

In cooperation with:



Idaho Water  
Resource Board

&



Henry's Fork  
Watershed Council

## Henry's Fork Basin Study

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### Meeting Summary: Workgroup Meeting 6

March 7, 2011

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**Meeting date:** February 15, 2011

**Summary prepared by:** Mark Bransom/CH2M HILL

**Attachments:**

1. February meeting notice and agenda (as prepared by the Henry's Fork Watershed Council (HFWC or Council) for February 15, 2011)
2. Brian Patton/IDWR PowerPoint presentation – Eastern Snake Plain Managed Aquifer Recharge Program
3. Cynthia Bridge Clark/IDWR PowerPoint presentation – The Board's Water Supply Bank
4. Harry Seely/WestWater Research Point presentation – Water Markets
5. Henry's Fork Basin Study Alternatives Data Matrix (revised on February 16, 2011 based on initial feedback during the February 15, 2011 Workgroup Meeting)

### Introduction

The Henry's Fork Basin Study (Study) summarized herein was conducted as an agenda item during a regular meeting of the Henry's Fork Watershed Council (HFWC). The HFWC has agreed to provide a forum for Stakeholders to participate in the Study. The Council and other interested stakeholders represent the Study Workgroup.

Bob Schattin/Bureau of Reclamation opened the Basin Study discussion with a recap of the Study. In addition, Bob reviewed the Evaluation Criteria that was developed during Workgroup Meetings 3 and 4.

### Meeting Schedule and Agenda

Based on feedback from the January Workgroup Meeting, the schedule of the February meeting (& subsequent meetings) was restructured into full-day extended working meetings to allow for additional Workgroup technical involvement and information sharing.

During the morning session there were three presentations and discussions of the following topics:

- Managed Aquifer Recharge, included as Attachment 2,
- Water Supply Bank, included as Attachment 3,
- Water Markets, included as Attachment 4.

During the afternoon session the Workgroup reviewed and brainstormed the Alternatives Data Matrix, with special focus on surface storage alternatives (see Attachment 5). *[Post meeting update: Reclamation incorporated the initial Workgroup feedback into the data matrix and distributed the revised matrix on February 16, 2011. Additional Workgroup comments were requested by February 25, 2011 and subsequently extended to March 18. Reclamation will incorporate Workgroup feedback and distribute an updated version by April 1st, 2011].*

## **Upcoming Meetings and Agenda**

The next meeting – Meeting 7 – scheduled for Tuesday, March 15, 2011 has been cancelled. The next meeting is scheduled for Tuesday, April 19, 2011. The April agenda will include review of a draft needs assessment, alternatives attributes matrix, and alternatives screening and prioritization. A May meeting has tentatively been scheduled for Tuesday the 17<sup>th</sup> to review any refinements of the alternatives prioritization matrix and attempt to select alternatives to carry forward to the reconnaissance evaluation phase.

## **ATTACHMENT 1**



# Henry's Fork Watershed Council

PO Box 852 • 604 Main Street • Ashton, ID • 83420

208-652-3567  
208-652-3568  
council@henrysfork.org

January 26, 2011

Henry's Fork Watershed Council members:

We will be meeting Tuesday, February 15, 2011, to continue discussions regarding the Henry's Fork Water Supply Study. Due to the large number of topics which need to be addressed, **a full day meeting has been scheduled**. The meeting will be at the SpringHill Marriott located at 1177 South Yellowstone in Rexburg.

The meeting will start at 8:30. Coffee and doughnuts will be served. We will have a light lunch brought in to the meeting room. Lunch will cost \$5.00 (cash or check only). If you plan to stay all day, please RSVP to Susan Steinman, [susan@henrysfork.org](mailto:susan@henrysfork.org) by noon on Monday Feb. 14 so we know how many lunches to order.

The entire meeting will focus on the Henry's Fork Basin Special Study on Water Supply. Bob Schattin, U.S. Bureau of Reclamation, and Mark Bransom, CH2M HILL, will facilitate. There are four topics that will be covered at this meeting:

- 1) Final review of the evaluation criteria;
- 2) Groundwater Storage and Recharge;
- 3) Water Markets;
- 4) Continue discussion of surface water supply and storage alternatives.

In the next couple weeks, BOR will be sending out materials to everyone who requested to be on the Core Work Group. It is important that this information be reviewed prior to the February meeting. Visit the project website to review materials from previous meetings.

<http://www.usbr.gov/pn/programs/studies/idaho/henrysfork/index.html>

## **February 15<sup>th</sup> Meeting Agenda**

8:00 – 8:30	Sign-in
8:30 – 8:45	Introductions and Community Building
8:45 – 9:30	Henry's Fork Special Study Recap and Review Evaluation Criteria Bob Schattin, USBOR, and Mark Bransom, CH2MHill
9:30-10:15	Idaho Groundwater Recharge Program Idaho Department of Water Resources
10:15 – 10:30	Break
10:30 - 11:15	Water Marketing Harry Seely, WestWater Research LLC; Idaho Department of Water Resources and/or Water District 1
11:15 – 12:15	Groundwater Recharge and Aquifer Storage and Recovery Alternatives
12:00 – 1:00	Lunch On Site
1:00 – 4:30	Surface Storage Alternatives Discussion

*Future Watershed Council meetings and USBOR Henry's Fork Special Study Workgroup:  
Tuesday, **March 15, 2011** and Tuesday, **April 19, 2011**.*

Cofacilitators:  
Henry's Fork Foundation, 208-652-3567  
Fremont-Madison Irrigation District, 208-624-3990

## **ATTACHMENT 2**



**IDAHO**  
Water Resource Board



# Eastern Snake Plain Managed Aquifer Recharge Program

Henrys Fork Basin Study Working Group

Brian Patton, Idaho Department of Water Resources

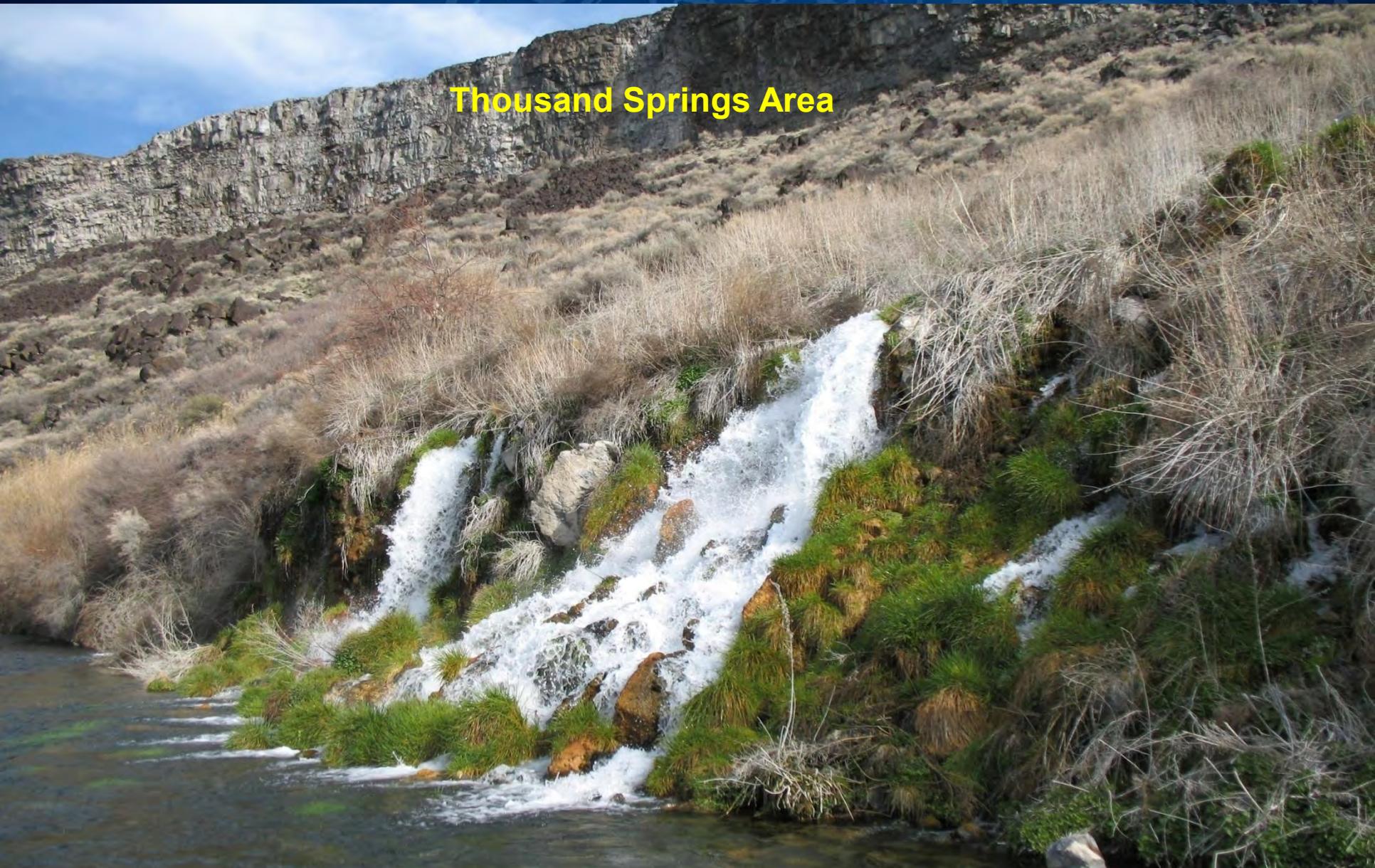
## Recharge Basics

- **Natural Recharge**
  - precipitation infiltrating into ground water aquifers
- **Artificial or Managed Recharge**
  - artificial placement of water from a different source into a ground water aquifer
- **Incidental Aquifer Recharge**
  - unintentional placement of water into an aquifer resulting from normal water deliveries for irrigation or other uses (i.e. canal losses)
- **Aquifer Storage and Recovery (ASR)**
  - currently no ASR in Idaho
  - ASR usually treats underground water storage the same as surface water storage:
    - 1-for 1 input and withdrawal
  - in states that have ASR, a closed ground water system is required (which the ESPA is not)
- **Managed Recharge Applications**
  - replenishment of depleted aquifers
  - water supply mitigation
  - low cost storage of large volumes that may otherwise flow out of the basin

## Eastern Snake Plain Aquifer

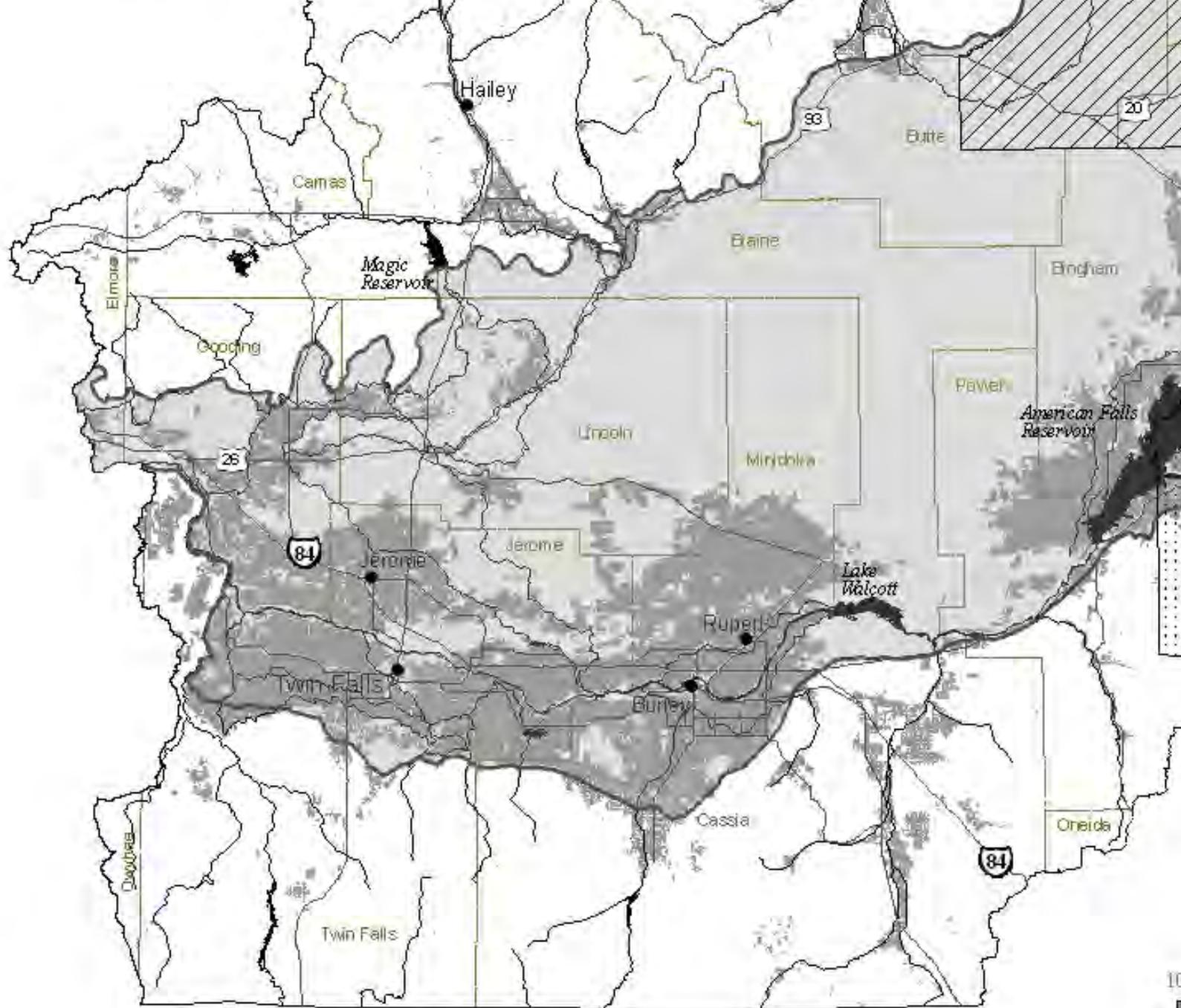
- fractured basalt, approximately 11,000 square miles (~ 200 mi. long by ~ 60 mi. wide)
- total storage in the upper 500 ft. estimated at 200-300 maf
- well yields above 3,000 gpm are common and transmissivity is high
- primary discharges are in the Thousand Springs area and in the American Falls/Fort Hall area.
- Interconnected with Snake River (gaining from or losing to along entire reach)

## Thousand Springs Area

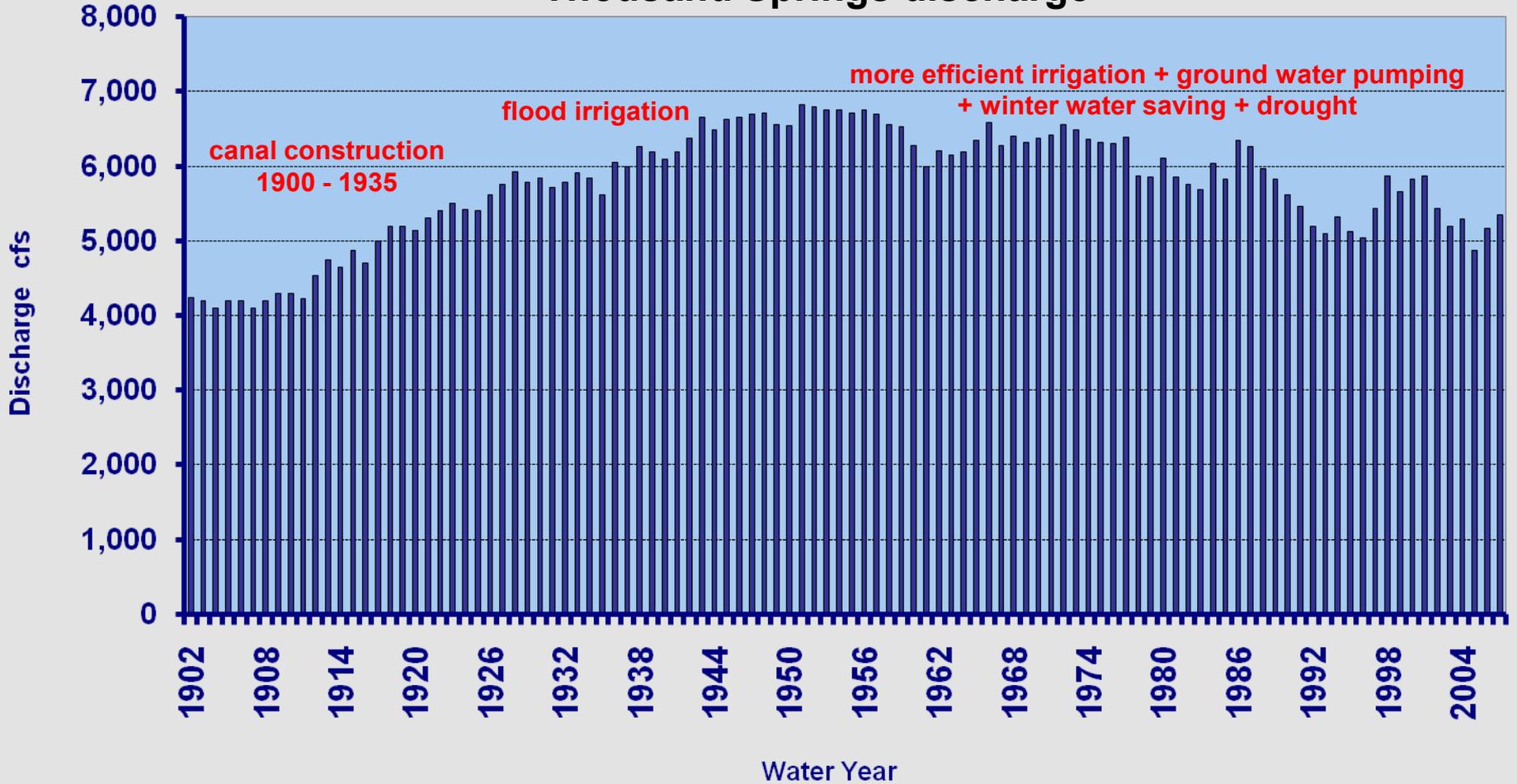


## Eastern Snake Plain

- Eastern Snake Plain is roughly the same area as the Upper Snake Basin (Snake and tributaries from Milner Dam to headwaters)
- ~ 2 million irrigated acres ~ half surface and half ground water
- canals constructed between 1890 and 1935
- most canals are unlined and leak ~ 30 %
- 1980-2002 average canal leakage (incidental recharge) ~ 3.4 million acre-feet annually
- Region accounts for approximately 25% of Idaho's economic output

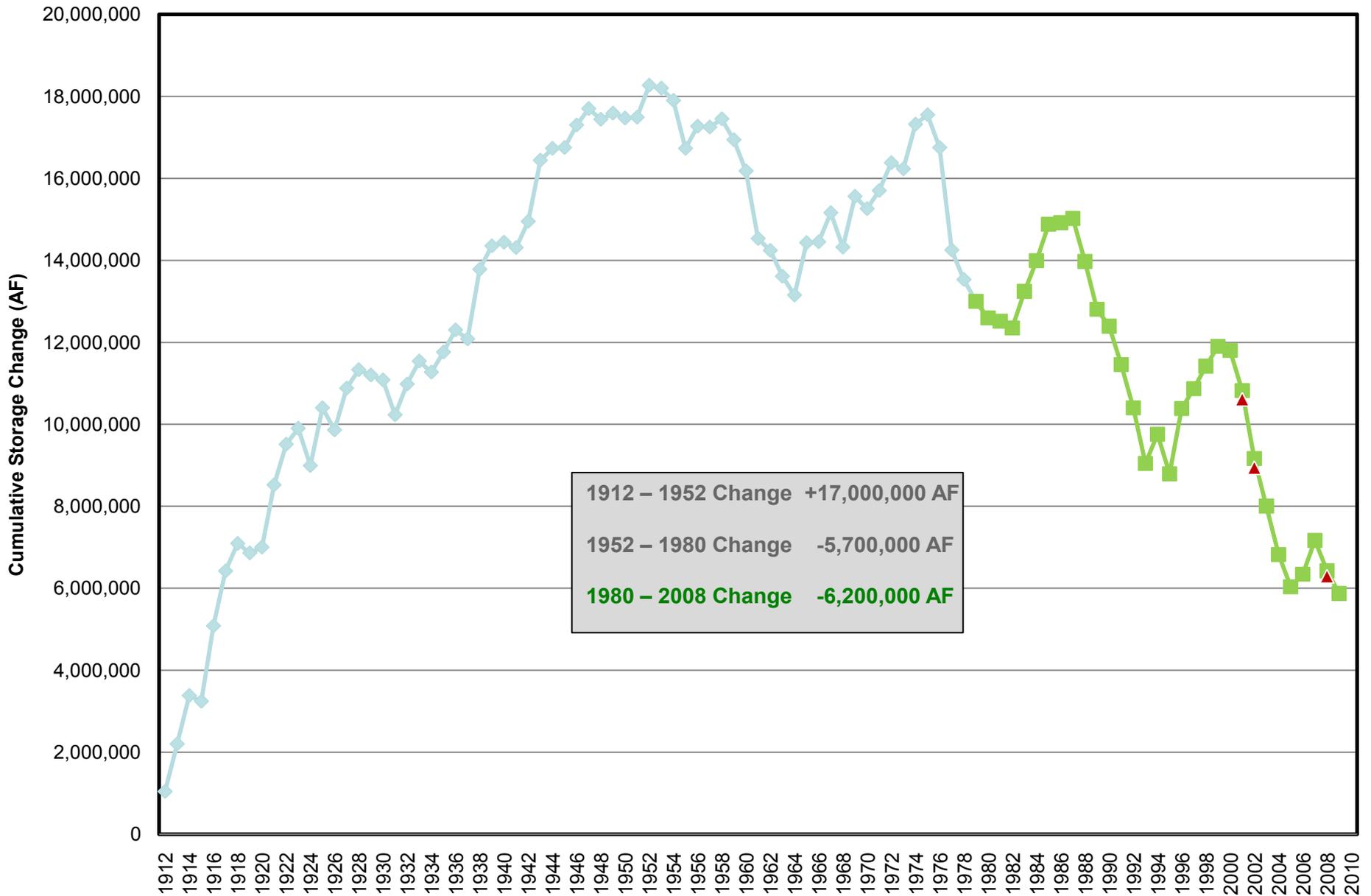


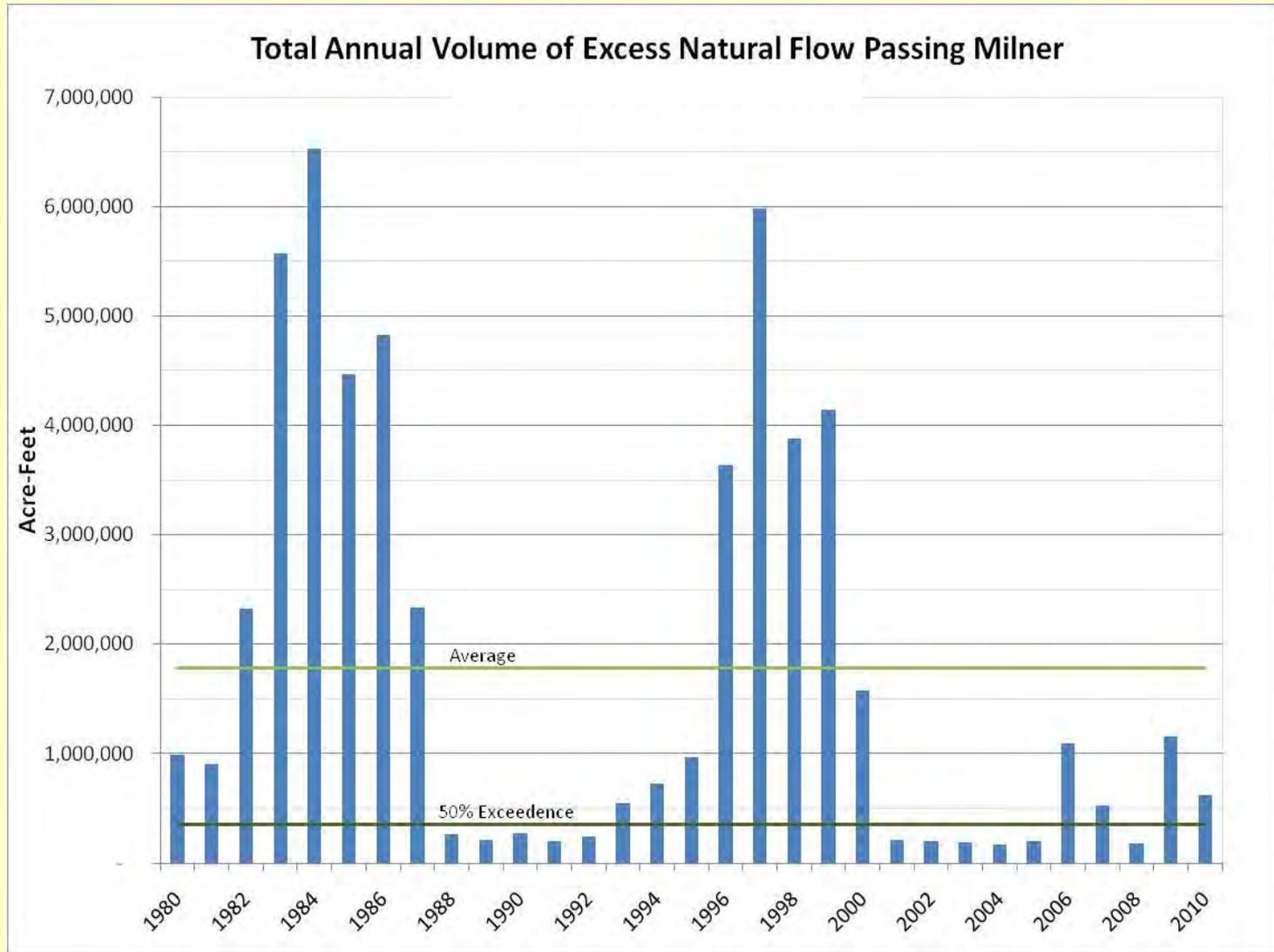
## Thousand Springs discharge



1902 discharge ~ 4,200 cfs (3 maf/yr)  
1950 peak discharge ~ 6,800 cfs (4.9 maf/yr)  
2007 discharge ~ 5,350 cfs (3.9 maf/yr)

# ESPA - Cumulative Change in Aquifer Storage





## Eastern Snake Plain Managed Recharge

- Studies of ESPA managed recharge by the Idaho Water Resource Board (IWRB) and Bureau of Reclamation and others date back to 1962.
- Legislature directed IWRB to undertake ESPA managed recharge program in 2005 (HB372, HB392, and HCR28)
- In 2008, IDWR Director clarified the relative priority of the Water Board's recharge water right vs. hydropower generation water rights at Milner Dam, removing a major hurdle to implementing a sustainable recharge program.

## Managed Recharge and CAMP

- A series of water use conflicts that had the potential to severely disrupt the economy of the Eastern Snake Plain region led to the ESPA Comprehensive Aquifer Management Plan (CAMP) which was approved as a component of the State Water Plan by the 2009 Legislature through HB 264.
- The CAMP recognized an annual water budget deficit in the ESPA of 600,000 acre-feet, which could be rectified over a 30-year term at a cost of \$600 million.
- Due to this high cost and long time frame, CAMP implementation was divided into two phases.
- Phase 1 is estimated to take 10 years and achieve a 200,000-to-300,000 acre-foot annual water budget adjustment to the ESPA, of which 100,000 acre-feet annually would be provided through recharge. The balance would come from cloud seeding, GW-SW conversion projects, and demand reduction.
- Phase 2 would provide the remainder of the water budget adjustment (300,000-to-600,000 acre-feet) and would include additional recharge, additional demand reduction, and possibly new surface water storage (Minidoka Enlargement, Henrys Fork/Teton storage).

## **Managed Recharge and the Swan Falls Reaffirmation Agreement**

- The State and the Idaho Power Company entered into the Swan Falls Reaffirmation Agreement in 2009.
- The Reaffirmation Agreement attempts to balance the need to address the water budget shortfall in the ESPA with the need to maintain flows in the Snake River from Milner Dam through Hells Canyon to maintain an adequate hydropower generation base.
- The Agreement recognizes the Phase 1 CAMP goal of an average of 100,000 acre-feet of recharge annually, but if the IWRB proposes to increase this amount prior to 2019, legislative approval must be obtained.
- After 2019, the annual average recharge amount can increase to 250,000 acre-feet.
- In addition, the IWRB must approve recharge projects by others that propose the diversion of natural flow for recharge in excess of 10,000 acre-feet.
- The provisions of this agreement were included in statute through several pieces of legislation passed in 2009.

## Eastern Snake Plain Managed Recharge

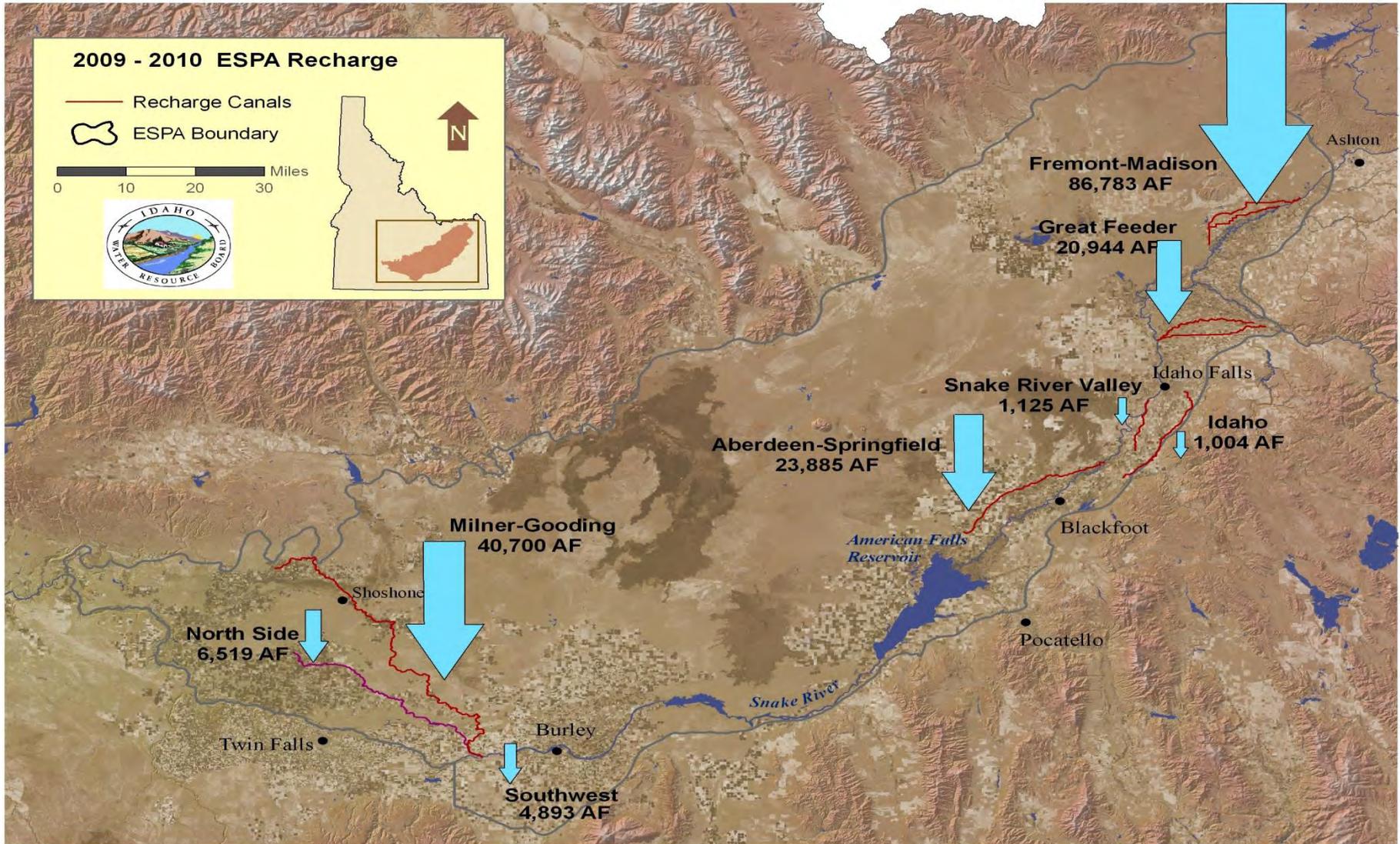
- Large volume, low cost, passive process: 186,044 ac-ft (2009-2010)  
\$3.00/a-f
- Undertaken by the IWRB under contract with canal companies/irrigation districts
- Canal companies/irrigation districts deliver the IWRB's water to aquifer recharge mostly through canal leakage before and after the irrigation season.
- A few dedicated recharge sites, including Egin Lakes, are used to increase recharge capacity. These are useful if the Board's recharge right stays in priority after the irrigation season starts.
- IWRB pays cash payment to encourage canal companies to participate and deliver the IWRB's water available under its water rights.

## Sources of Recharge Water

- Idaho Water Resource Board recharge rights
  - 1980 priority, 1,200 cfs diversion from the Snake River
  - 1980 priority, 800 cfs diversion from the Big/Little Wood Rivers
- IWRB's Recharge rights generally in priority before and after irrigation season
- Losses that occur during irrigation, "incidental losses", are considered normal operating losses and are not counted as managed recharge

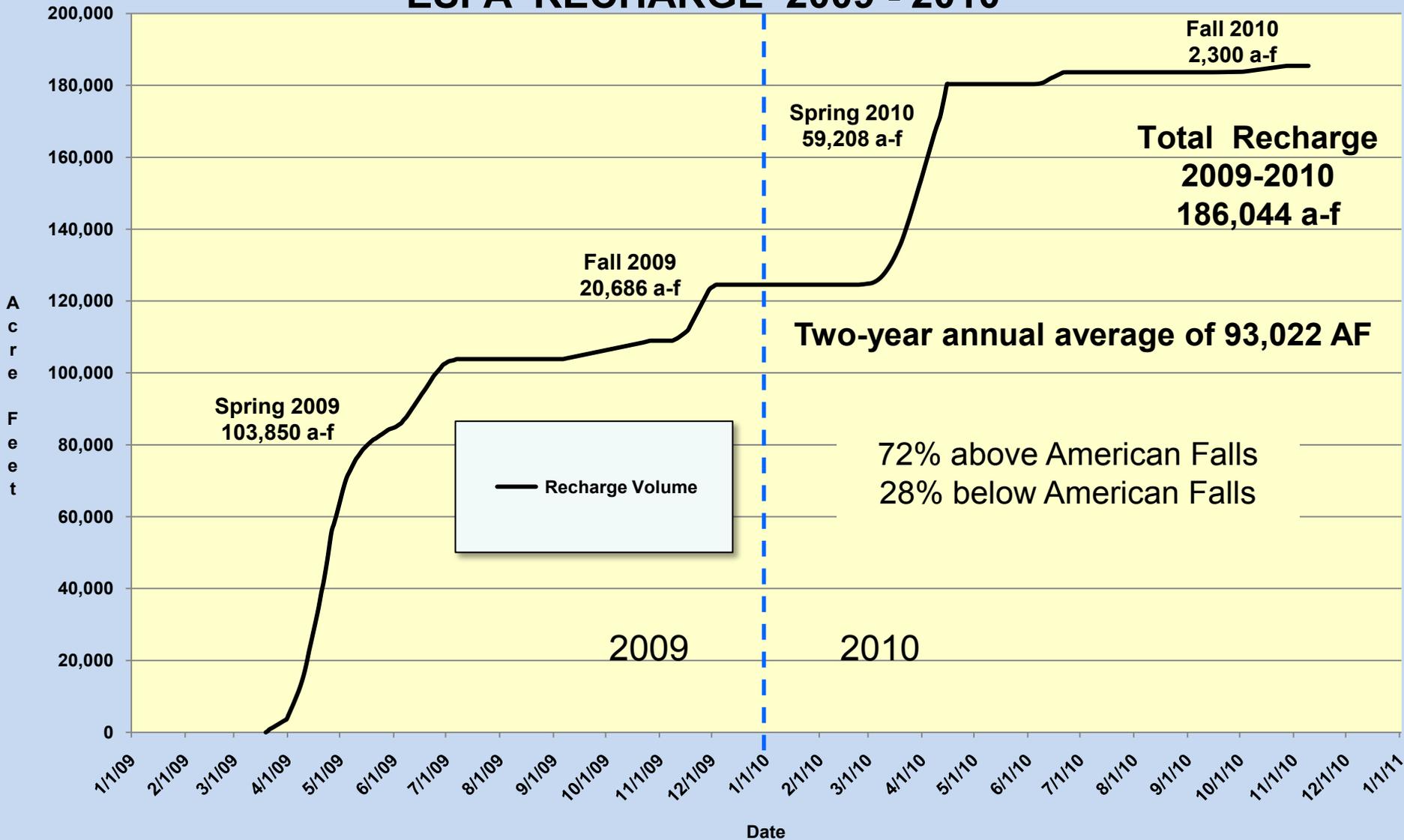
## Contracting, Reporting, Verification & Payment

- two party annual, renewable contracts between the IWRB and canal companies, essentially available to all
- measurements made by canal personnel, subject to verification by IDWR and WD01.
- reports submitted to IWRB
- upon approval of recharge reports, payment made to canal company by IWRB





## ESPA RECHARGE 2009 - 2010

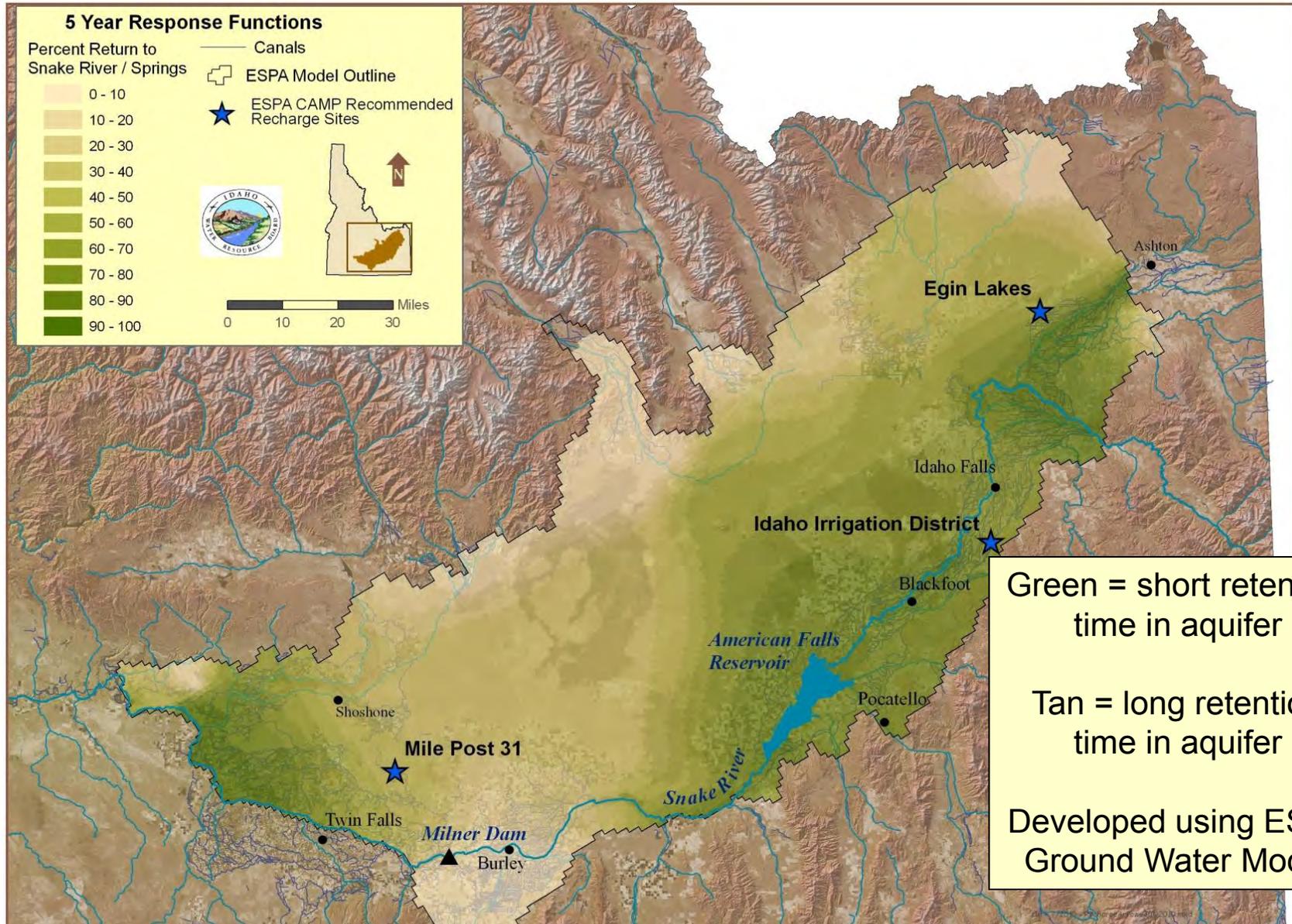




**Managed recharge at Egin Lakes site in 2008**



**Managed recharge north of Shoshone from Milner-Gooding Canal  
April 28, 2009. Flow is approximately 230 cfs.**



Green = short retention time in aquifer

Tan = long retention time in aquifer

Developed using ESPA Ground Water Model

Modeled Return Time to the Ashton-Rexburg and Heise-Shelley reaches of the river due to a one-time recharge event in FMID

## Effects of Managed Recharge in ESPA

Above American Falls (Including Henrys Fork):

- In general short retention time, with most back to the Snake River within weeks to months.
- This can extend the availability of natural flow during the irrigation season, reducing storage use and resulting in more carry-over in reservoirs.
- Recharge in Henrys Fork may benefit Mud Lake area

Below American Falls Reservoir:

- In general long retention time and long-term storage of water in aquifer.
- Recharge above Thousand Springs has short retention time but augments spring flows.

## All ESPA Recharge Since 2008

**Total Recharged = 188,604 acre-feet**

**73.5 % Above American Falls**      **26.5% Below American Falls**  
**(including Henrys Fork)**

## All ESPA Recharge Retained Since 2008

**Total Estimated Retention = 44,100 acre-feet**

**21.3 % Above American Falls**      **78.7% Below American Falls**  
**(including Henrys Fork)**

Note: volume shown here differs slightly from volumes shown earlier in presentation because this analysis was done for IWRB while recharge was still occurring in fall of 2010 and includes 2009-2010 recharge plus 5,000 AF done in 2008.

## **Pending ESPA Managed Recharge Issues**

- IWRB moving towards prioritizing location of recharge
- IWRB is concerned about continuing to pay the entire program cost
  - CAMP funding mechanism not yet in place to fund recharge
  - IWRB is concerned that water users on the Eastern Snake Plain are not contributing to program
- Additional constructed capacity is needed mostly below American Falls

# Conclusions

- Managed recharge program already underway for ESPA including Henrys Fork.
- Swan Falls Reaffirmation Agreement limits managed recharge to 100,000 acre-feet annually through 2019, and existing program is almost at this point.
- Egin Lakes and canals in Henrys Fork area are already in use to accomplish recharge and Egin is under consideration for expansion.
- Modeling shows short retention time in aquifer for water recharged in Henrys Fork.

# Questions and Discussion

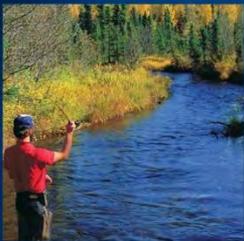
**ATTACHMENT 3**



# The Board's Water Supply Bank

February 15, 2011





## What is “the Bank?”

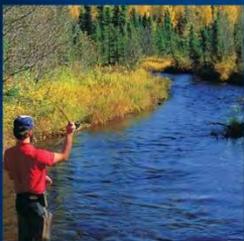
- Exchange market operated to facilitate marketing of water rights
- Provides mechanism to temporarily change water rights
- Can be a substitute for transfers



## What are the purposes of the Bank?

- Encourage the highest beneficial use of water
- Provide a source of water supplies to benefit new and supplemental uses

# The Board's Bank is not a Rental Pool



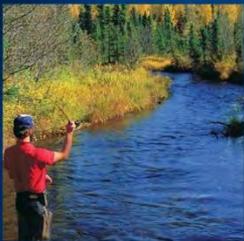
## Board's Bank vs. Rental Pool

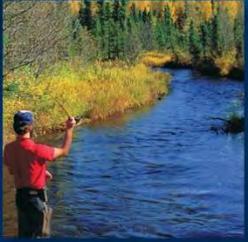
### Board's Bank

- Managed by IDWR for the IWRB
- Operates statewide
- Ground and surface water – live/natural flow

### Rental pool

- Managed by a local committee
- Specific watersheds
- Primarily storage water





# Terminology

- Lease – *into* the Bank
- Rent – *from* the Bank



# Leasing

- **Lease Period/Term: generally 1-5 years (Some grandfathered indefinite)**
- **Filing fee:**
  - **No Current filing fee**
  - **Proposed fee : \$250 per water right**
- **Protection from forfeiture**
- **Potential to receive payment if rented**

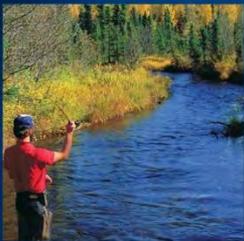


## Leasing

- **Owner must not use water right for duration of lease even if the right is not rented**
- **Leases conditioned in accordance with offered right(s)**
- **Lessor receives 90% of rental fees (10% retained by IDWR)**

## Leasing – Review Considerations

- Recorded
- Ownership
- Forfeiture or abandonment
- Availability of source to fill right
- Consistent with State Water Plan
- In the local public interest
- If rented, no enlargement



## Renting

- **Rental period: generally 1-5 years**
- **Rentals conditioned in accordance with the conditions of the leased right(s)**
- **Rental Fee: \$14 per AF (current rental rate)**

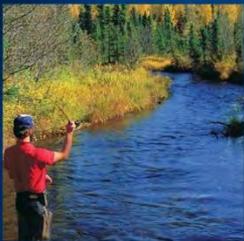
## Renting – Review Considerations

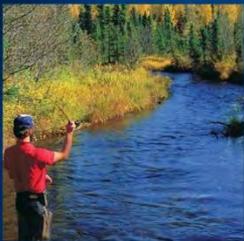
- Must be hydraulic connection between leased right and rental location
- Rental cannot be for use requiring permanent water right
- Does not authorize new well construction
- Payment must be received to validate the rental agreement.



## Renting – Review Considerations

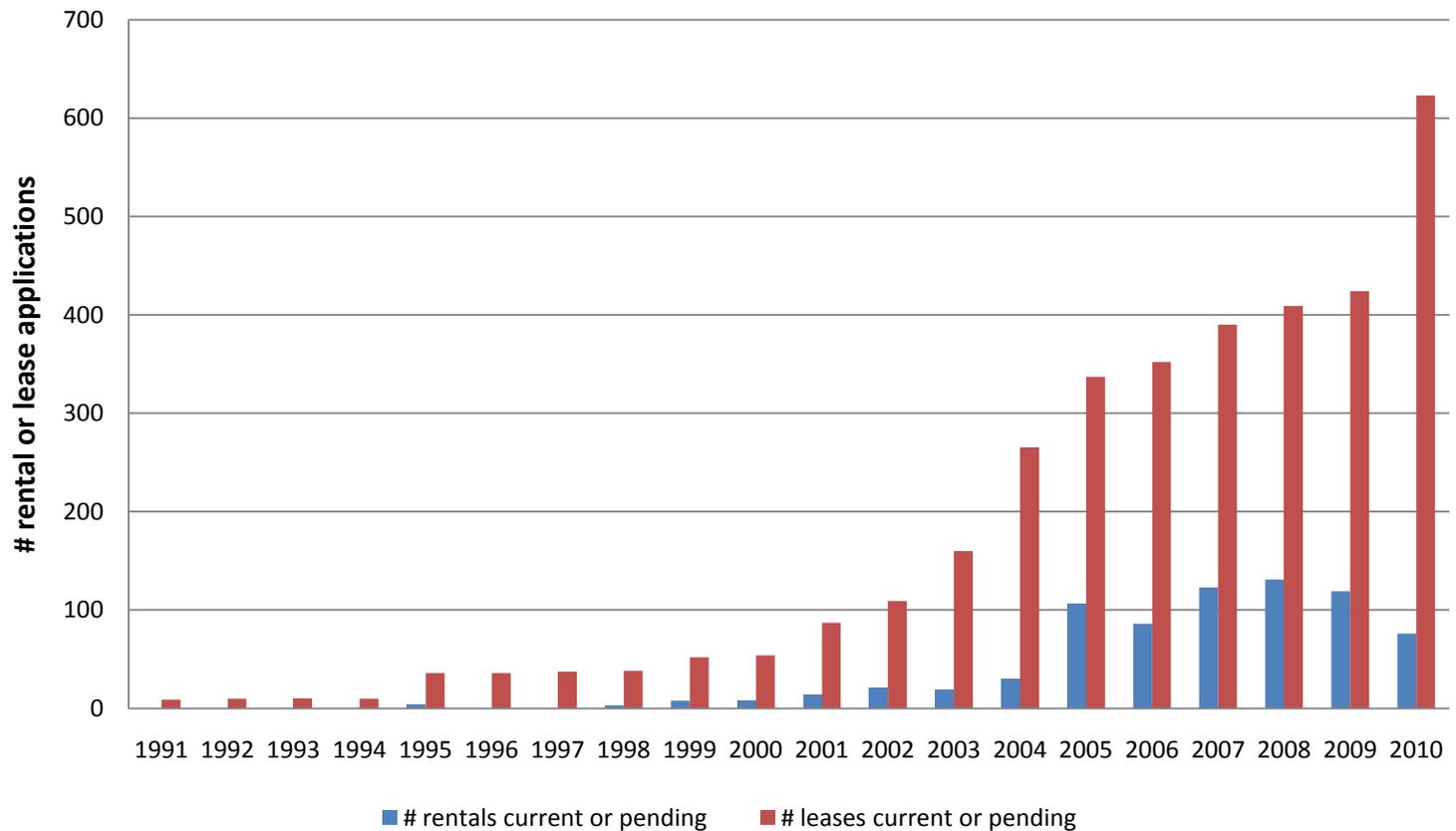
- Injury to other water rights
- Enlargement of the water right
- Water put to beneficial use
- Sufficiency of water supply
- In the local public interest

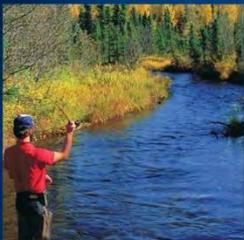




# The Numbers

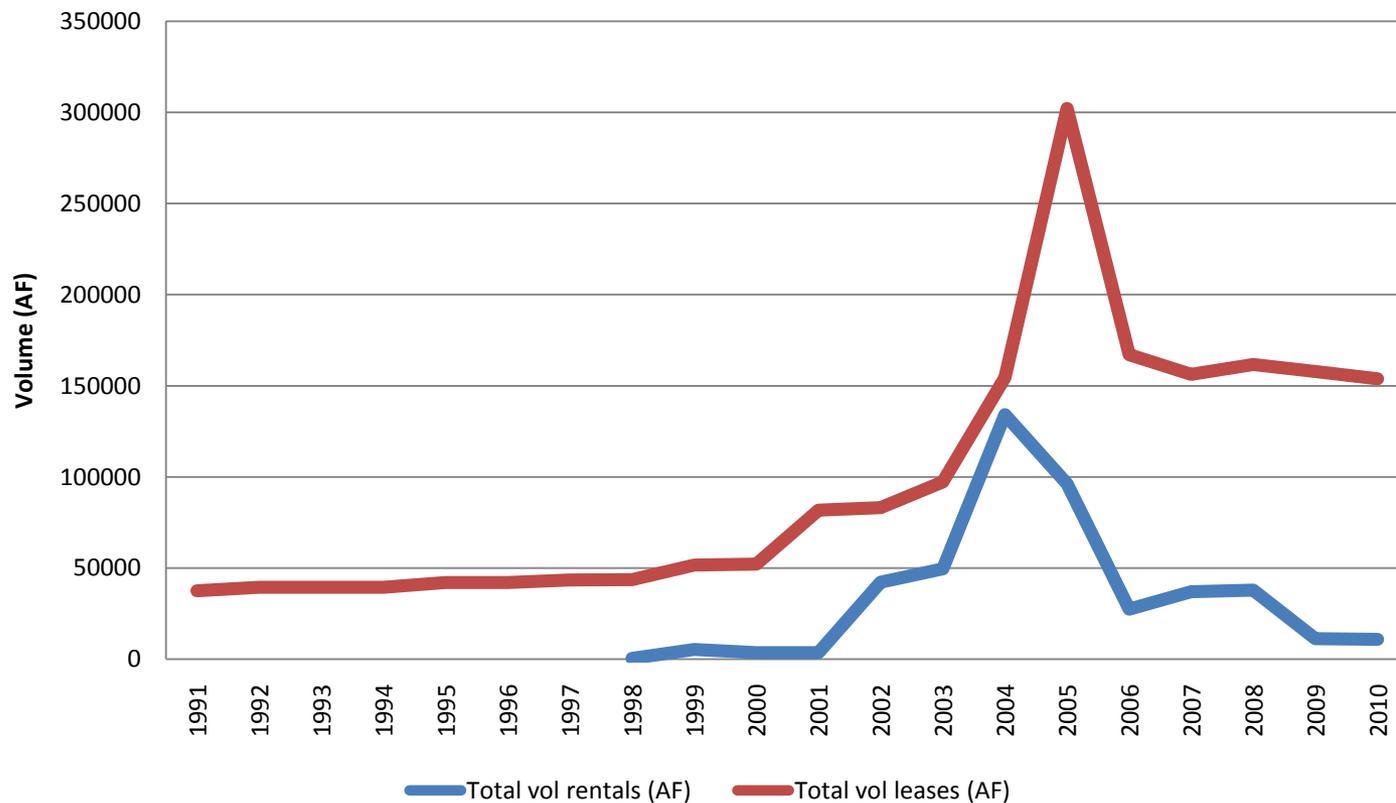
## Water Supply Bank Activity



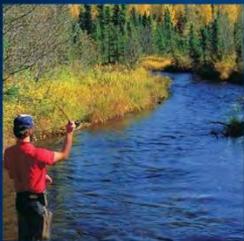


# The Numbers

Total volume rented or leased by year

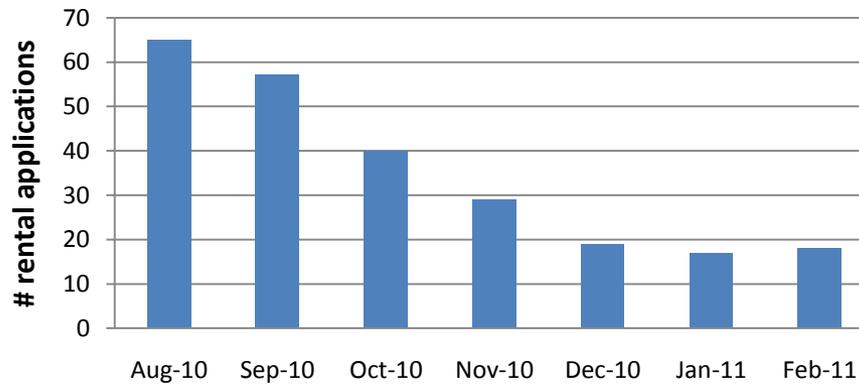


\*The increases from 2001-2005 result from a flow augmentation program pursued by the Bureau of Reclamation. 2010 data shows minimum based on available data.

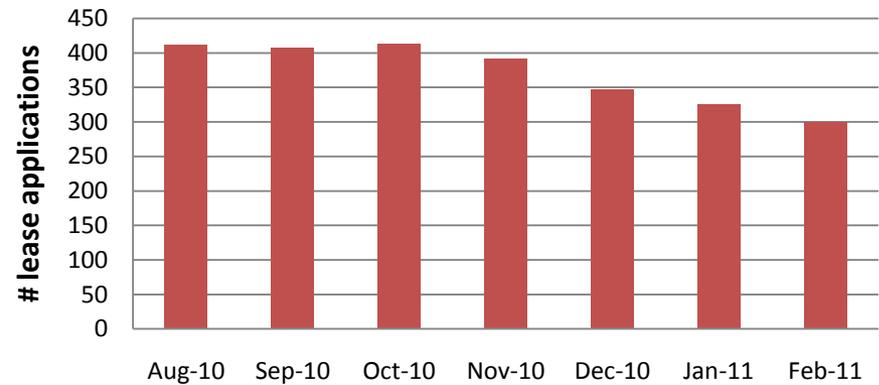


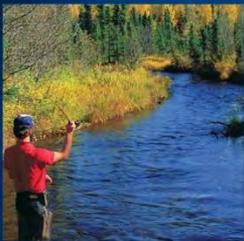
# The Numbers

## Water Supply Bank Rental Backlog



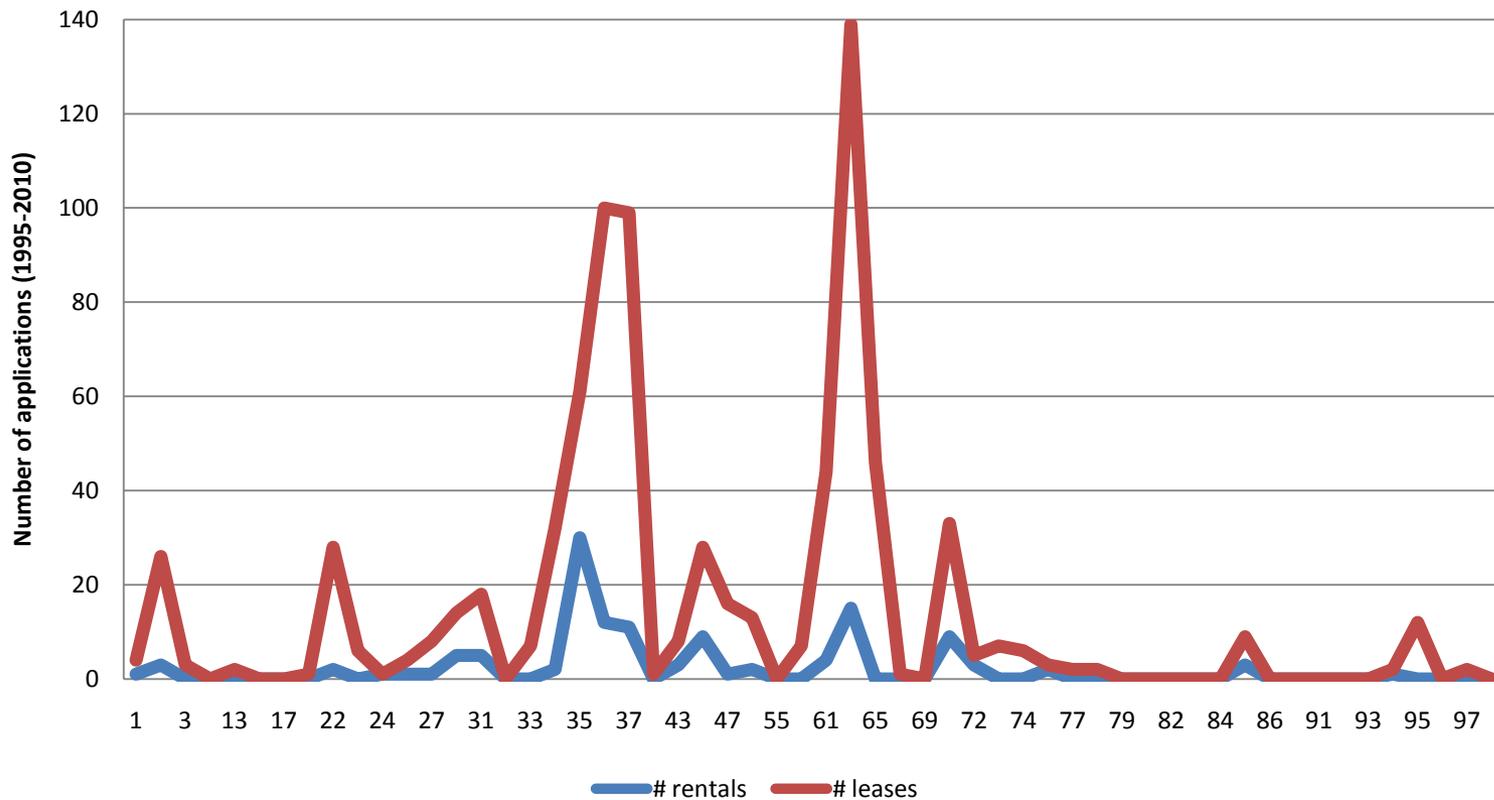
## Water Supply Bank Lease Backlog

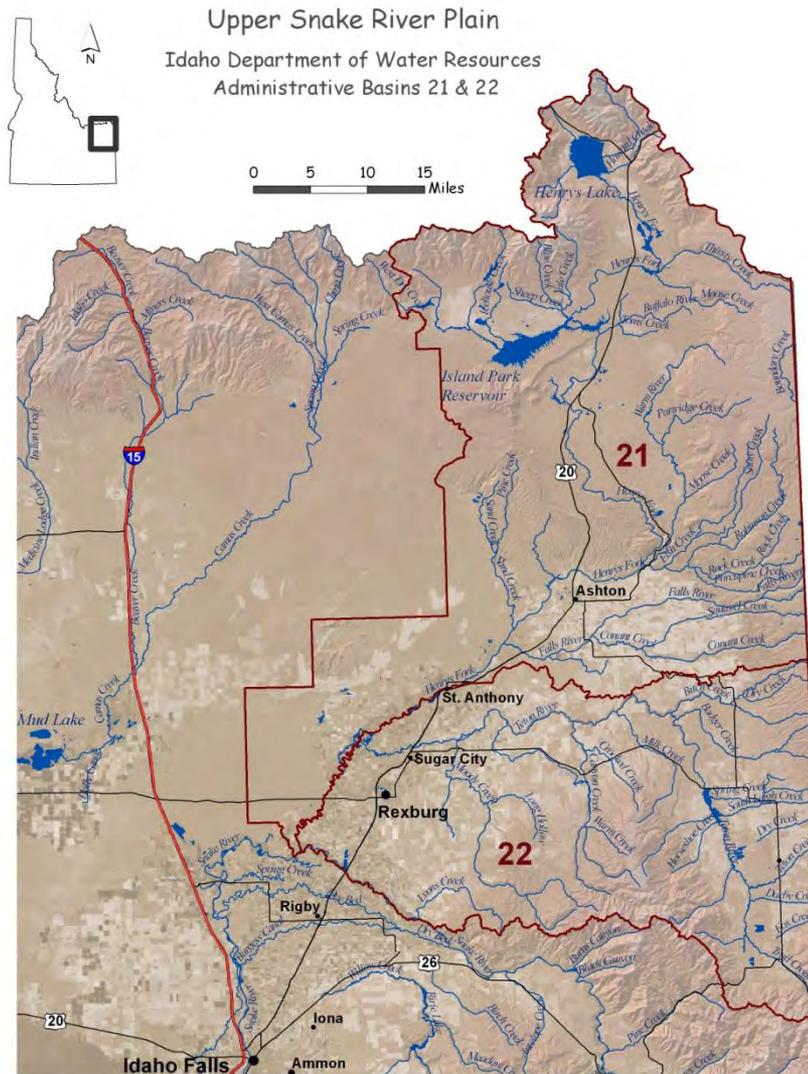


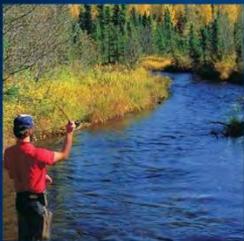


# The Numbers

## Leases and rentals by basin

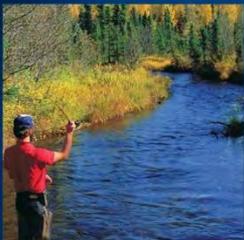






## The Numbers

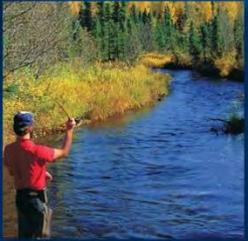
- **Basin 21:**
  - 1 leased rights (1.5 cfs)
  - 0 rentals
- **Basin 22:**
  - 32 leased rights
  - 10 rental applications (portions of 43 rights totaling 18.5 cfs, 2410 af)



## Summary

- Rental Pools and Board's Water Supply Bank make up two major components of Idaho's water marketing system.
- Both are intended to encourage the highest beneficial use of water and provide for additional flexibility in the use of existing supplies.
- Additional information about the Idaho Water Supply Bank:

[http://idwr.idaho.gov/WaterManagement/WaterRights/WaterSupply/ws\\_default.htm](http://idwr.idaho.gov/WaterManagement/WaterRights/WaterSupply/ws_default.htm)



# Questions

**ATTACHMENT 4**

# **Henry's Fork Basin Working Group**

## **Water Markets**

**Harry Seely, WestWater Research**  
**February 15, 2011**

# The Current Idaho Market

- Limited market activity relative to other western states
- Few permanent sales - more water “under contract” than has actually moved
  - Leasing activity – primarily in the State Water Supply Bank and the Local Rental Pools
- Most active areas:
  - Eastern Snake Plain
  - Wood River Valley
  - Treasure Valley



# Innovations in Western Water Markets

- Market Examples
  - Alternatives to “Buy and Dry”
  - Market incentives for aquifer protection
- Potential for Henrys Fork



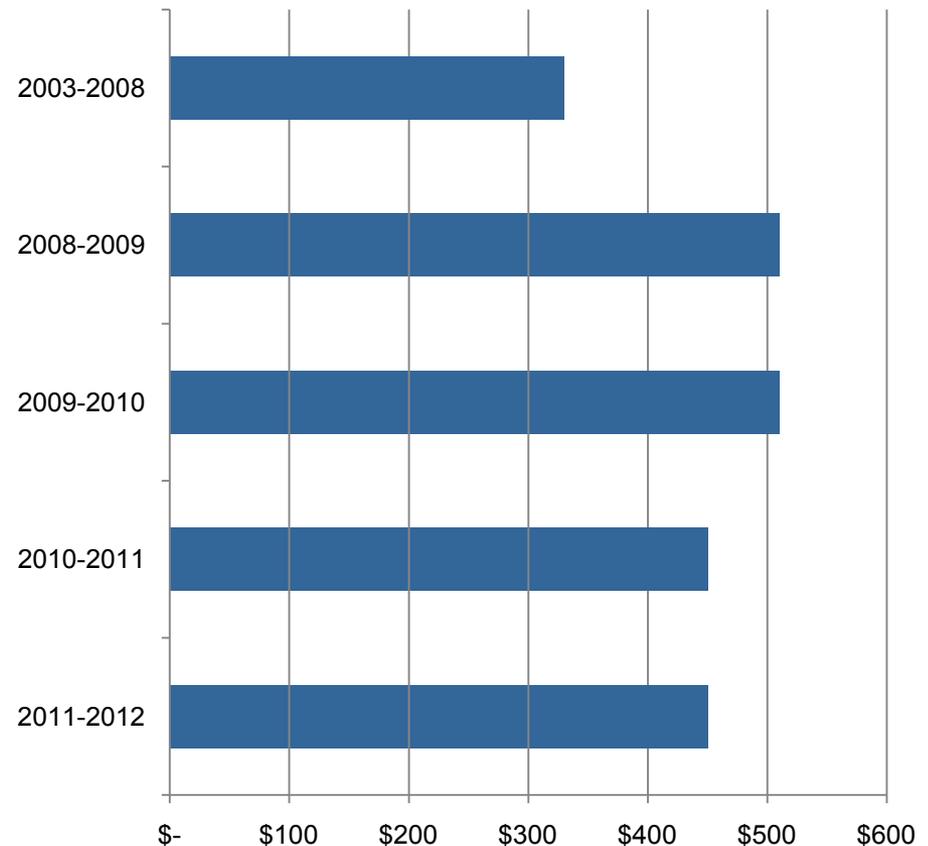
# The Super Ditch Company – Lower Arkansas River Valley, CO

- Proposed program involves shareholders in multiple ditch companies
- Participation is voluntary
- Long term leases rather than permanent sales
- Water derived from rotational fallowing
- Forgone farming activity is spread equally over member's farms and ranches and is temporary
- Long term lease of portions of irrigation rights could improve property values and the prospect for obtaining farm loans
- Two current long term lease agreements commit up to 8,020 AF per year, and up to 18,020 AF in three years out of every ten.
- Lease prices are currently set at \$500 per AF of consumptive use
- Consumptive use is approximately 2 AF/ Acre
- Lease price approximately \$1000/acre

# Imperial Irrigation District – Imperial Valley, CA

- Following will provide water committed to
  - San Diego
  - Salton Sea Mitigation
  - Comply with Colorado River consumptive use cap
- Landowners will contract with the District on a voluntary basis
- Price for fallowing is set each year by the District
- Efficiency improvements will provide all water under the agreement by 2018.

**\$/Acre paid by Imperial for Voluntary Fallowing**

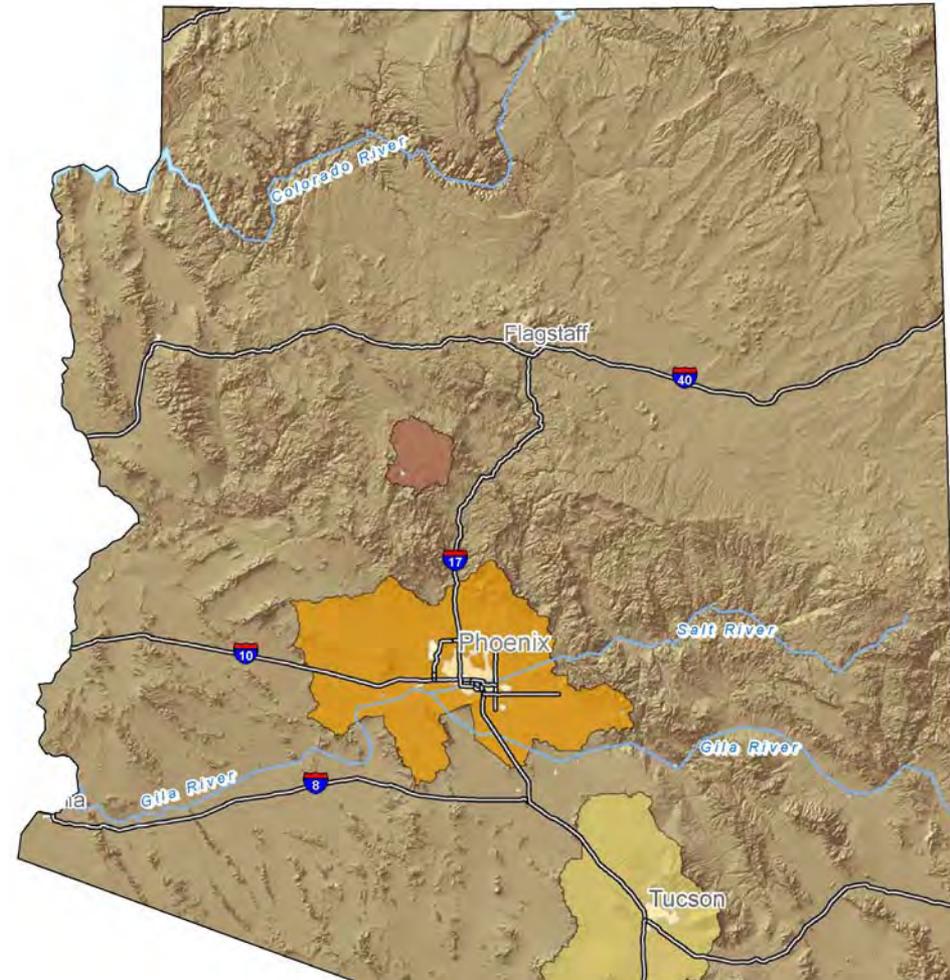


## Palo Verde Irrigation District – Palo Verde Valley, CA

- PVID agreed to 35 year contract with MWD in 2004
- MWD can call upon the participating PVID farmers to fallow enrolled acres depending on need
- MWD call can range from 6,000-26,500 acres (max of 111,000 AF)
- MWD paid a one time fee of \$3,170 per acre enrolled in the program
- MWD paid farmers \$602 for each fallowed acre in 2005
  - Price escalates by 2.5 % for first 10 years
  - Price escalated by CPI for remaining 25 years

# Arizona Active Management Areas

- Rapid groundwater level declines.
- Achieve “safe yield” by 2020.
- Promote aquifer recharge through market incentives.
- Transparent process for “extinguishing” irrigation water rights.

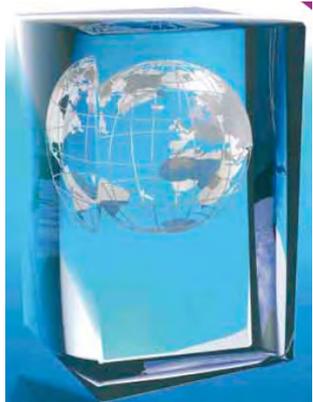


# Arizona Active Management Areas

- Common currency
- Mobile throughout AMA.
- No forfeiture.
- Market pricing.
- Promoting private market participation.



# Prescott Valley Effluent Auction



<b><i>Asset</i></b>	2,274 AF of effluent water credits in the Prescott AMA
<b><i>Description</i></b>	Water credits created through physical recharge of treated municipal wastewater into the Prescott AMA. The credits can be used to support permitting for real estate development projects within the Prescott AMA.
<b><i>Auction</i></b>	The credits were offered at auction through a 2-day double bid procedure. Prior to the auction, The winning bid was \$24,650/AF with terms favorable to the buyer.
<b><i>Secondary Market</i></b>	Asset purchased by Private Equity fund that is creating a secondary market and selling and financing credits to development projects.

# Opportunities for Henrys Fork

- There are alternatives to “buy and dry.”
- Current lease market could be expanded to encourage more diverse trading opportunities – e.g. recharge.
- Use surface storage in combination with aquifer recharge to operate a “credit” market?
- May be a cost-effective alternative for some uses – scalability.
- Markets can provide a mechanism to limit economic costs of water regulation.
- Markets work best where there are significant disparities in water values – gains from trade.

# Thank You

## **Main Office**

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Fax: 208-433-5596

## **West Coast Office**

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Fax: 360-695-6105

## **Intermountain Office**

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Bozeman, MT 59715  
Tel: 208-433-0255  
Fax: 208-433-5596



**ATTACHMENT 5**

Date: February 16, 2011 (Revised based on feedback during February 15, 2011 Workgroup Meeting)  
 Draft Table X. Attribute and Information Summary of Water Supply Alternatives, Henrys Fork Basin Study

Literature Information Summary												
Surface Storage Site	Published Storage Potential (AF)	On-stream	Off-stream <sup>a</sup>	Existing	Impounded Drainage(s)	Off-stream Water Source(s)	Published Hydrology Potential (average annual)	Published Hydropower Potential <sup>c</sup>	Published Impoundment Impacts	Location Unknown	Literature Source <sup>b</sup>	Notes
Ashton Dam Enlargement	29,000 <sup>1</sup> ; 40,000 <sup>2</sup>	•		•	Henrys Fork Snake River			6.2 MW (additional)	agricultural development, roads, habitation		IWRRI 1981, IWRB 1992	
Bitch Creek	142,000 <sup>1,2</sup> ; 210,000 <sup>2</sup>		•		Bitch Creek	Teton River, Falls River, Conant Creek	75,000 AF (Bitch Creek)	5 MW	limited development and habitation, highway/roads, Union Pacific Railroad Bridge		IWRRI 1981, IWRB 1992	
Boone Creek	83,000 <sup>1</sup> ; 80,000 <sup>2</sup>		•		Boone Creek	Falls River	30,000 AF (Boone Creek)	3 MW	Targhee National Forest, diversion would be located in Yellowstone National Park		IWRRI 1981, IWRB 1992	
Conant Creek	40,000 <sup>1,2</sup> ; 20,100 <sup>3</sup>		•		Conant Creek	Bitch Creek, Squirrel Creek, Falls River, Boone Creek	20,000-30,000 AF (Conant); 20,000-30,000 AF (Boone/Squirrel)		roads and habitation		IWRRI 1981, IWRB 1992, Reclamation	
Driggs/Tetonia	35,000 (active, Driggs); 590,000 (Tetonia)	•			Teton River			4 MW	Tetonia site would flood extensive area		IWRB 1992	
Generic Reservoir in Flat Land	NA		•							•	NA	Presented by Reclamation at January 11, 2011 Workgroup meeting
Grassy Lake												Potential site identified by Workgroup; Potential low hydrologic reliability
Harropes Bridge/Tetonia (? see note)	NA	•			Teton River					•	NA	Potential site identified by Workgroup member, duplication of Tetonia site?
Horseshoe Creek	NA		• <sup>d</sup>		Horseshoe Creek <sup>d</sup>	Teton River <sup>d</sup>				•	NA	Potential site identified by Workgroup member, no specific location provided.
Howell Ranch	32,000 <sup>1</sup> ; 30,000 <sup>2</sup>		•		Rock Creek, Porcupine Creek	Falls River, Robinson Creek	10,000 AF (Robinson Creek); 30,000 AF (Falls River)	✓	uninhabited Howell Ranch and some roads		IWRRI 1981, IWRB 1992	
Island Park Enlargement	NA			•							NA	Presented by Reclamation at January 11, 2011 Workgroup meeting
JY Ranch	49,000 <sup>1</sup> ; 50,000 <sup>2</sup> ; 80,000 <sup>2</sup>		•		Rock Creek, Shaefer Creek	Falls River, Porcupine Creek, Robinson Creek			inundation of habitation (J Y Ranch), roads, Targhee National Forest		IWRRI 1981	
Lane Lake/Teton Lake	69,000 <sup>1</sup> ; 70,000 <sup>2</sup>		•		dry basin north of Teton River	Bitch Creek, Conant Creek	75,000 AF (Bitch Creek); 32,000 AF (Conant Creek)	✓	some roads, agricultural development, limited habitation		IWRRI 1981, IWRB 1992	
Lower Badger Creek	73,000 <sup>1</sup> ; 70,000 <sup>2</sup>		•		Badger Creek	Teton River, Bitch Creek		✓	very little development		IWRRI 1981, IWRB 1992	
Marysville Headworks	38,000 - 56,000	•			Falls River						IWRB 1992	
Moody Creek (Webster Dam)	46,000 <sup>1</sup> ; 50,000 <sup>2</sup>		•		Moody Creek	Teton River, Canyon Creek	6,000 AF (Moody Creek); 9,000 AF (Canyon Creek)		Unknown		IWRRI 1981, IWRB 1992	Webster Dam identified by Workgroup member but no specific location given.
Moose Creek	60,000		•		Moose Creek	Henrys Fork Snake River					IWRB 1992	Minimal water-storage benefits b/c diversion location is above Island Park.
Park Lake	37,000 <sup>1</sup> ; 40,000 <sup>2</sup>		•		Upper Rock Creek	Falls River, Belcher River			Cave Falls Road, canal diversions would be in Yellowstone National Park		IWRRI 1981	
Robinson Creek	70,000		•		Robinson Creek, Bear Creek	Falls River, Fish Creek	20,000 AF (Robinson Creek); 5,000 AF (Fish Creek)	✓	Targhee National Forest		IWRRI 1981	
Spring Creek (Canyon Creek)	32,000 <sup>1</sup> ; 30,000 <sup>2</sup>		•		Spring Creek (tributary to Canyon Creek)	Bitch Creek, Canyon Creek, Teton River	9,000 AF (Canyon Creek)	✓	Unknown		IWRRI 1981, IWRB 1992	Potential Canyon Creek site iden. by Workgroup memb. but no specific loc.
Squirrel Creek	126,000 <sup>1</sup> ; 130,000 <sup>2</sup>		•		Squirrel Creek	Conant Creek, Boone Creek, Falls River	30,000 AF (Boone Creek)		Targhee National Forest		IWRRI 1981, IWRB 1992	
Squirrel Meadows (Wyoming)	10,000		•		tributary to Squirrel Creek	Boone Creek					IWRB 1992	
Teton (rebuild or new site)	200,000 (active)	•			Teton River		31,670 AF	8 MW			IWRB 1992, Reclamation 1994	
Teton Creek (Wyoming)	NA		• <sup>d</sup>		Teton Creek <sup>d</sup>	Teton River <sup>d</sup>				•	NA	Potential site identified by Workgroup member, no specific location provided.
Upper Badger Creek	49,000 <sup>1</sup> ; 50,000 <sup>2</sup>		•		Badger Creek	Teton River	87,000 AF (Teton River)	2 MW	limited farmstead development		IWRRI 1981, IWRB 1992	
Warm River	75,000 (active)	•			Henrys Fork Snake River, Warm River, Robinson Creek			22 MW			IWRB 1992	
<b>Managed Groundwater Recharge (and potential recovery) Site</b>												
Egin Lake Enlargement												
Teton Basin												
Sand Creek Wildlife Management Area (Blue Creek)												
<b>Water Market Alternative</b>												
Credit System												
Lease in Fallow Years												
Utilize and/or Expand Existing Banking Program												
<b>Conservation and Water Management Alternative</b>												
TBD												

<sup>a</sup>Primary water source is offstream

<sup>b</sup>Literature Sources

<sup>1</sup> A Preliminary Appraisal of Offstream Reservoir Sites for Meeting Water Storage Requirements (IWRRI 1981)

<sup>2</sup> Comprehensive State Water Plan - Henrys Fork Basin (IWRB 1992)

<sup>3</sup> Snake River Basin Storage Appraisal Study (January 1994)

<sup>c</sup>Some sites were identified as having hydropower potential and are therefore noted with a checkmark, however, a specific quantity (MW) was not provided.

<sup>d</sup>No published information available, however, estimates/assumptions have been made based on best professional judgment.

Date: February 16, 2011 (Revised based on feedback during February 15, 2011 Workgroup Meeting)  
 Draft Table Y. Attribute and Information Summary of Water Supply Alternatives, Henrys Fork Basin Study

Surface Storage Site	Information Summary																Ranking Recommendation		
	Protection Status			Special Designation				State Species of Special Concern		Land Management Data <sup>a</sup>							Carry Forward?	Eliminate?	Notes
	Special Designation	Species of Special Concern	TBD	BLM/USFS Eligible Stream Determination	IWRB Minimum Stream Flows	IWRB Natural Stream Designation	Recreational Stream Designation	Yellowstone cutthroat trout (YCT) presence	YCT Crucial Habitat	Private	BLM	USFS	Reclamation	IDFG	IDPR	IDL			
Ashton Dam Enlargement	None	None								•	•								
Bitch Creek	State	Crucial			•	•	•	•	•	•						•			
Boone Creek	State	Presence				•		•				•							
Conant Creek	None	Presence						•		•									
Driggs/Tetonia	State	Presence					•	•		•				•					
Generic Reservoir in Flat Land	None	None																	
Grassy Lake	TBD	TBD																	
Harropes Bridge/Tetonia (? see note)	State	Presence		• <sup>b</sup>				• <sup>b</sup>											
Horseshoe Creek	None	Presence						• <sup>b</sup>		• <sup>b</sup>		• <sup>b</sup>							
Howell Ranch	State	Presence					•	•		•		•							
Island Park Enlargement	None	None								•	•	•	•			•			
JY Ranch	State	Presence					•	•				•							
Lane Lake/Teton Lake	None	None								•									
Lower Badger Creek	State	Presence		•			•	•		•									
Marysville Headworks	State	Presence					•	•		•	•	•							
Moody Creek (Webster Dam)	None	Presence						•		•									
Moose Creek	None	None										•							
Park Lake	State	Presence					•	•				•							
Robinson Creek	State	Presence				•		•								•			
Spring Creek (Canyon Creek)	None	None								•									
Squirrel Creek	None	Presence						•				•							
Squirrel Meadows (Wyoming)	None	None										•							
Teton (rebuild or new site)	State	Presence		•				•		•	•		•						
Teton Creek (Wyoming)	State	Presence					• <sup>b</sup>	• <sup>b</sup>		• <sup>b</sup>									
Upper Badger Creek	None	Presence						•		•									
Warm River	State	Presence			•	•	•	•		•	•	•							
<b>Managed Groundwater Recharge (and potential recovery) Site</b>																			
Egin Lake Enlargement																			
Teton Basin																			
Sand Creek Wildlife Management Area (Blue Creek)																			
<b>Water Market Alternative</b>																			
Credit System																			
Lease in Fallow Years																			
Utilize and/or Expand Existing Banking Program																			
<b>Conservation and Water Management Alternative</b>																			
TBD																			

<sup>a</sup>Land management data per the BLM Idaho Surface Management Agency (2010). For federal government lands, the data displays the managing agency which may or may not be the same as the agency that "owns" the land.

<sup>b</sup>Specific site location data is not available, however, assumptions have been made based on best professional judgment.

**Special Designation**

- Federal Federal Protection (Wilderness Area) and National Wild and Scenic River
- State State Protected Natural or Recreational Streams
- None No Designation
- ? Site Location Unknown

**State Species of Special Concern**

- Crucial YCT Crucial Habitat
- Presence Yellowstone cutthroat trout (YCT) Presence
- None No Known Populations
- ? Site Location Unknown