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Water Resource Board

ESPA Managed Recharge Program – CAMP Review

Joint IWRB Planning and Aquifer Stabilization Committee

September 18, 2019

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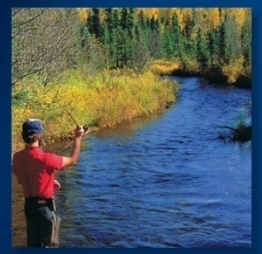


Recharge Terms

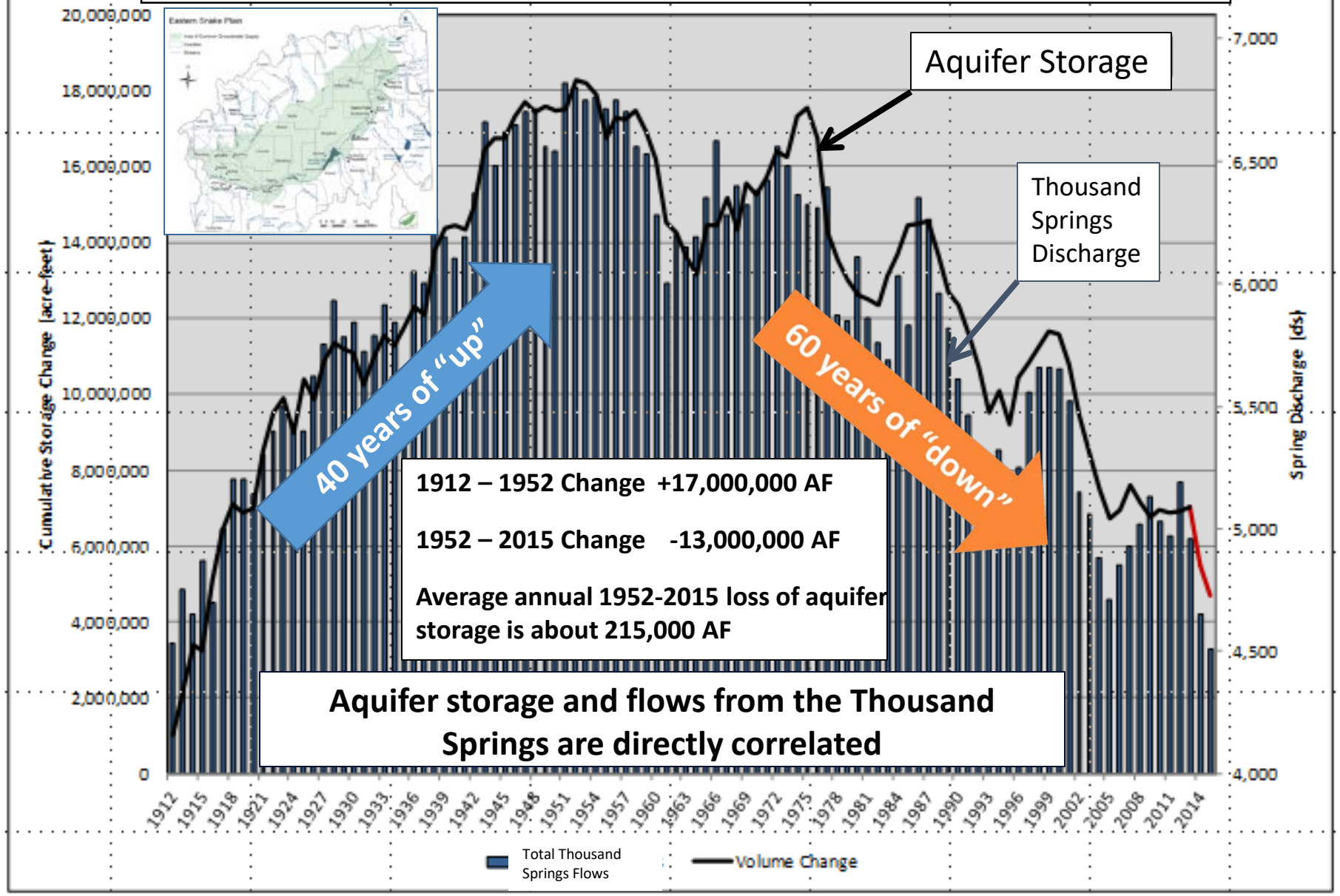
- **Natural Recharge**
  - Rain and snow infiltrating into ground water aquifers

- **Managed (or Artificial) Recharge**
  -Intentional placement of water into a ground water aquifer
  -In ESPA managed recharge is done through un-lined canals, recharge/spill basins, and injection wells

- **Incidental Aquifer Recharge**
  -Unintentional placement of water into an aquifer resulting from normal water deliveries for irrigation or other uses (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 normally required (which the ESPA is not)

Volume Change of Water Stored Within the Eastern Snake Plain Aquifer and Thousand Springs Total Discharge



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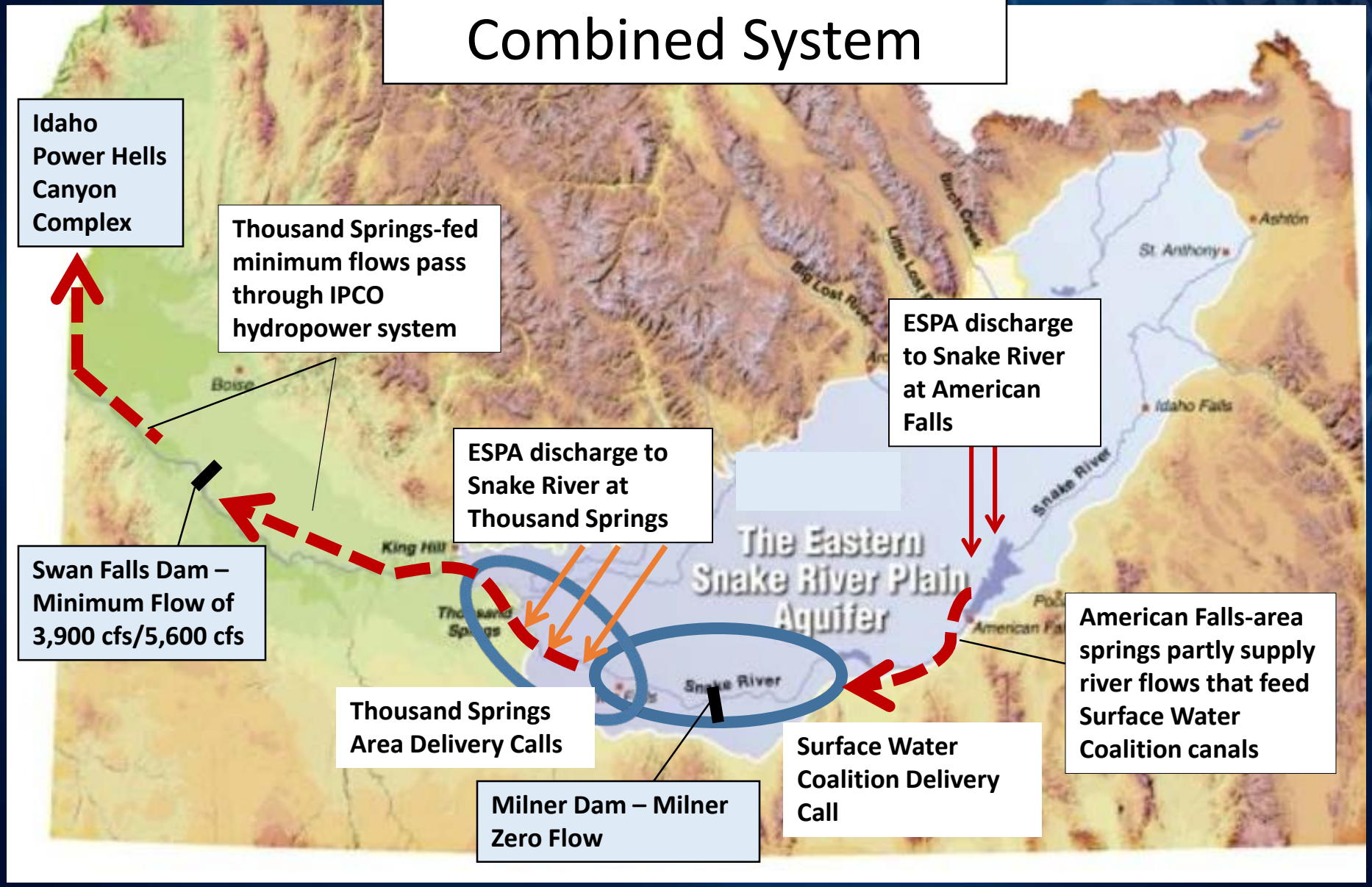
Combined System



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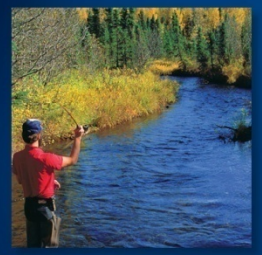
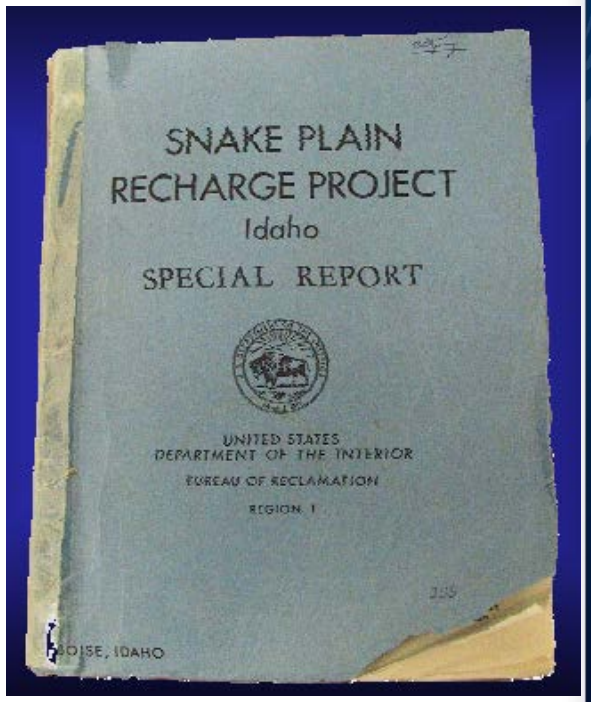


1962 – U.S. Bureau of Reclamation Issues Report on Possible Recharge Project

- 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.

- BOR recognized the difficulty in undertaking a large-scale recharge project because no ability to assess ground water users that benefit from aquifer recharge.


SNAKE PLAIN
RECHARGE PROJECT
Idaho
SPECIAL REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGION 1

BOISE, IDAHO

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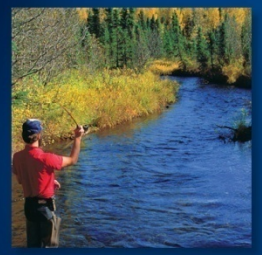
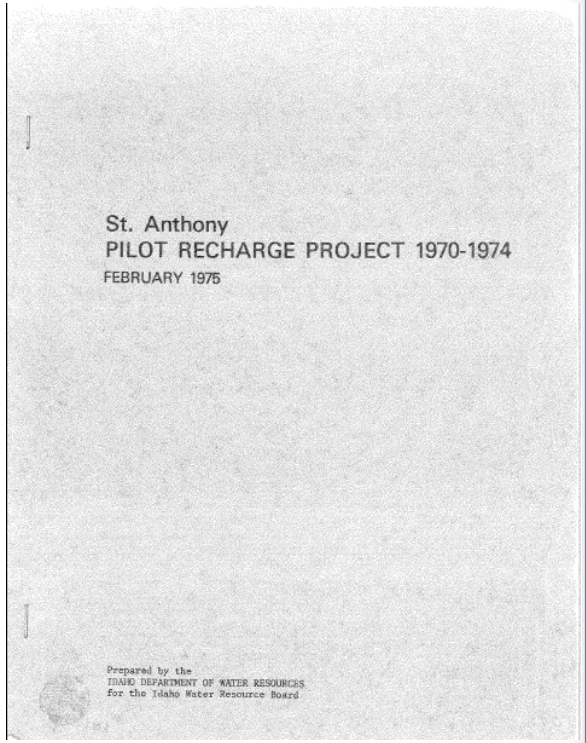


1970-1974 – Idaho Water Resource Board (IWRB) undertakes pilot recharge project at St. Anthony

- 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 water right permit.
- Testing showed seepage rates at Egin Lakes to be approximately ½ foot/day, so large land areas needed for large-scale project
- Egin Lakes still used by FMID as part of Water Board's recharge program



St. Anthony
PILOT RECHARGE PROJECT 1970-1974
FEBRUARY 1975

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

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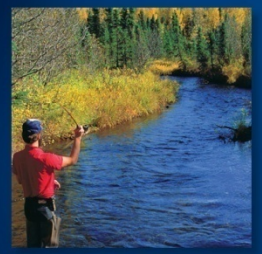
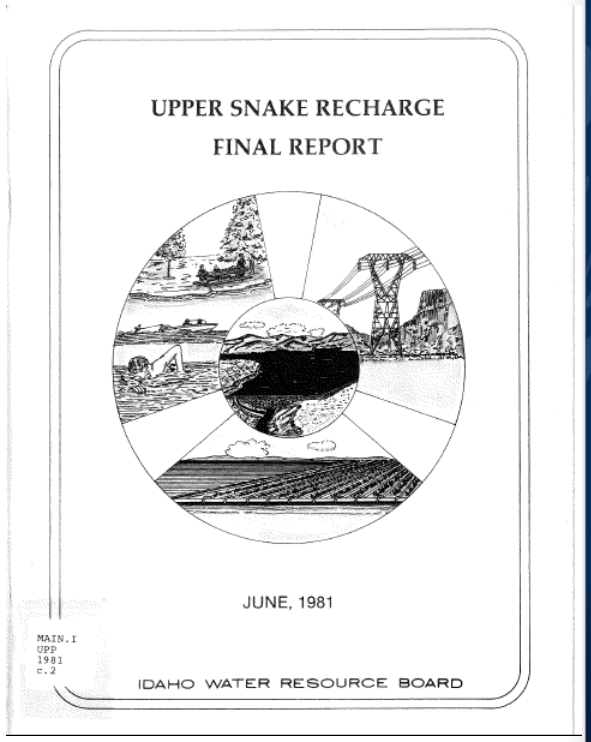


1981 – IWRB Upper Snake Recharge Report

- 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 Blackfoot-Idaho Falls area due to the short return time of water to the Snake River
- Study did not look at the Thousand Springs area due efforts to create recharge district for that area



UPPER SNAKE RECHARGE
FINAL REPORT

JUNE, 1981

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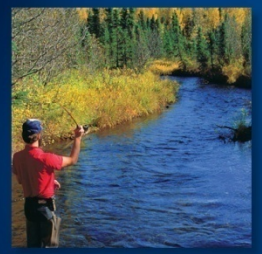

1978-1980 – Legislation Creating the Lower Snake River Aquifer Recharge District

- Initial plan proposed by LSRARD was to develop recharge basins at numerous locations along Northside, Milner-Gooding, and Big Wood canal systems
- LSRARD's small assessment base, primarily the Hagerman Valley, has limited its effectiveness
- Acquired water right permits for recharge with a 1980 priority date
- Constructed Shoshone recharge site
- Accomplished about 84,700 acre-feet of recharge between 1980 and 1999 (numbers may be incomplete)
- LSRARD continues to be valuable partner

Shoshone recharge site in use – spring 2012

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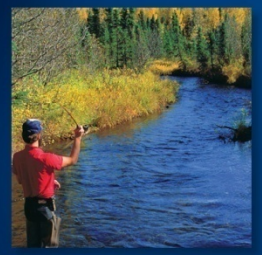

1992-1997 - Southwest Irrigation District – High Plains Ground Water Recharge Demonstration Project

- 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 capital 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.
- Southwest uses system and participates in Water Board program

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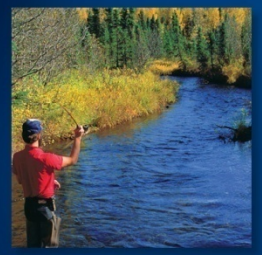

1995 – 2000: IWRB & WD01 Program

- The 1995 Legislature appropriated $945,000 to the IWRB for recharge. IWRB delegated the program to Water District 1. Funds were used to pay delivery costs for running recharge water through canals and to lease storage 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

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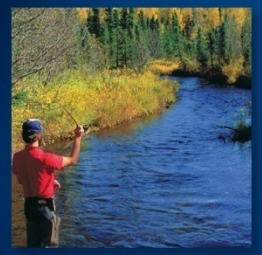

1998-1999: IWRB acquires recharge water rights

- During the 1995-2000 WD01/IWRB recharge effort it became clear that water rights for recharge needed to be clarified. In 1998 IWRB applied for 20 water rights for recharge from Snake River, but applications were put on hold due to protests from environmental groups, Fish & Game, Bureau of Reclamation, Idaho Power, and others.
- Due to inability to make full beneficial use it its water right permits for recharge, LSRARD conveys water rights 01-7054 (1,200 cfs) and 37-7842 (800 cfs) to IWRB in 1999.
- Two of the 1998-priority applications in the Lower Valley have been permitted (01-7142 & 01-10609)

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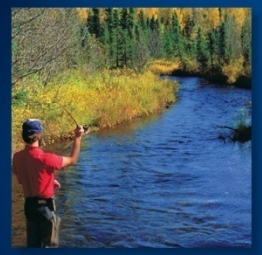
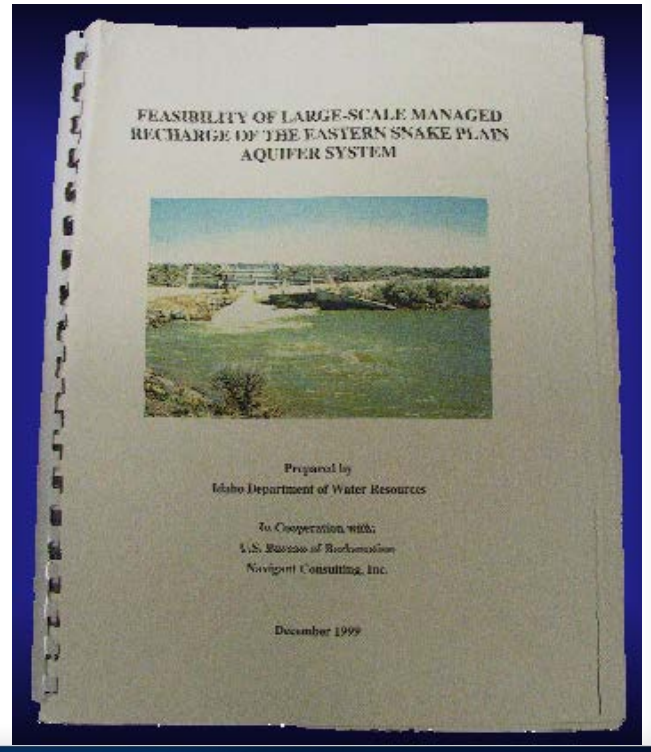


1999: IWRB Issues ESPA Managed Recharge Feasibility Report

- 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.



FEASIBILITY OF LARGE-SCALE MANAGED RECHARGE OF THE EASTERN SNAKE PLAIN AQUIFER SYSTEM

Prepared by
Idaho Department of Water Resources

In Cooperation with:
U.S. Bureau of Reclamation
Norvgent Consulting, Inc.

December 1999

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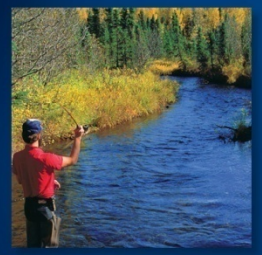

2008: Milner Hydropower License Issued

- Water right license issued for Milner Dam Hydropower Project by Director Tuthill
- Decision clarified that hydropower generation at Milner Dam was subordinate to managed recharge diversions at or above Milner Dam
- Due to conflicting conditions on the Snake River recharge water right permit (01-7054) and the Milner Dam hydropower water right permit, recharge was administered as if it was junior to Milner Dam hydropower until this licensing decision
- Various legal actions continued until 2010, but Director's decision was upheld

Milner Dam – Lower end of WD01

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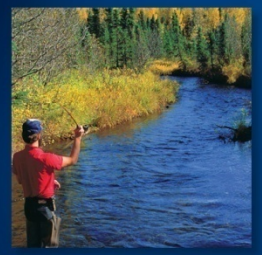
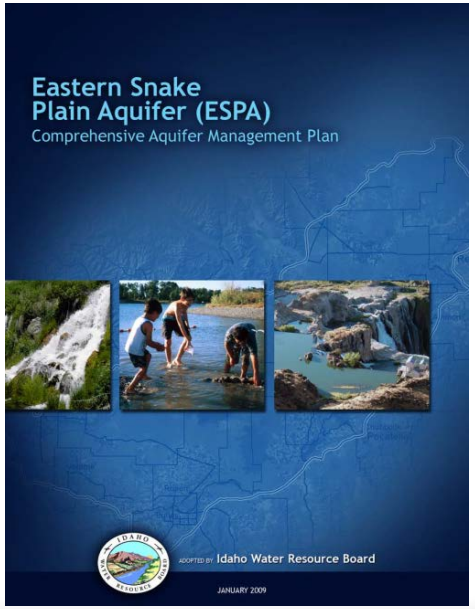


2009 -ESPA Comprehensive Aquifer Management Plan

- CAMP adopted by the Idaho Water Resource Board, approved by Legislature, and signed into law by Governor as part of State Water Plan
- Includes average annual targets for managed recharge of 100,000 acre-feet/year for years 1-10, and 250,000 acre-feet/year after year 10
- Also includes other aquifer management strategies:
  - GW-SW conversion projects
  - Demand reduction
  - Cloud seeding
- Clarified that recharge and other management actions are for aquifer stabilization and management
- CAMP funding system was not put into place



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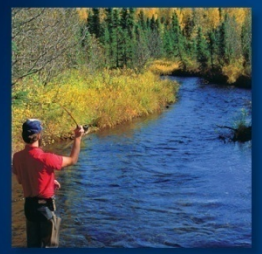


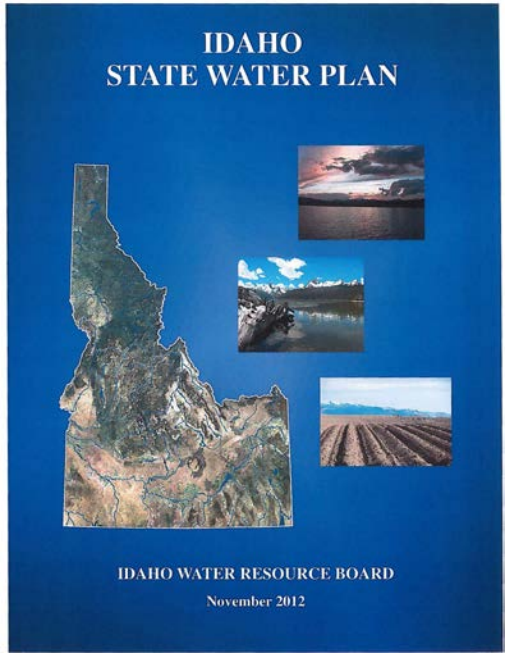
2009 - Swan Falls Re-Affirmation Agreement

- Agreement between State of Idaho and Idaho Power Company
- Confirms that ESPA managed recharge is allowed under the original Swan Falls Agreement
- Places limits on amount of recharge by state based on ESPA CAMP:
  - Average annual of 175,000 AF through 2018 (unless changed by legislature)
  - Average annual of 250,000 AF beginning in 2019
- Requires Water Board to approve recharge projects of certain threshold proposed by others
- Requires state to assist Idaho Power in rate proceedings before PUC if recharge diversions lead to reduced hydropower generation and higher energy rates
- If Water Board proposes to increase recharge beyond these limits legislative approval must be obtained – public policy decision regarding diversions from river vs. maintaining river flows for hydropower generation
- Signed by Water Board, Governor, and approved by Legislature in 2009

Swan Falls Dam

2012 State Water Plan

- 2012 State Water Plan included CAMP recharge goals as implementation strategies for Policy 4D (Conjunctive Management of ESPA and the Snake River) and Policy 4E (Snake River Basin New Storage)
- Adopted by IWRB in 2012
- Through non-action by Legislature it became effective in 2013



Legislative Funding

- The 2014 Legislature passed HB 547 which provided up to $5M annually from the Cigarette Tax for “Statewide Aquifer Stabilization”
- Funds deposited into the Secondary Aquifer Fund
- Since aquifer management is at the end of the uses for the Cigarette tax, we expect to see revenues from this source diminish over time
- With these funds, IWRB ramped up recharge program with “winter recharge” in winter of 2014-2015 – recharged 75,000 AF

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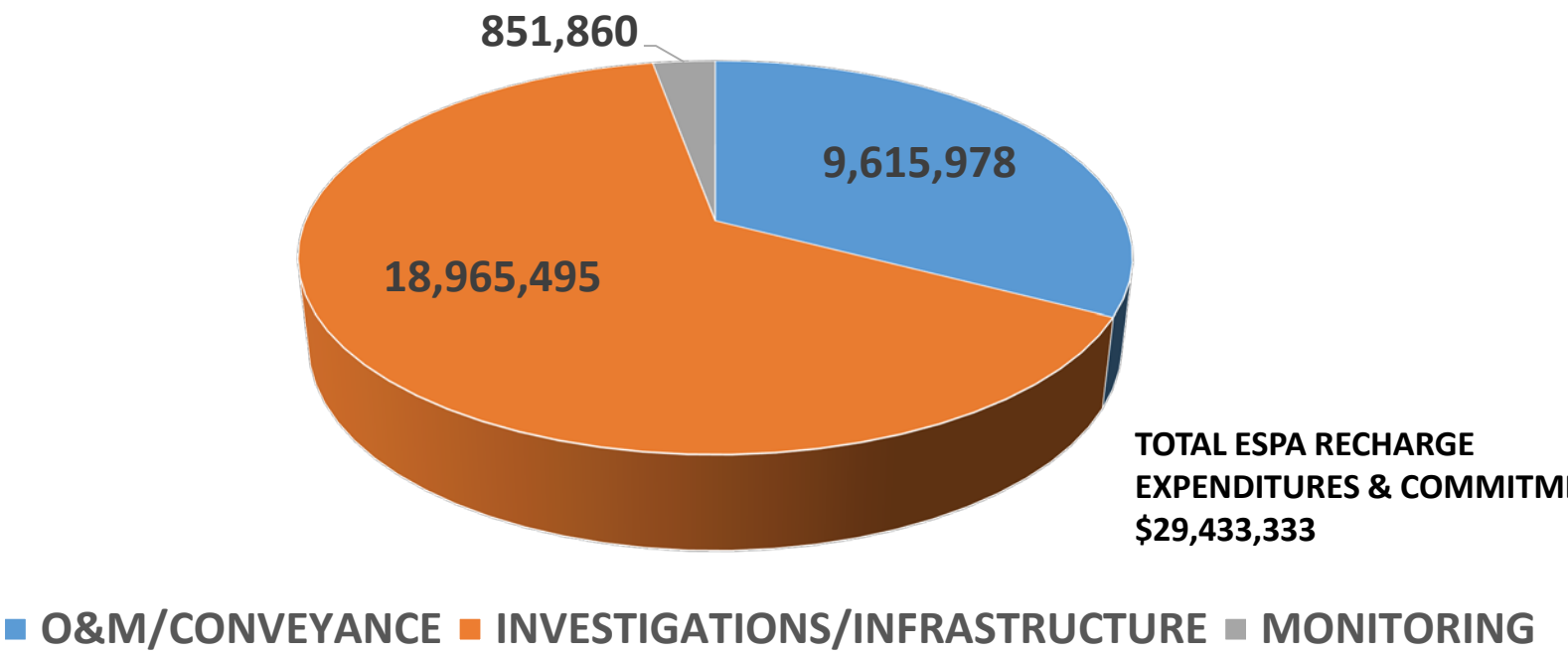
Senate Concurrent Resolution 136 (2016)

- Directed IWRB to develop program of ESPA Managed Recharge of 250,000 AF on average annual basis
- Directed IWRB to develop needed capacity by 2024
- Provided Legislative approval to increase the Phase 1 CAMP recharge goal from 100,000 AF to 250,000 AF on average annual basis prior to 2019, pursuant to Swan Falls Re-Affirmation Agreement
- Companion to:
  - ✓ SCR138 (2016) – IGWA-SWC Settlement
  - ✓ HCR10 (2019) – Cities-SWC-IGWA Settlement

Legislative Funding Continued

- Beginning in FY 2016 $5M annually from General Fund has been provided for “Water Sustainability” and “Aquifer Management”
- Funds are deposited into the Secondary Aquifer Fund
- Together with the amount received from the Cigarette Tax and accrued interest, IWRB sets a budget for the use of these funds every year

SECONDARY AQUIFER FUND
ESPA RECHARGE EXPENDITURES & COMMITMENTS
AS OF JUNE 30, 2019



TOTAL ESPA RECHARGE EXPENDITURES & COMMITMENTS - $29,433,333

Data from July 1, 2008 - June 30, 2019

Settlement Agreements

- IGWA-SWC Settlement Agreement commits parties to support State's ESPA managed recharge program of 250,000 AF

- Cities-SWC-IGWA Settlement Agreement committee parties to support state's ESPA managed recharge program including support for continued state funding

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Actual ESPA Recharge Volumes Since Passage of SCR136 in 2016

Recharge Season	Natural Flow (AF)	Donated/Contracted Storage Water (AF)	Total (AF)
2016/2017	317,714	--	317,417
2017/2018	475,746	60,255	536,001
2018/2019	309,308	53,769	363,077

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A Few Thoughts on Managed Recharge as it Relates to the CAMP

- SCR136 passed by the 2016 Legislature directs IWRB to develop managed recharge program for ESPA of 250,000 AF on average

- How to define average annual? IWRB is considering in CAMP review. 10-year rolling average?

- Even though recharge in last 3 years has exceeded 250,000 AF, we still don't have enough capacity to average 250,000 AF over long-term

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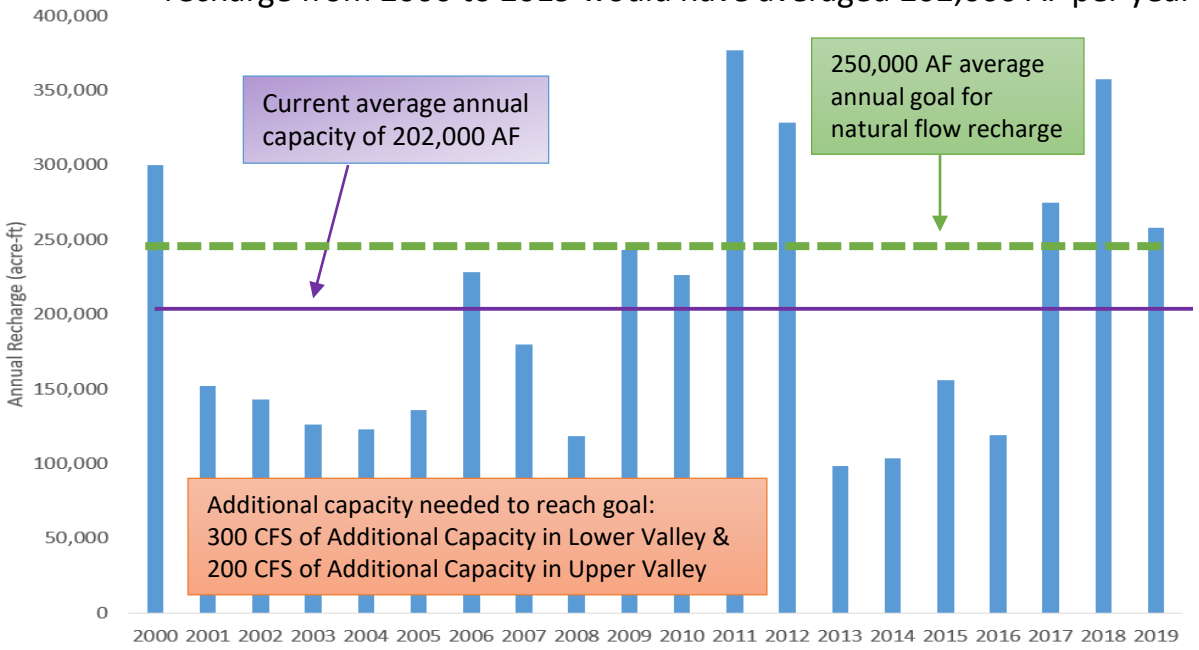
Current Long-Term Average Annual Recharge Capacity

If current level of capacity has been in place in 2000, the natural-flow recharge from 2000 to 2019 would have averaged 202,000 AF per year



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Managed Recharge Infrastructure Update

Two Lower Valley projects in development and one in planning to increase capacity:

- Wilson Canyon on North Side Canal
- Mile Post 29 on Milner Gooding Canal
- ABID recharge

- These should finish building out capacity in Lower Valley

Construction on the Wilson Canyon Recharge Site

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Managed Recharge Infrastructure Update

One Upper Valley project in development to increase capacity:

- Egin Bench Recharge Site Expansion

- Will still need about 150 cfs in Upper Valley

- Studies underway to find remaining needed capacity

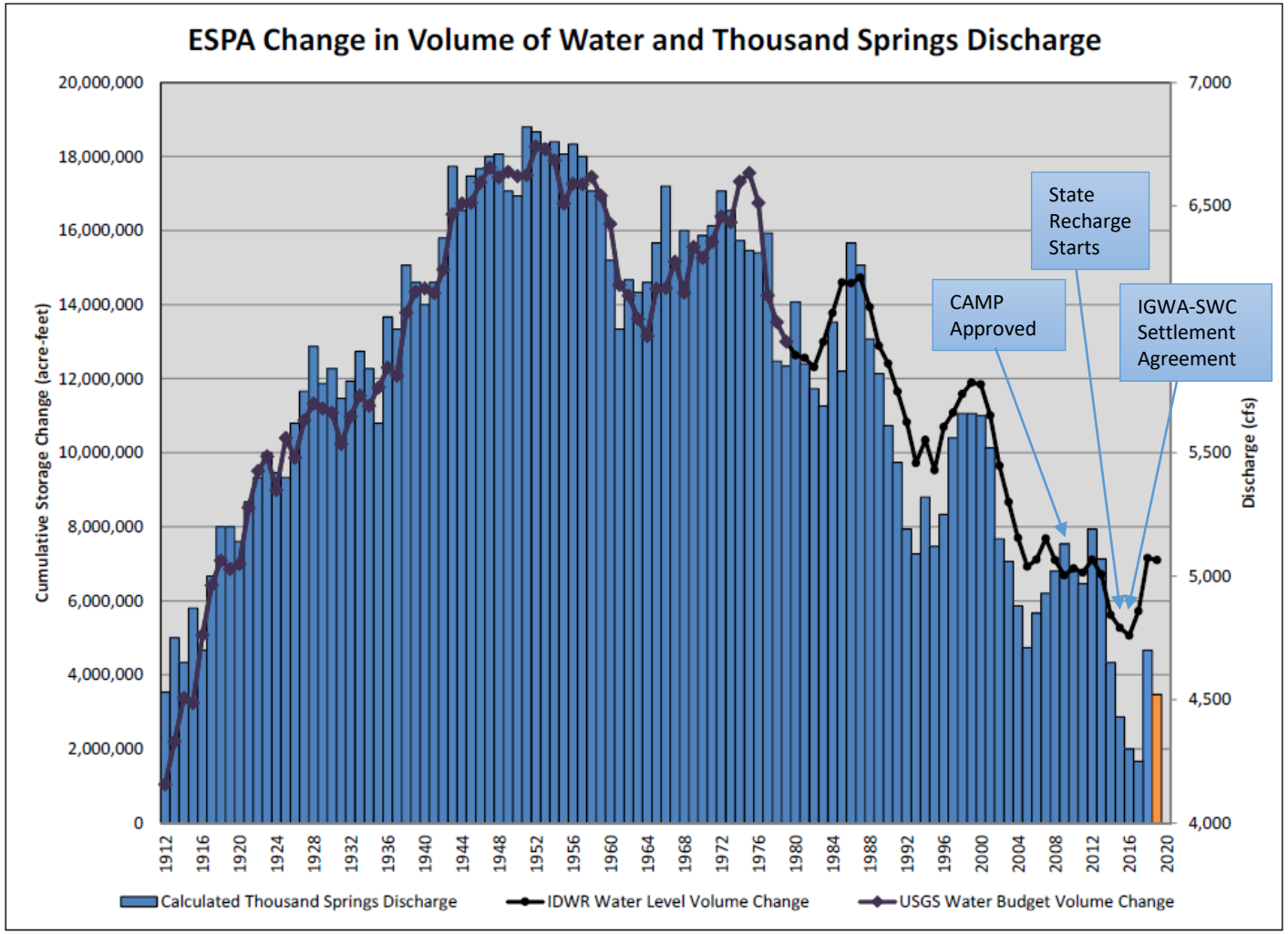
Construction on Egin Recharge Site Expansion

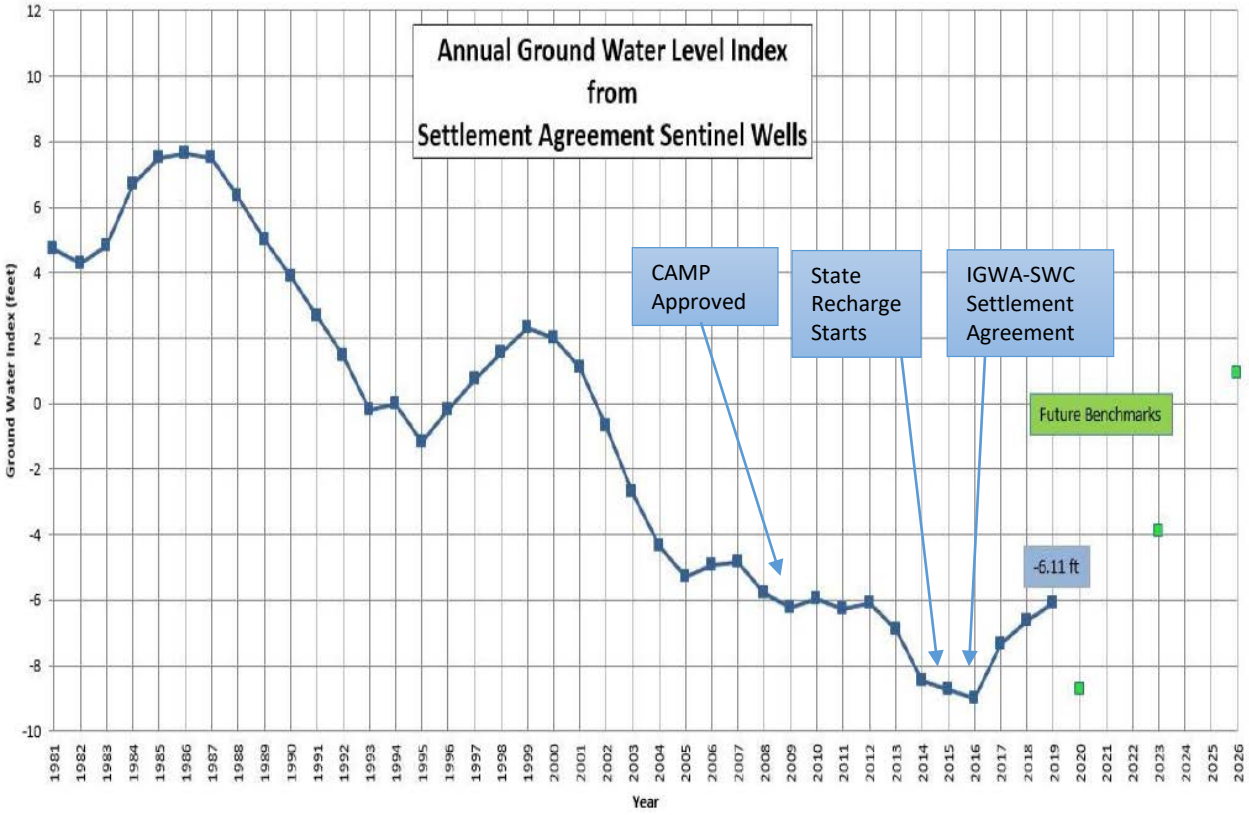
- Managed Recharge Water Quality
  - ✓ State recharge is extensively monitored – water going into recharge sites, and ground water before, during, and after recharge
  - ✓ State recharge is causing no effect to ground water quality

- Role of “Storage Water” recharge by IWRB
  - ✓ Several settlement agreements require parties to provide storage water for aquifer management
  - ✓ Some parties choose to have IWRB recharge it for convenience - they could choose to use it differently for aquifer management
  - ✓ Should be counted separately from the State’s 250,000 AF average annual program using natural flows

Role of "Private Recharge" by others

- ✓ SWC-IGWA Settlement allows IGWA Ground Water Districts to offset required reductions with managed recharge
- ✓ Creates a market for managed recharge by private or 3rd parties
- ✓ Recharge is done with:
  - Storage water leased through Rental Pool
  - Natural flow irrigation rights leased through Water Supply Bank
  - Natural flow recharge rights help by irrigation districts, canal companies, or ground water districts
  - Temporary water use approvals during large flows
- ✓ Since this is done pursuant to the IGWA-SWC Settlement, it should be considered separate from the State's 250,000 AF recharge program
- ✓ Through 42-2737, IWRB has role in approving any recharge project greater that 10,000 AF/year on average proposing new use of natural flows


ESPA Change in Volume of Water and Thousand Springs Discharge
Cumulative Storage Change (acre-feet)
Discharge (cfs)
20,000,000
18,000,000
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
7,000
6,500
5,500
5,000
4,500
4,000
1912
1916
1920
1924
1928
1932
1936
1940
1944
1948
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2004
2008
2012
2016
2020
State Recharge Starts
CAMP Approved
IGWA-SWC Settlement Agreement
Calculated Thousand Springs Discharge
IDWR Water Level Volume Change
USGS Water Budget Volume Change


Annual Ground Water Level Index
from
Settlement Agreement Sentinel Wells
CAMP Approved
State Recharge Starts
IGWA-SWC Settlement Agreement
Future Benchmarks
-6.11 ft
Ground Water Index (feet)
Year
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
1981
1982
1983
1984
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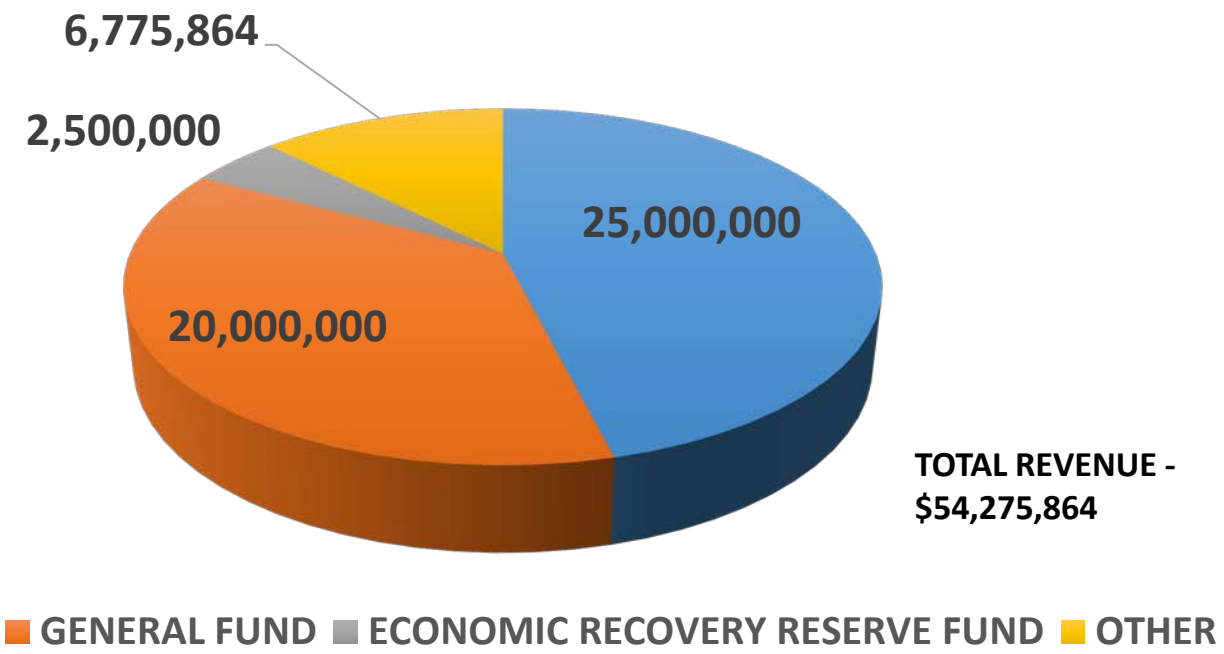
2026

Observed Aquifer Response 2016-2019

Questions?

SECONDARY AQUIFER PLANNING MANAGEMENT & IMPLEMENTATION FUND REVENUE AS OF JUNE 30, 2019

Used for Aquifer Management



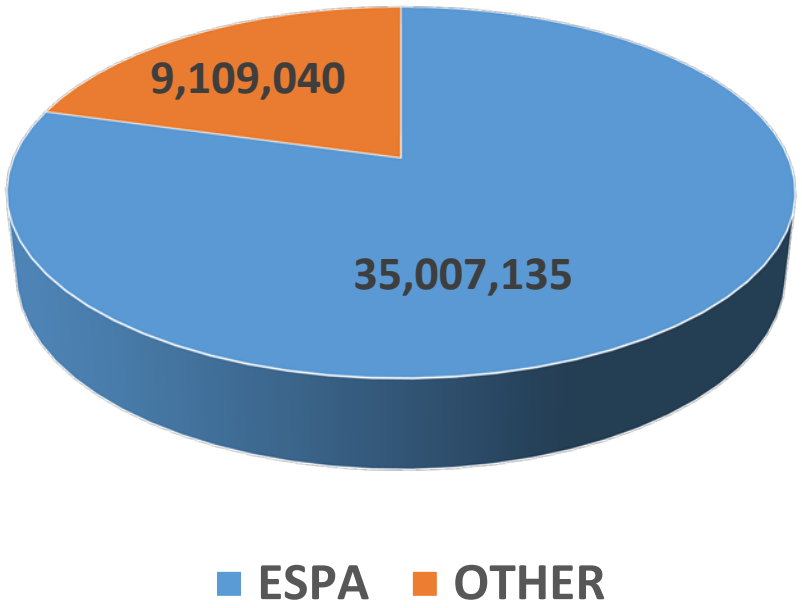
- Cigarette Tax - HB547 (2014) -- up to $5M annually for “Statewide Aquifer Stabilization”
- General Fund -- Part of IDWR “Base Budget” beginning in FY2016 -- $5M annually for “Water Sustainability” and “Aquifer Management”

Data from July 1, 2008 - June 30, 2019

SECONDARY AQUIFER PLANNING MANAGEMENT & IMPLEMENTATION FUND EXPENDITURES & COMMITMENTS

AS OF JUNE 30, 2019

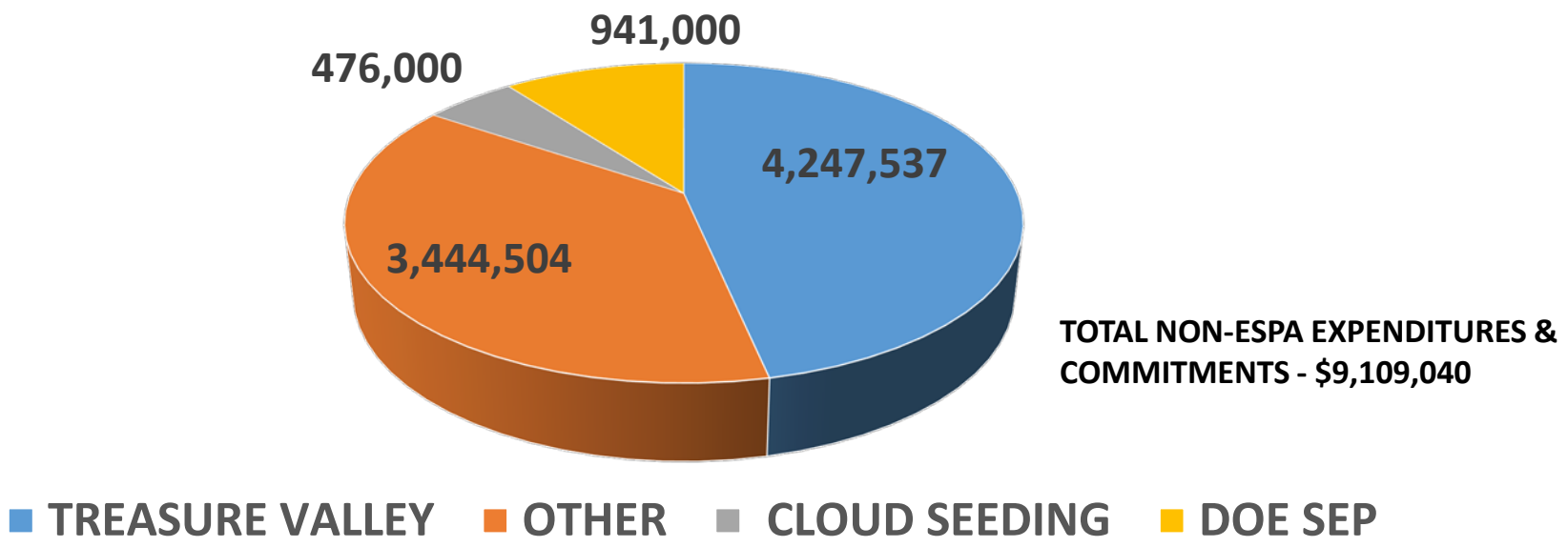
Used for Aquifer Management



TOTAL EXPENDITURE & COMMITMENTS - $44,039,807

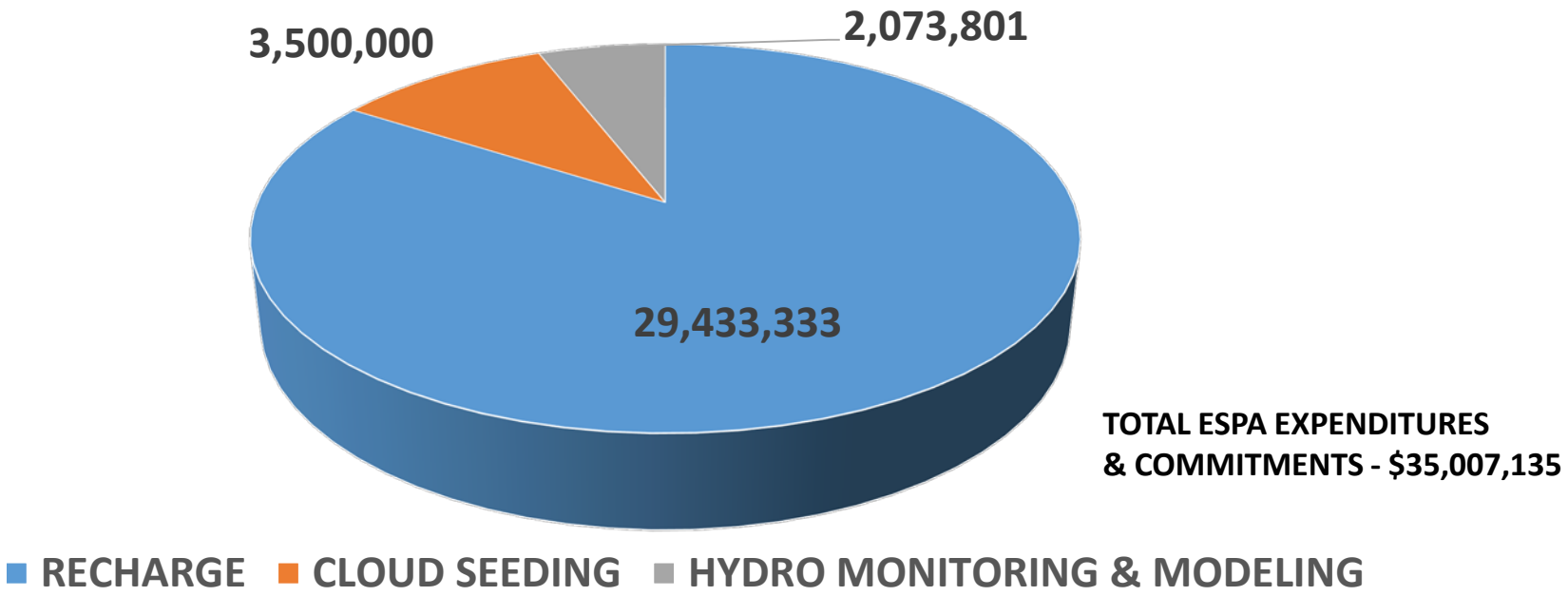
Data from July 1, 2008 - June 30, 2019

SECONDARY AQUIFER FUND
NON-ESPA EXPENDITURES & COMMITMENTS
AS OF JUNE 30, 2019



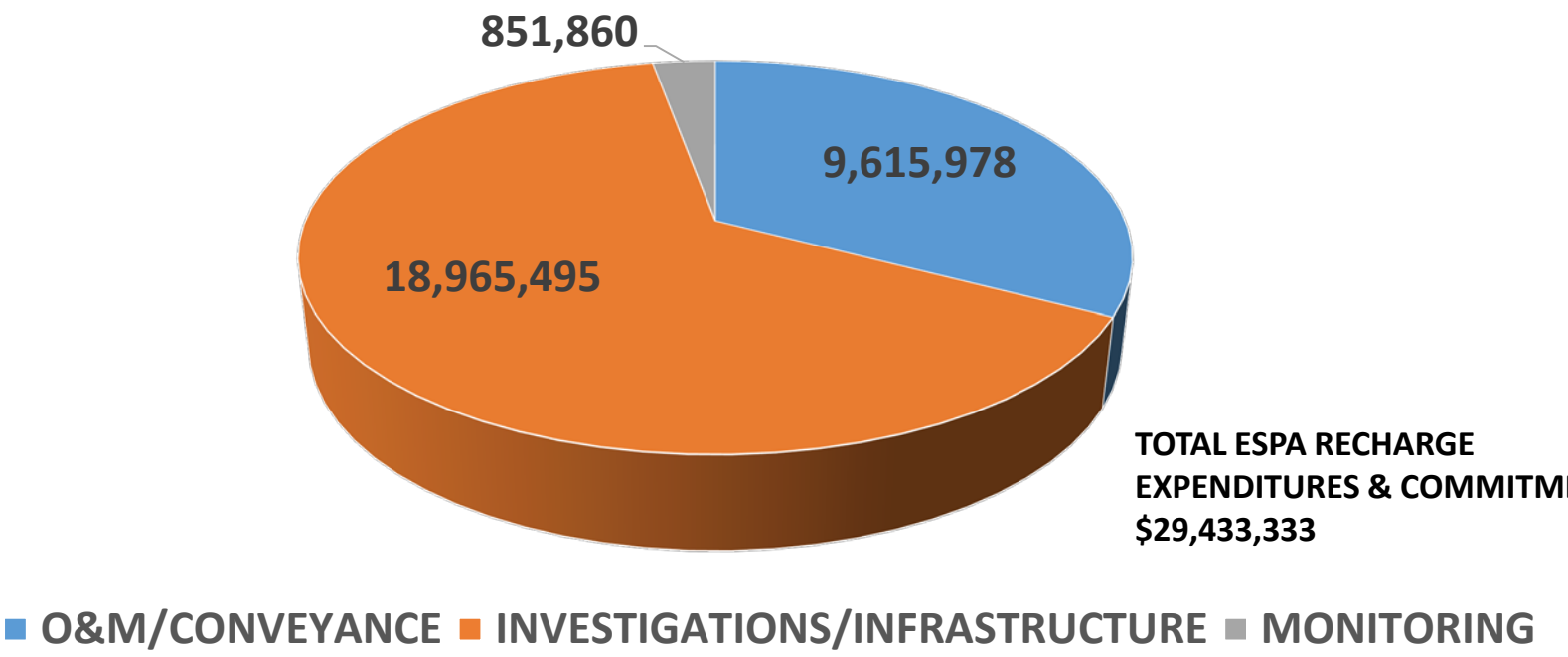
Data from July 1, 2008 - June 30, 2019

SECONDARY AQUIFER FUND
ESPA EXPENDITURES & COMMITMENTS
AS OF JUNE 30, 2019



Data from July 1, 2008 - June 30, 2019

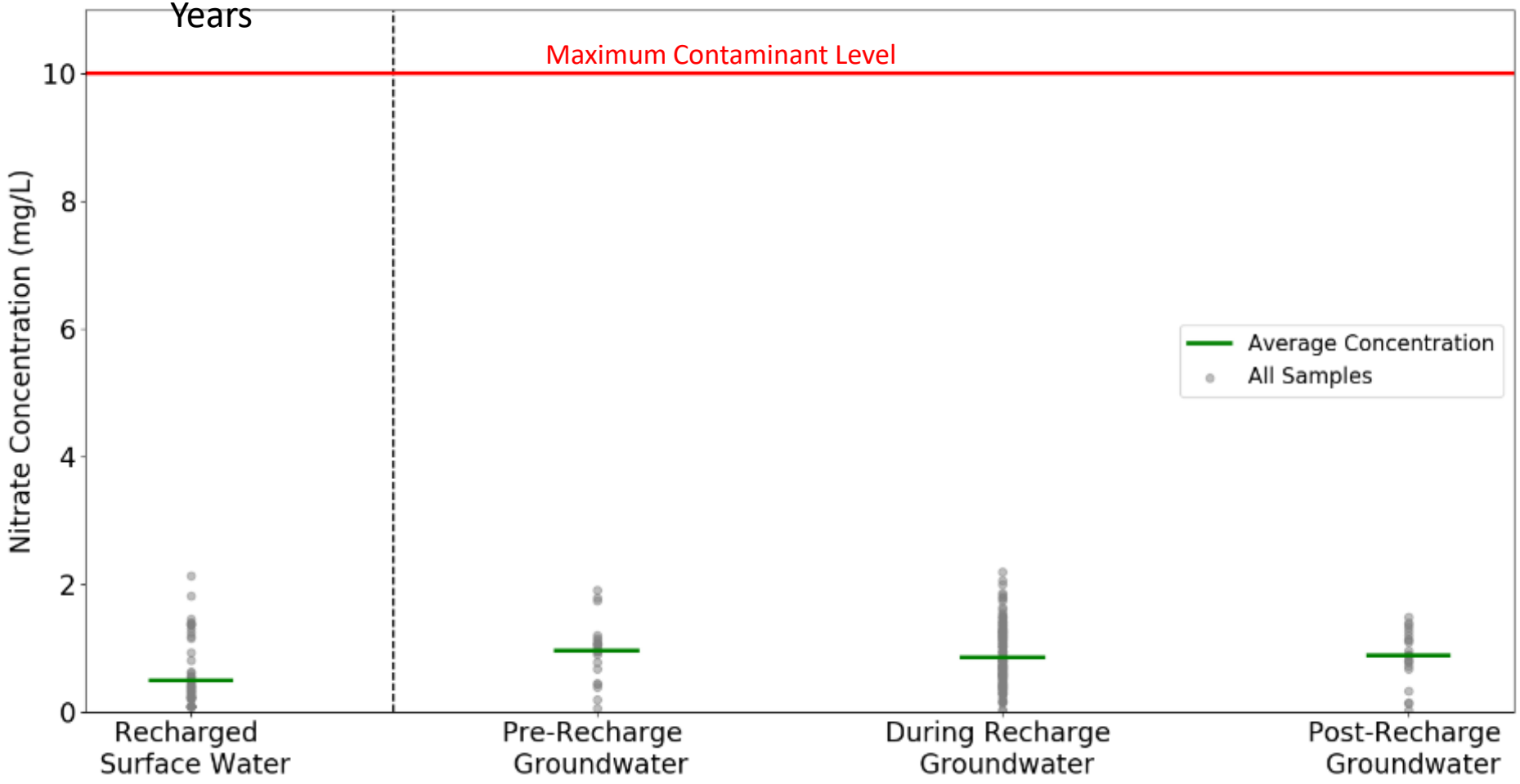
SECONDARY AQUIFER FUND
ESPA RECHARGE EXPENDITURES & COMMITMENTS
AS OF JUNE 30, 2019

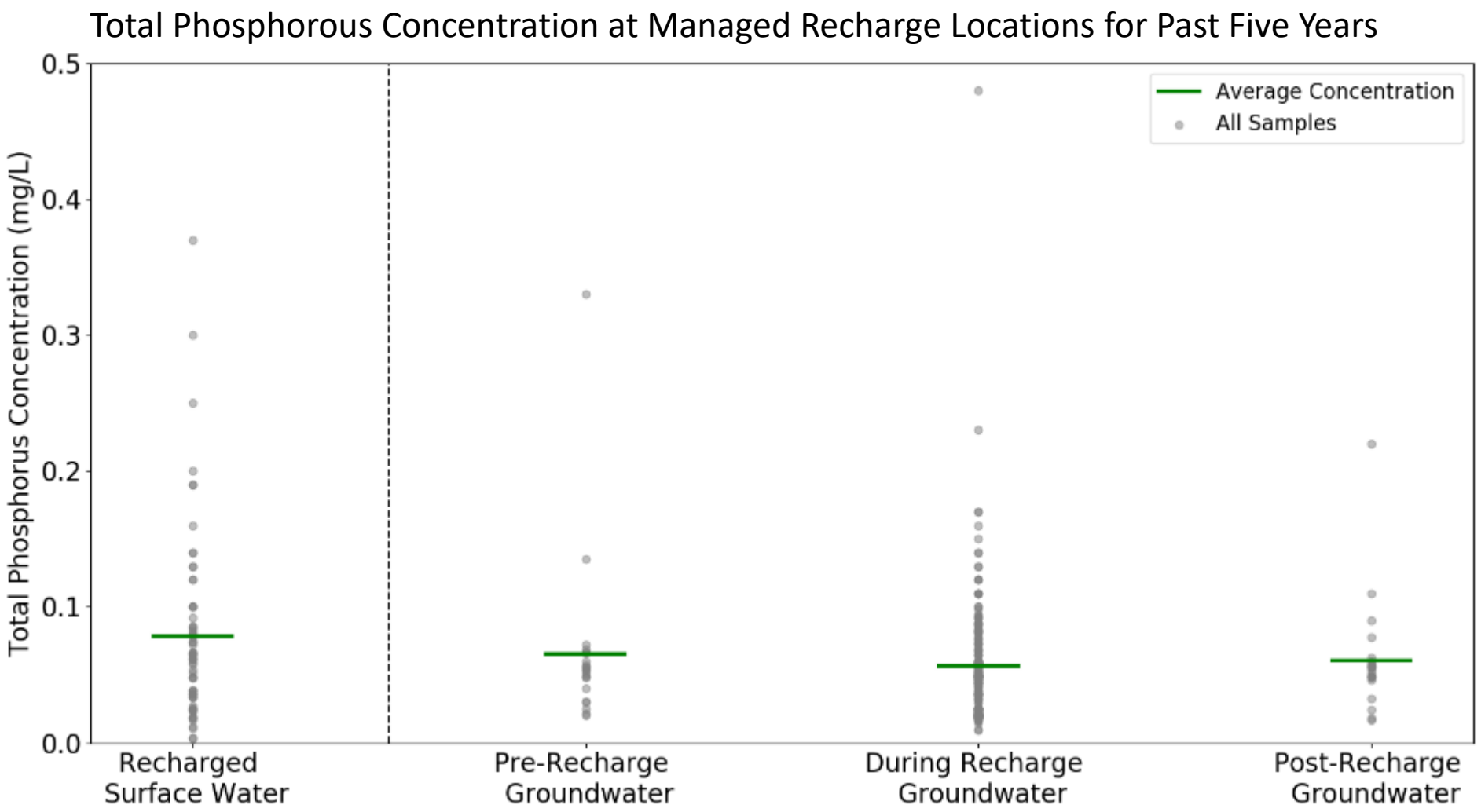


TOTAL ESPA RECHARGE EXPENDITURES & COMMITMENTS - $29,433,333

Data from July 1, 2008 - June 30, 2019

Nitrate Concentration at Managed Recharge Locations for Past Five Years




Total Phosphorous Concentration at Managed Recharge Locations for Past Five Years
Total Phosphorus Concentration (mg/L)
0.5
0.4
0.3
0.2
0.1
0.0
Average Concentration
All Samples
Recharged Surface Water
Pre-Recharge Groundwater
During Recharge Groundwater
Post-Recharge Groundwater