MANAGED AQUIFER RECHARGE EFFORTS ON SNAKE RIVER PLAIN

ESPA Comprehensive Aquifer Management Plan Advisory Committee Meeting

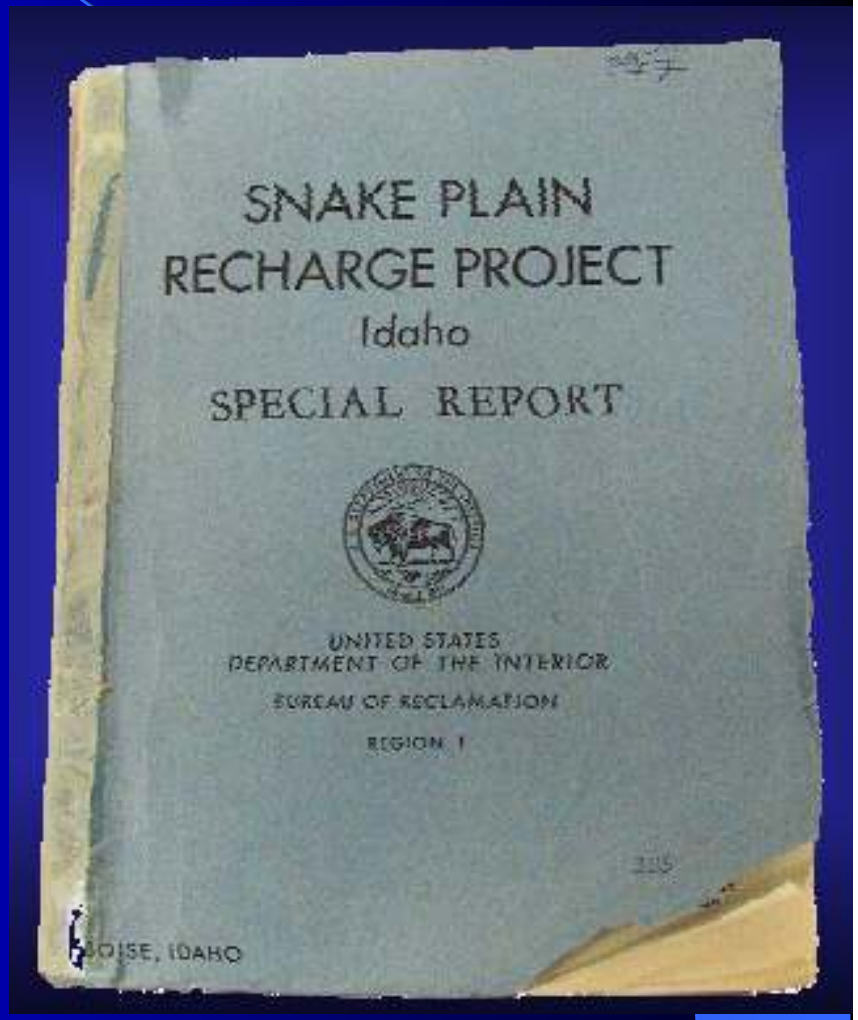
August 23, 2007

Topics

- Previous managed recharge activities on Eastern Snake Plain
- Current Activities
- Water Supply for Managed Recharge
- Recommendations

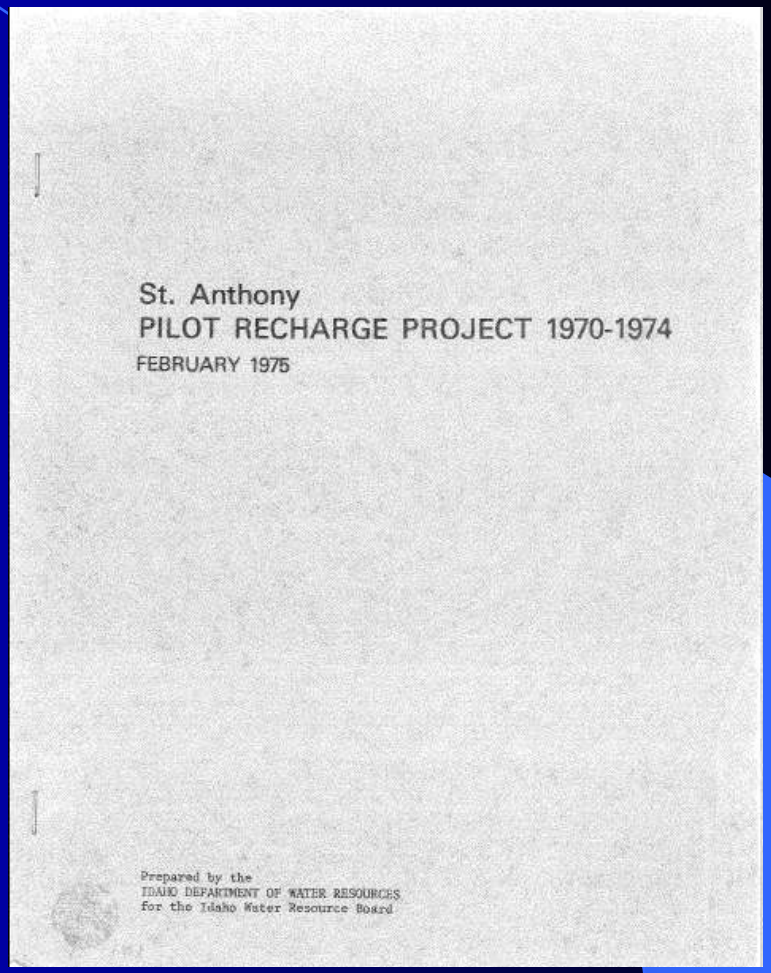
1962 – U.S. Bureau of Reclamation Issues Report on Possible Recharge Project

- U.S. Bureau of Reclamation (BOR) looked as using the aquifer as a water storage system to provide irrigation and flood control benefits.
- BOR's plan was to recharge water as far up-slope as possible, in the Henrys Fork area, to maximize water retention time.
- In an appendix to the BOR report, the USGS recognized the low permeability of the surface soils on the ESPA and recommended injection well systems.
- BOR recognized the difficulty in undertaking a large-scale recharge project because of inability to assess water users that benefit from aquifer recharge.



1970-1974 – Idaho Water Resource Board (IWRB) undertakes pilot recharge project at St. Anthony

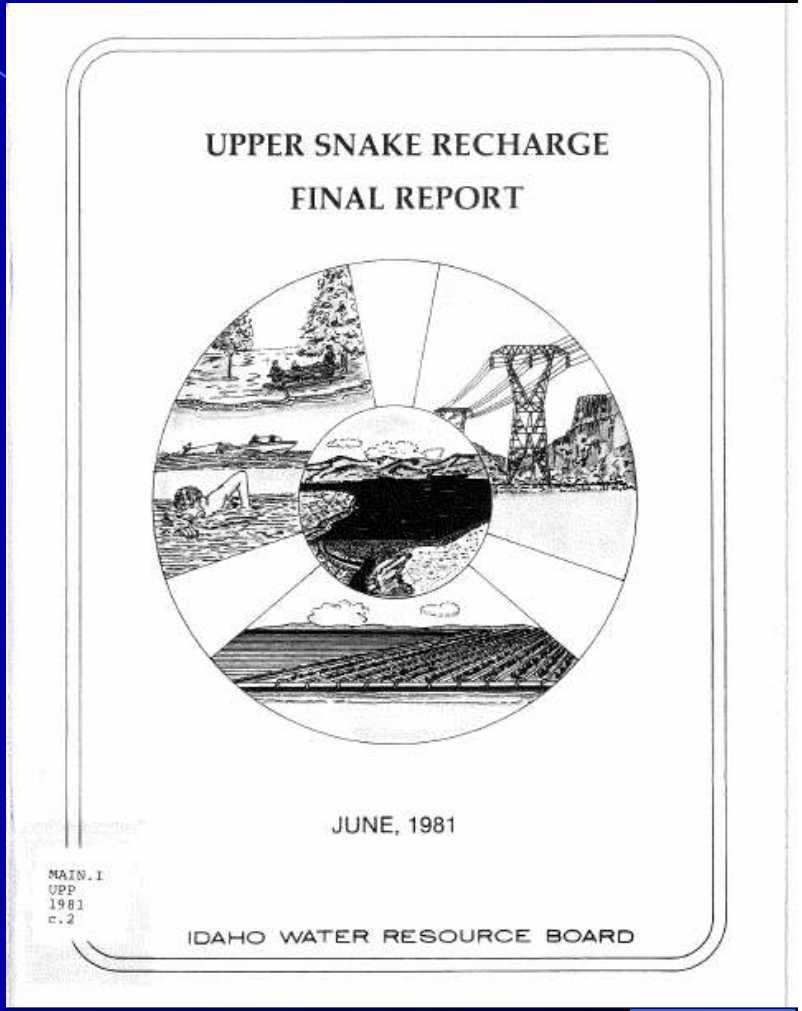
- Purpose was to investigate the feasibility of implementing a recharge project as proposed by BOR in 1962.
- A total of 16,200 AF was diverted into the Egin Lakes area during 1973 and 1974, under a temporary "research" water right permit.
- Testing showed seepage rates at Egin Lakes to be approximately ½ foot/day, so large land areas would be required for a large-scale project.


St. Anthony
PILOT RECHARGE PROJECT 1970-1974
FEBRUARY 1975

Prepared by the
IDAHO DEPARTMENT OF WATER RESOURCES
for the Idaho Water Resource Board

1981 – IWRB Upper Snake Recharge Report

- Estimated costs for developing Egin Lakes site into a large-scale recharge project –
  - $579,000 (1980 dollars) for a 400 cfs project
  - $12 .1 million (1980 dollars) for a 2,000 cfs project
- The IWRB recognized potential conflicts with hydropower water rights.
- Study did not look at sites on Blackfoot-Idaho Falls area due to the short return time of water to the Snake River, and did not look at the Thousand Springs area due to legislation creating a recharge district for the area.



1978 – Legislation passed allowing formation of the Lower Snake River Aquifer Recharge District

- Initial plan proposed by LSRARD was to develop recharge basins at numerous locations along Northside, Milner-Gooding, and Big Wood canal systems.
- LSRARD was granted water right permits for recharge purposes with a 1980 priority date.
- LSRARD's small assessment base, primarily the Hagerman Valley, has limited its effectiveness.

1992-1997 - Southwest Irrigation District – High Plains Ground Water Recharge Demonstration Project

- Joint project between Southwest Irrigation District and federal government.
- Project consisted of 13 injection wells located between Murtaugh and Oakley.
- Water supply was leased from the Upper Snake Rental Pool and some flood water from small tributaries.
- Total project cost was $3.53 million, of which 75% was paid by the federal government and 25% by Southwest.
- Between 1992 and 1997 a total of 23,154 AF of recharge was accomplished. After 1997, federal involvement ceased and the project was turned over to Southwest.

1995 – 2000: IWRB & WD01 Program

- The 1995 Legislature appropriated $945,000 to the IWRB for recharge. IWRB delegated the program to Water District 1. Recharge was accomplished by canal seepage. Funds were used pay delivery costs for running recharge water through canals and to lease water from rental pool.
- Natural flow diversions for recharge were made under the irrigation water rights of the participating canals.

From WD01 Records:

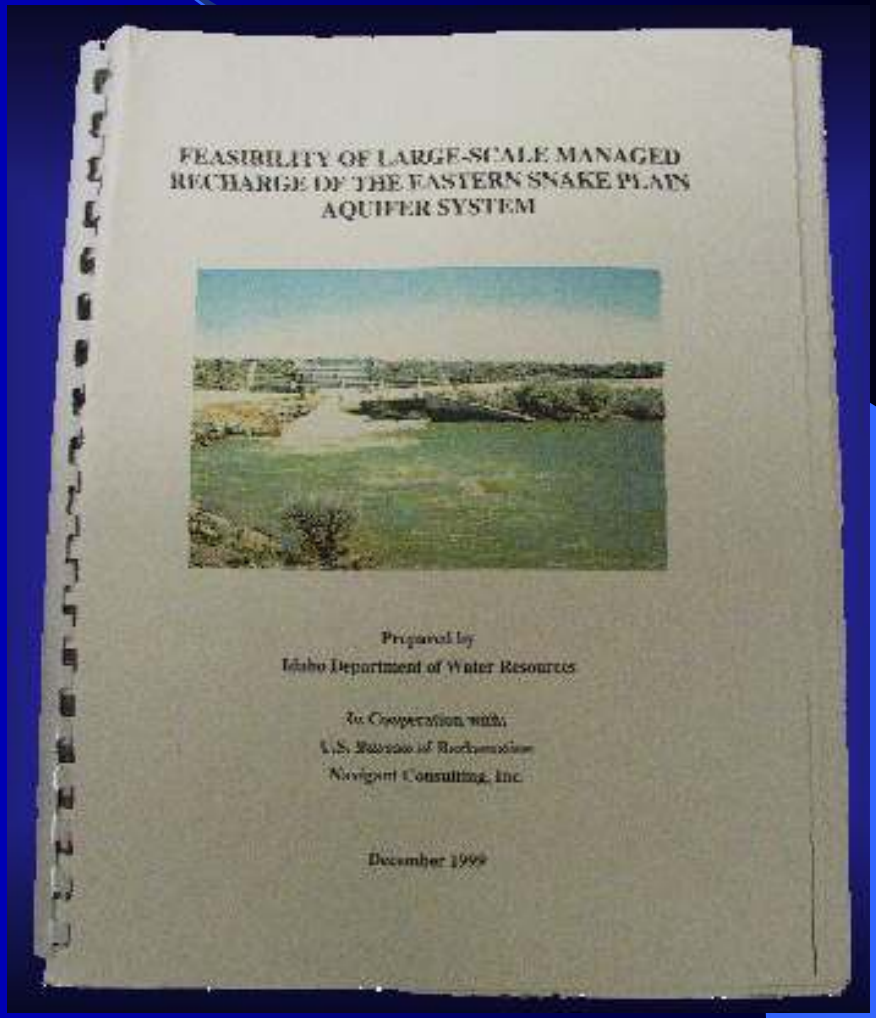
	Natural Flow	Storage Water	Total
1995	66,585	71,091	138,676
1996	135,687	33,314	169,001
1997	214,780	--	214,780
1998	189,696	10,991	200,687
1999	137,162	15,361	152,523
2000	66,278	3,361	69,639

1999 – IWRB acquires recharge water rights

- Due to inability to make full beneficial use it its water right permits for recharge, LSRARD conveys water rights 01-7054 and 37-7842 to IWRB in 1999.
- In order to clarify water rights for recharge purposes, IWRB applies for 20 additional water rights from Snake River, but applications were put on hold due to protests from environmental groups, Fish & Game, and others.

1999 – IDWR Issues Managed Recharge Feasibility Report

- Report evaluated the feasibility of implementing managed recharge.
- Various scenarios were evaluated for different parts of the ESPA in regard to water level and spring discharge responses.
- Report over-estimated infiltration rates and under-estimated construction costs.



2001 – Legislature appropriated $60,000 to IWRB for Sugarloaf Recharge Site

- Site located on Northside Canal system.
- Appropriation was for diversion works to the basin.
- Based on anecdotal evidence, the 1999 Recharge Feasibility Report estimated the basin at Sugarloaf would take 400 cfs.
- IWRB contracted with Northside Canal Company to construct the diversion works.
- The Sugarloaf basin, however, only takes a few cfs.
- This caused us to re-evaluate infiltration capacity at other proposed sites such as Milepost 31.

Current Recharge Activities: IWRB Spring Recharge Program

- In the spring of 2006, the IWRB recharge rights from the Snake River and Wood Rivers came into priority.
- The IWRB asked a number of canals to divert this water into their canals for seepage into the aquifer. Approximately 38,000 AF of recharge from the Snake River and 22,500 AF of recharge from the Wood Rivers was accomplished.
- Due to concerns by the canals about compensation for running the IWRB's recharge water, the IWRB committed $150,000 to pay delivery fees in 2007, but the water rights did not come into priority.
- Plan is to continue this effort into the future.

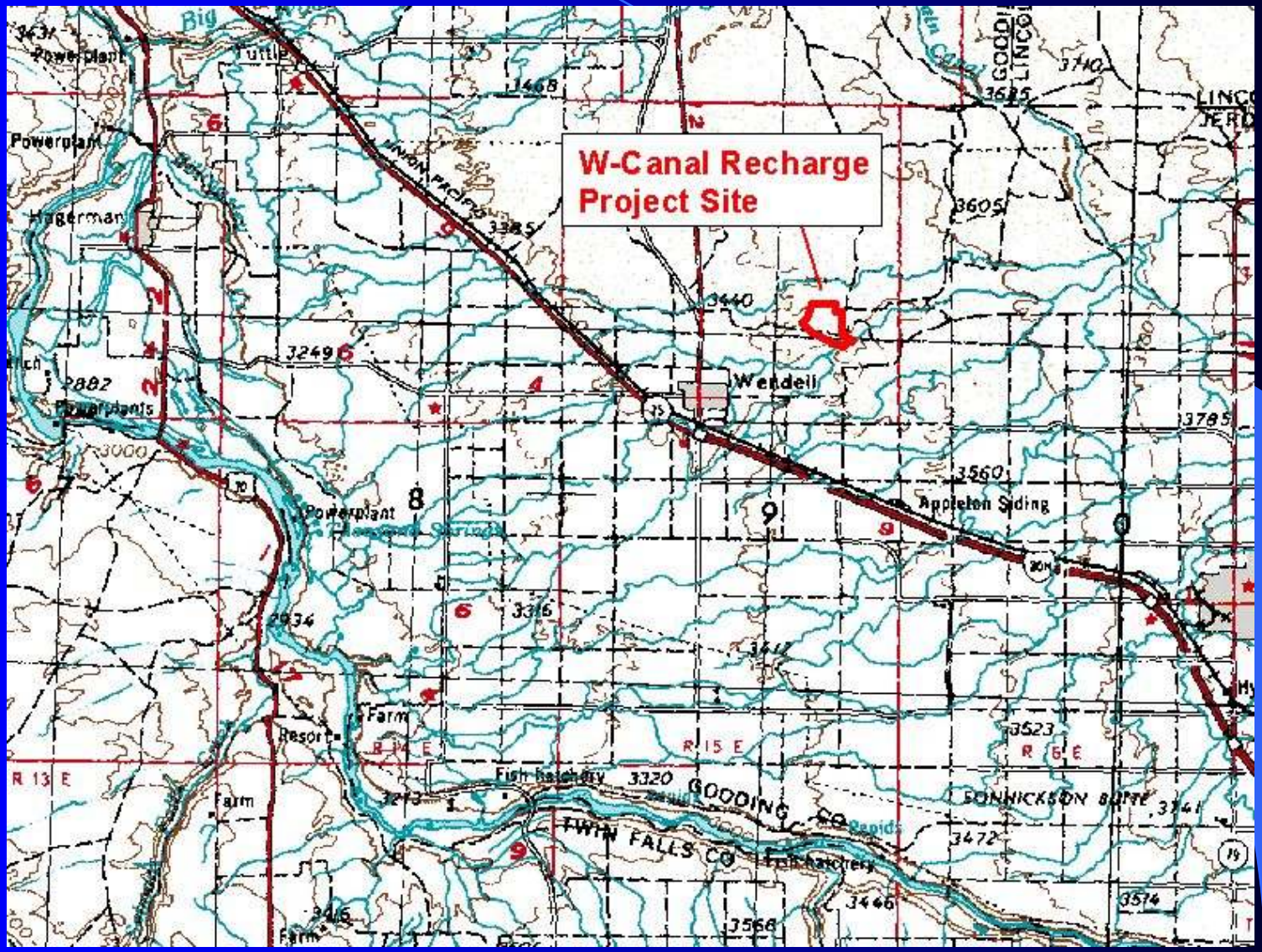
Current Recharge Activities: IGWA Mitigation

- IGWA and others acquired 29,500 AF through the rental pool to provide part of their required mitigation in the Thousand Springs area.
- Plan is to run it through the Northside canal system this fall and accomplish recharge through canal seepage.
- IDWR will monitor this effort.

Current Recharge Activities: W-Canal Managed Recharge Project

- Project undertaken by IWRB
- Natural basin, ~ 60 acres, located on State land, ~ 2 miles northeast of Wendell
- Water delivery through North Side Canal Company's "W-Canal"
- Goal: to construct a low-cost, managed aquifer recharge facility that will capture large excess natural flows when they occur, providing long-term storage in the aquifer.

W-Canal Recharge Project

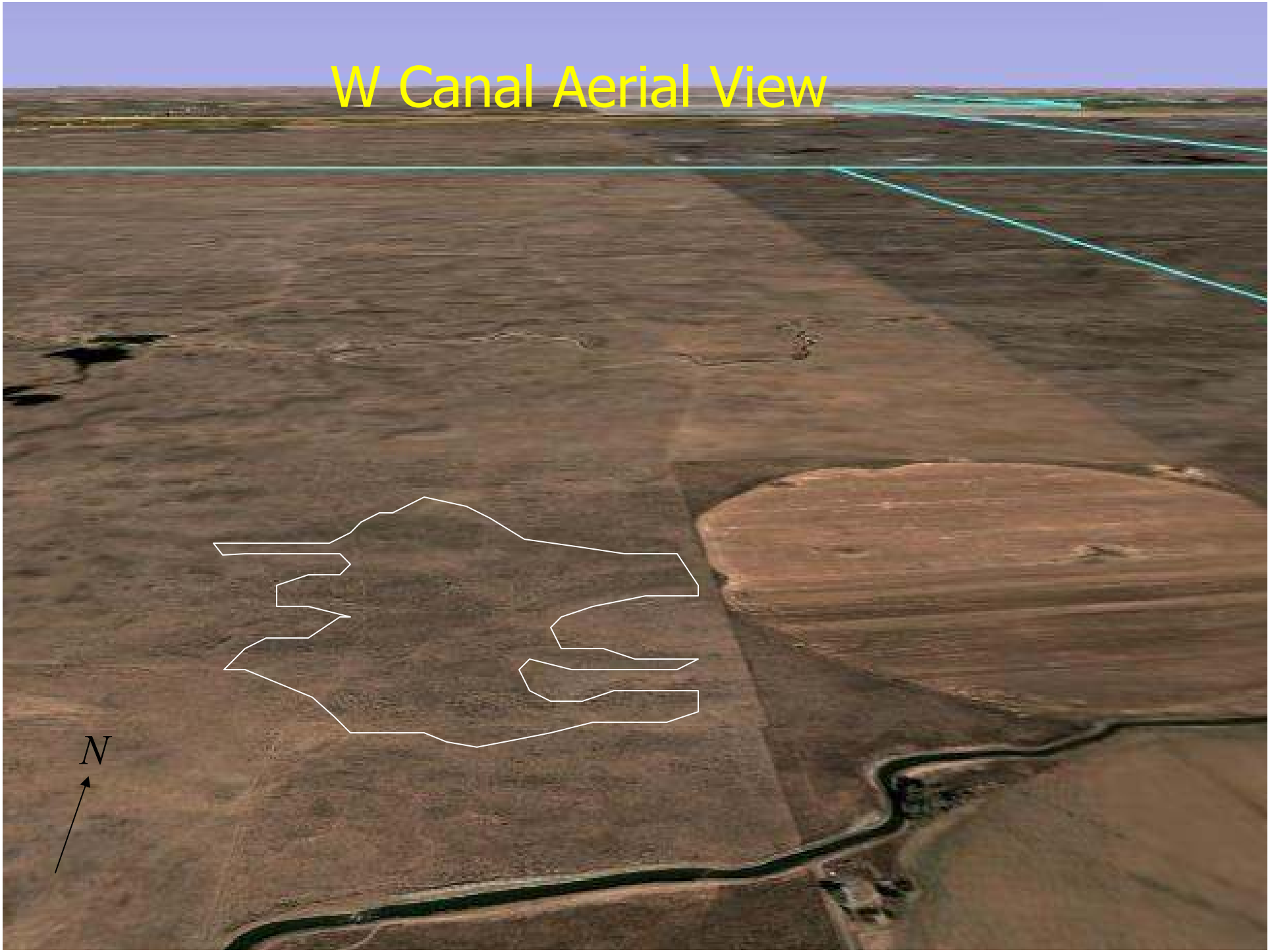


W-Canal Recharge Project

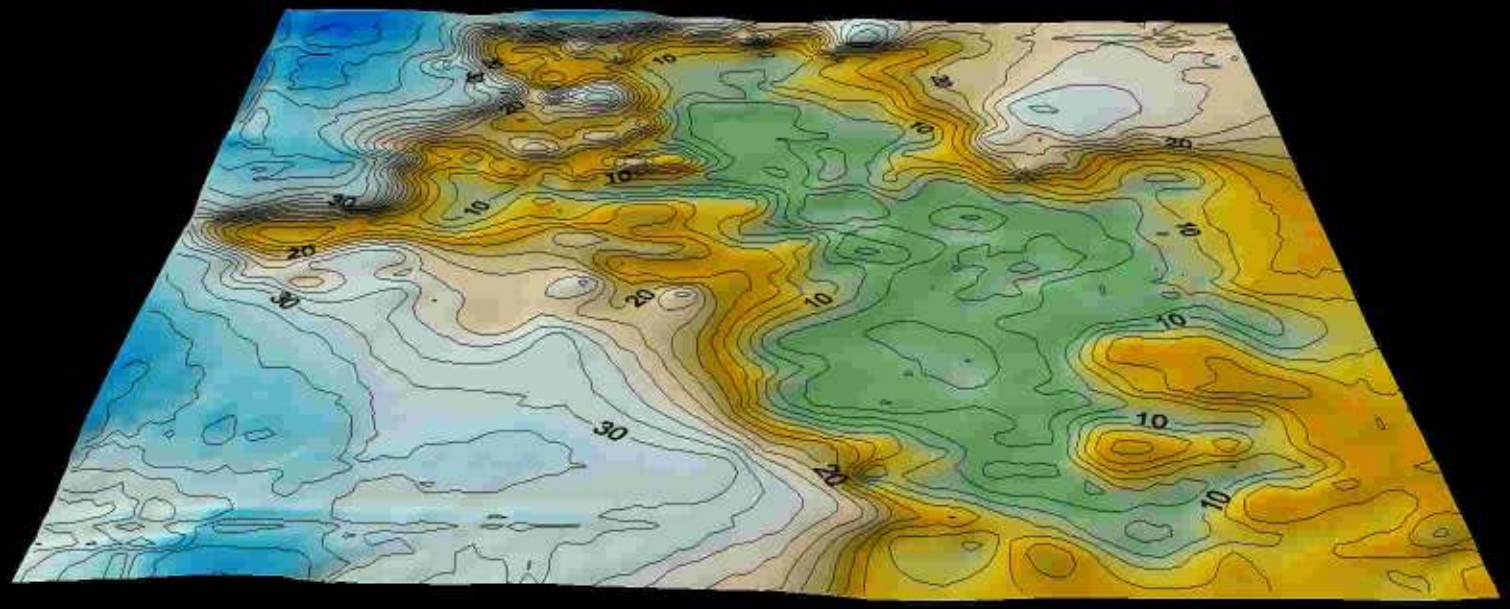
Predicted Steady-State Response due to Recharge at the W-Canal Site

- Above Milner: 7%
- Devil's Washbowl to Buhl: 30%
- Buhl to Thousand Springs: 30%
- Thousand Springs: 19%
- Thousand Springs to Malad: 2%
- Malad: 12%
- Malad to Bancroft: 0%

W Canal Aerial View



W Canal Topographic Map



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W-Canal Recharge Project – 2006 to Present

- Conveyance and operating agreement with NSCC
- Private land easements secured and permits for state lands issued - final operating permit for state lands currently being negotiated
- Consultant Activities

  Soils characterization

  Bedrock characterization

  Recommendations (July 2007)

W-Canal Recharge Project – Current Activities

- Develop preliminary designs for
  - sand filter pilot test
  - injection well
- Model and evaluate surface and ground water compatibility
- Possible aquifer testing

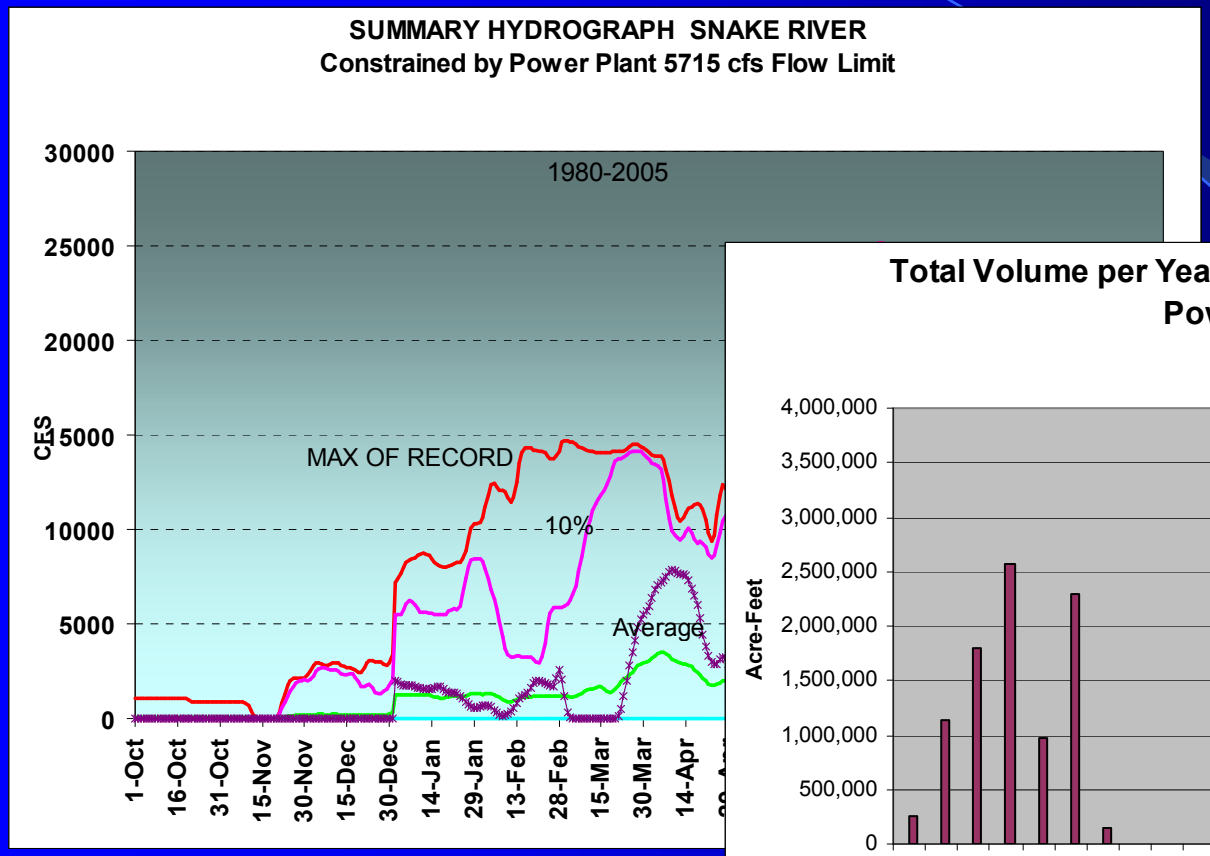
W-Canal Recharge Project – Future Direction

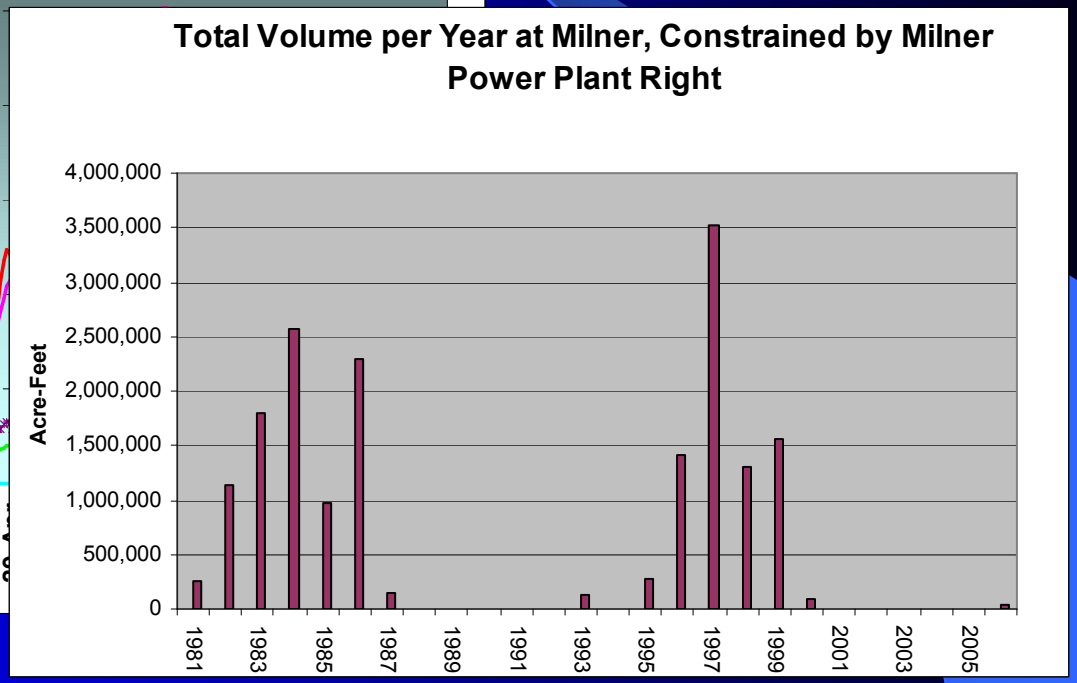
- Pilot scale project operational by Spring 2008
- Final design, construction management and full scale operation, 2009 ⟶
- Ultimate goal: to develop a design for a low cost, engineered, managed aquifer recharge facility that can be implemented at other ESP locales.

Water Availability for ESPA Managed Recharge

- IWRB's natural flow recharge water rights
  - Snake River: 1,200 cfs; 1980 priority date; subordinate to Milner Hydropower water right of 5,715 cfs
  - Big & Little Wood Rivers: 800 cfs; 1980 priority date
- Possible Salmon Flow Exchange - replace BOR salmon flow releases with other water supplies in southwest Idaho to free up the water now being used for salmon flows.
- Possible re-activation of one or more recharge water right applications filed in 1999 by the IWRB for additional natural flow when it occurs.
- Rental Pool leases – this may make sense in certain situations.

Excess Flow past Milner Dam after meeting the Milner Hydropower Water Right





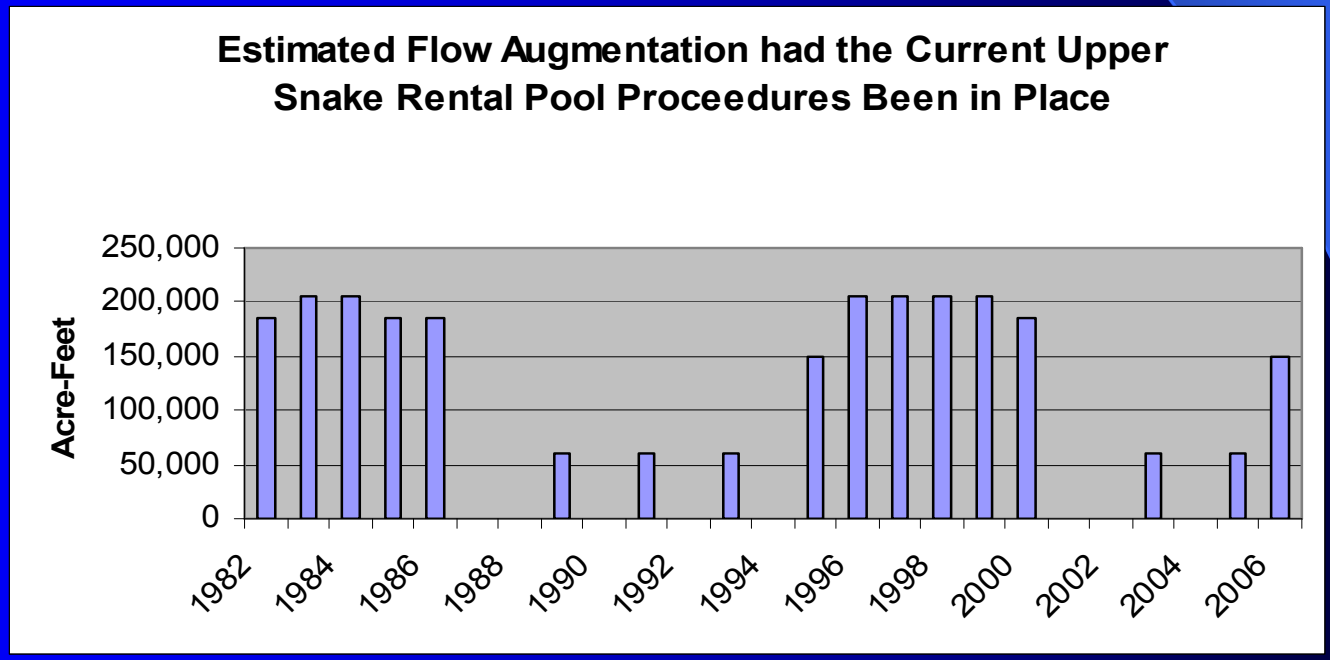
1982-2006 Average = 689,000 AF

1982-2006 50% Exceedence = 199,000 AF

Salmon Flow Exchange Water

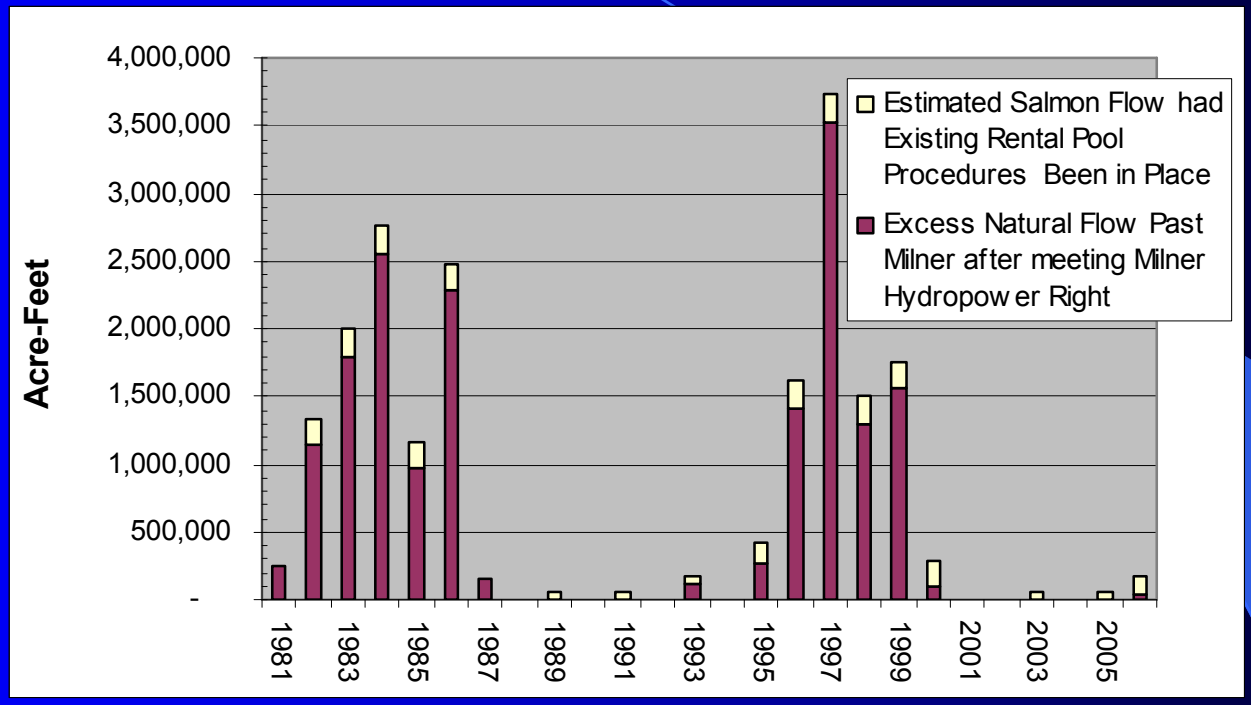
•Current Upper Snake Rental Pool procedures provide BOR up to 200,000 AF annually for salmon flow. The actual amount is determined by reservoir carry-over and the April 1st runoff forecast.

•What would have been the annual amount of rental pool water going to BOR for salmon flow releases since 1982 if the current rental pool procedures had been in place?



Average 1982-2006 = 102,000 AF

Excess Flow Past Milner combined with Salmon Flow Exchange Water



Conclusions from chart:

- Salmon flow exchange could provide on average about 100KAF, but mostly in years when there is plenty of excess natural flow.
- There is a considerable amount of excess natural flow, but about half of the years have no excess natural flow.

Recommendations for Managed Recharge on Eastern Snake Plain

- Continue with IWRB spring recharge program.
- Add constructed facilities to capture the large excess natural flows when they occur, in various locations to provide for long-term storage of water in the aquifer and be prepared to maintain those facilities during dry year sequences.
- Develop funding mechanism to pay for development, operations, and maintenance costs of program.
- Re-activate one or more water right applications filed in 1999 in order to be able to utilize additional natural flow in years when it occurs.
- Investigate costs of implementing the salmon flow exchange, recognizing that in some years there would be no salmon flow released from the Upper Snake with which to exchange.

Questions?