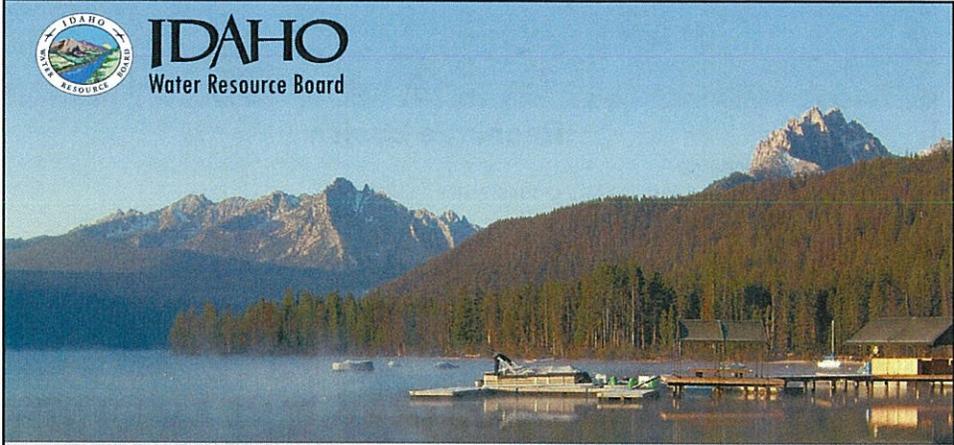


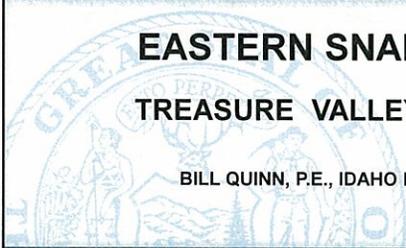


IDAHO
Water Resource Board



EASTERN SNAKE PLAIN RECHARGE
TREASURE VALLEY CAMP November 10, 2010

BILL QUINN, P.E., IDAHO DEPARTMENT OF WATER RESOURCES



Eastern Snake Plain Aquifer (ESPA) Recharge

- Recharge Basics
- ESPA Aquifer Characteristics
- Recharge Water Rights
- Water Board Role
- Canal Company/Irrigation District Role
- Water Board/Canal Company Contracts
- Reporting, Verification and Payment

Recharge Basics

- **Natural Recharge**
 - precipitation infiltrating into ground water aquifers
- **Artificial Recharge**
 - artificial placement of water from a different source into a ground water aquifer
- **Managed Aquifer Recharge**
 - source water can be from a river, lake or separate aquifer
 - in Idaho is primarily used to mitigate ground water withdrawals or ground water quality
 - can be accomplished by surface infiltration or well injection
 - infiltration best suited for untreated water. Large volumes, low cost
 - injection requires high quality source water. Lower volume, more expensive
- **Aquifer Storage and Recovery (ASR)**
 - currently no ASR in Idaho
- **Applications**
 - replenishment of depleted aquifers
 - water quality and water supply mitigation
 - low cost storage of large volumes
 - provides a method to capture water that may not be available in the future

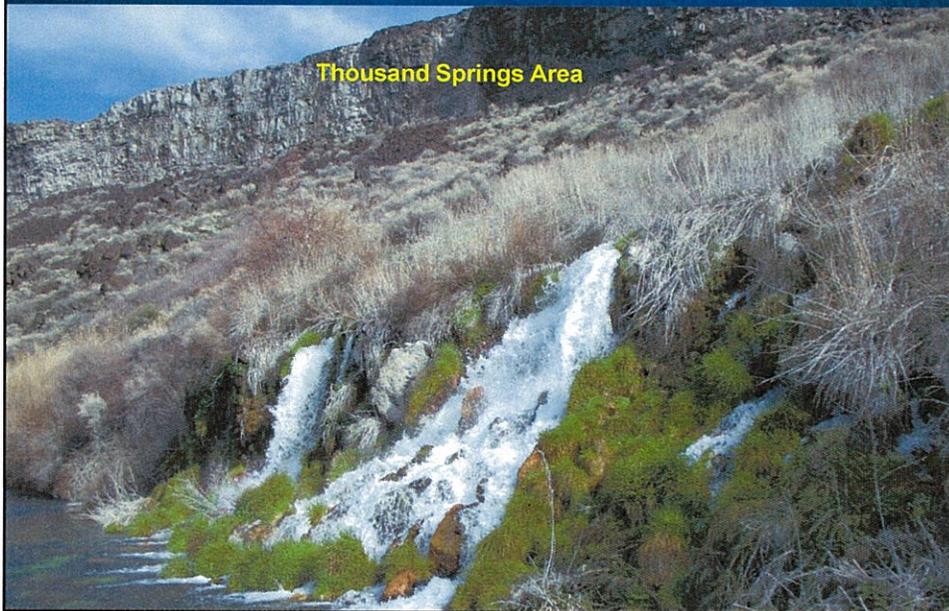


**Eastern Snake Plain
Managed Passive Recharge**

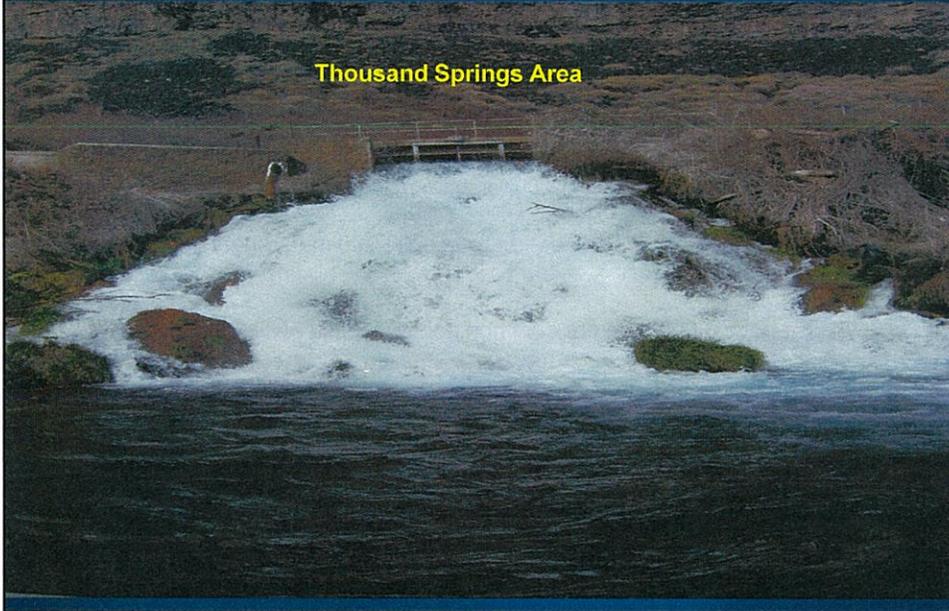
Eastern Snake Plain Aquifer

- 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, roughly equivalent to Lake Erie (116 mi³ , 392 maf)
- well yields above 3,000 gpm are common and transmissivity is high
- hydraulic gradient (flow direction) is southwest
- primary discharge is in the Thousand Springs area, near Hagerman

Thousand Springs Area

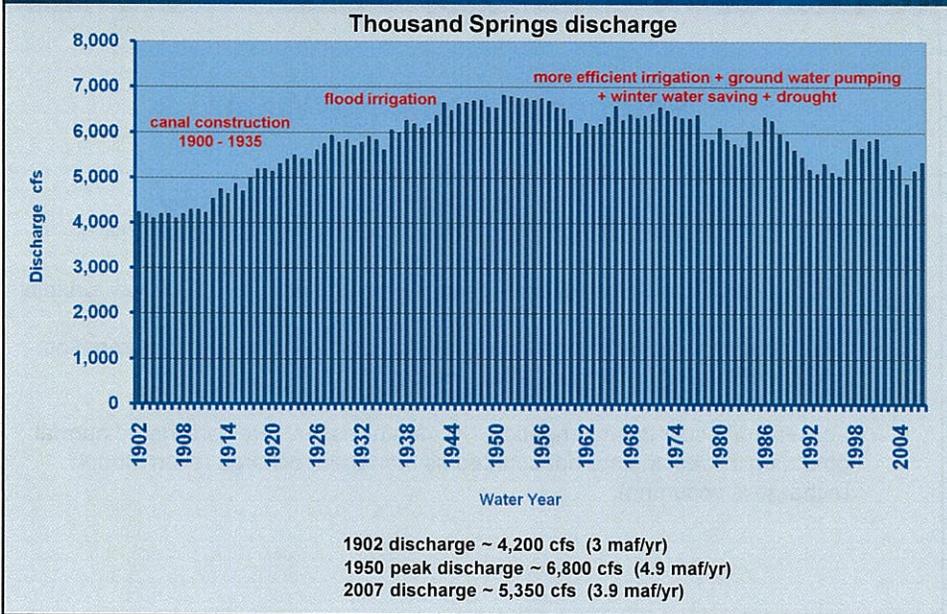
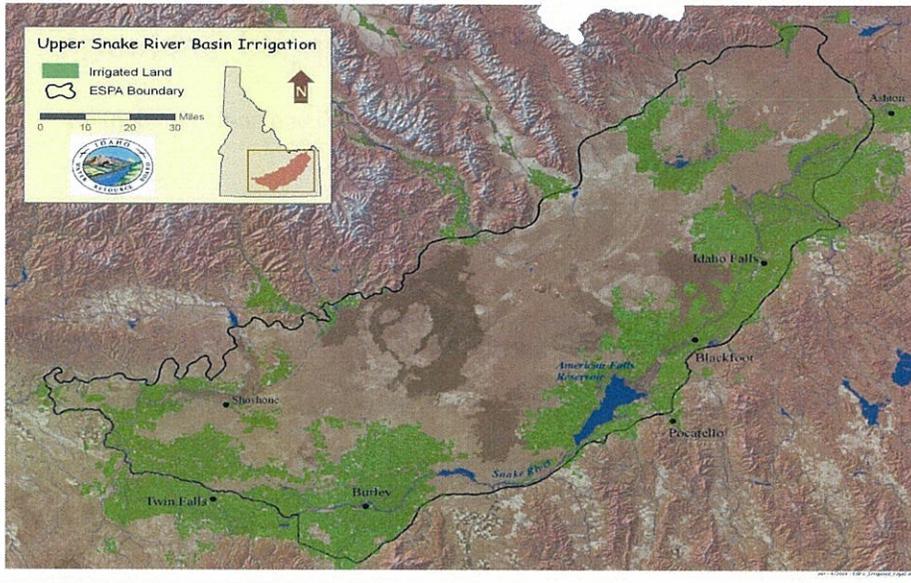


Thousand Springs Area



Eastern Snake Plain Canals and Leakage

- ~ 2 million irrigated acres ~ half surface and half ground water
- canals constructed between 1900 and 1935
- most canals are unlined and leak ~ 30 %
- one canal diverting 1 maf/season loses ~ 300 kaf (~1,700 af/day)
- 1980-2002 average leakage (incidental recharge) ~ 3.4 maf



Eastern Snake Plain Managed Recharge

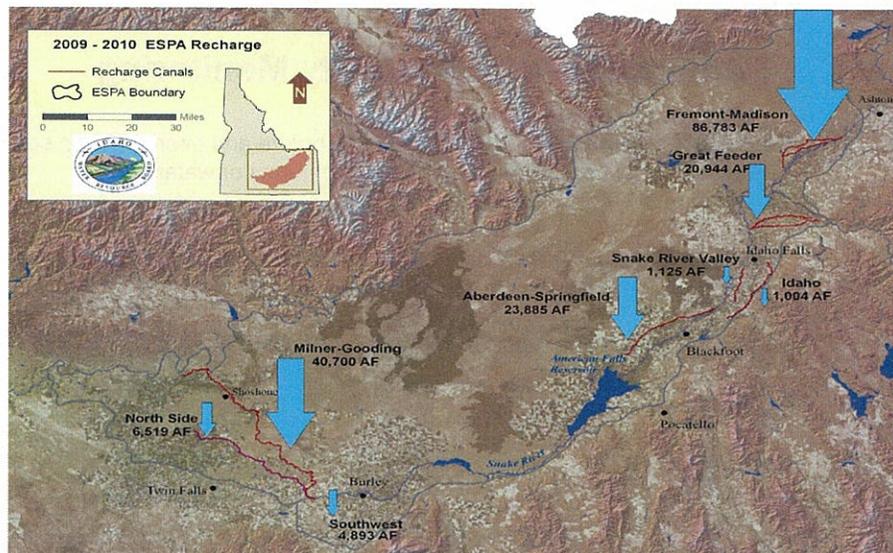
- large volume, low cost, passive process: 185,944 ac-ft (2009-2010)
\$3.00/a-f
- allows use of recharge rights before (after) senior irrigation rights are used
- extends the time water is in canals
- sponsored by the Idaho Water Resource Board under contract with canal companies/irrigation districts
- Water Board pays cash incentive to encourage canal companies to participate
- recharge is a major component of the ESPA CAMP
 - water budget change of 600 kaf annually by 2030
 - by stabilizing and improving spring flows, ground water levels and river flows

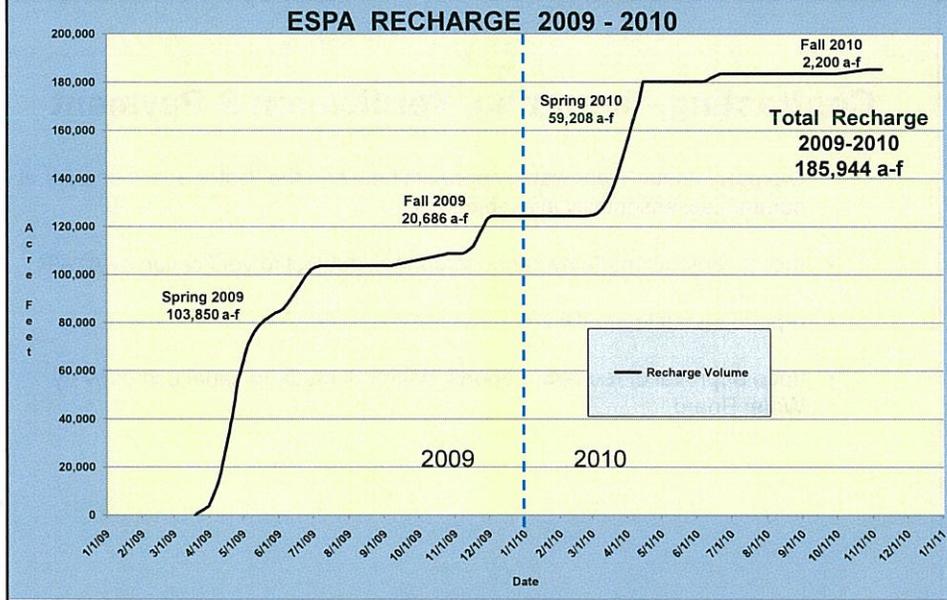
Sources of Recharge Water

- 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
- Snake & Big/Little Wood Rivers – generally good quality, low TDS, low turbidity
- Water Board's Recharge rights generally in priority before and after irrigation season (before April 15th and after October 15th)
- Losses that occur during irrigation, "incidental losses", are considered normal operating losses and are not counted as managed recharge (even though recharge is occurring)

Contracting, Reporting, Verification & Payment

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





Permitting & Water Quality Monitoring

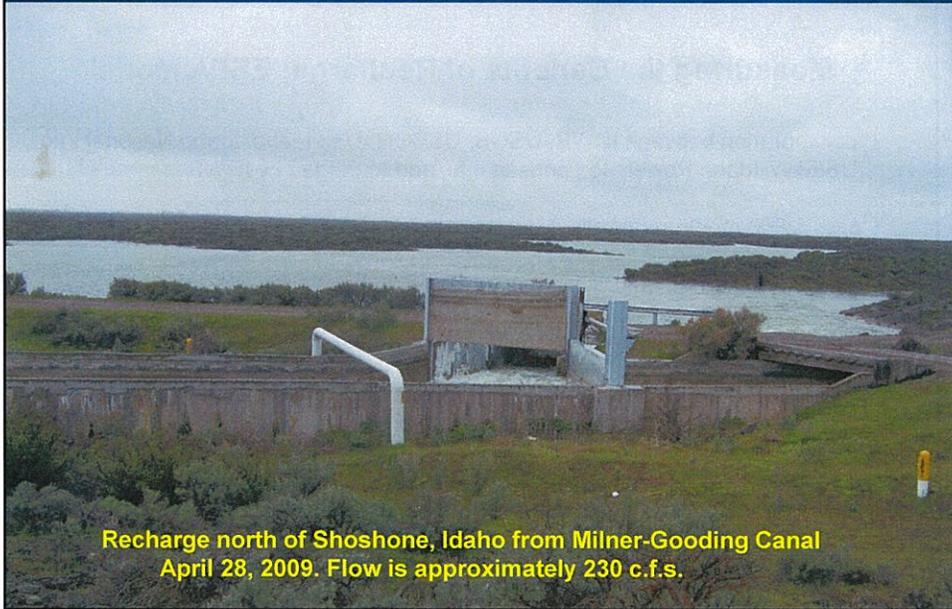
- recharge that occurs through canal losses before and after irrigation season is considered a normal canal operation. No permit or water quality monitoring is required by IDEQ
- recharge at designated off-canal recharge sites requires IDEQ approval and water quality monitoring
- recharge by injection requires a UIC permit issued by IDWR

Measuring the Benefits of Recharge: ESPA Model

- collaboration between IDWR, USGS, USBOR, U of Idaho, Idaho National Lab, USF&W, Idaho Power Co., consultants, and managed by IDWR
- over 1,000 monitoring wells
- over 2,500 computed reach gains/losses in 11 Snake River reaches
- illustrates the benefits of recharge by steady state and transient responses in the 11 river reaches

So what good are these !##*#! canals if they leak so much ??





Final Comment

A successful managed recharge program is highly dependent on local conditions. Among the more important considerations are:

- well defined recharge objectives
- availability and quality of source water
- quality of receiving ground water
- aquifer characteristics
- sufficient depletion to accommodate recharge water
- land availability
- institutional constraints
- regulatory and water rights issues
- economic considerations