from which the data are derived.
- c. Subbasin from Appendix A from which the data are derived.
- d. Description of new acres put into production and acres receiving a supplemental supply.
- e. The factor applied to supplemental acres to convert from the full supply depletion rates. States shall use 40% unless another value is submitted to and approved by the Commission.
- f. Spatial description of irrigated land, in acres, taken out of production (negative acreage value for netting or banking, as described under II.D.)
- g. Irrigation depletion rate in acre-feet per acre for new acres and irrigation depletion rate for acres taken out of production, from Appendix B.
- h. Depletion by compact subbasin: This value is the sum of new acres within a subbasin multiplied by its full supply depletion rate, plus the sum of the new supplemental acres multiplied by its full supply depletion rate and the supplemental depletion factor, minus the sum of the acres taken out of production multiplied by its depletion rate.
- 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. If applicable, 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 Compact specifically exempts self-supplied domestic and stockwatering use in the Upper and Central Divisions from depletion charges. For consistency, the Commission has extended this exemption to the Lower Division.

States must calculate, tabulate, and report increased or decreased depletion attributed to municipal uses since January 1, 1976, by the methods set forth 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. As a result, the Commission directed the Bear River Technical Advisory Committee (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 domestic irrigation was supplied by the system.
4. Type of waste-water disposal method.
5. Published depletion values associated with the different identified water uses.

In fulfillment of Commission direction, the TAC calculated a weighted average municipal depletion rate of **0.11 acre-feet per capita**.

In estimating depletions, 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 population data for individual water systems are unavailable, states may substitute county or other suitable population data. Each state will estimate depletions for above Stewart Dam and within the Lower Division (i.e., below Stewart Dam) and will submit the depletions estimates to the Commission for approval.

### **C. Industrial Depletion**

Changes in industrial use not accounted for under municipal depletion will be accounted for by the states, and each state is responsible for compiling and reporting total increases or decreases in water use by division and by state. 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 industrial diversion in acre-feet prior to January 1, 1976, estimated or known.
4. Industrial diversion rate in acre-feet as of current reporting date.
5. Total increases or decreases in industrial diversions, in acre-feet since January 1, 1976 (decreases are reported as a negative value).
6. Total increase or decrease in industrial depletion in acre-feet since 1976.
7. Location: latitude and longitude and/or section, township, and range (quarter-quarter section optional but preferred) for each industrial place of use.
8. The state and compact division from which the industrial depletion was derived.

The states shall report these data for each compact division in each state.

Where data are not available to document use as of January 1, 1976, states can use current use data and then apply a prorated estimate 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 determining the net increase of irrigated acres in a subbasin, each state may subtract its post January 1, 1976, decrease in irrigated acres from the post January 1, 1976, increases in irrigated acres to determine a net change in irrigated acres, which it shall report to the Commission. In the alternative, at their discretion, individual states may elect to use either of the following options to account for pre-1976 depletions that are no longer occurring.

When a water use with a pre-1976 state water right is discontinued after January 1, 1976, (1) the state may transfer<sup>1</sup> the associated depletion from the pre-1976 water right to a use associated with a post-January 1, 1976 water right without a new depletion charge, or (2) the water may be "banked" for future transfer to a post-1976 use and water right. Each state shall implement an accounting system that documents the transferred water right and the post-1976 water right(s) and depletion amounts offset by the transfer. Any pre-1976 depletions that have not been transferred to a post-1976 water right may be "banked."

Before the Commission approves banking allotments for individual states, the state requesting the allotments will prepare a report summarizing its accounting methods and present those methods to the Commission. The report must explain the calculations of proposed banking allotments and must include data about water use, place of use, associated water rights, and previous depletions. The Commission must review and approve banked water values and the methods used to calculate the values before a state can offset depletions with banked water.

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

States are required to account for any change in net evaporation as a result of increased storage after January 1, 1976. Any decrease in evaporation from reservoir abandonment or reduced storage may be "banked" as defined above. Evapotranspiration from inundated lands may also be included in determining net evaporation at the storage site. Individual state's accounting for net evaporation

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<sup>1</sup> The use of the word "transfer" herein is generic and informal and is not meant to define or infer any specific state water right process.

changes must employ acceptable scientific methods, and those scientific methods must 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, the TAC estimated the changes in irrigation, municipal and industrial uses in each compact division from 1976 to 1990. These estimates were reported to the Commission at its April 1992 meeting.

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

For the Upper and Central Divisions (above Stewart Dam), the states will determine the changes in depletion every five years, or as determined by the Commission. For the Lower Division (below Stewart Dam), the states will determine depletions every ten years.

The determinations will include depletions from both new full-supply and supplemental irrigation uses and municipal and industrial uses. In determining depletions, individual states may utilize aerial photography, satellite imagery, and other remote sensing data by the methods prescribed in these procedures 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 production of an updated map.

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. The states will send their reports to the Engineer-Manager, as directed by the Commission. The Engineer-Manager will circulate the report to Commission members four (4) weeks prior to the Commission

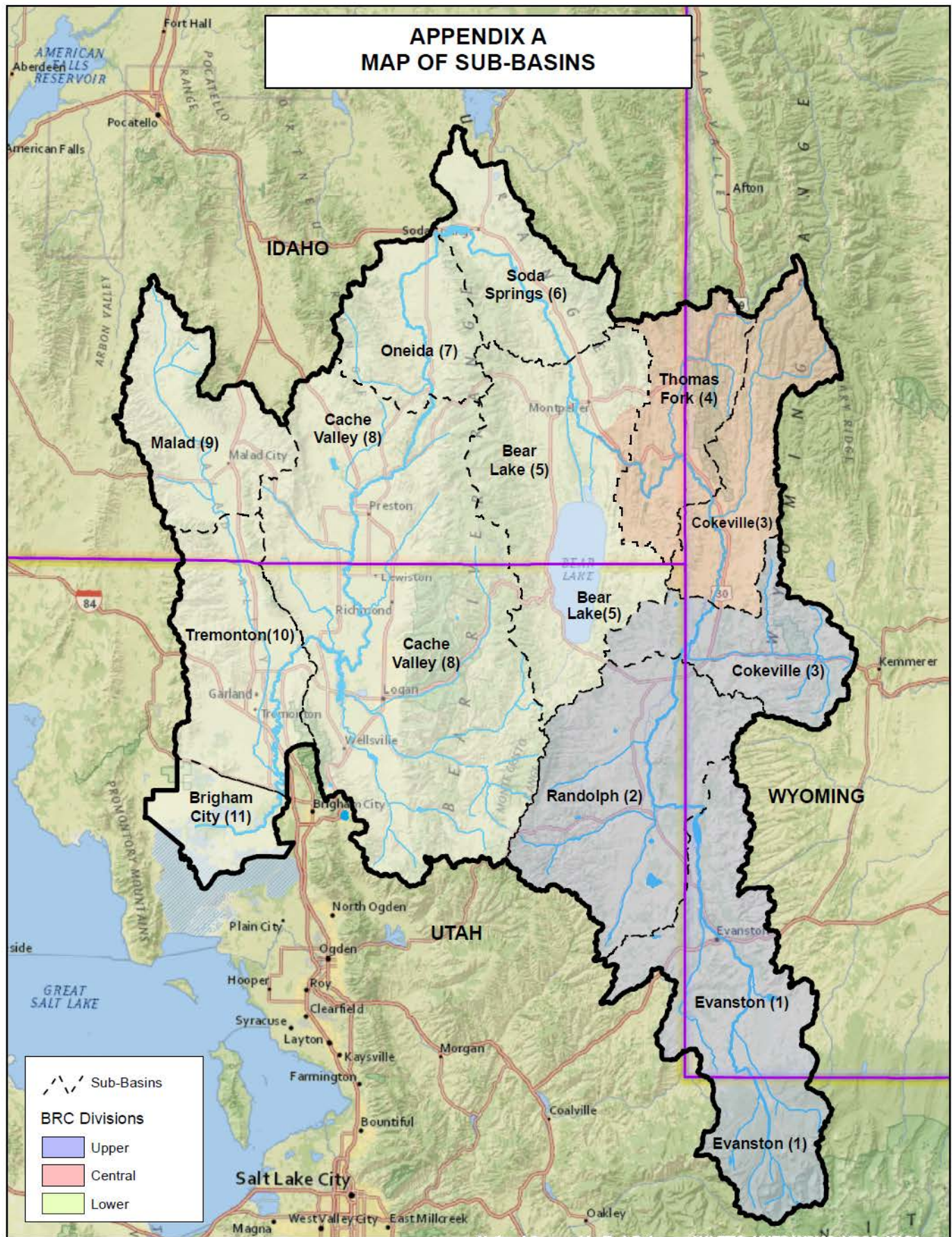


meeting at which the report is to be presented. If the report is acceptable, it will be adopted by the Commission as the official depletion estimate record. If the Commission has questions regarding the states' methodology or total depletion estimates, the states will address the Commission's concerns, revise the report, and resubmit it for reconsideration by the Commission at its next meeting.

If the Commission determines that a mapping update is necessary, the update will depict the new lands added and lands taken out of production since January 1, 1976. Each state will compile and submit mapping information to the Engineer-Manager. Each state will document how it developed the map products and how it verified the information. At the Commission's direction, map information will be compiled and merged to draw updated maps.

### **III. CONCLUSIONS**

The Amended Bear River Compact requires the Commission to establish "Commission-approved procedures" for estimating depletion. Once established, the Commission can revise these procedures at a regular or annual Commission meeting should it determine it needs to change these Commission-approved procedures.



## APPENDIX B

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

Based on average (2015 - 2019) crop mixes  
and updated ET rates from Utah Division of  
Water Resources' GridET program (2022)

	Bear River Irrigation Depletion Rates by Subbasin (acre-feet/acre)										
	Evanston 01	Randolph 02	Cokeville 03	Thomas Fork 04	Bear Lake 05	Soda 06	Oneida 07	Cache Valley 08	Malad 09	Tremonton 10	Brigham City 11
Rate for Added Acres	1.24	1.36	1.25	1.17	1.15	1.09	1.17	1.35	1.46	1.46	1.63
Rate for Subtracted Acres	1.30	1.34	1.28	1.22	1.20	1.09	1.18	1.43	1.52	1.45	1.54