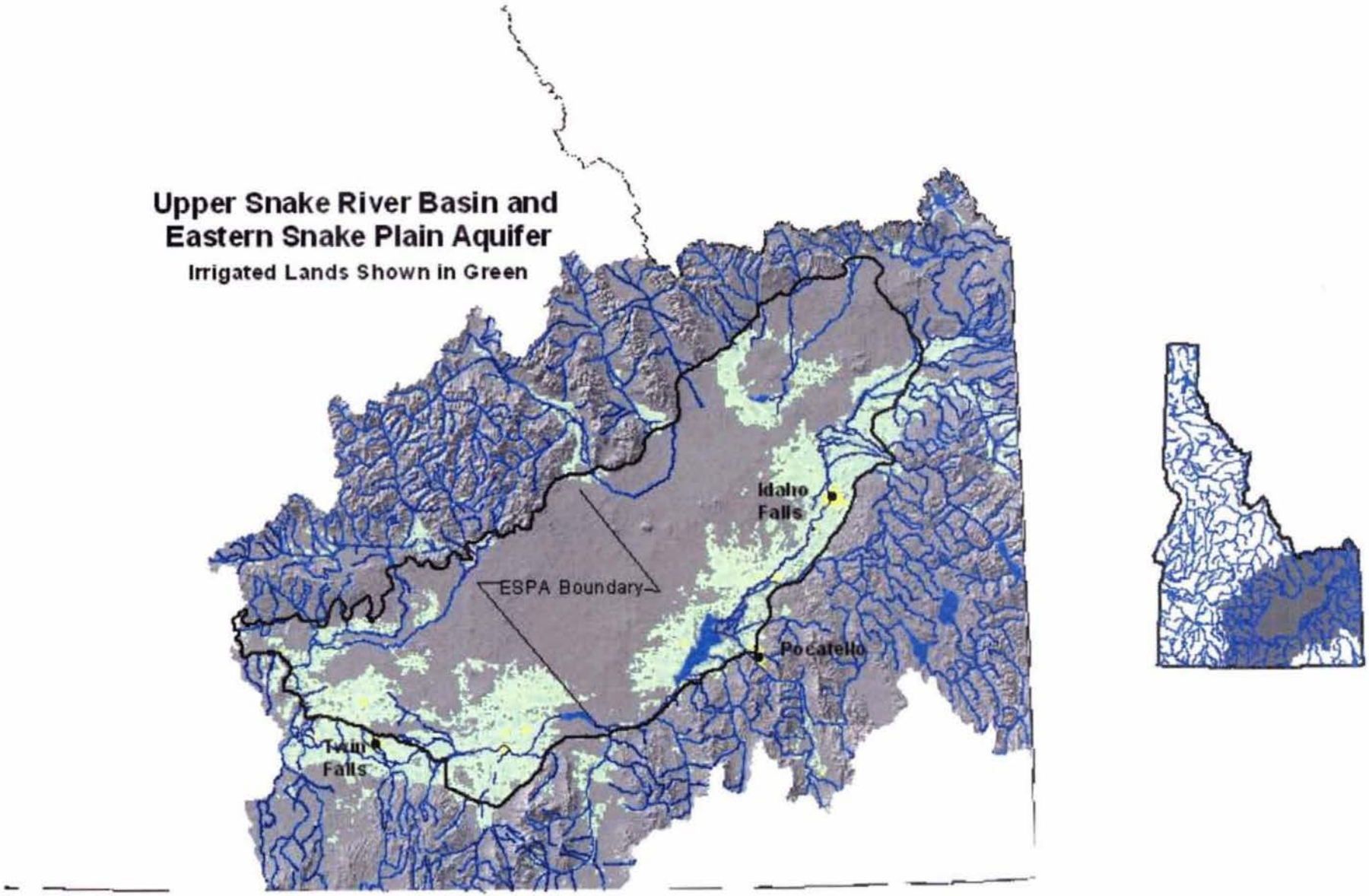
Idaho Water Resource Board

Eastern Snake Plain Aquifer
Overview of Planning Area

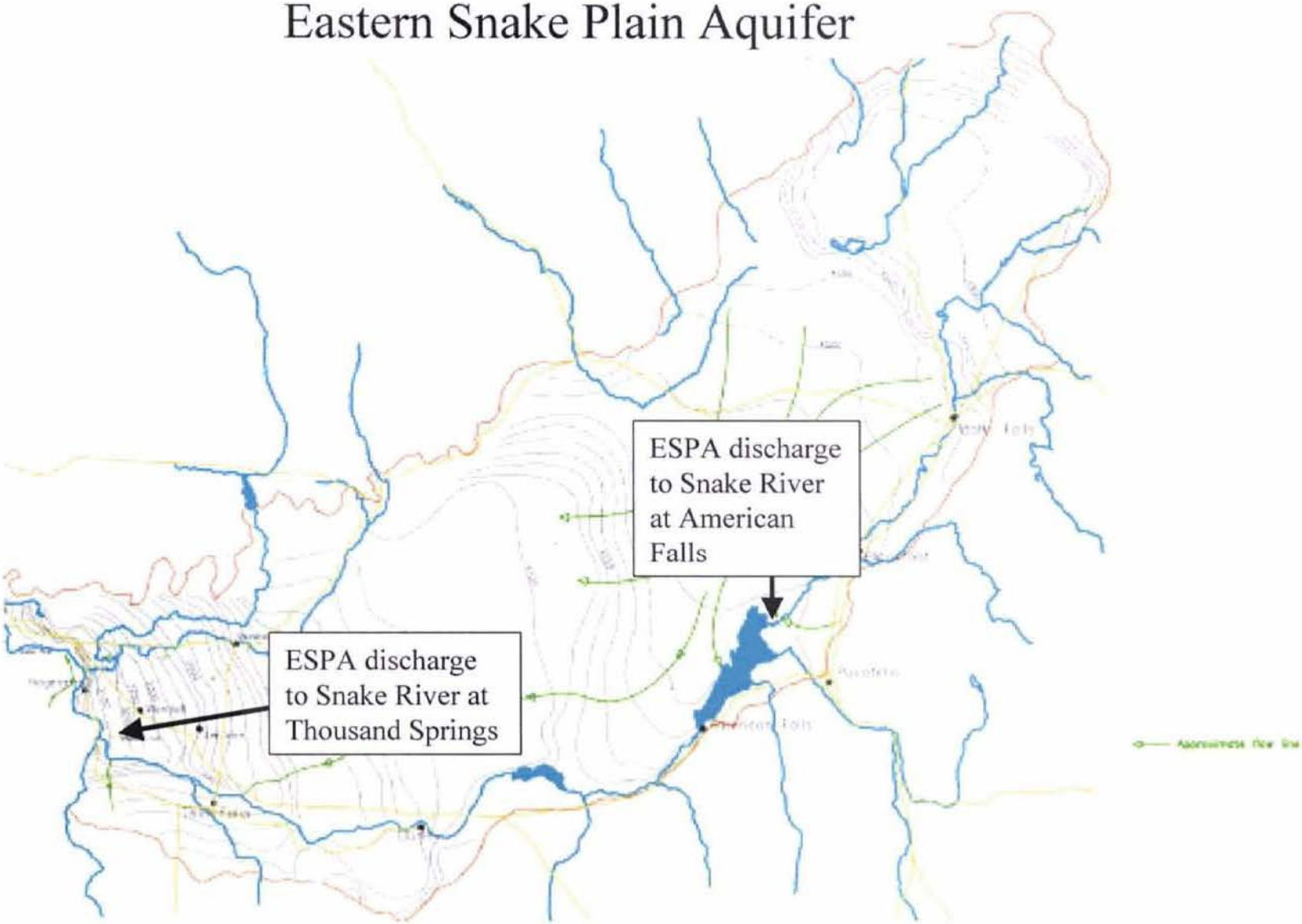

Upper Snake River Basin and
Eastern Snake Plain Aquifer
Irrigated Lands Shown in Green
Idaho Falls
ESPA Boundary
Pocatello
Twin Falls

ESPA General Characteristics

- Located within the Upper Snake River Basin
  - Encompasses all or part of 20 counties, and
  - Approximately 35% of Idaho's land area (29,000 square miles).
- ESPA underlies approximately 10,000 square miles, or 13% of the state.

- The ESPA consists of layered basalt, thousands of feet thick in some places.
- The major ground water flow is generally from northeast to southwest.
- Two major aquifer discharge areas are:
  - American Falls (about 2 MAF/yr).
  - Thousand Springs (about 4 MAF/yr).

Eastern Snake Plain Aquifer



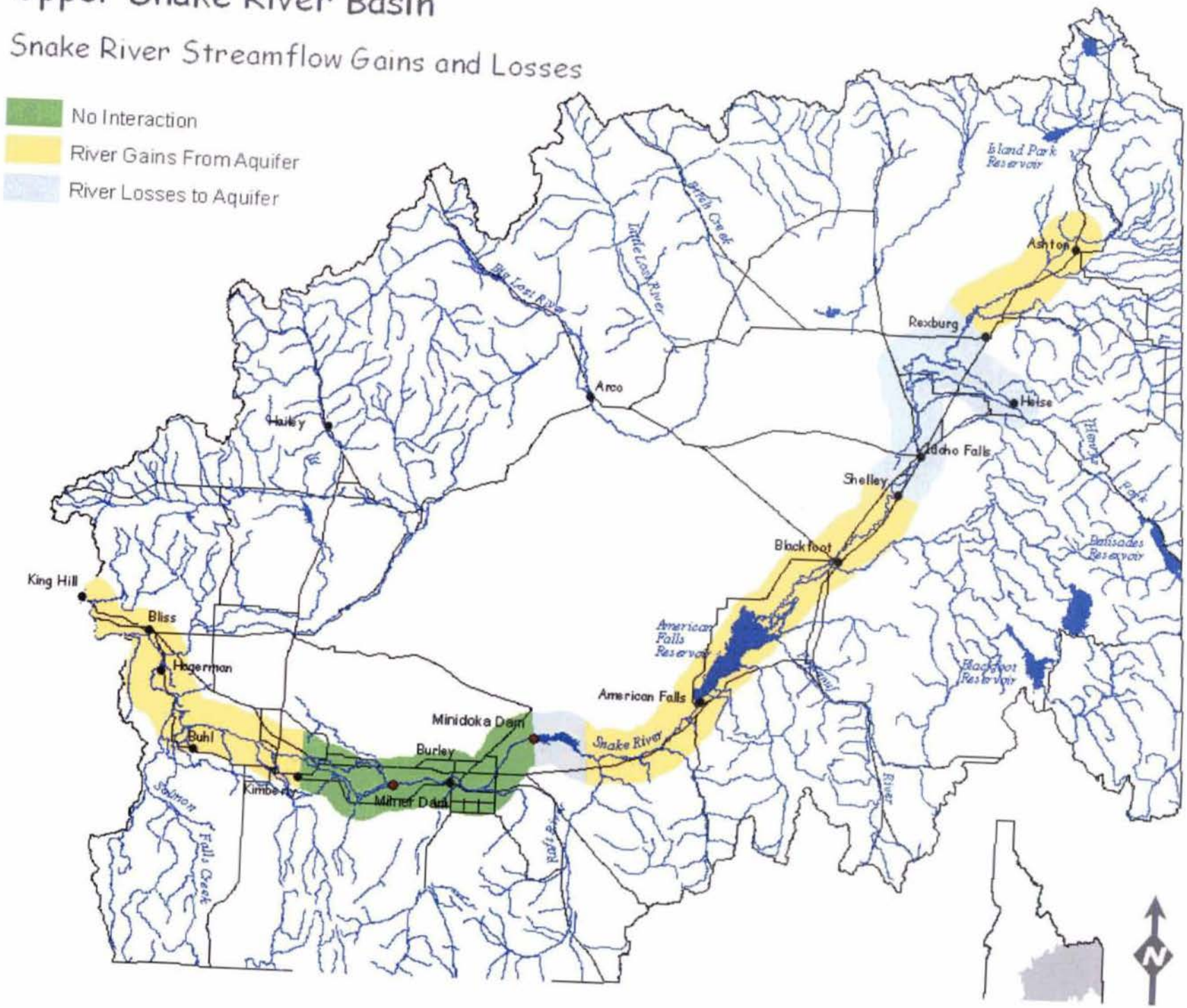
ESPA Discharges to Snake River

Niagara Springs in the
Thousand Springs Reach

Fort Hall Bottoms in the
American Falls Reach

Upper Snake River Basin

Snake River Streamflow Gains and Losses

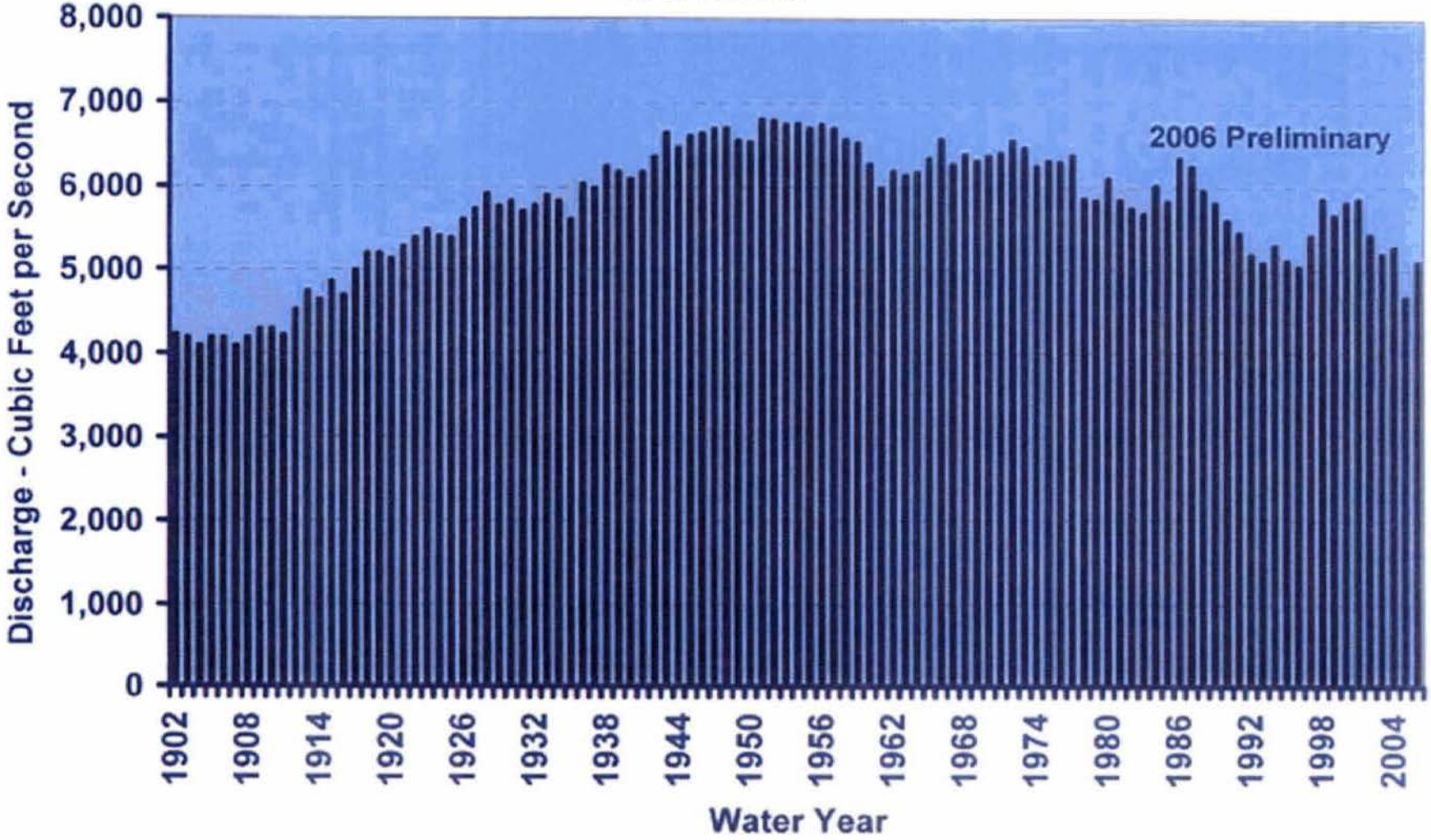


- The ESPA is recharged by:
  - Deep percolation of excess irrigation water
  - Leakage from canals
  - Seepage from streams overlying the aquifer
  - Underflow from tributary basins
  - Direct precipitation.
- Spring discharge was estimated at 4,200 cfs in the Thousand Springs reach of the Snake River in 1900.
- Spring discharge in the Thousand Springs reach peaked at 6,800 cfs in 1950.
- Approximately 70 percent of the Snake River flow at King Hill was attributed to ground-water discharge from the Thousand Springs reach in 2004.

- Sprinkler irrigation using surface water and ground-water pumping have increased since 1970, reducing ground water levels and spring flows.
- Today, approximately 70% of irrigated acreage in the Upper Snake River Basin is watered by sprinklers compared with only 12% in 1977.
- Spring flows have recently declined to between 4,800 and 5,000 cfs in the Thousand Springs reach. The cause for this decline is a combination of:
  - Reduction in incidental recharge from surface water as a result of the conversion from flood to sprinkler irrigation
  - Extended drought
  - Ground-water pumping.

AVERAGE ANNUAL SPRING DISCHARGE TO SNAKE RIVER BETWEEN MILNER AND KING HILL

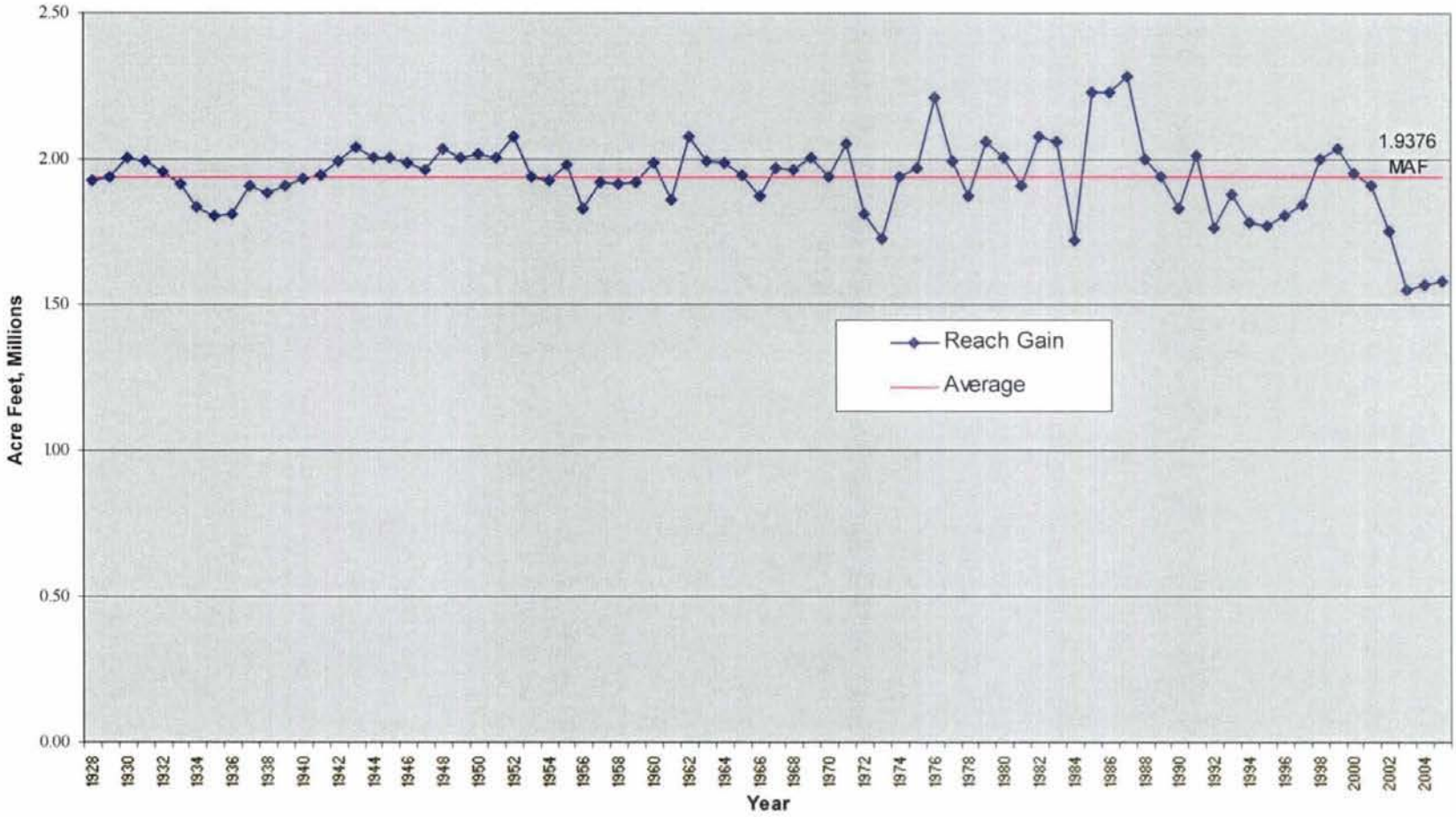
1902-2006



- Aquifer gains in the American Falls reach are more stable.

ANNUAL REACH GAINS TO SNAKE RIVER NEAR BLACKFOOT TO NEELEY

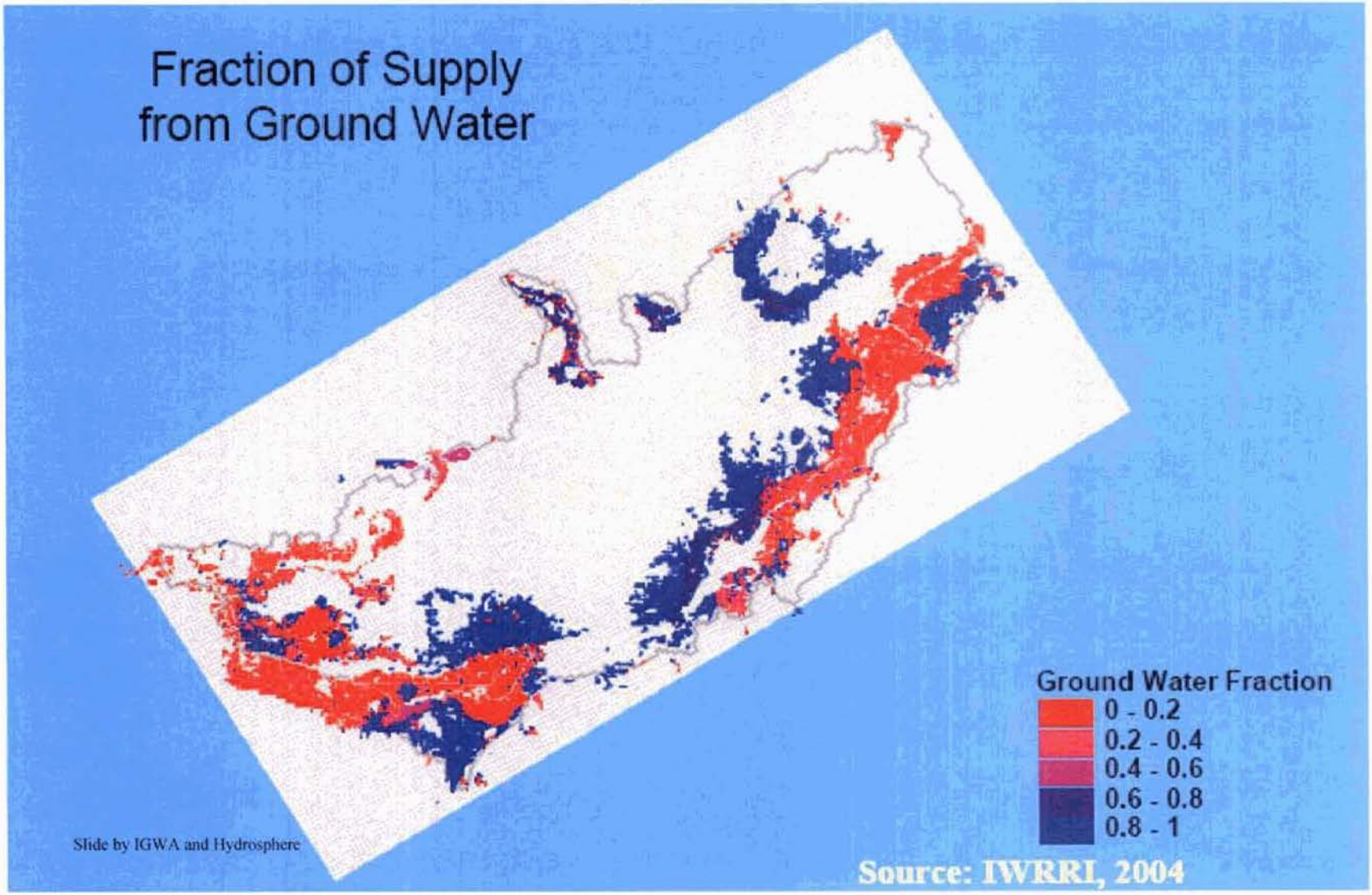
Includes Return Flows, Water Year 2005 Data is Final



- Surface and ground water resources in the ESP area are hydraulically connected.
- ESPA gains from and discharges to Snake River at various locations.
- The ESPA has been designated as an area having a common ground water supply.
- Diversions or changes in ground-water recharge and use affect the flows of surface water resources and availability of ground water supply to other holders of ground water rights.

ESPA-Related Economy

- Agriculture is the largest segment of the economy and the largest consumptive user of water.
- 2.1 million irrigated acres overlie the aquifer (about 60% of Idaho's total):
  - 871,000 acres irrigated from surface water
  - 889,000 acres irrigated from ground water
  - 348,000 acres irrigated from both sources
- Beyond irrigated agriculture, food processing and aquaculture depend on an ample supply of ground water
- Hydroelectric power generation dependent on river flows.
- Though small relative to agricultural uses, domestic, commercial, municipal water use are essential to the local economy.


Fraction of Supply
from Ground Water
Ground Water Fraction
0 - 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1
Slide by IGWA and Hydrosphere
Source: IWRRI, 2004

ESPA-Related Economy

- About 1/3rd of Idaho's population lives in the Eastern Snake Plain region. Some cities supplied by the Aquifer include Twin Falls, Jerome, Burley, Pocatello, Blackfoot, Idaho Falls, and Rexburg.

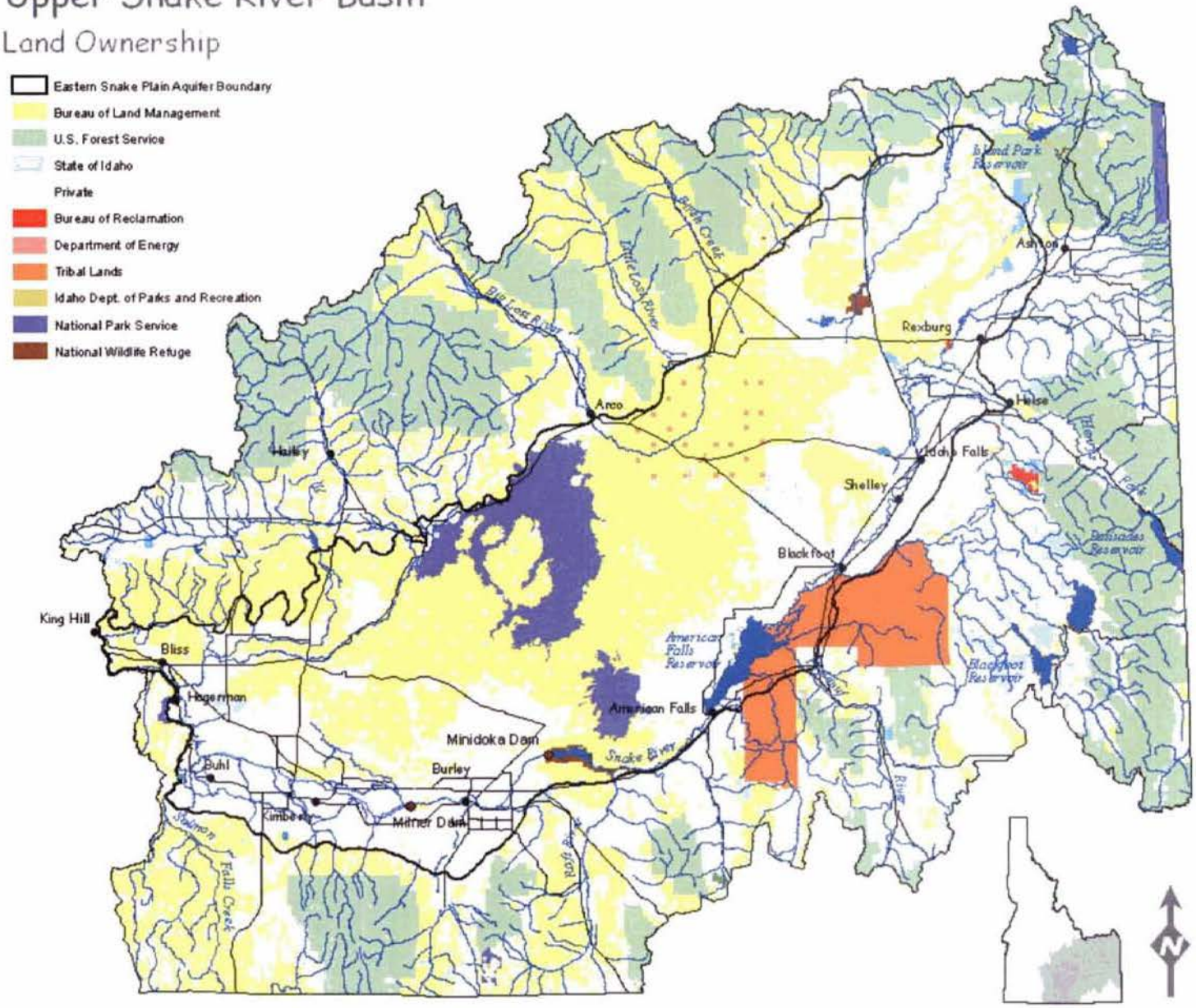
- 78% of all food-size trout produced in the nation are from hatchery operations that utilize spring flow discharged from the ESPA.

Other factors…

- Water Quality
  - Good quality overall, some local problems.
  - Sole Source of drinking water for most of 400,000 people living in basin.
  - Some concerns over waste management at Idaho National Lab.
- Threatened or Endangered Aquatic Species
  - Snails, Anadromous Fish .
- Water for Salmon Flows in the Columbia
  - The U.S. Bureau of Reclamation provides up to 487,000 acre-feet of flow augmentation water to meet the Federal Columbia River Power System Biological Opinion (FCRPSBO) and the Nez Perce Agreement.
- Indian Reservation
- Evolving political landscape

Upper Snake River Basin

Land Ownership



ESPA MANAGEMENT PLAN
MANAGEMENT GOAL ALTERNATIVES
Preliminary draft for discussion only
15-year appraisal-level costs

MINIMAL MANAGEMENT				MODEST MANAGEMENT						AGGRESSIVE MANAGEMENT					
Status Quo	Enhancement Level 1			Enhancement Level 2			Enhancement Level 3			Enhancement Level 4			Enhancement Level 5		
	Action	Water Budget Change (KAF)	Cost	Action	Water Budget Change (KAF)	Cost	Action	Water Budget Change (KAF)	Cost	Action	Water Budget Change (KAF)	Cost	Action	Water Budget Change (KAF)	Cost
No added management by state	CREP	200	$ 72,000,000	CREP	200	$ 72,000,000	CREP	200	$ 72,000,000	CREP	200	$ 72,000,000	CREP	200	$ 72,000,000
Aquifer may be approaching dynamic equilibrium	Thousand Springs Demand Reduction	100	$ 5,000,000	Thousand Springs (Billingsley) Reduction	100	$ 5,000,000	Thousand Springs Demand Reduction	100	$ 5,000,000	Thousand Springs Demand Reduction	100	$ 5,000,000	Thousand Springs Demand Reduction	100	$ 5,000,000
				50 KAF recharge program	50	$ 5,000,000	150 KAF recharge program	150	$ 20,000,000	150 KAF recharge program	150	$ 20,000,000	150 KAF recharge program	150	$ 20,000,000
										Convert 50,000 acres of GW lands to SW	100	$ 32,000,000	Convert 50,000 acres of GW lands to SW	100	$ 32,000,000
													Acquire high-lift water and exchange for above-Milner flow augmentation releases	200	$ 65,000,000
TOTALS		300	$ 77,000,000		350	$ 92,000,000		450	$ 97,000,000		550	$ 127,000,000		750	$ 192,000,000

NOTES: CREP and Thousand Springs Demand Reduction are already authorized and funded by the legislature
The CREP costs include the total state and federal services and cash expenditures over the 15-year period
The 50KAF Recharge Program would use the IWRB recharge water rights and use facilities the currently exist (canals and Shoshone-ist) or are under way (N Canal Project)
The 150KAF Recharge Program would entail the construction of facilities needed to maximize the use of the IWRB recharge water rights.
The conversions from GW to SW would likely be applied via the Upper Snake Rental Pool.
The high-lift exchange water would be delivered to additional recharge, additional conversion projects, and/or direct delivery to surface water users.
Other options to achieve the enhancement goals may exist.
The water budget changes shown are estimates.

Those costs are preliminary appraisal-level costs.

Actions in Progress

- CREP Program – sign-up's currently in progress. Goal is to sign up 100,000 acres to reduce ground water use by 200,000 acre-feet annually.
- Aquifer Recharge Program – recharge operations occurred in 2006 on a modest scale (about 50,000 acre-feet). Water Resource Board to begin construction on first large-scale recharge facility this winter.
- 2006 Legislature appropriated $5 million to Water Resource Board for water right acquisitions in ESPA area.