



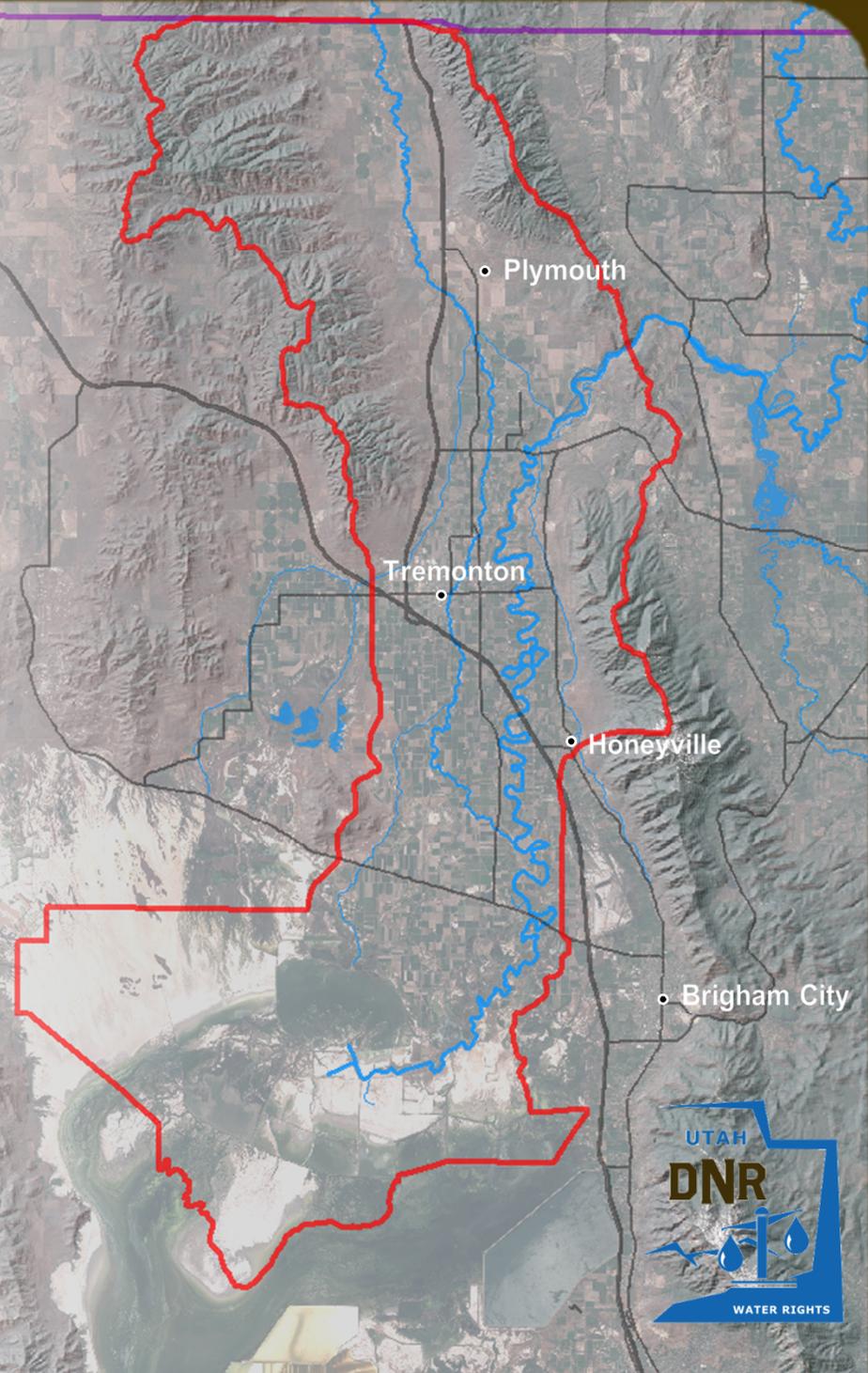
PUBLIC MEETING

**POLICY FOR MALAD AND BEAR
RIVER DRAINAGES IN WATER
RIGHT AREA 29**

OVERVIEW

Purpose: Discuss proposed changes to water management policy in this area

1. Results from USGS study
 - Groundwater level trends
 - Water budget
 - Impact of groundwater pumping on surface water (capture maps)
2. New policy
3. Questions

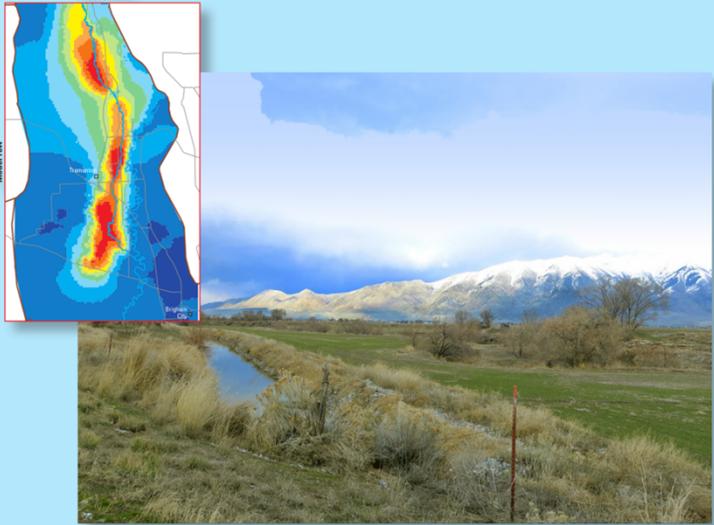


USGS STUDY



In cooperation with the Utah Department of Natural Resources, Division of Water Rights

Hydrology and Numerical Simulation of Groundwater Flow and Streamflow Depletion by Well Withdrawals in the Malad-Lower Bear River Area, Box Elder County, Utah



Scientific Investigations Report 2017-5011

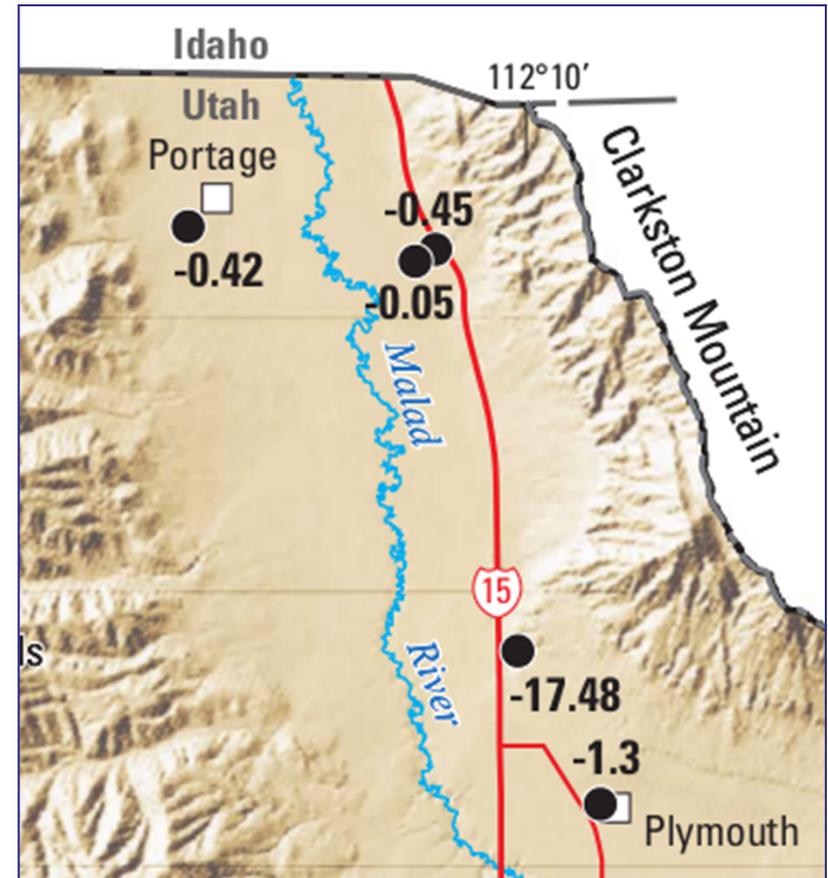
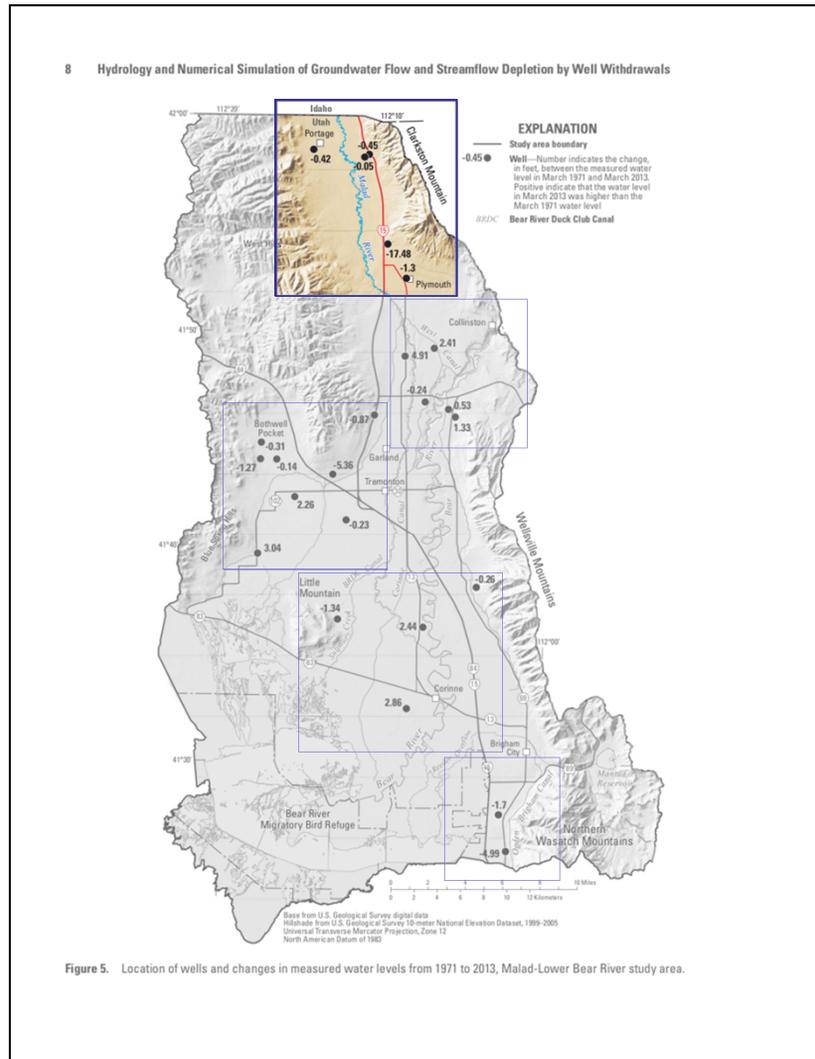
U.S. Department of the Interior
U.S. Geological Survey

- Described hydrologic system
- Collected new data (groundwater levels & surface water flows)
- Estimated water budget components
- Analyzed connection between groundwater & surface sources
- Created capture maps

(Note that USGS study area was larger than the policy area)

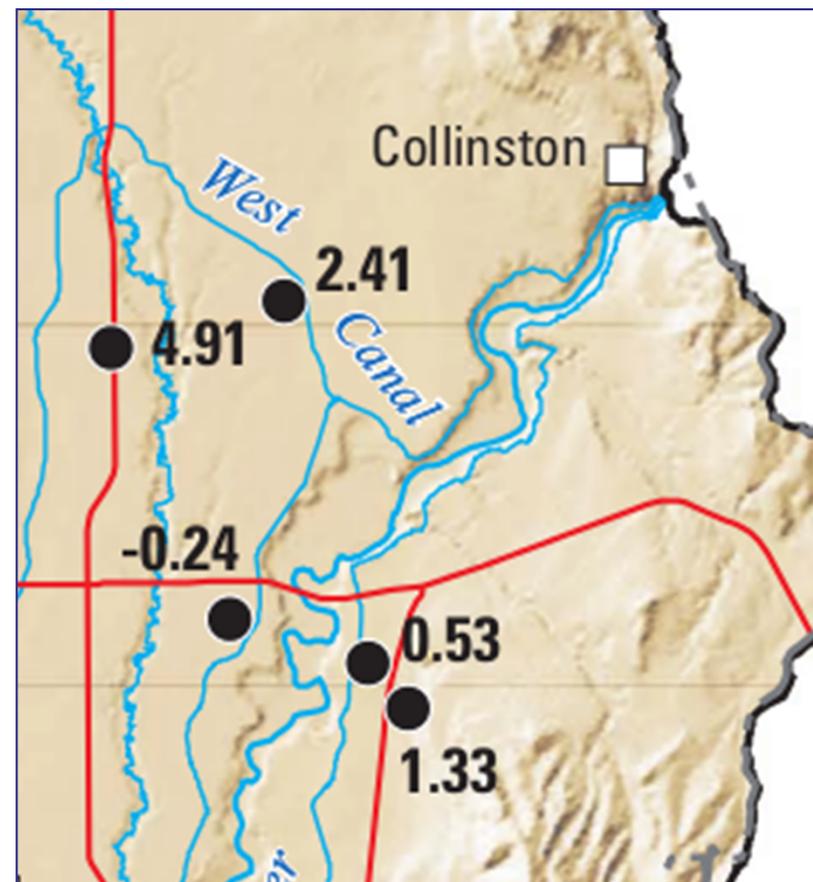
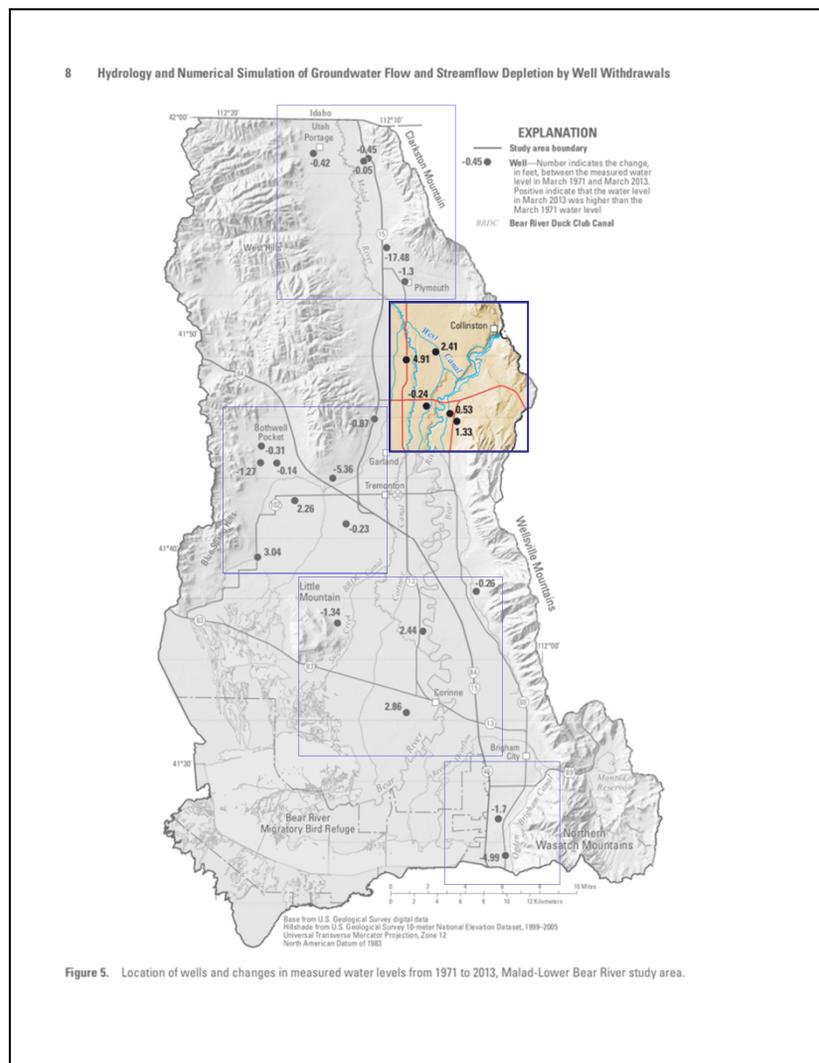


GROUNDWATER LEVEL CHANGES



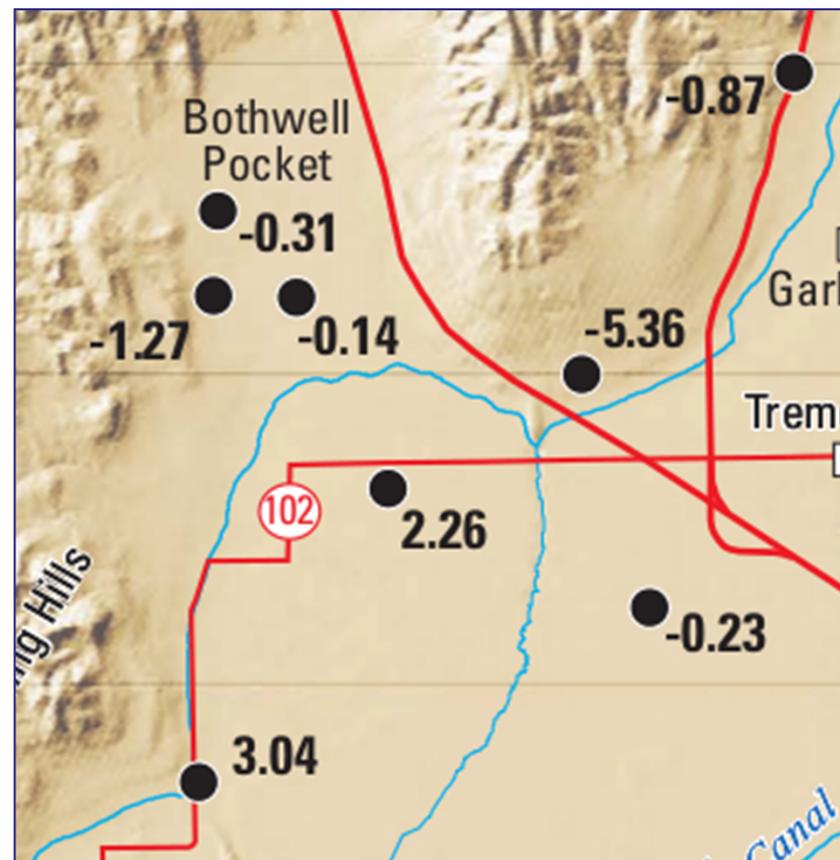
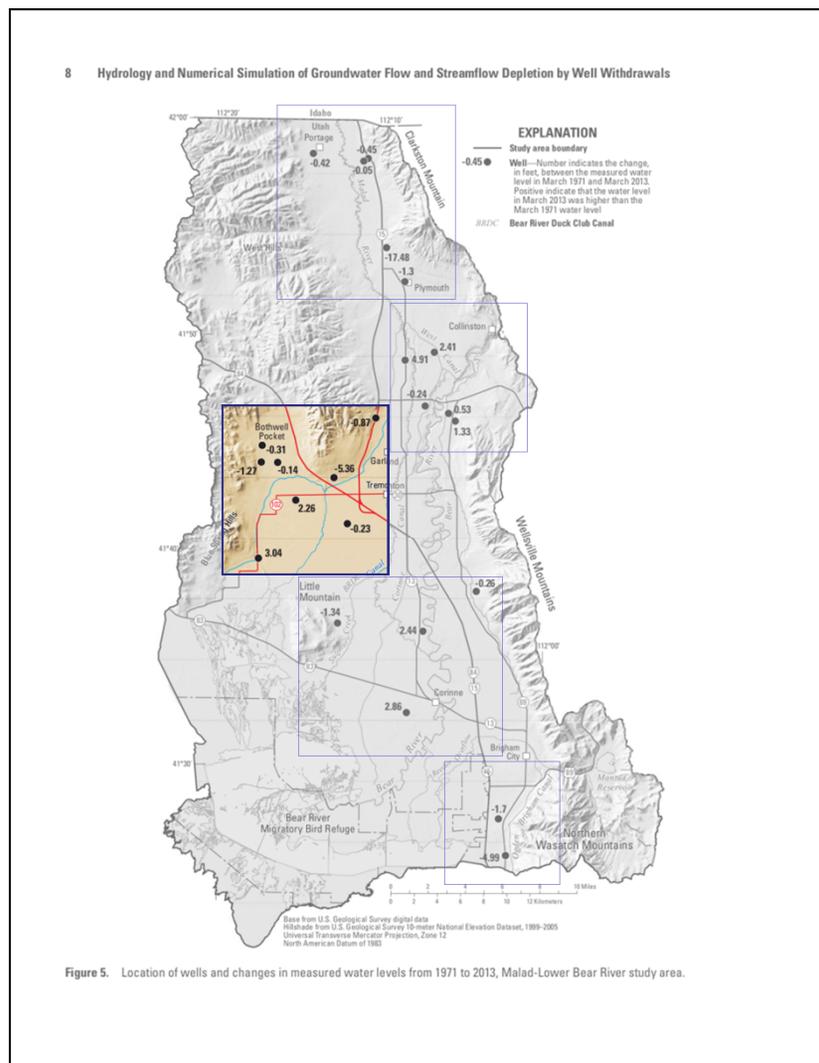
1971 - 2013

GROUNDWATER LEVEL CHANGES



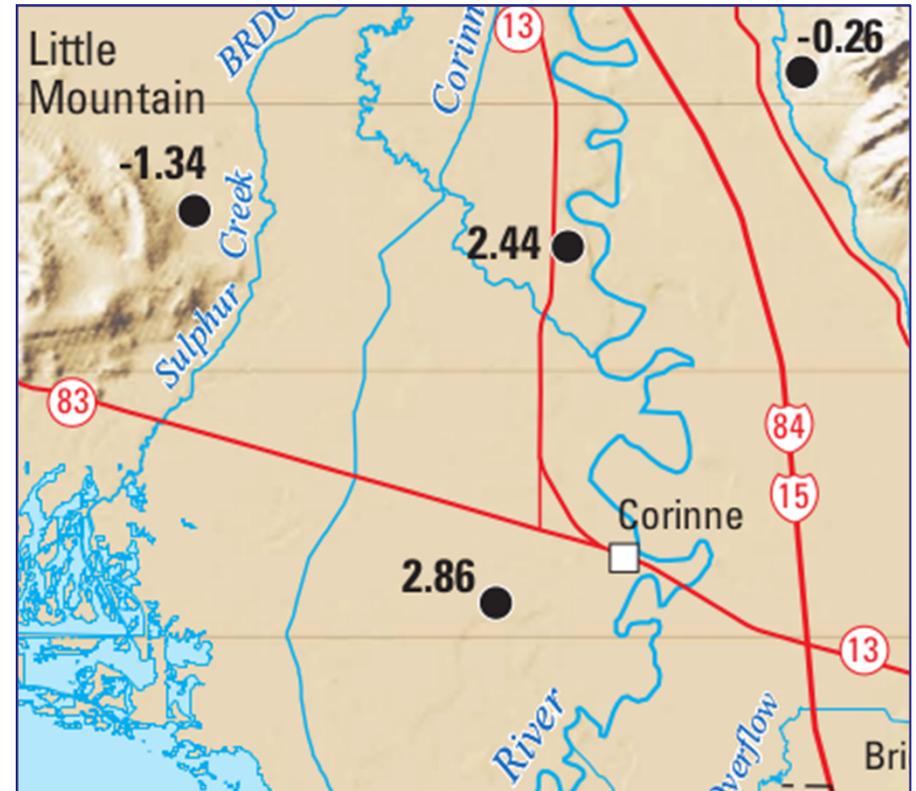
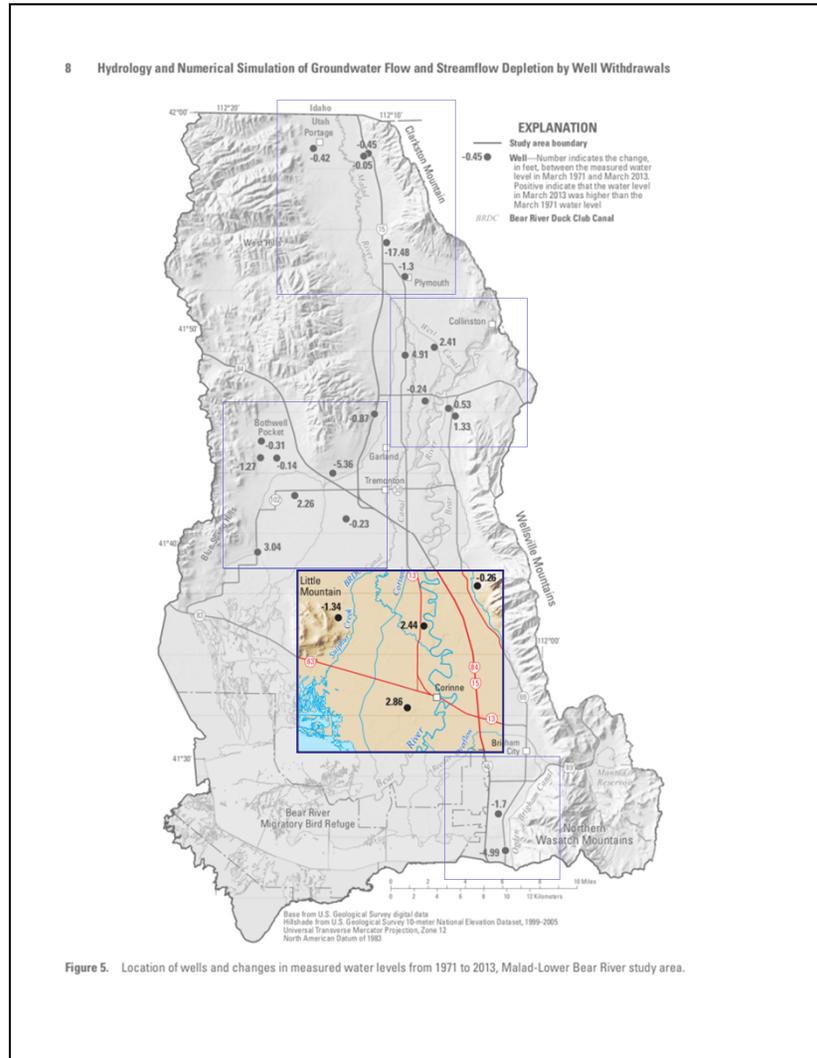
1971 - 2013

GROUNDWATER LEVEL CHANGES



1971 - 2013

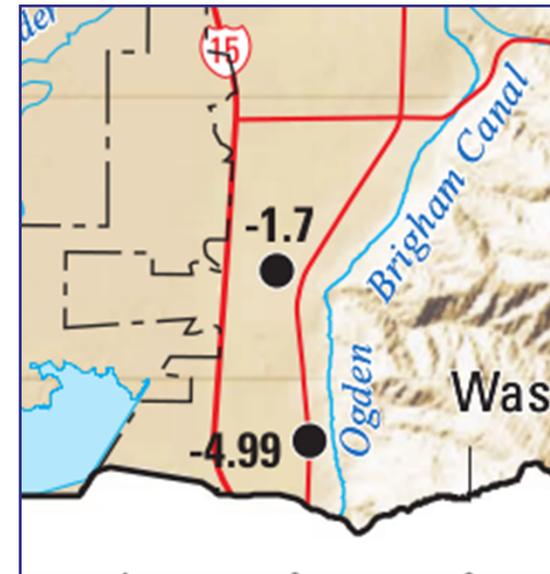
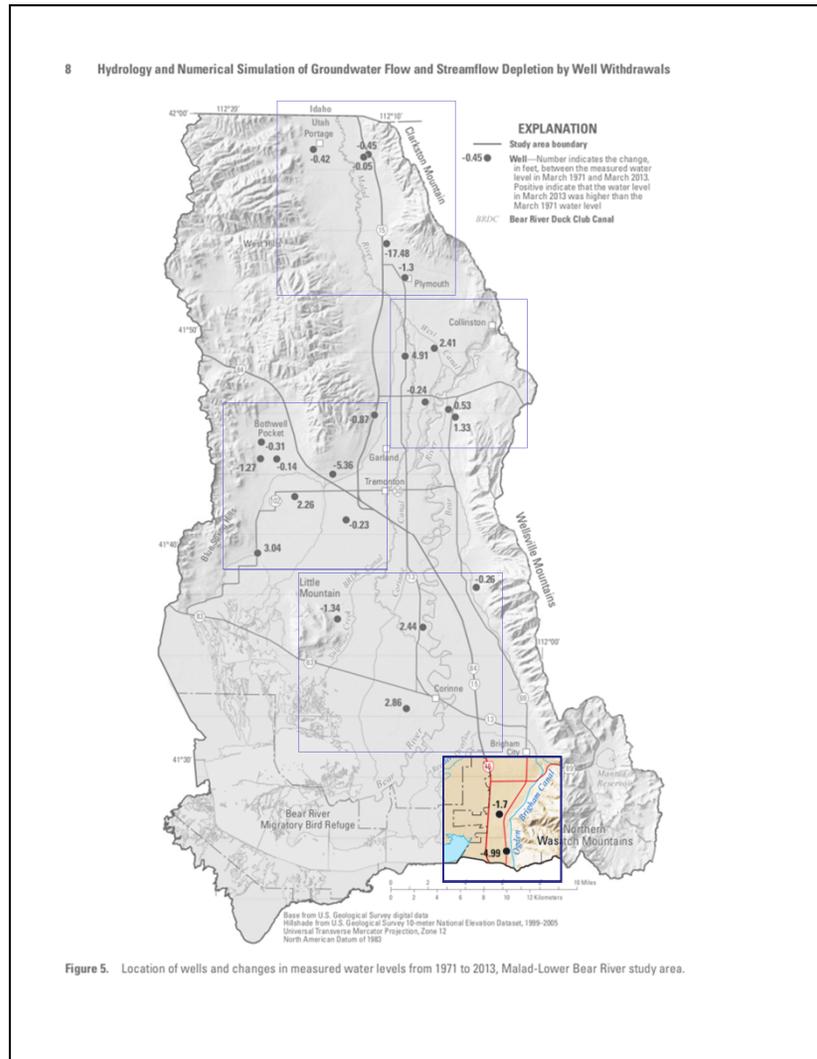
GROUNDWATER LEVEL CHANGES



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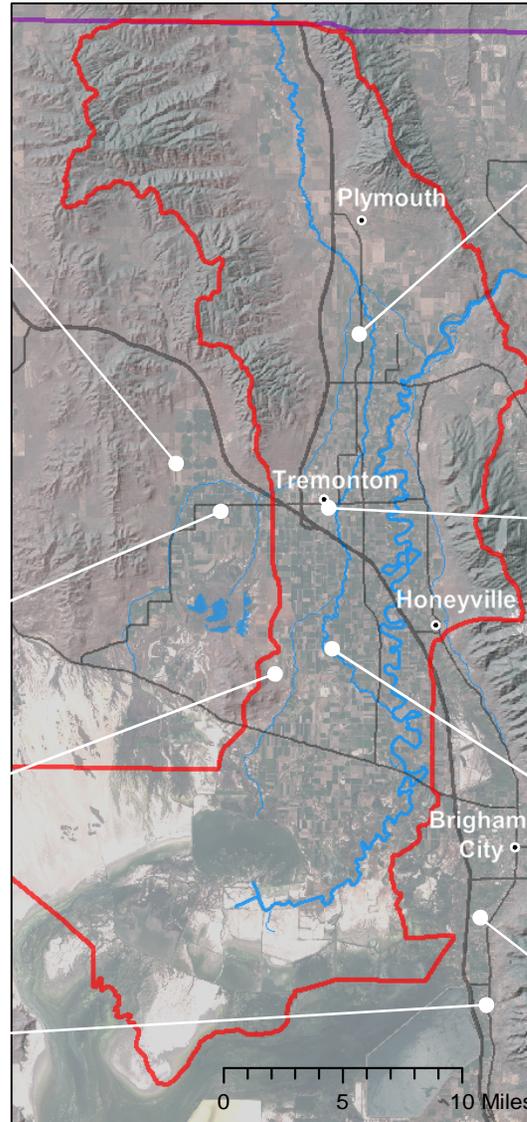
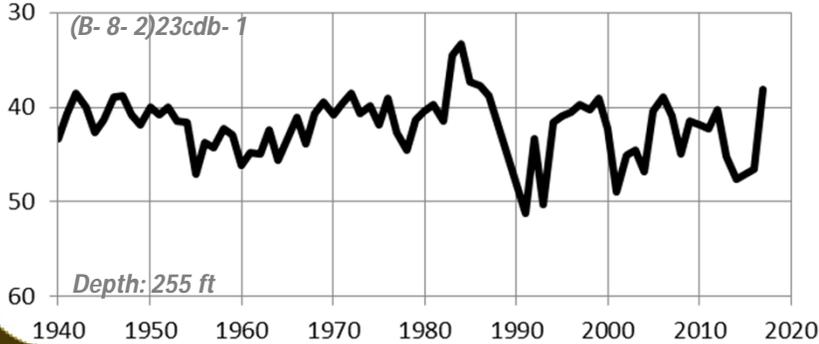
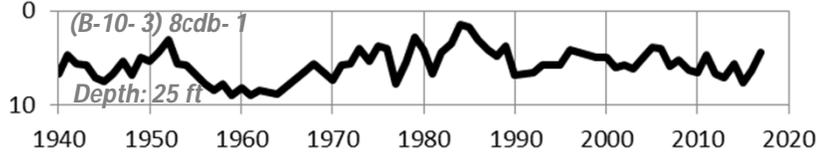
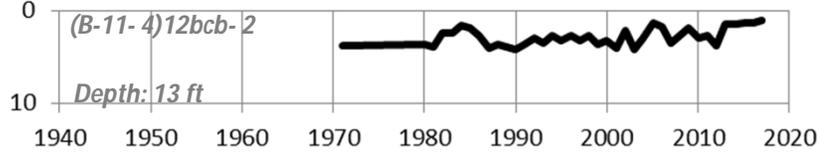
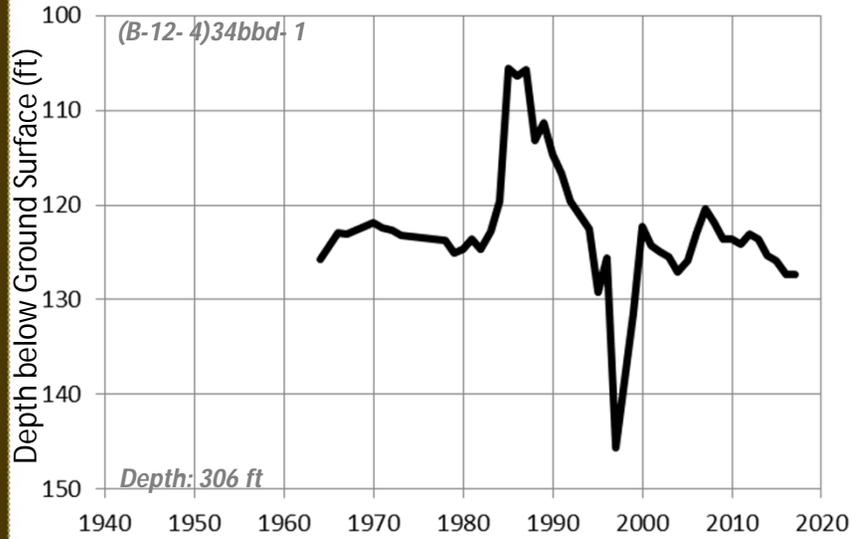


GROUNDWATER LEVEL CHANGES

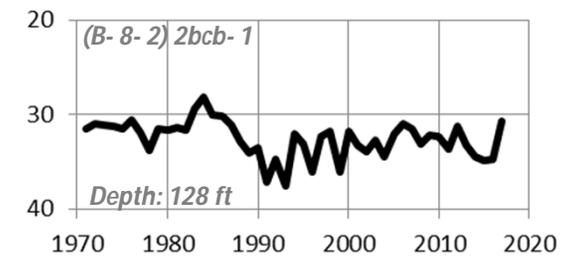
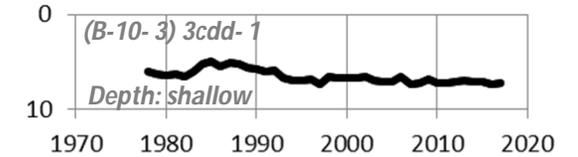
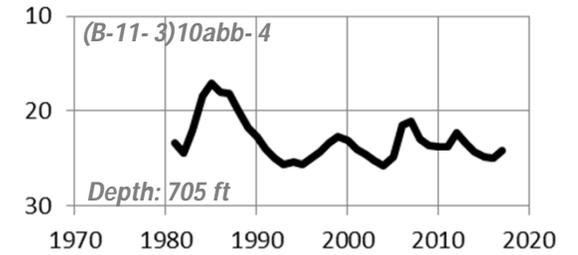
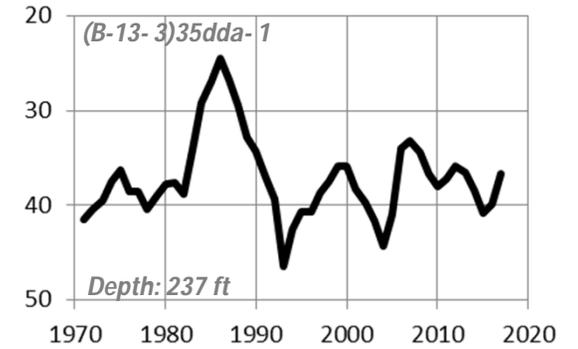


1971 - 2013

GROUNDWATER LEVEL TRENDS



(Graphs show spring water levels)



USGS GROUNDWATER BUDGET

Total Recharge (afy)	164,000
Precipitation	82,000
Irrigation	82,000
Other	Unknown

Total Discharge (afy)	228,000
Seepage to Bear River	74,000
Seepage to Malad River	21,000
Diffuse Seepage (HW-83)	22,000
Evapotranspiration	26,000
Springs	74,000
Well Withdrawals	11,400

Total discharge and total recharge don't balance because of uncertainty in components

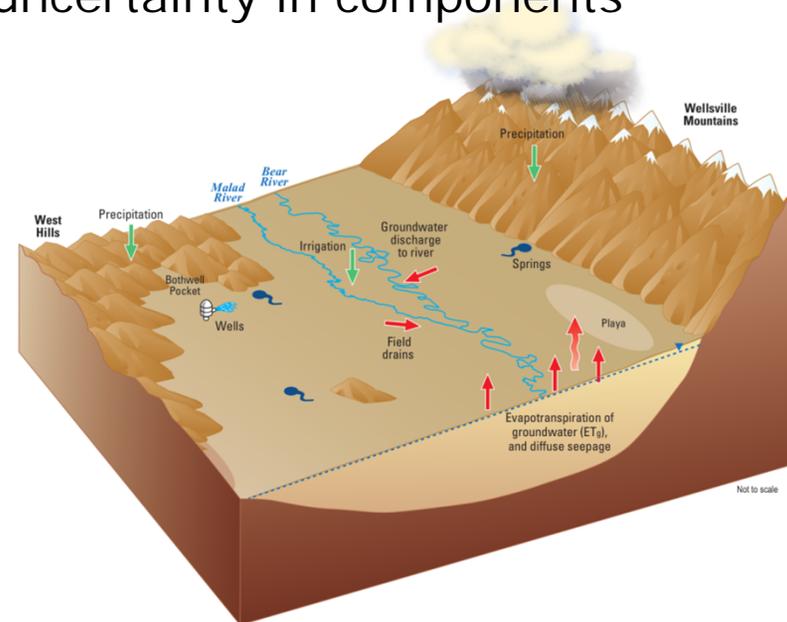


Figure 9. Conceptual groundwater system, Malad-Lower Bear River study area.

PRECIP RECHARGE (82,000 ACRE-FEET)

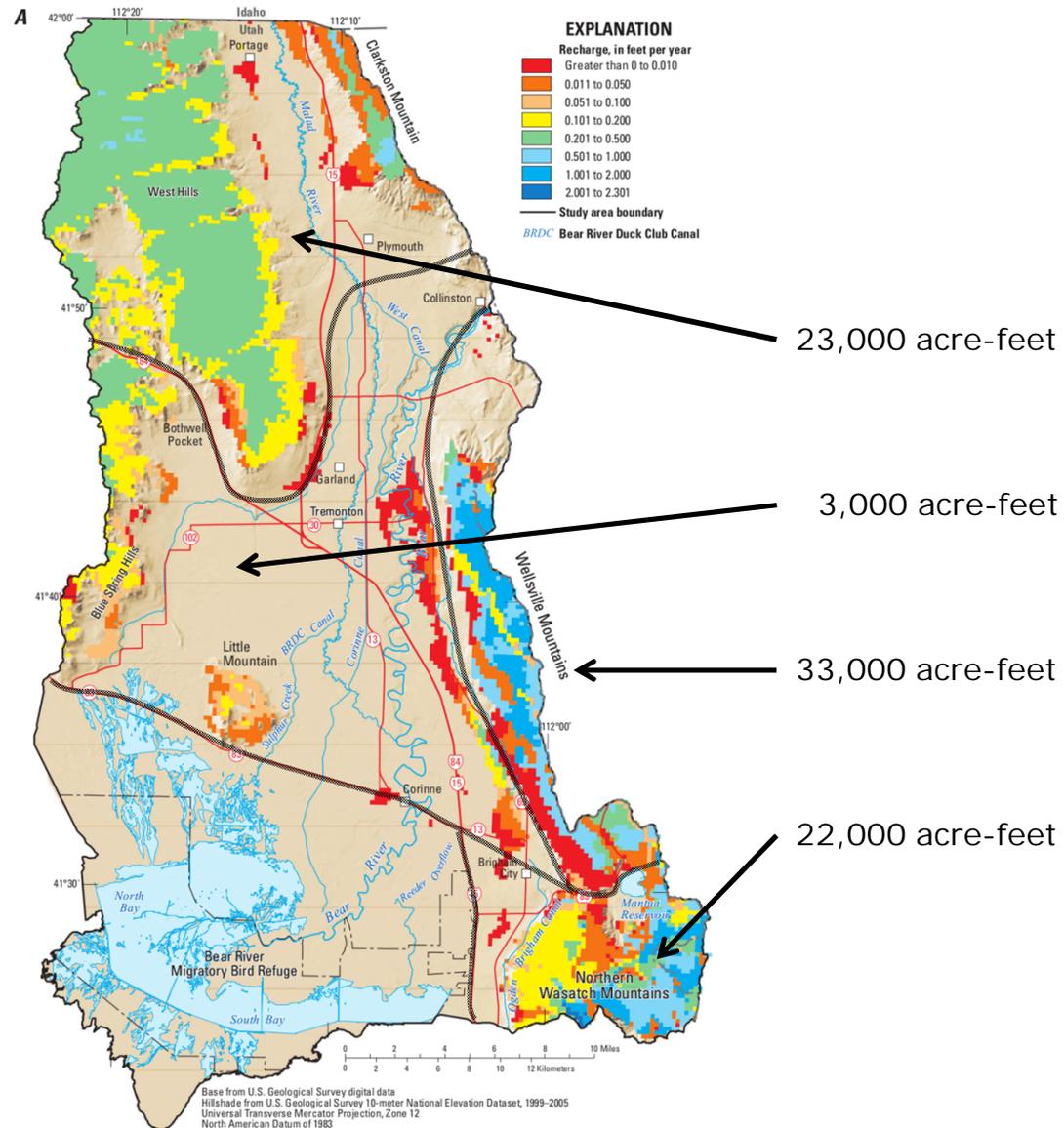


Figure 10. Distribution of average annual 1940–2006 recharge and runoff from the Basin Characterization Model, Malad-Lower Bear River study area. A, in-place recharge, and B, runoff.



IRRIGATION RECHARGE (82,000 ACRE-FEET)

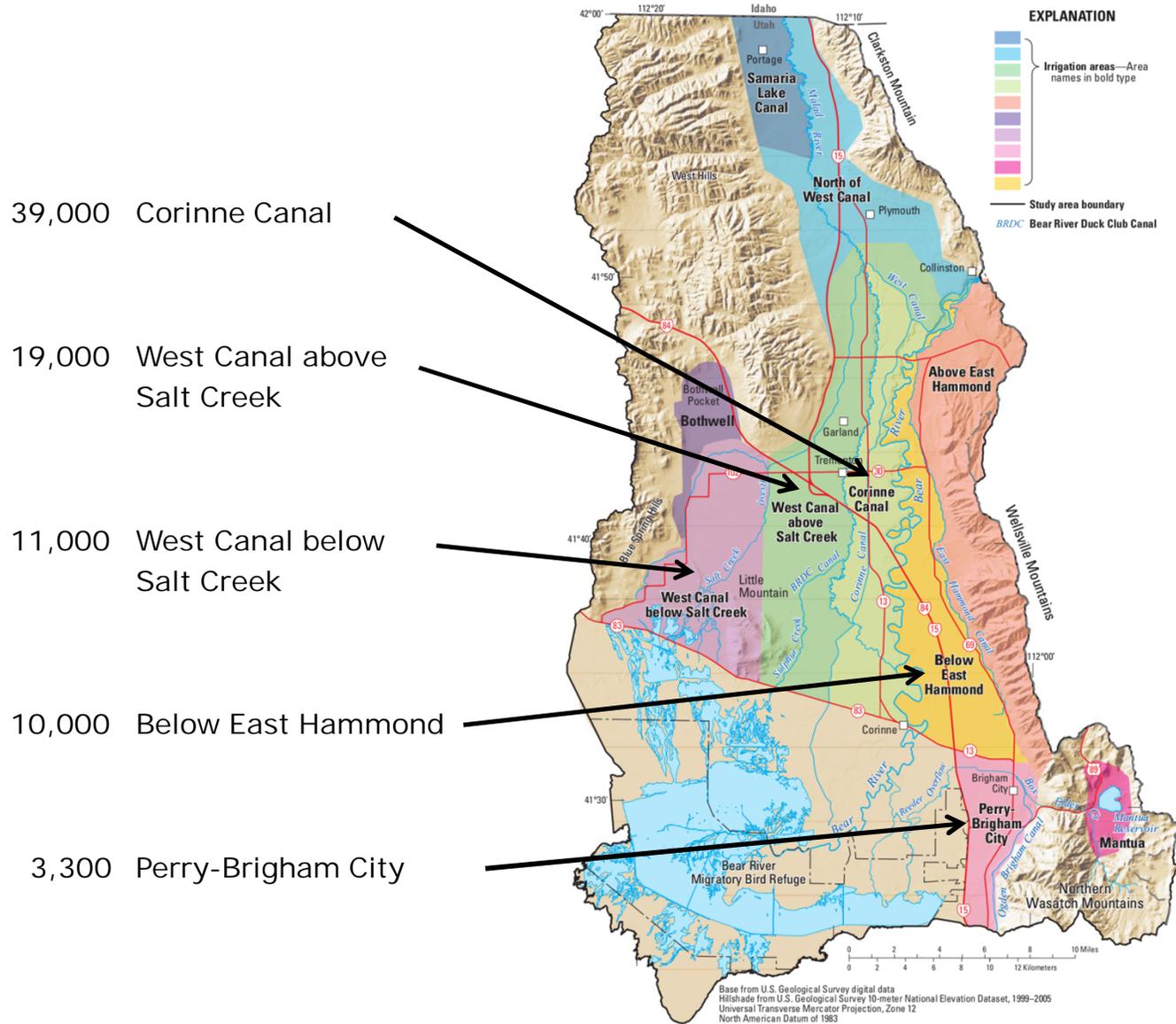


Figure 12. Irrigation areas, Malad-Lower Bear River study area.



SEEPAGE DISCHARGE

21,000 Total to Malad River

4,400 Discharge to Malad River
(Woodruff to Plymouth)

13,000 Discharge to Malad River
(Plymouth to Duck Club
Diversion)

4,000 Discharge to Malad River
(Duck Club Diversion to
Bear River)

22,000 Diffuse seepage across
highway 83

74,000 Discharge to Bear River
(Collinston to Corinne)

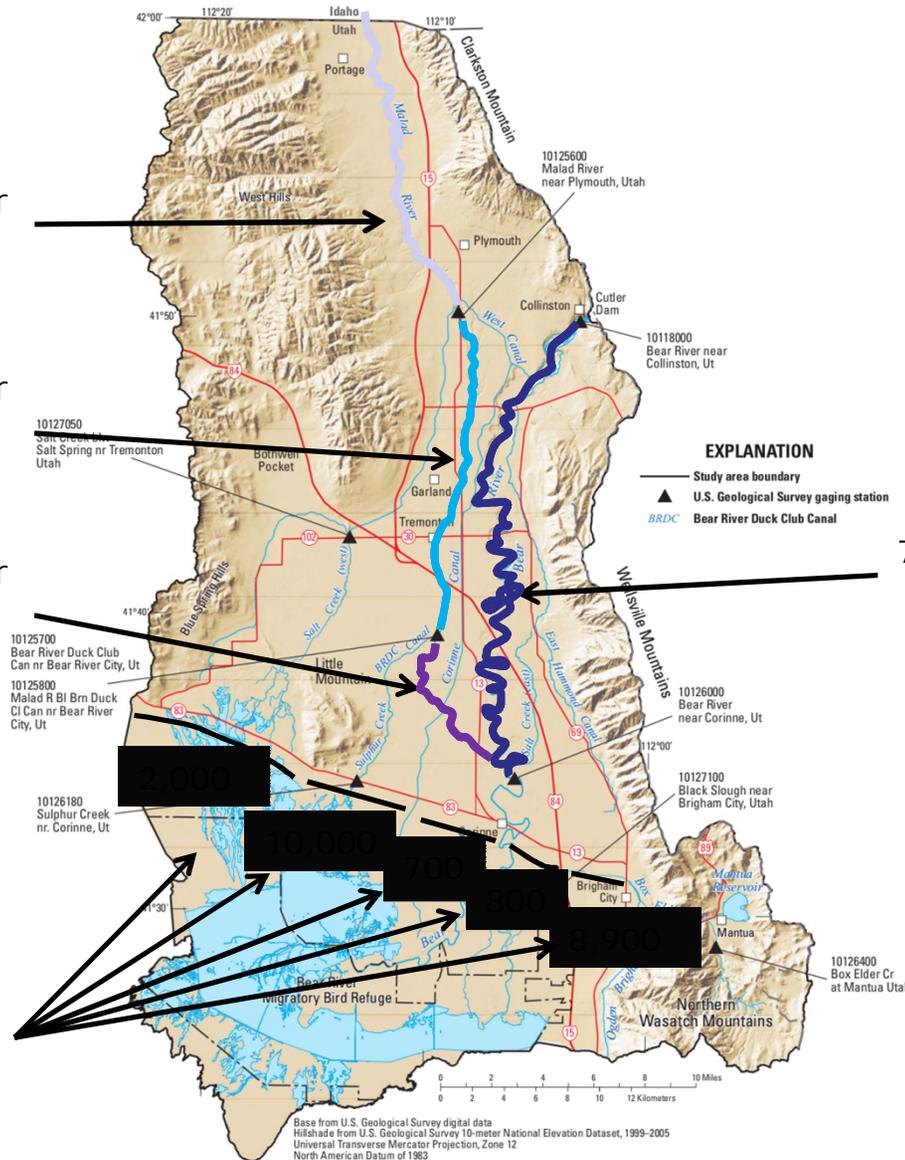
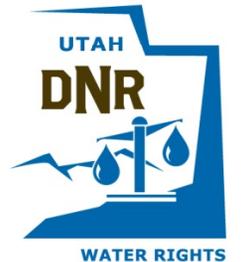
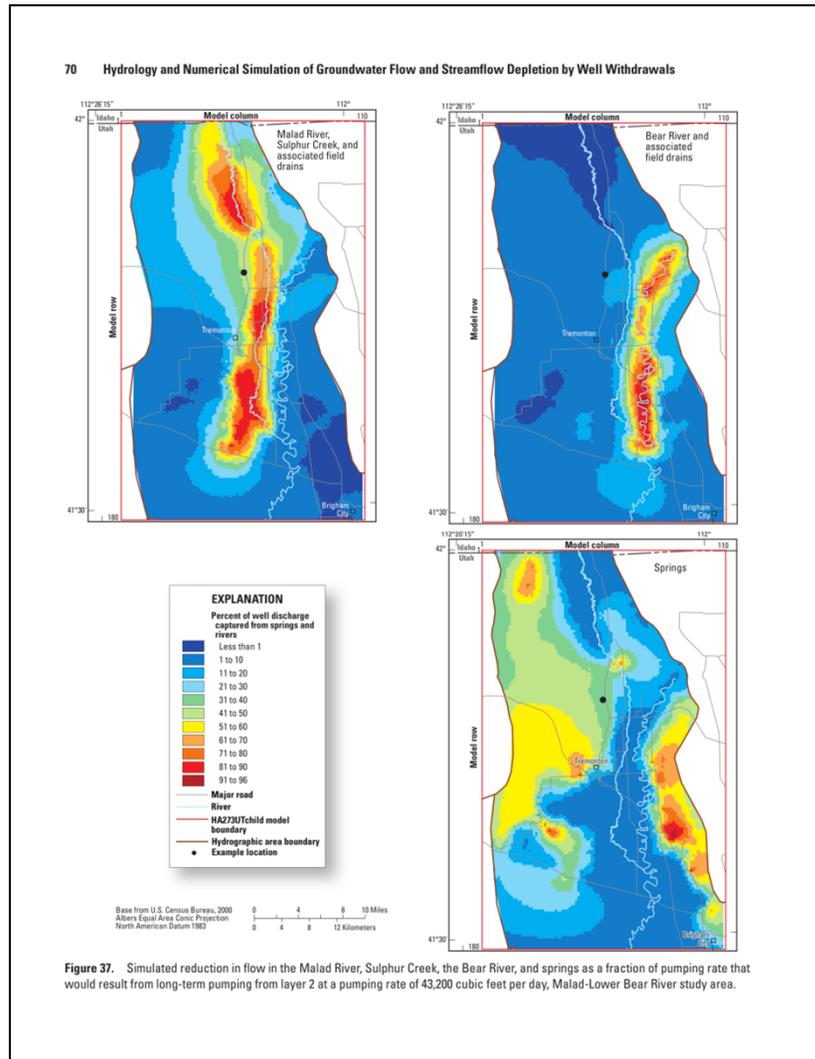


Figure 1. Location of Malad-Lower Bear River study area and U.S. Geological Survey streamflow gaging stations.

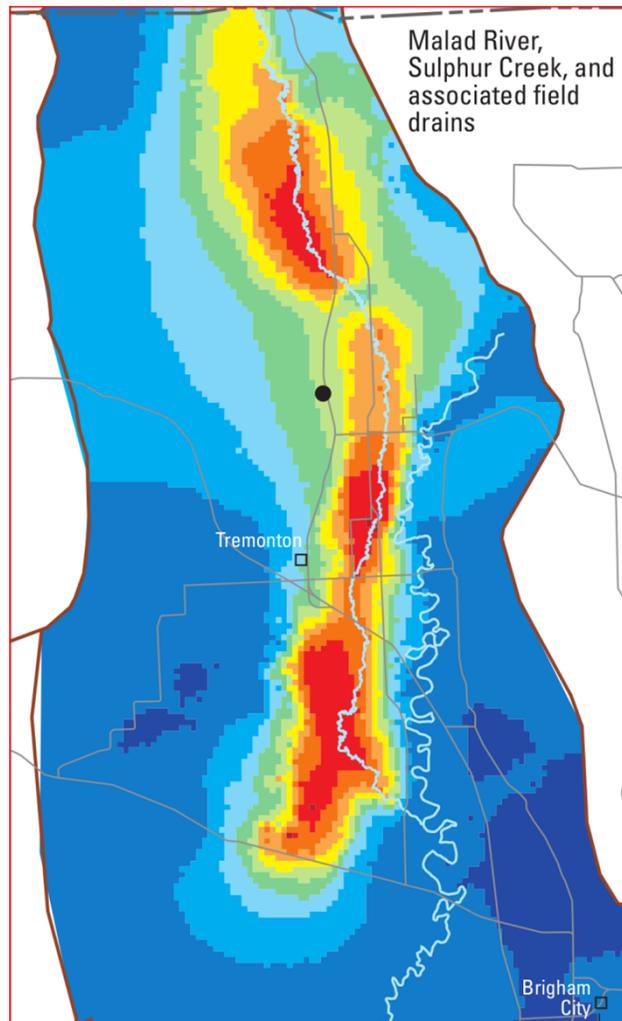


IMPACTS OF NEW WELLS



- A groundwater flow model was used to estimate the impacts of new well withdrawals on:
 - Malad River
 - Bear River
 - Springs
- Capture maps were created showing these impacts for a well located at any location

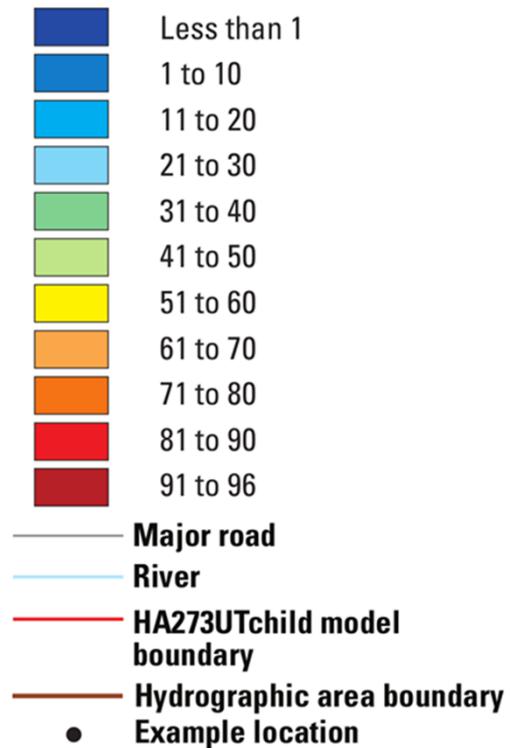
USGS CAPTURE MAPS - MALAD



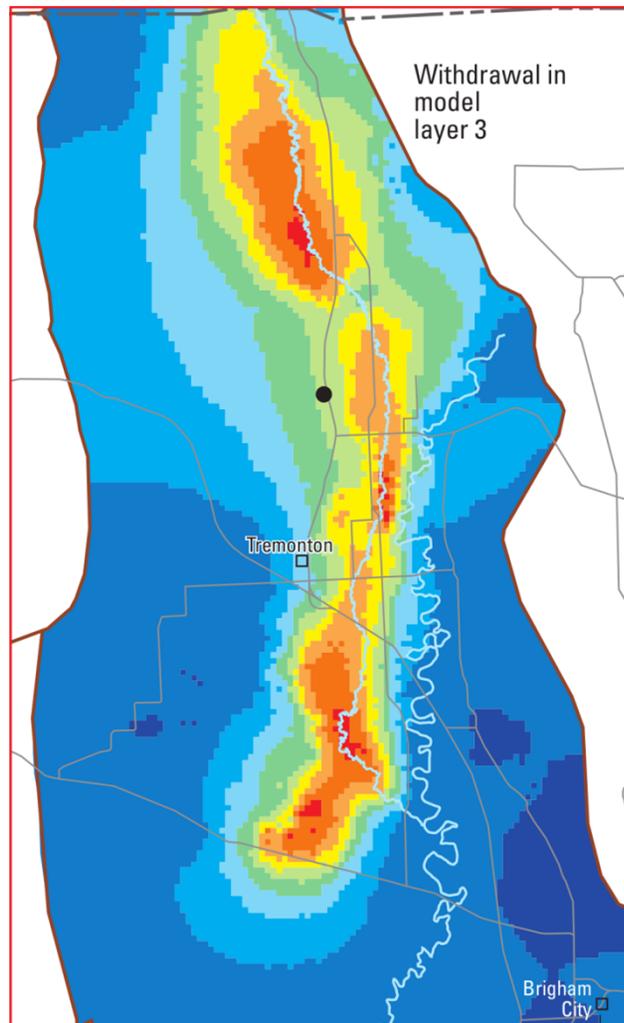
0 4 8 10 Miles
0 4 8 12 Kilometers

EXPLANATION

Percent of well discharge captured from springs and rivers

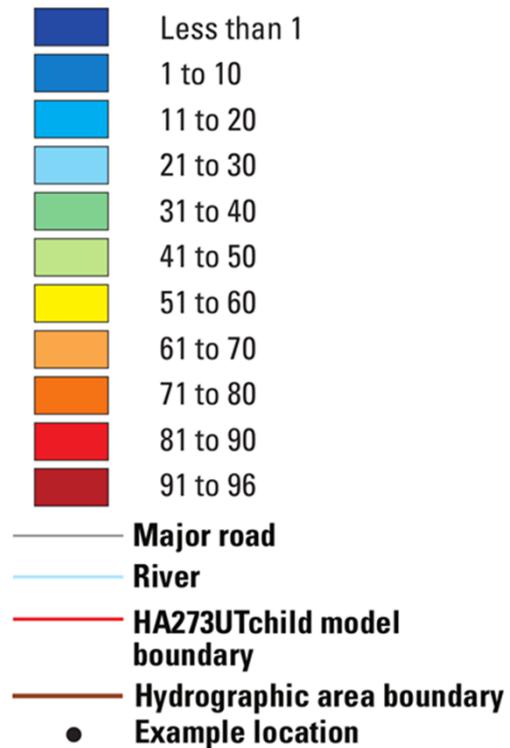


USGS CAPTURE MAPS – MALAD

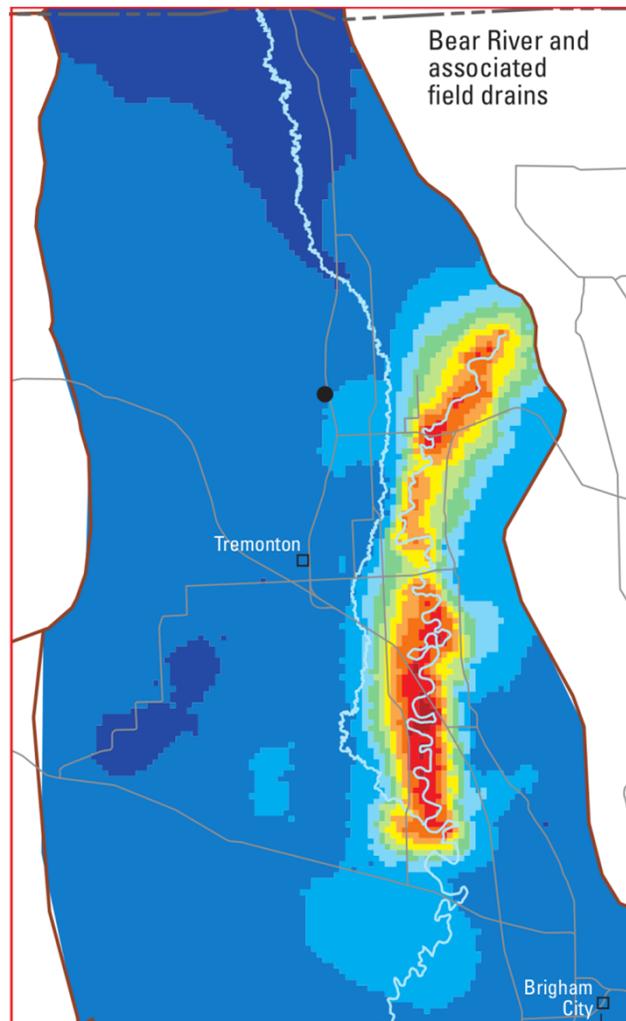


EXPLANATION

Percent of well discharge captured from springs and rivers

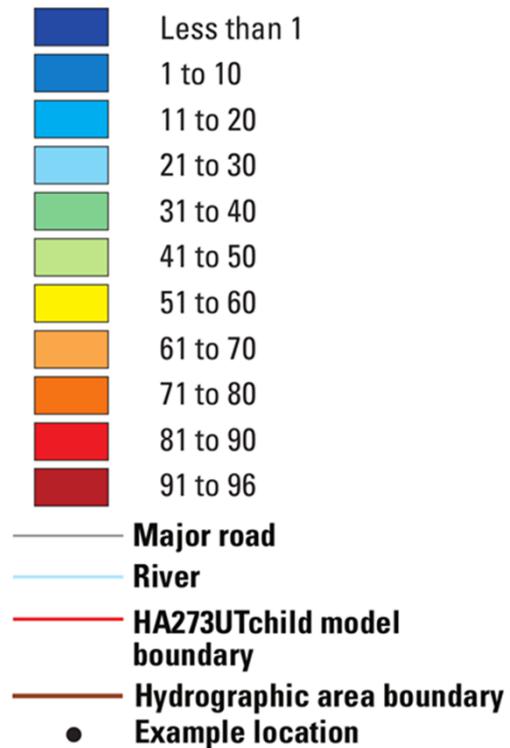


USGS CAPTURE MAPS – BEAR

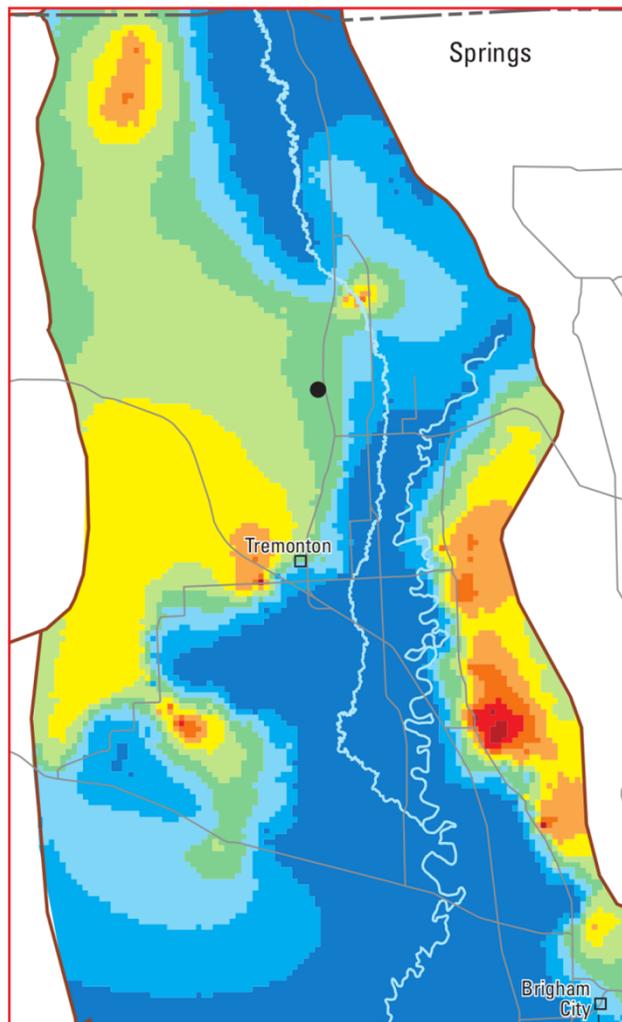


EXPLANATION

Percent of well discharge captured from springs and rivers



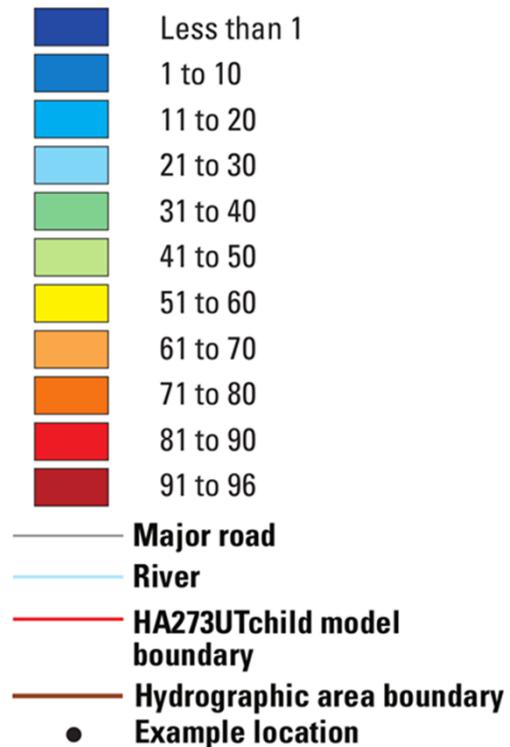
USGS CAPTURE MAPS – SPRINGS



0 4 8 10 Miles
0 4 8 12 Kilometers

EXPLANATION

Percent of well discharge captured from springs and rivers



CONCLUSIONS FROM STUDY

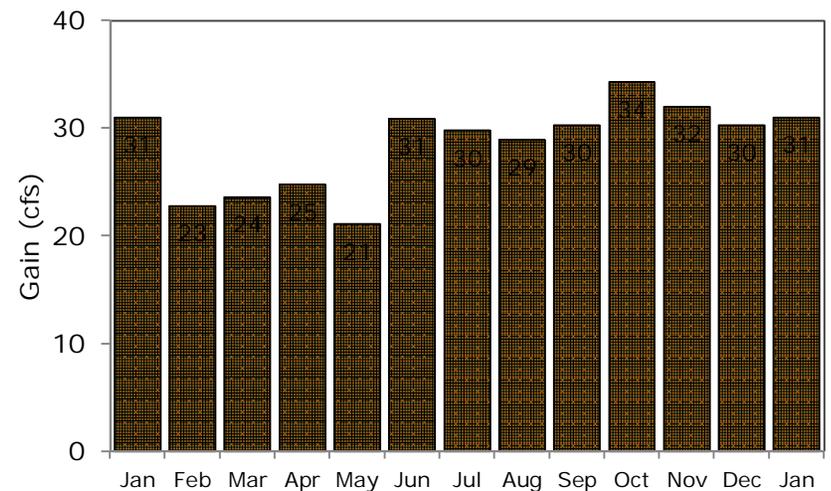
- The groundwater system has not changed significantly over the past 40 years.
- Surface water dominates the groundwater system, with large amounts of recharge from irrigation return flows and discharge to rivers and streams.
- Withdrawals from the groundwater system will impact the Malad River, the Bear River, and springs.



MALAD GAINS & IMPORT WATER

- Seepage to the Malad River is comprised of:
 - Groundwater from precipitation recharge
 - Groundwater from irrigation return flows (which is imported from Bear River)
 - The state engineer estimates the irrigation return flow component to be about 15 cfs
 - This estimate is based on stable isotope data and flow measurements from the USGS report
- Total flow during summer months is about 15 cfs greater than prior to the importation of this Bear River water

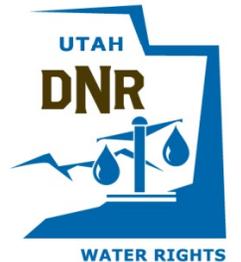
Malad River Gains between
Plymouth & Duck Club Diversion, 1965-1973



PREVIOUS POLICY

Interim Groundwater Management Policy (In effect since April 23, 2012)

- Primary objective was to protect prior rights while putting to beneficial use the greatest amount of available water
- Forthcoming USGS study would be used to assist the State Engineer in making decisions
- Policy guidelines:
 - 1) Area would be open to small domestic applications to appropriate, subject to local interference issues
 - 2) Larger applications would be held pending the results of the study
 - 3) Previously filed applications to appropriate may also be held pending the results of the study
 - 4) Change applications would be considered on their own individual merits, would be reviewed to ensure no enlargement or impairment



PURPOSE OF THE POLICY

The purpose of presenting a Groundwater Management Policy

- Present results of the groundwater study and available information upon which the policy is founded.
- Set forth guidelines for groundwater appropriations and change applications.
- Subject to statutory criteria in section 73-3-8, Utah Code Annotated



NEW PROPOSED POLICY

Groundwater Management Policy

- Primary objective is to protect prior rights while putting to beneficial use the greatest amount of available water
- USGS study will be used to assist the State Engineer in making decisions
- Policy guidelines:
 - 1) Area open to appropriation of groundwater, not just small domestic applications
 - 2) An additional 10,000 acre-feet/year of potential groundwater withdrawals will be allowed. The State Engineer will continue to monitor groundwater withdrawals, water levels in selected wells and streamflow.
 - 3) Local water administration practices and localized interference concerns which exist within the Bear River Valley will supplement this policy and will remain in effect and are not overridden. Areas of particular concern include Plymouth and Deweyville.



Process

- 30 day Comment Period – February 9th, 2017
- Evaluate Comments
- Implement Policy or Make Modifications



Questions/Comments



Send written comments to:

**Utah Division of Water Rights
Attn: Malad River Policy**

PO Box 146300

Salt Lake City UT 84114-6300

waterrights@utah.gov

<http://www.waterrights.utah.gov>