

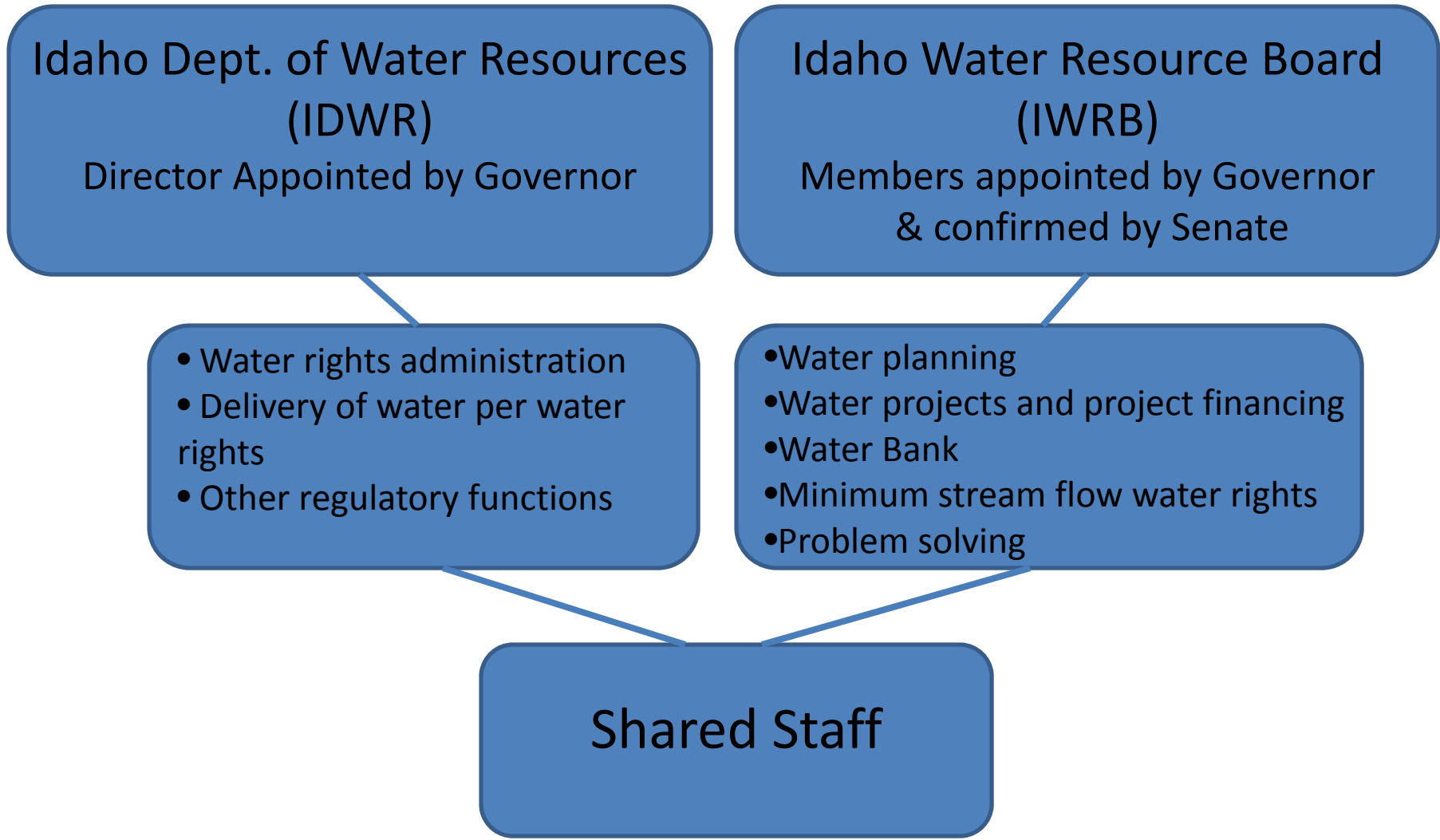


## Addressing Regional, Local and Municipal Water-Supply Needs: Idaho's Comprehensive Aquifer Planning and Management Program

Neeley Miller, Planning & Projects Bureau

Idaho Department of Water Resources





## Idaho State Water Plan Highlights

- Demonstrates that Idaho has a plan for the use of Idaho's water resources
- Describes how Idaho will develop and manage the state's water and related resources
- All state agencies are to comply with the policies providing a framework for the management of the water resources of the State
- Provides guidance and direction for: Optimum Use, Conservation, Management

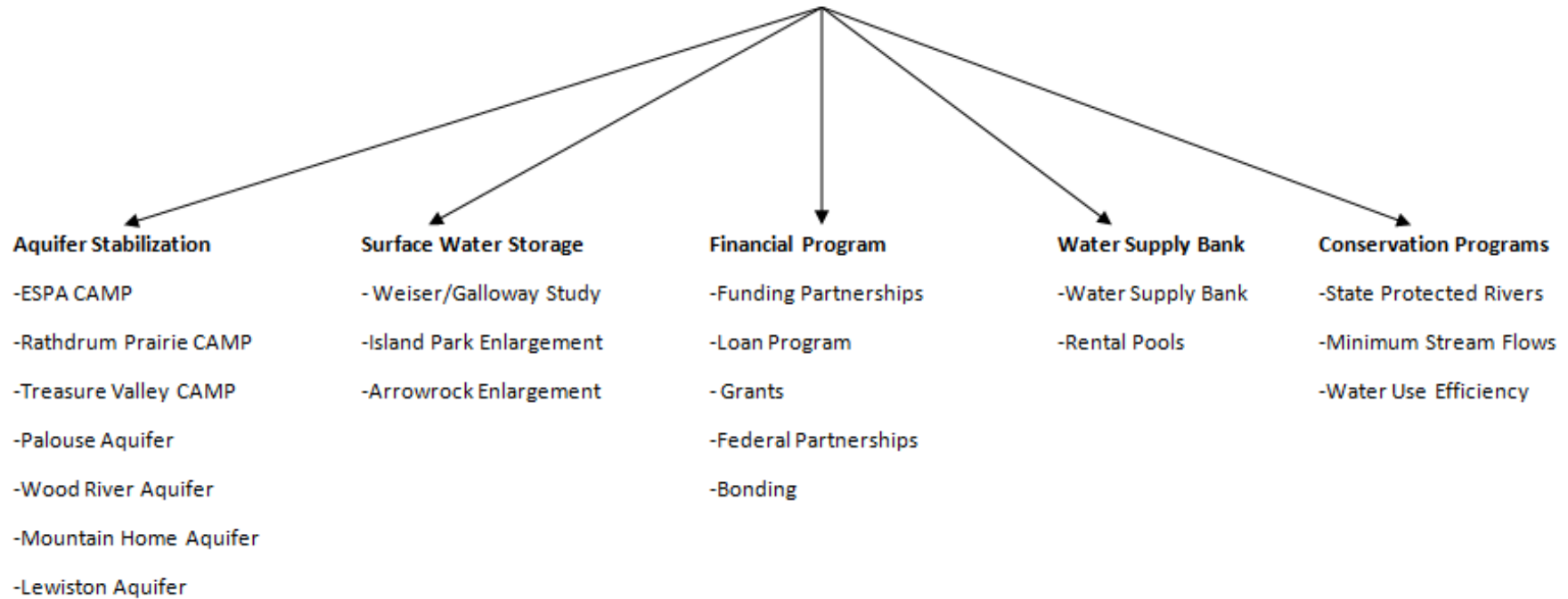




## State Water Plan

**Vision for Sustainability** – A sustainable and reliable water supply is fundamental to Idaho’s economic future and quality of life

**Optimum Use Policies, Conservation Policies, Management Policies**

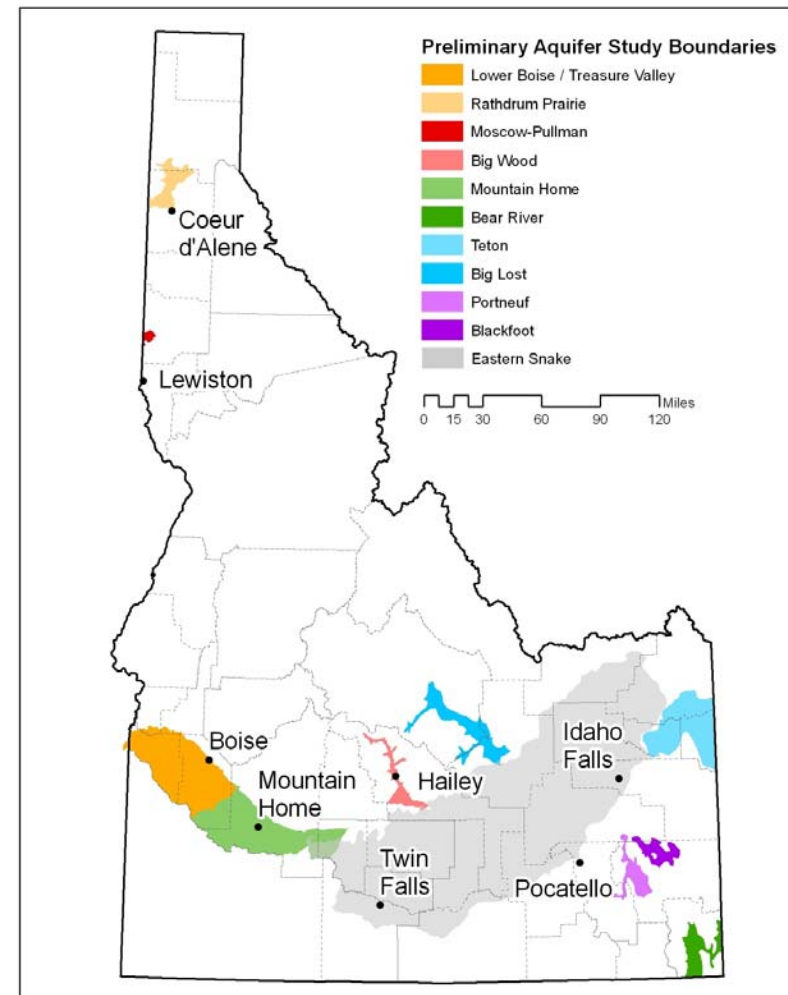


# Aquifer Planning and Management Program

- Fiscal Year 2009
- House Bills No. 428 and 644
- Created Aquifer Planning and Management Program under the authority of the Idaho Water Resource Board

## Purpose

- Conduct statewide comprehensive aquifer planning and management effort over a 10-year period
- Avoid the conflicts in Eastern Snake Plain in other priority basins (see map)
- Develop management plans for selected basins with potential ground-surface water conflicts or other potential conflicts

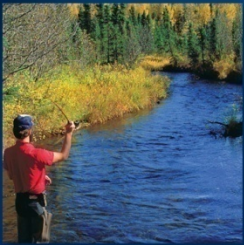


# Water Sustainability Initiative Funding HB479

## \$15 Million in one-time funds

Project	Amount
Mt. Home AFB Water Rights & Supply	\$4 Million
ESPA Managed Recharge Infrastructure & Expenses	\$4 Million
Northern Idaho Future Water Needs Studies	\$500,000
Water Storage (Galloway, Arrowrock, Island Park)	\$6 Million
Water Supply Bank Computer Infrastructure & Costs	\$500,000

Included in Governor's Budget and approved by 2014 Legislature





## Aquifer Stabilization Funding HB547

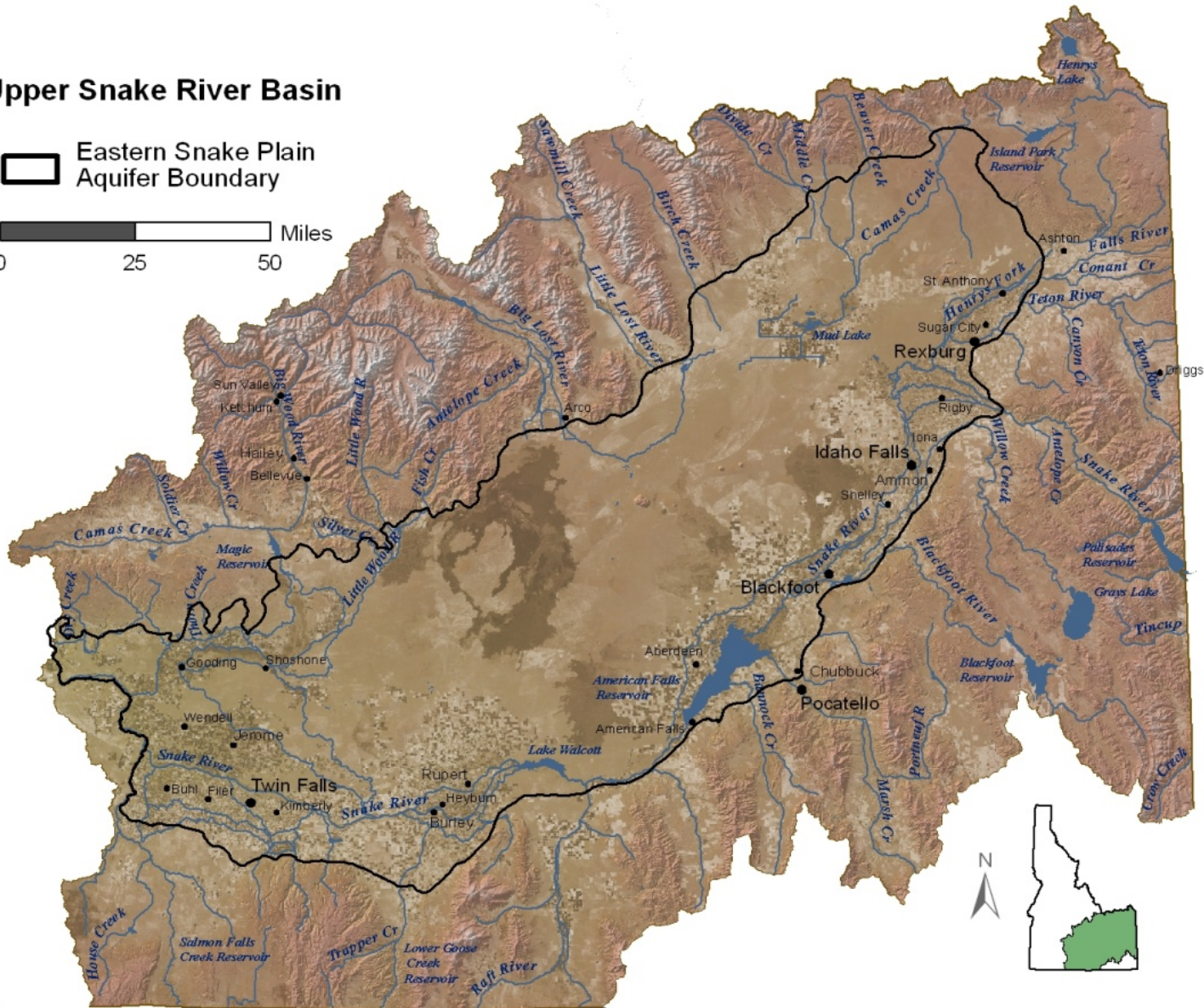
- Directs \$5 million annually to the Idaho Water Resource Board for statewide aquifer stabilization
- Funds had been used to pay for Capital renovation project – paid off this year
- Will receive 1<sup>st</sup> disbursement in July of 2015
- First priority is Eastern Snake Plain Aquifer, but other aquifers also have needs
- Sponsored by Speaker of the House, approved by 2014 Legislature



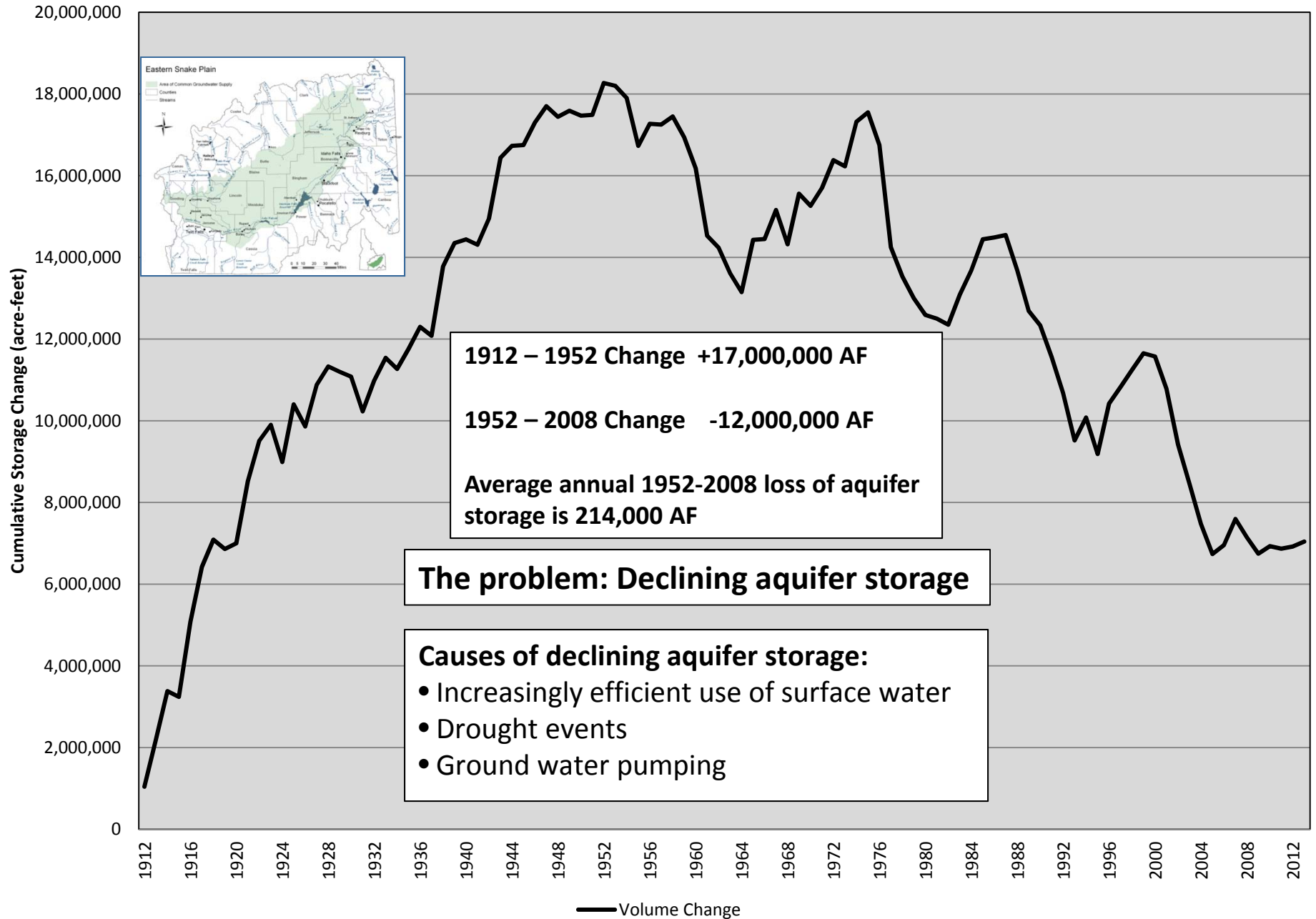
## Upper Snake River Basin

 Eastern Snake Plain  
Aquifer Boundary

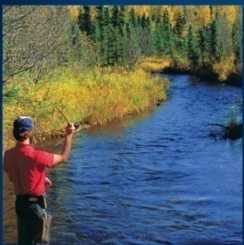
 Miles  
0 25 50



# Cumulative Volume Change of Water Stored Within ESPA





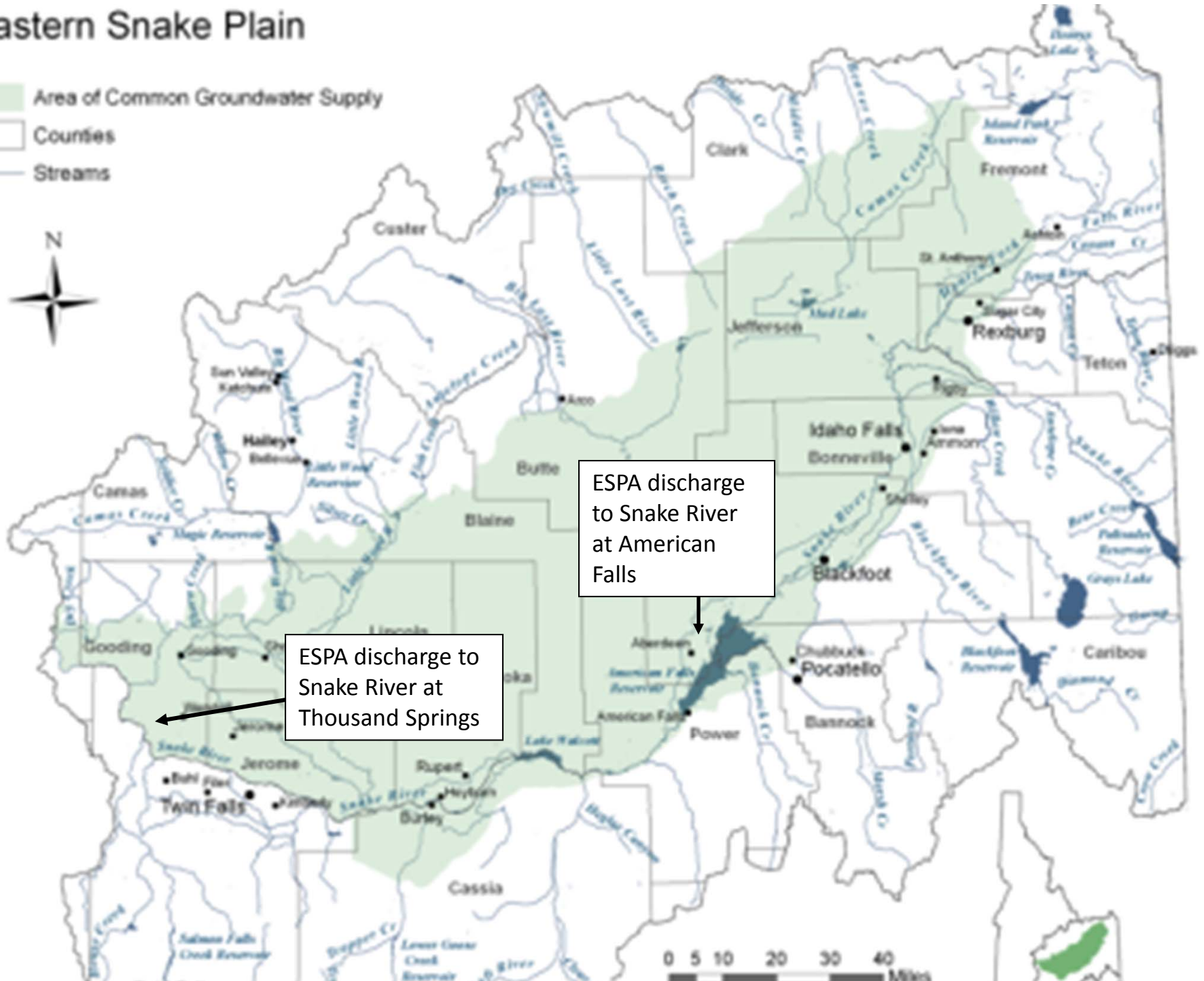


## Delivery Calls – Why Do We Care?

- ESPA region produces 33% of Idaho's economic output (2012 estimate)
- Lots of “value-added” agricultural processing locating in southern and eastern Idaho
- Cities and processing plants have disproportionately junior water right portfolios
- Potential for calls in Wood River Valley, Mountain Home, Treasure Valley, others
- Has chilling effect on economic development efforts – how can our economy grow if we can't sustain water supplies for existing uses?**

# Eastern Snake Plain

- Area of Common Groundwater Supply
- Courties
- Streams

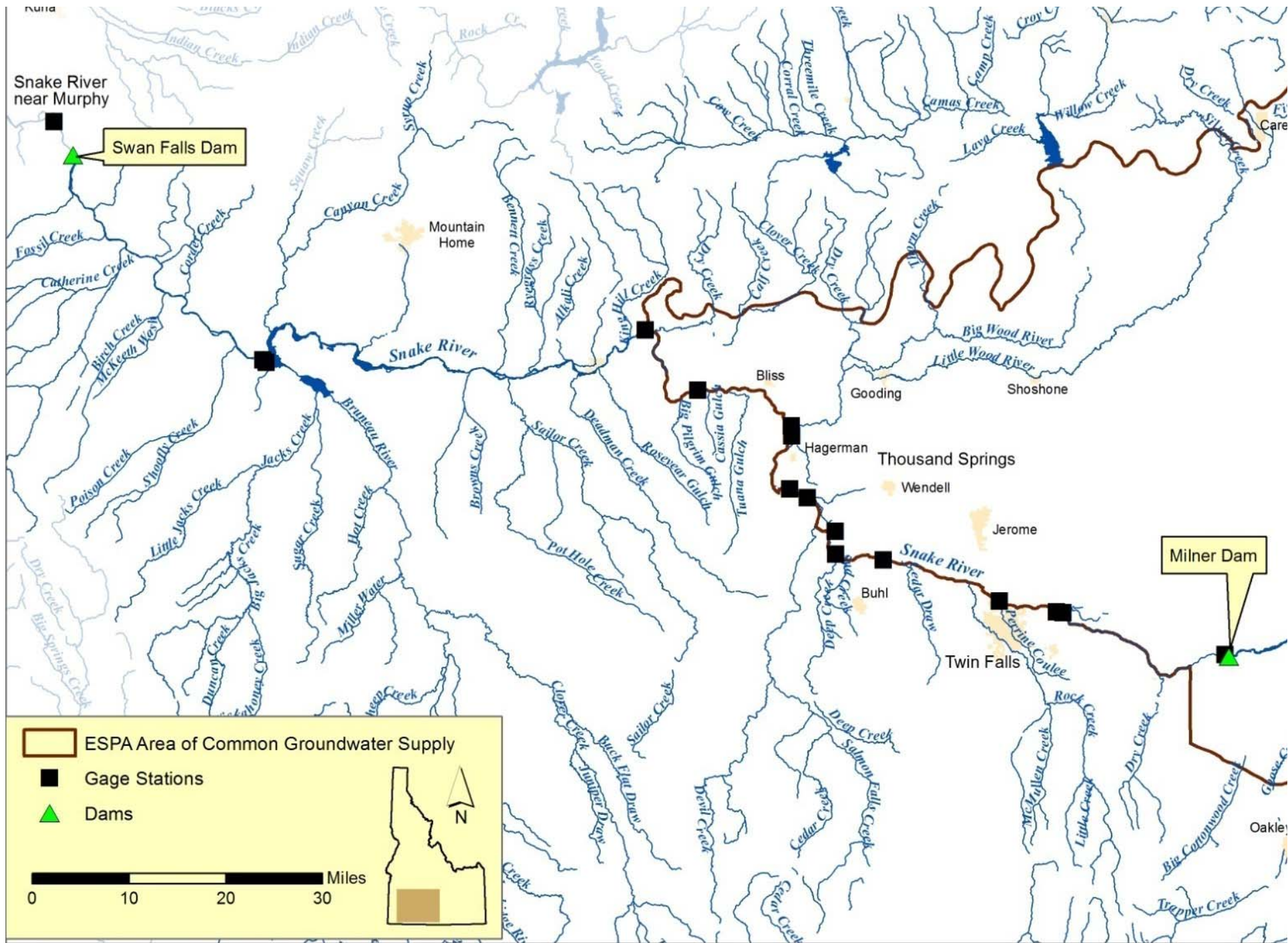


ESPA discharge to Snake River at American Falls

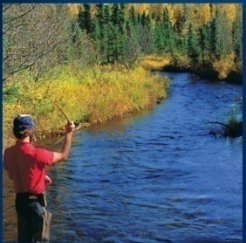
ESPA discharge to Snake River at Thousand Springs

0 5 10 20 30 40 Miles









## ESPA Stabilization and Swan Falls Agreement

State obligation to ensure minimum flows at Murphy Gage just below Swan Falls Dam of:

- ✓ 3,900 cfs (4/1 through 10/31) and
- ✓ 5,600 cfs (11/1 through 3/31)

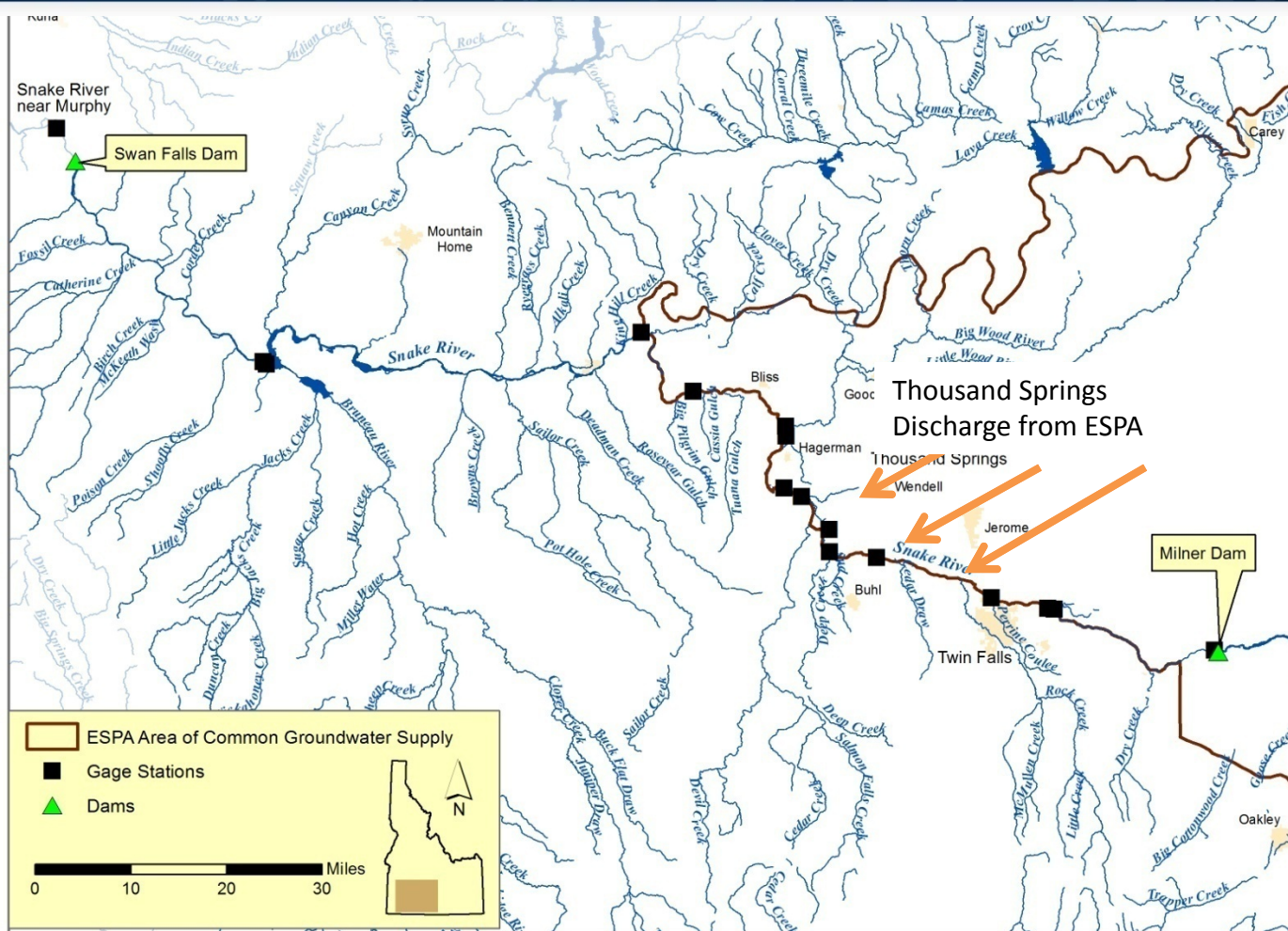
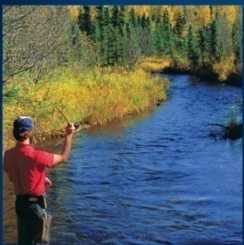


## However, 180 miles Upstream at Milner Dam



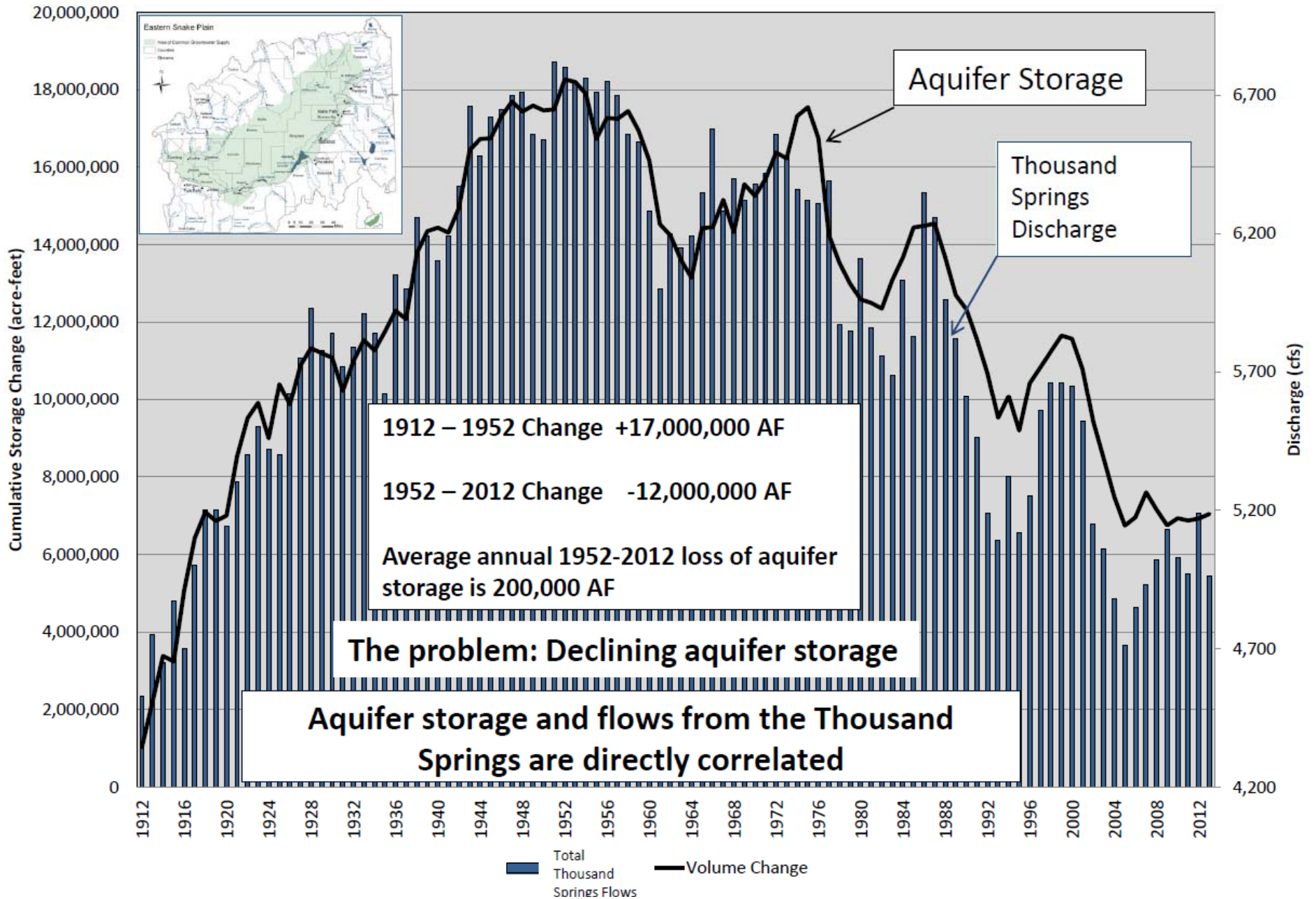
- Water planning, policy, and practice provides for full development of Snake River above Milner Dam
- At times this reduces Snake River flow at Milner Dam to zero



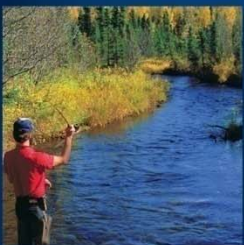


When flow is zero at Milner, flow at Swan Falls Dam is made up almost entirely of spring flows from the ESPA

# Cumulative Volume Change of Water Stored Within ESPA and Thousand Springs Discharge

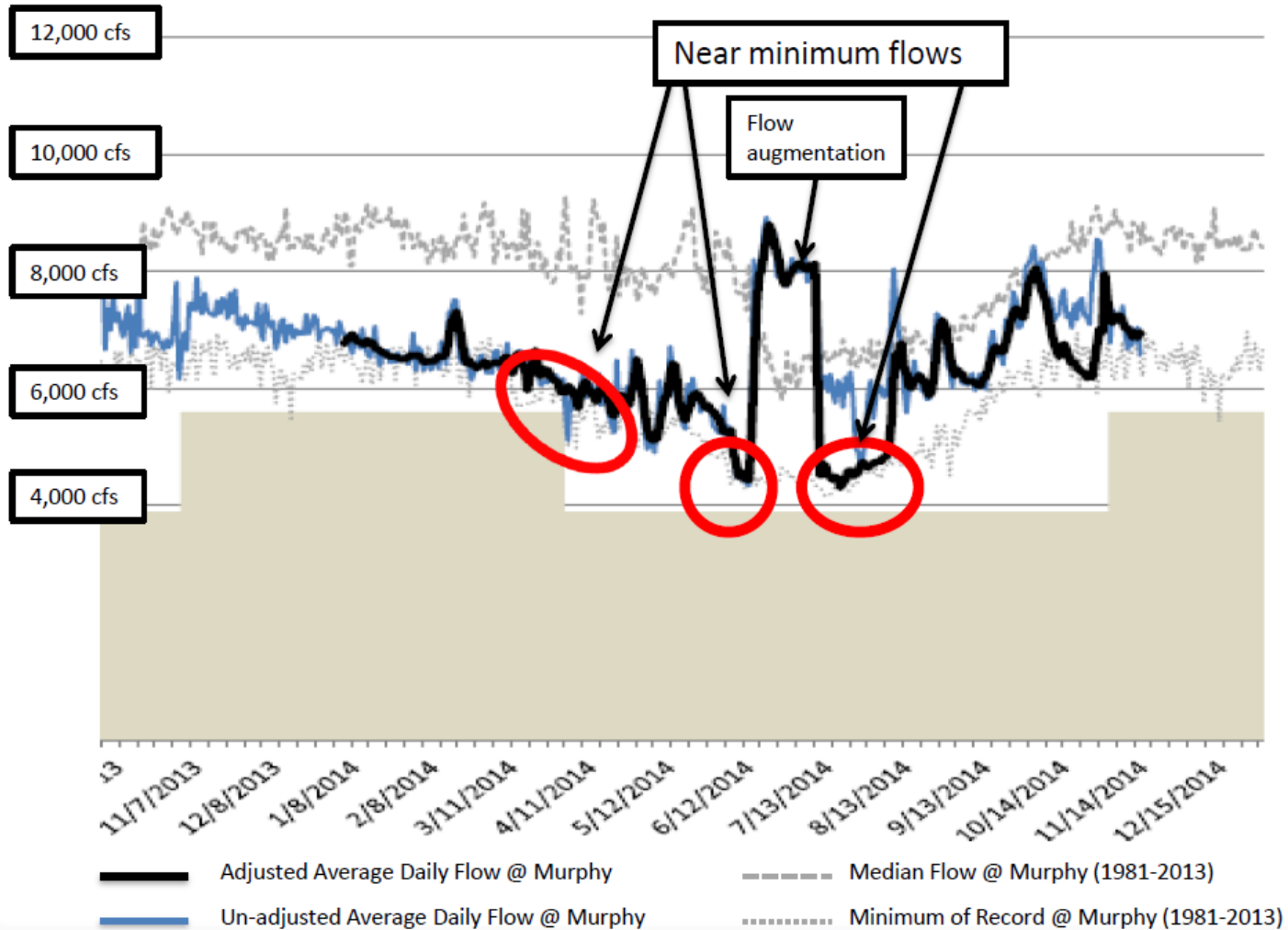






## Snake River at Murphy Gage

### Swan Falls Dam - 2014



## Implications of Swan Falls Agreement Combined with Milner Zero Flow Policy

- ✓ ESPA must be managed to sustain spring flows sufficient to meet the Swan Falls minimum flows
- ✓ Current situation is due partly to “deferred maintenance” of the ESPA
- ✓ Need to “re-build” ESPA

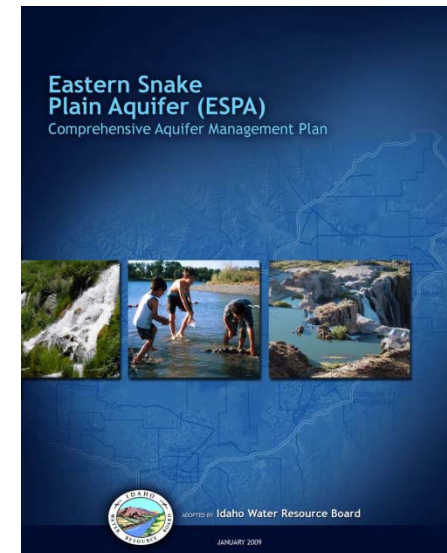


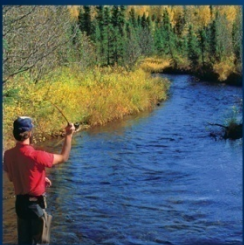




## ESPA Comprehensive Aquifer Management Plan

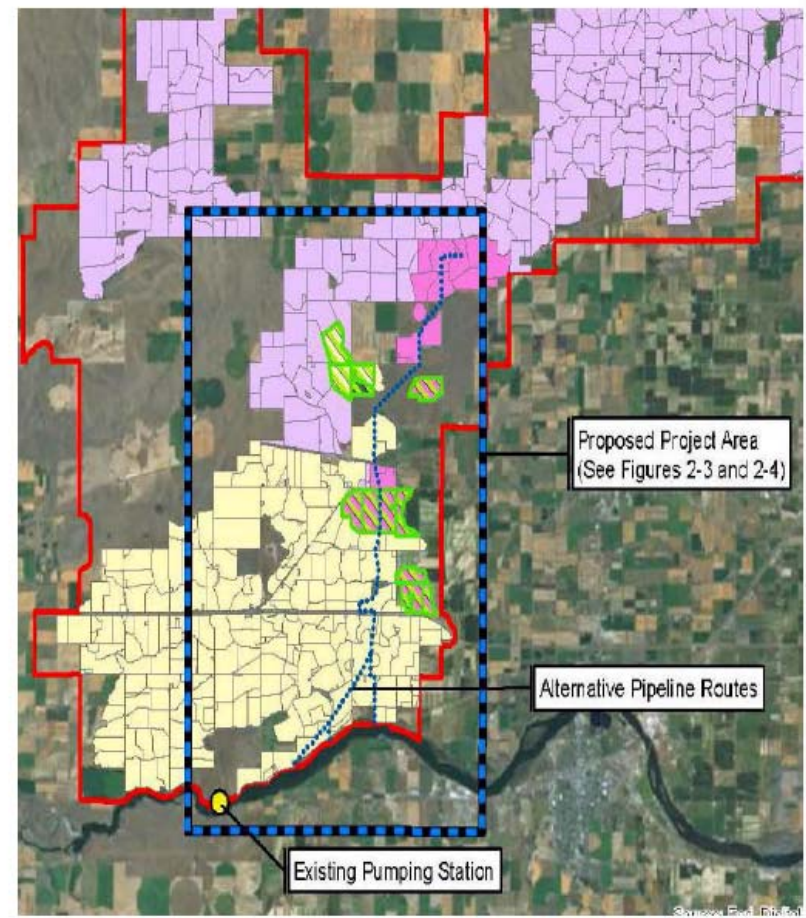
- ✓ CAMP lays out a goal for ESPA stabilization and recovery (water budget change) through a series of management actions
- ✓ Phase 1 of CAMP (200-300 KAF water budget change) is designed to stabilize aquifer storage - this should stabilize spring flows
- ✓ Phase 2 (600 KAF water budget change) is designed to recover some aquifer storage – this should recover some spring flows
- ✓ CAMP funding system not enacted in 2009 when CAMP was approved; additional funding Aquifer Stabilization funding approved in 2014.
- ✓ Progress being made by using some Water Board funds to leverage water user funds and securing federal funds – now have additional funds



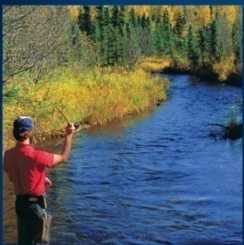


## A&B Pipeline

- ✓ Offset ground water pumping from ESPA
- ✓ Assist with ESPA stabilization
- ✓ Federal AWEF dollars
- ✓ \$7M loan from IWRB



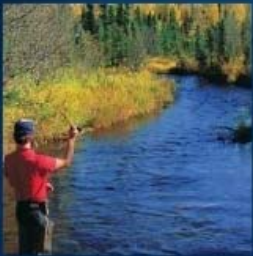




## Hagerman Valley

- ✓ Working toward overall settlement
  - State undertakes stabilization of aquifer and spring flows - | ESPA recharge
  - Junior ground water users pay for below-the-rim mitigation projects
- ✓ \$1.3M loan for Rangen mitigation pipeline by IGWA
- ✓ Lease of Aqualife Hatchery to IGWA
- ✓ Anticipate loans for additional projects





## CAMP Plan for ESPA

*Average loss from storage is about 200,000 AF/year*

- GW-SW Conversions

- ✓ About 60,000 AF/yr delivered to offset GW pumping in Southwest ID and Magic Valley & North Snake GWD's
- ✓ A&B pipeline under construction

- Demand Reduction – About 17,000 acres in CREP

- Weather Modification/Cloud Seeding –

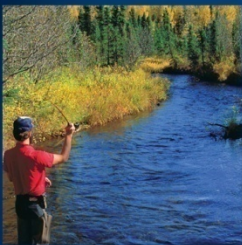
- ✓ Operational program - State, Idaho Power, & water user partnership – current program: 283,000 acre-foot annually
- ✓ Expansion underway in Upper Snake and in Wood Basins

- Managed Recharge -

- ✓ average annual volume about 74,000 acre-feet
- ✓ Goal of 250,000 acre-feet/year
- ✓ Need to increase!

**REAL TEST OF SUCCESS WILL BE AQUIFER STABILIZATION & RECOVERY!**





# Rathdrum Prairie Aquifer

The Idaho Department of Water Resources (IDWR), Washington State Department of Ecology (WDOE), and the United States Geological Survey (USGS) partnered to develop a groundwater-flow model of the Spokane Valley-Rathdrum Prairie aquifer system.



## Hydrologic Investigation and Ground-Water Flow Model of the Spokane Valley – Rathdrum Prairie Aquifer

By Sue Kahle, U.S. Geological Survey (USGS), Helen Harrington, Idaho Department of Water Resources (IDWR), and Guy Gregory, Washington State Department of Ecology (WDOE)



### Background

The Spokane Valley–Rathdrum Prairie (SVRP) aquifer is the sole source of drinking water for more than 400,000 residents in Spokane County, Washington, and Kootenai County, Idaho. The area includes the rapidly growing cities of Spokane, Spokane Valley, and Liberty Lake, Washington, and Conner d'Alene and Post Falls, Idaho. Recent and projected urban, suburban, and industrial/commercial growth has raised concerns about potential future impacts on water availability and water quality in the SVRP aquifer, and Spokane and Little Spokane Rivers. The aquifer is highly productive, consisting primarily of thick layers of coarse-grained sediments – gravels, cobbles, and boulders – deposited during a series of outburst floods resulting from repeated collapse of the ice dam that impounded ancient glacial Lake Missoula.

The Washington State Department of Ecology, Idaho Department of Water Resources, and the U.S. Geological Survey are conducting a joint investigation of the aquifer to develop a comprehensive data set that will provide an improved scientific basis for ground- and surface-water management. The study will include the construction of a numerical ground-water model to support the conjunctive management of ground- and surface-water resources. Application of the numerical model to water-resource management strategies will occur as a cooperative effort by Washington and Idaho water resource managers.

Landowners and local municipalities are an integral part of this investigation. They are gratefully acknowledged for granting permission to access their property for data collection. Without their consent, it would be impossible to collect the majority of the data required for this study.

### Objectives

The purpose of this study is to gain a better understanding of ground- and surface-water resources in the SVRP area.

This study will provide:

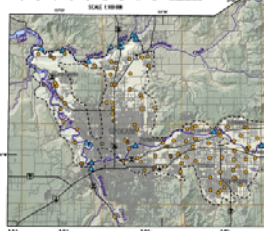
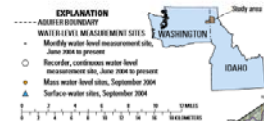
- An improved scientific basis for evaluating water-management alternatives for the SVRP aquifer and Spokane and Little Spokane Rivers.
- The means for estimating the effects of additional ground- and surface-water withdrawals from the SVRP aquifer and Spokane and Little Spokane Rivers, as well as simulating potential effects of climate change on water resources in the area.

The study includes:

- Compile, review, and evaluate published reports, numerical models, and database records describing geology, hydrogeology, aquifer characteristics, and water-budget components of the SVRP aquifer, and adjacent geologic units.
- Establish monitoring networks and collect ground-water level and stream-discharge data to characterize the movement of water in the SVRP aquifer and the exchange of water between the aquifer and adjacent rivers and lakes.
- Collect additional data for improved understanding of the physical extent and hydraulic properties of the aquifer and the aquifer water budget (recharge and discharge).
- Construct a numerical ground-water model to support the management of ground- and surface-water resources in the SVRP area.
- Convey project results to Federal, State and local decisionmakers, the professional community, and the general public.



Spokane River looking upstream to the Sullivan Road bridge.



MAP SHOWING GROUND WATER AND SURFACE WATER MEASUREMENT SITES, SPOKANE VALLEY RATHDRUM PRAIRIE AQUIFER, WASHINGTON AND IDAHO, 2004

### Progress highlights as of January 2005

- An observation network of more than 50 wells for monthly water-level measurements and another 8 wells with continuous electronic recorders has been in operation since June 2004. These data will provide information on seasonal fluctuations and long-term trends of water levels in the aquifer.
- A mass water-level measurement was conducted in September 2004. This measurement, a "snapshot" of ground-water levels in the aquifer, included the observation network and an additional 200 wells aquifer-wide. Data from the mass measurement will be used to expand the understanding of water movement in the aquifer.
- Streamflows were measured at 20 locations along the Spokane and Little Spokane Rivers, and selected tributary creeks and springs in September 2004 coinciding with the mass water level measurement. These measurements will be used to better understand the exchange of water between the aquifer and surface-water system.
- With assistance from Spokane County, all measurement sites have been surveyed using Digital Global Positioning System technology to assure three-dimensional accuracy.
- An annotated bibliography, representing available information regarding the SVRP aquifer geology and hydrogeology was assembled. The bibliography will be continually updated with new information.
- The Modeling Team, composed of one representative from each participating agency is compiling existing models and information, refining the conceptual model of the aquifer, and providing direction on data needs for the current workplan.
- Current project activities focus on refining our understanding of recharge to and discharge from the aquifer, compiling and expanding our understanding of the hydrologic properties of the aquifer, and more closely understanding the physical conditions within and bounding the aquifer. Data gathered will apply directly to model development.



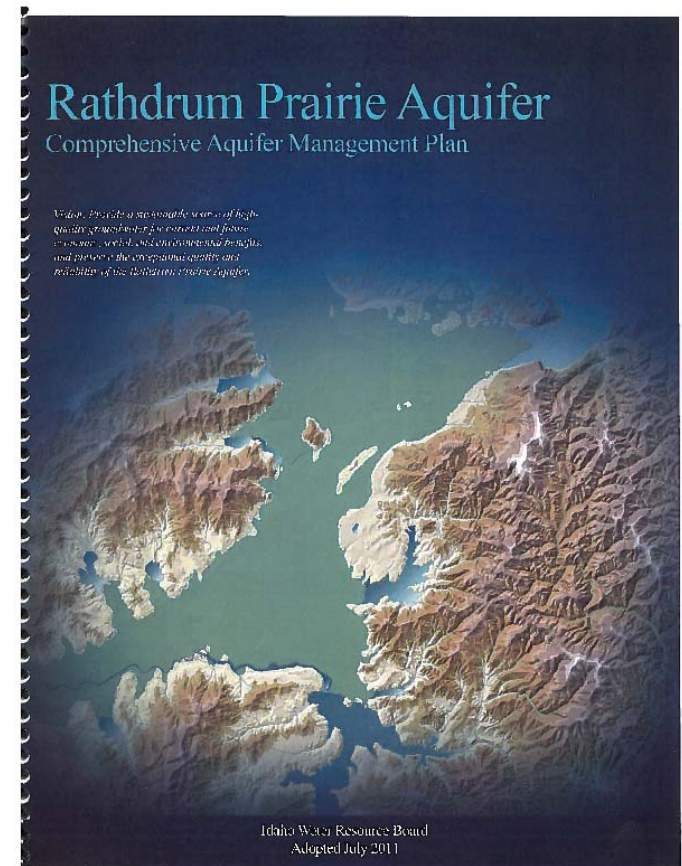
Spokane Valley Rathdrum Prairie Hydrologic Study  
The additional information:  
Solutions from the Washington State Department of Ecology, Idaho Department of Water Resources, and the U.S. Geological Survey recording water level measurements, September 2004

## Rathdrum Prairie CAMP

*Provide a sustainable source of high quality groundwater for current and future economic, social, and environmental benefits, and preserve the exceptional quality and reliability of the Rathdrum Prairie Aquifer.*

The three goals of the plan are:

- Meet Future Demand for Water
- Prevent and Resolve Water Conflicts
- Protect the Aquifer

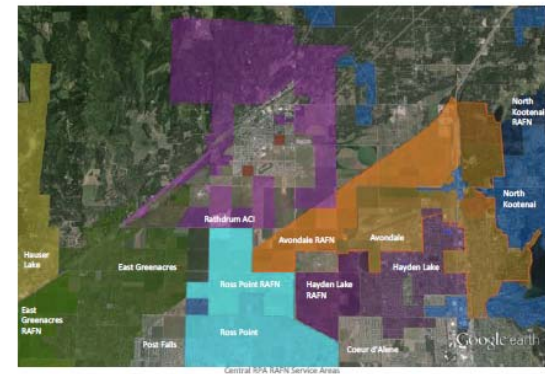




# Northern Idaho Future Water Needs

- The Idaho Water Resource Board authorized the expenditure of funds to the Idaho Water Resource Research Institute (IWRRI) to conduct studies necessary to determine the extent of future water needs in coordination with Northern Idaho communities.
- Several Rathdrum Prairie municipal water providers utilized the information developed in the report to submit applications for reasonably anticipated future needs (RAFN) water rights on the Rathdrum Prairie.

## RATHDRUM PRAIRIE AQUIFER FUTURE WATER DEMAND



December 2014  
Rev. 4/2/15

Idaho Water Resources Research Institute  
Report #201404: Mark Solomon and Elizabeth Scott

Report to the Idaho Water Resources Board providing information for evaluation of Rathdrum Prairie Aquifer Reasonably Anticipated Future Need municipal provider water right applications.

# Treasure Valley CAMP

## Treasure Valley Comprehensive Aquifer Management Plan



*The vision of the Treasure Valley CAMP is to promote and protect Treasure Valley water resources through:*

- *Respect for Idaho water law and water rights*
- *A sustainable framework of collaboration, cooperation, and stewardship*
- *A commitment to ongoing research, data collection and analysis*

*The vision of the Treasure Valley CAMP is to promote and protect Treasure Valley water resources through:*

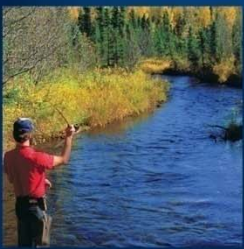
- *Respect for Idaho water law and water rights*
- *A sustainable framework of collaboration, cooperation, and stewardship, and*
- *A commitment to ongoing research, data collection, and analysis*

Challenges Identified:

Water Supply, Distribution, Water Use & Needs, and Management & Administration

TV CAMP Plan is still in draft. The IWRB plans to revisit the TV CAMP in 2015/2016.

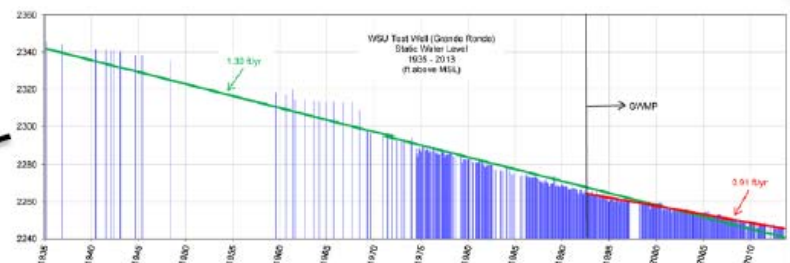
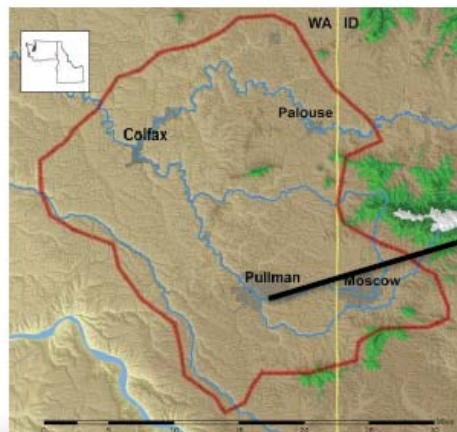




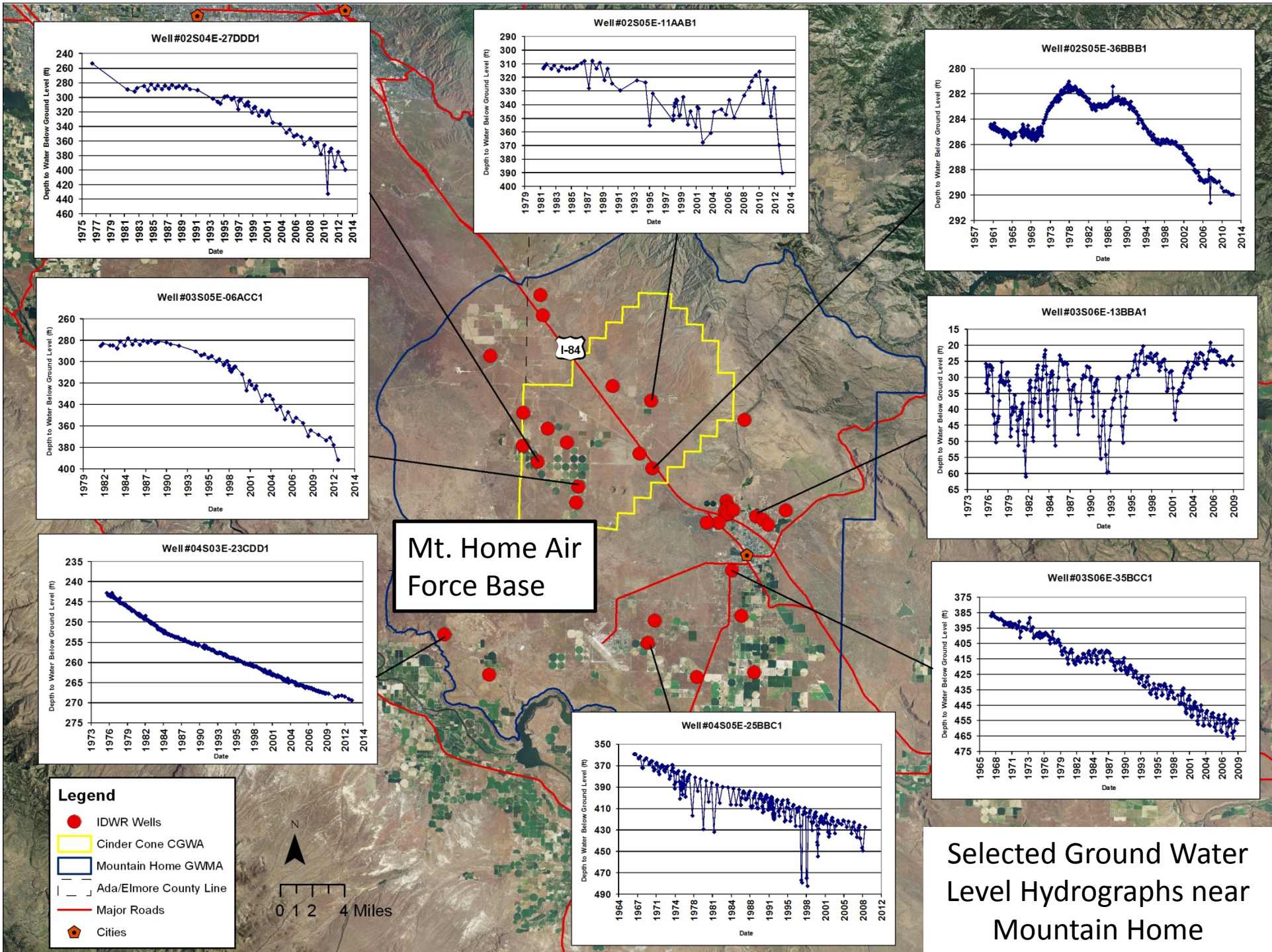
## Other Aquifers

- ✓ Working to evaluate needs in other aquifers and develop process for evaluation of projects
- ✓ Anticipate involvement in the Big Wood, Treasure Valley, and Palouse over the next year

Moscow/Palouse Basin – Deep aquifer dropping







Selected Ground Water Level Hydrographs near Mountain Home



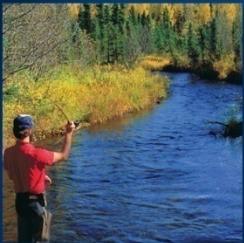


## Mountain Home

- ✓ Develop replacement water supply for Mt. Home AFB – eliminate use of declining ground water
- ✓ Completed purchase of senior Snake River water rights from Simplot
- ✓ In discussions with Air Force - how best to finance and build delivery project
- ✓ Air Force very supportive







## Wood River Valley

The Idaho Department of Water Resources and the United States Geological Survey (USGS) are partnering to develop a groundwater-flow model of Idaho's Wood River Valley aquifer system.

The project is anticipated to be completed in late 2015. The model will be constructed to simulate the effects of climate and human activities on the aquifer system with an emphasis on the interaction of the surface and groundwater system.



### Groundwater Resources of the Wood River Valley, Idaho: A Groundwater-Flow Model for Resource Management

The U.S. Geological Survey (USGS), in collaboration with the Idaho Department of Water Resources (IDWR), will use the current understanding of the Wood River Valley aquifer system to construct a MODFLOW numerical groundwater-flow model to simulate potential anthropogenic and climatic effects on groundwater and surface-water resources. This model will serve as a tool for water rights administration and water-resource management and planning. The study will be conducted over a 3-year period from late 2012 until model and report completion in 2015.

#### The Wood River Valley

The population of Blaine County in south-central Idaho has nearly quadrupled from 1970 to 2010; most of the growth has occurred in the Wood River Valley in the northern part of the county. Because the entire population of the valley depends on groundwater for domestic supply, from either domestic or municipal-supply wells, this growth has caused concern about the long-term sustainability of the groundwater resource (Bartolino and Adkins, 2012). The upper Wood River Valley is more developed than the lower valley and contains the incorporated communities of Sun Valley, Ketchum, Hailey, and Bellevue (fig. 1). The lower Wood River Valley is dominated by farms and ranches (irrigated by groundwater and diverted surface water), and contains the small communities of Gannett and Picabo. A number of tributary canyons to the main valley have been developed over the last 50 years (Bartolino and Adkins, 2012).

#### The Aquifer System

The Wood River Valley aquifer system is composed primarily of Quaternary-age sediment and basalt. This material constitutes the three components of the aquifer system: a single unconfined aquifer underlying the entire valley, a deeper confined aquifer present to the south of Baseline Road (fig. 1), and a confining layer separating the two aquifers. The confining layer thickens toward the south and generally, as land-surface altitude decreases in the same direction, the water-level surface rises above land surface so that wells flow under artesian pressure. South and east of Gannett the confining unit thins and disappears over the basalt.

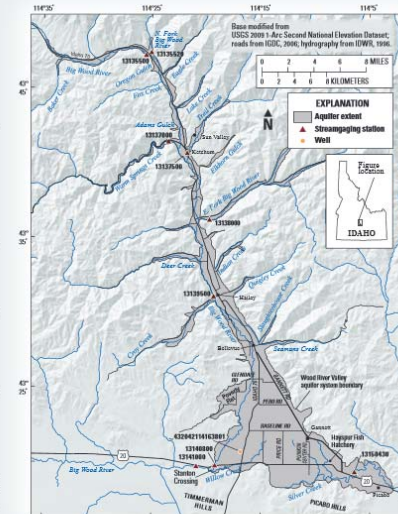


Figure 1. Locations of communities, selected U.S. Geological Survey streamgaging stations, and other features, Wood River Valley, south-central Idaho (modified from Bartolino and Adkins, 2012).



## Storage Projects – Making Progress

### Weiser-Galloway - new 750,000 AF reservoir

- Completed geotechnical studies, nearly complete with operational studies
- Received FERC preliminary permit
- Next items: Weiser River Trail relocation study, economics of flow augmentation exchange, define needed environmental studies

### Island Park – enlargement of Island Park Reservoir by 30,000 AF

- Highest priority from Henrys Fork Basin Study
- Raise spillway by 3 feet
- Developing agreement with BOR
- Detailed Land impacts analysis
- Offset ESPA pumping; maintain Swan Falls minimum flows



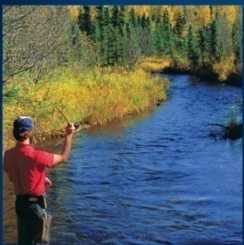
## Storage Projects – Making Progress

Arrowrock – enlargement of Arrowrock Reservoir by 300,000 AF

- Partnering with Corps of Engineers – flood control and water supply
- Study received federal funds from Congress
- Project may include channel conveyance as well as storage
- Draft Feasibility Report & EIS: Fall 2015
- Final Record of Decision: 2017







Questions...