AGENDA

IDAHO WATER RESOURCE BOARD

Workshop Meeting on
Efforts to Resolve Eastern Snake Plain Aquifer Issues

September 17, 2015 at 8:30 am

University of Idaho Aquaculture Research Institute/ Hagerman Fish Culture Experiment Station
3059F National Fish Hatchery Rd
Hagerman, ID 83332

1. Introductory Remarks
   Speaker Scott Bedke, Senator Steve Bair, Chairman Roger Chase
2. Aquifer Decline Background
   Mathew Weaver, IDWR Deputy Director
3. Surface Water Coalition Settlement Overview
   Speaker Scott Bedke
4. IWRB Managed Recharge Program
   Brian Patton, IDWR Planning Bureau Chief
5. Proposed Hagerman Valley Settlement
   Clive Strong, Deputy Attorney General
6. Aquifer and Springflow/reach gain modeled response to recharge and settlement actions
   Michael McVay, IDWR Technical Hydrogeologist
7. Wrap-Up
   Speaker Scott Bedke and Senator Steve Bair

---The meeting will break for lunch at approximately 12:00pm.---

1:00 pm: IWRB Field Trip to selected points of interest related to Eastern Snake Plain Aquifer solutions including the Rangen Pipeline and the Shoshone Recharge site. Transportation will be provided for Board members, staff, and invited guests.

Americans with Disabilities

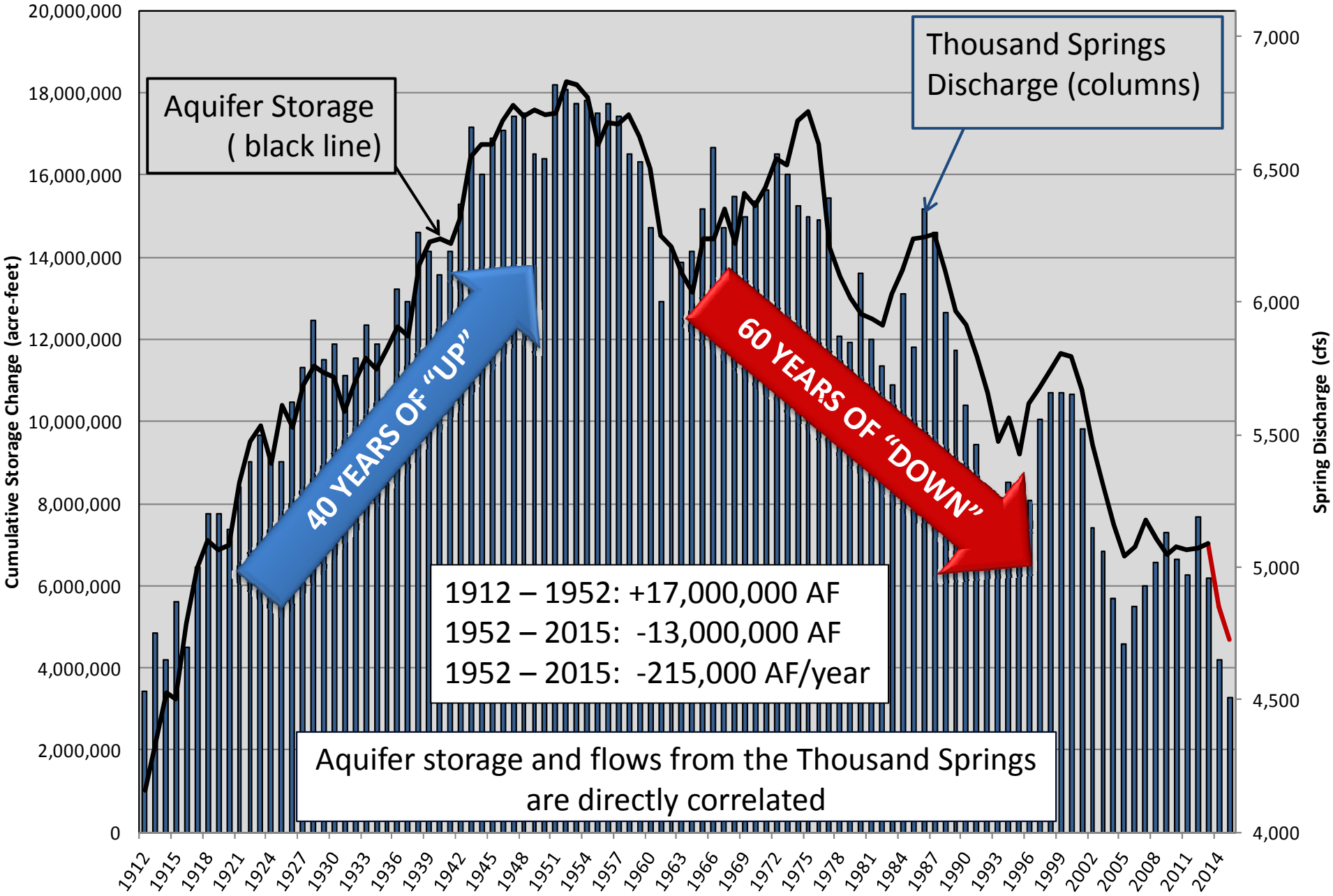
The meeting will be held in facilities that meet the accessibility requirements of the Americans with Disabilities Act. If you require special accommodations to attend, participate in, or understand the meeting, please make advance arrangements by contacting Department staff by email Mandi.Pearson@idwr.idaho.gov or by phone at (208) 287-4800.

History of Aquifer Declines on the Eastern Snake Plain and Related Implications

Idaho Water Resource Board Meeting

Presented by Mat Weaver, September 17, 2015

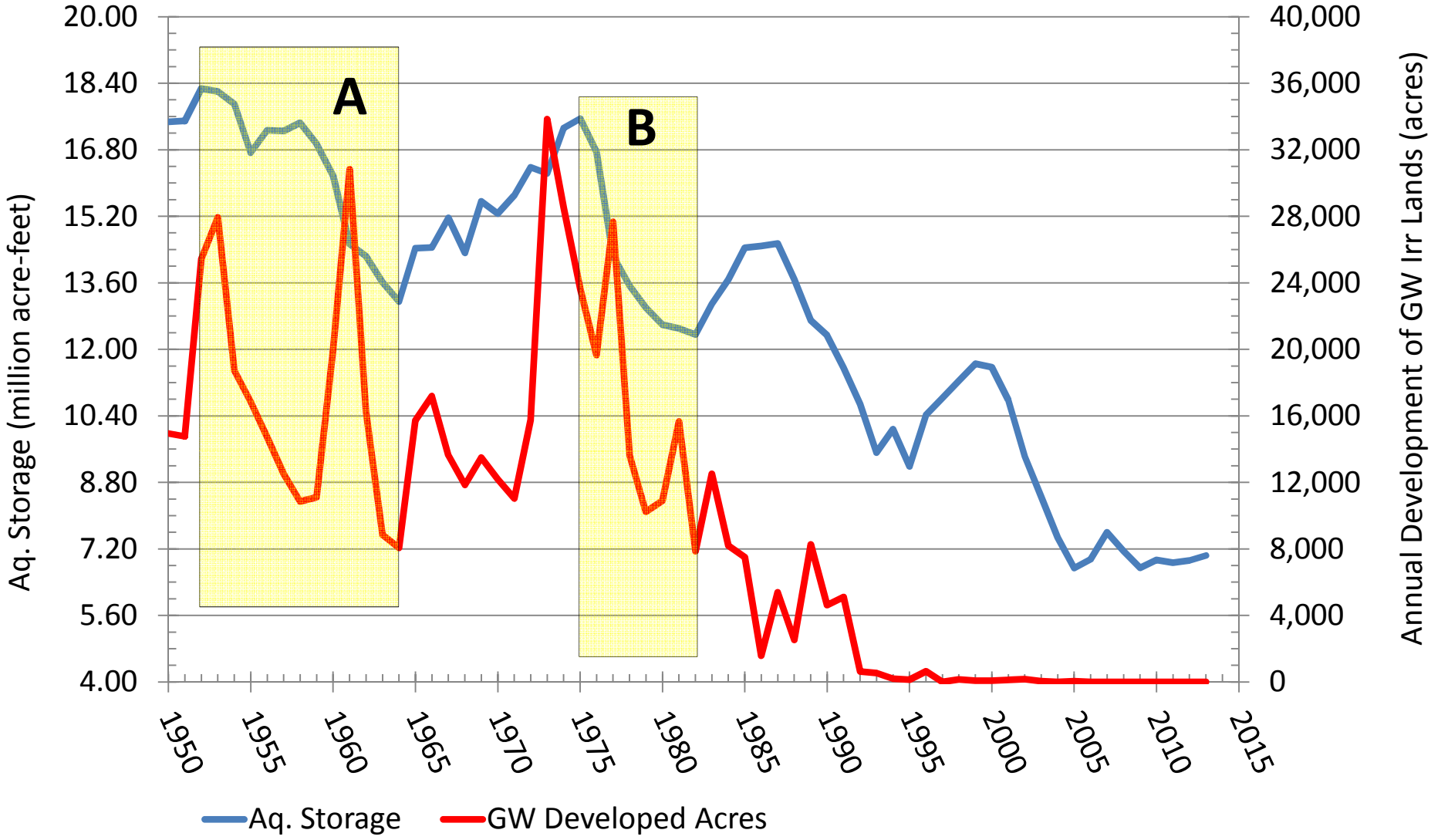
ESPA Change in Storage Volume & Thousand Springs Discharge



Factors Effecting Declines in the ESPA

- Increase in GW Diversions
- Increase in surface water irrigation efficiencies (i.e. less incidental recharge)
- Winter Water Savings
- Flow Augmentation Releases
- Changing Climate

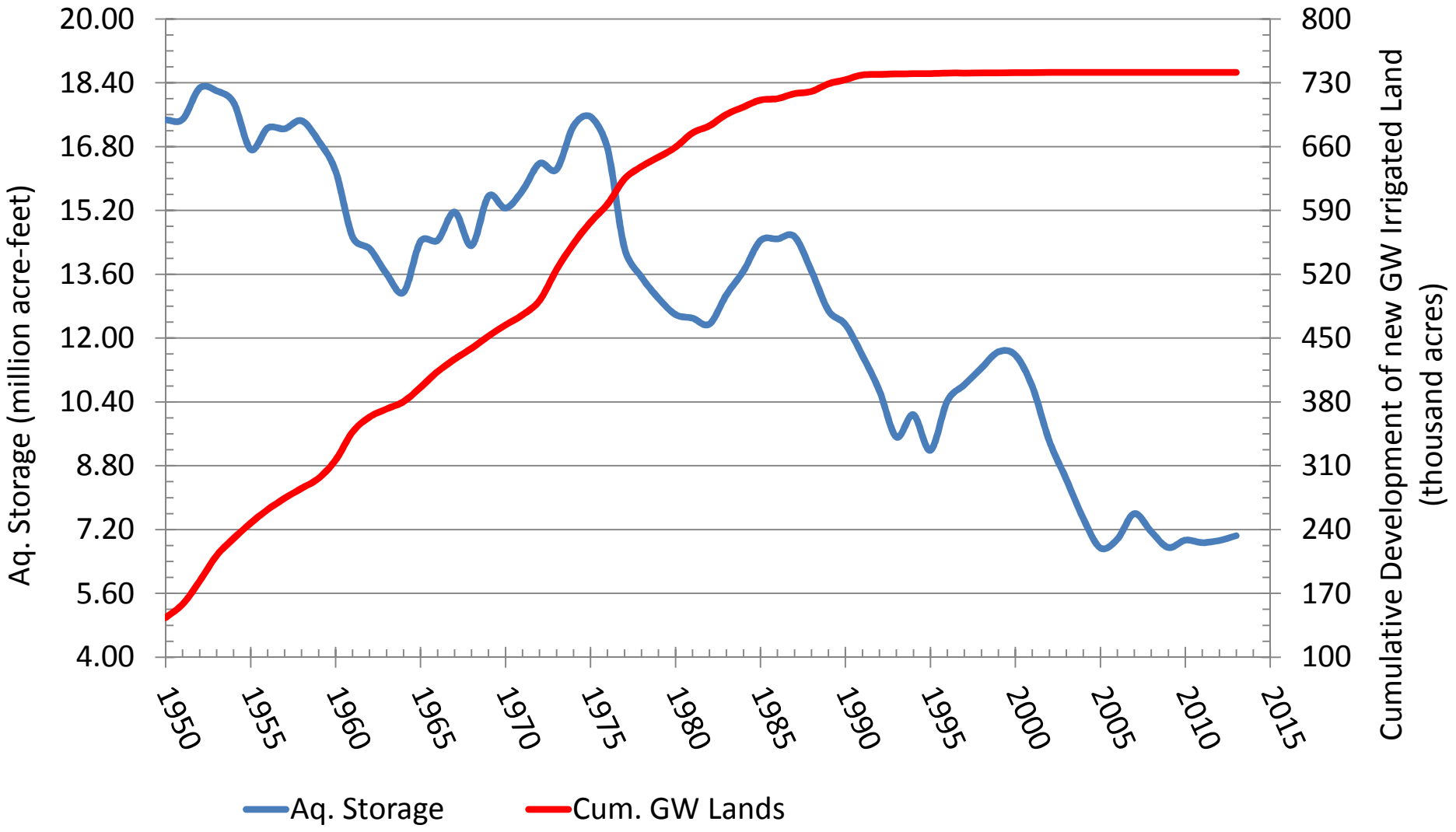
Aquifer Storage and GW Irrigation Development



IDAHO Department of Water Resources

*Irrigated acreage is estimated by summing total WR diversion rates developed in a single year and assuming a standard duty of water of 0.02 CFS per acre.

Aquifer Storage and Cum. GW Irrigation Development



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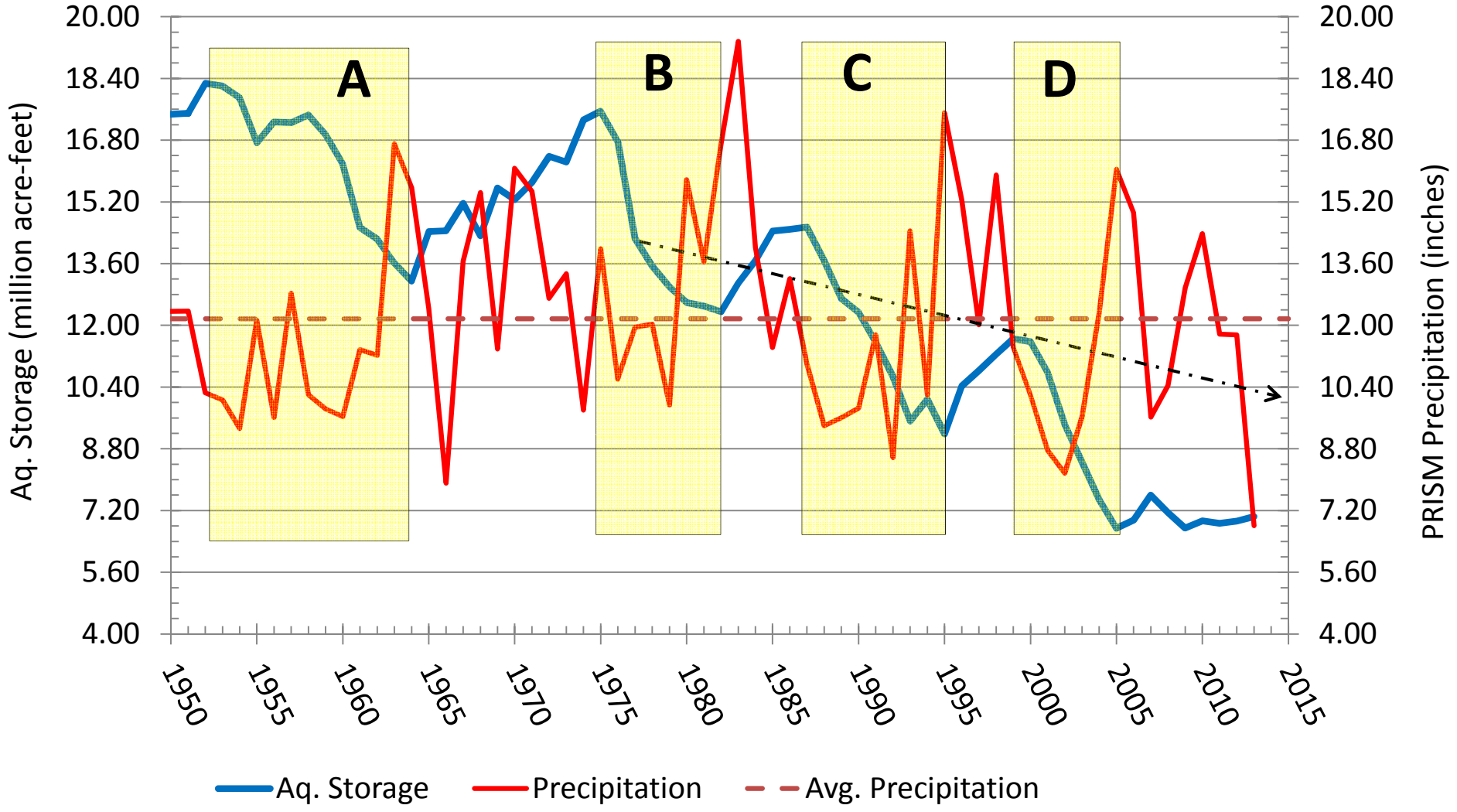
Aquifer Storage and Precipitation



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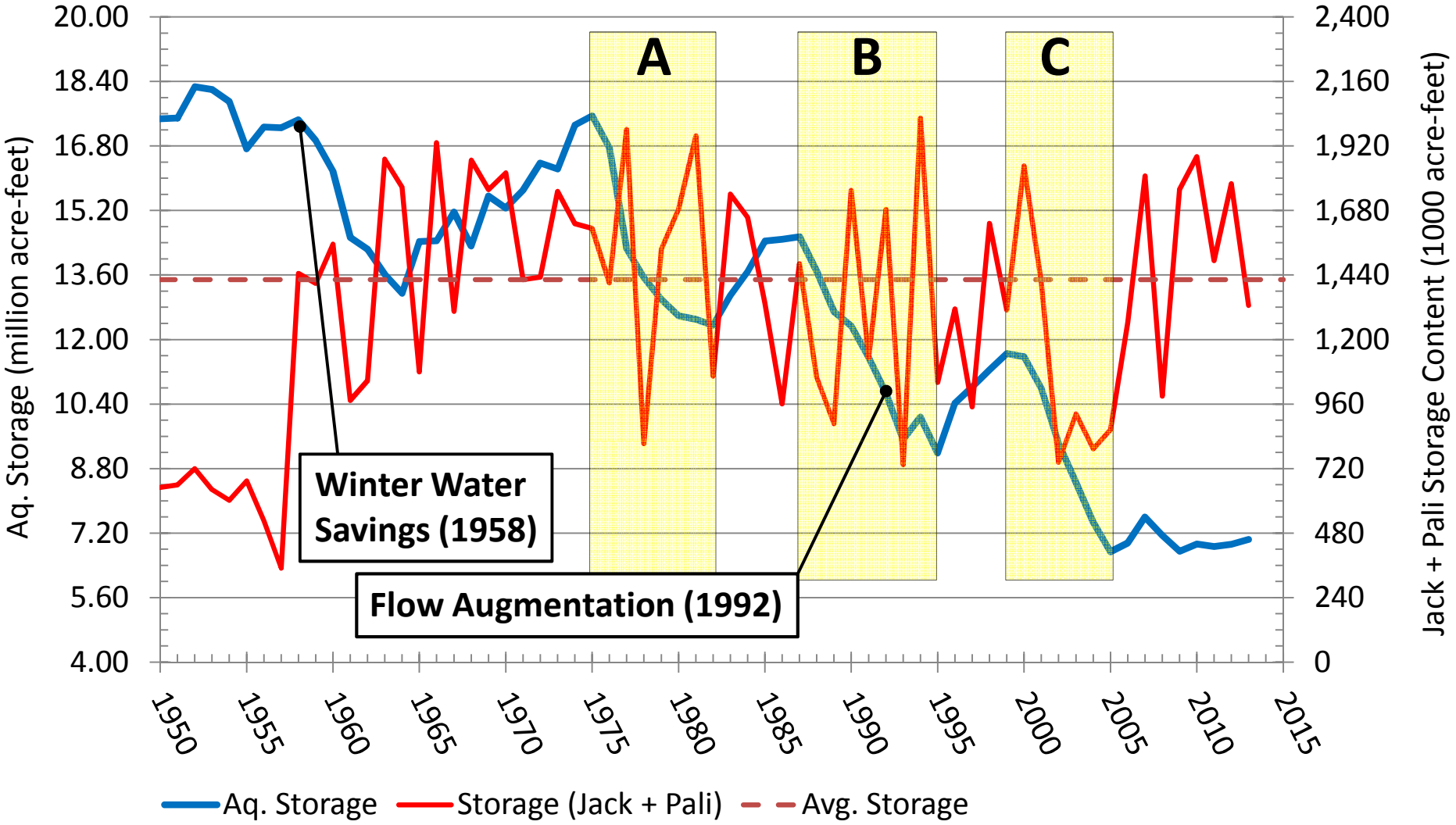
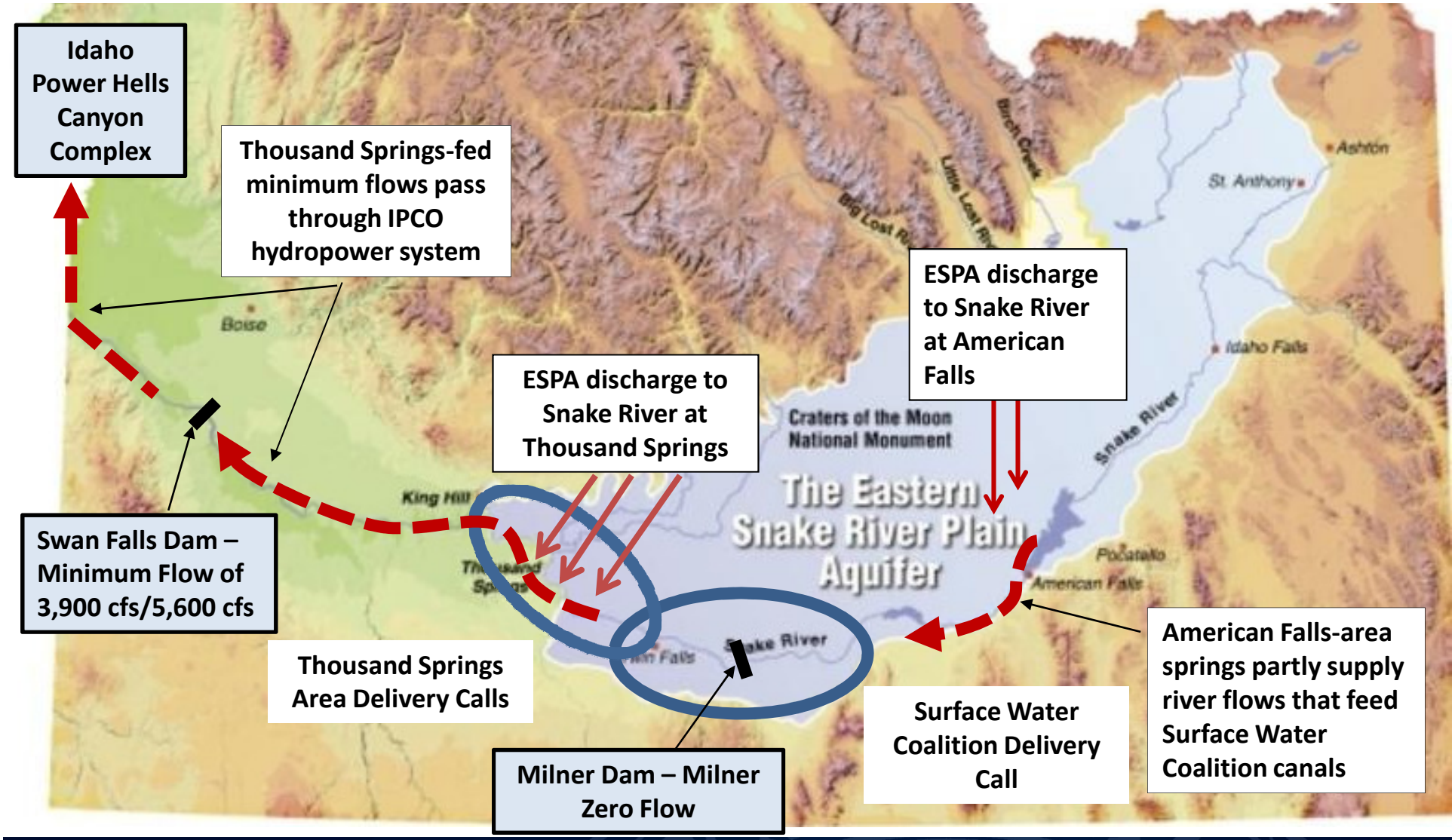
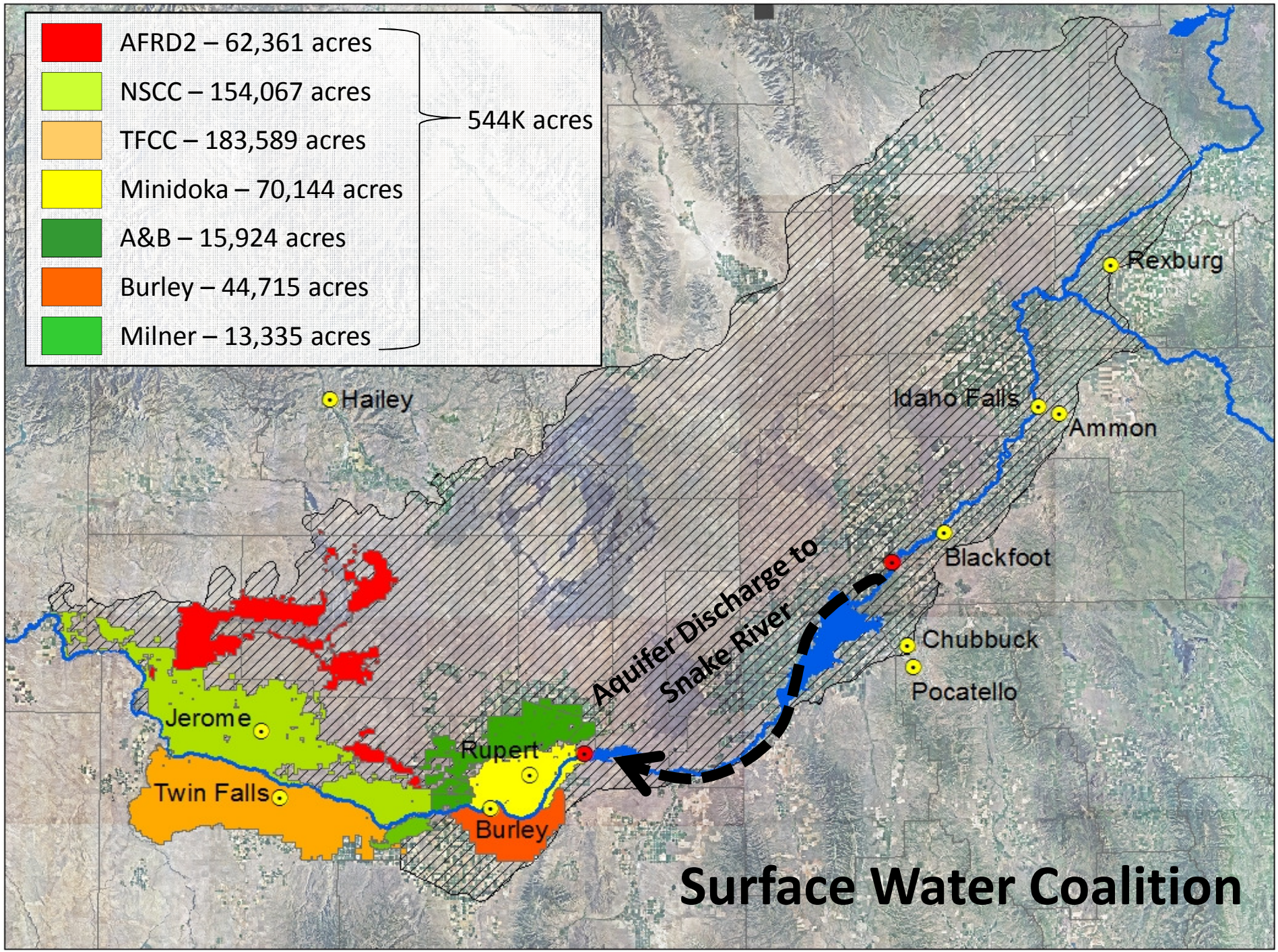
*Precipitation data is PRISM precipitation data for the entire year averaged for Bingham, Blaine, Bonneville, Butte, Clark, Jefferson, Jerome, Gooding, Lincoln, Minidoka, and Power Co.

Aquifer Storage and Reservoir Storage

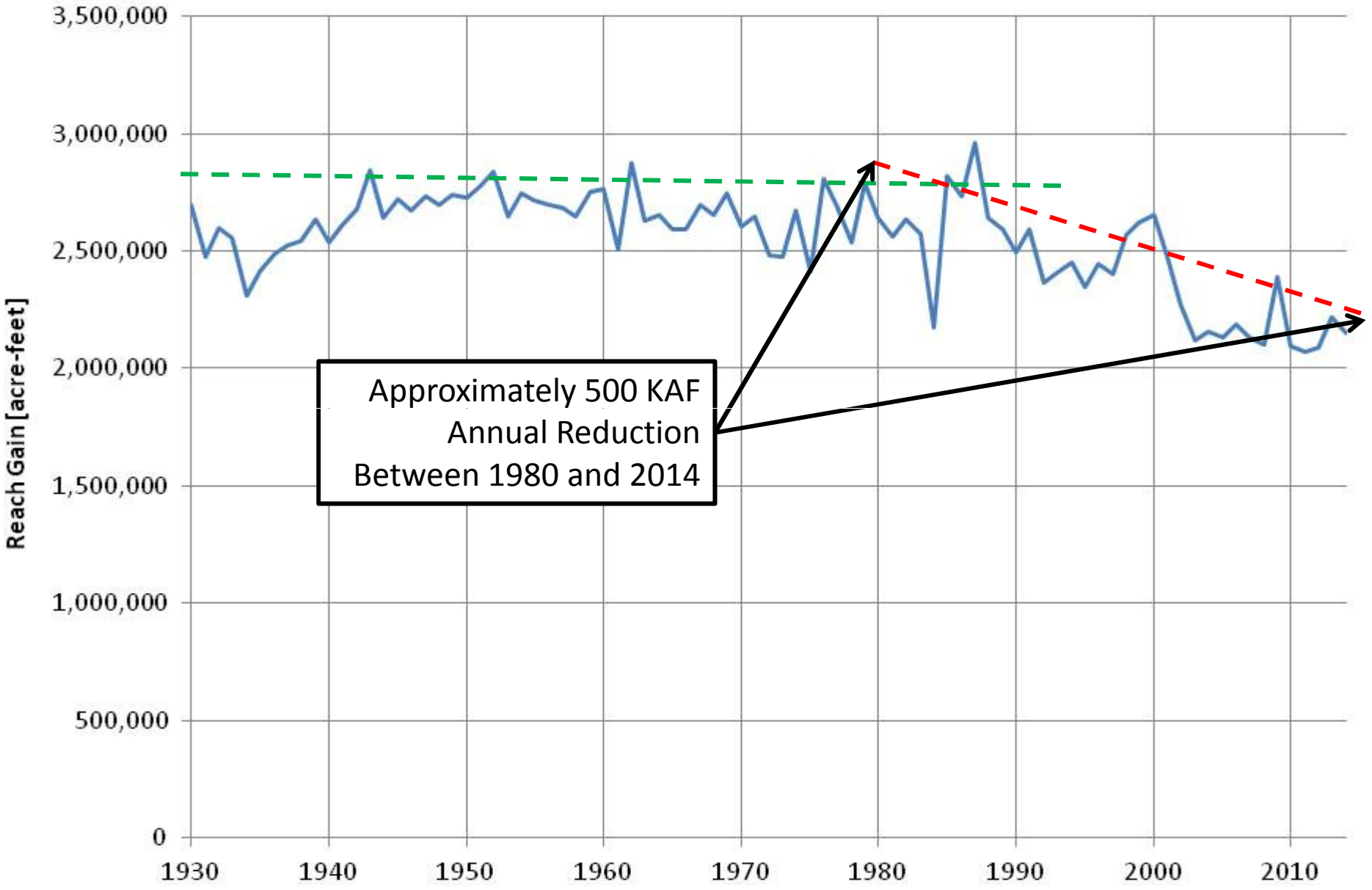


ESPA and the Snake River – A Combined System

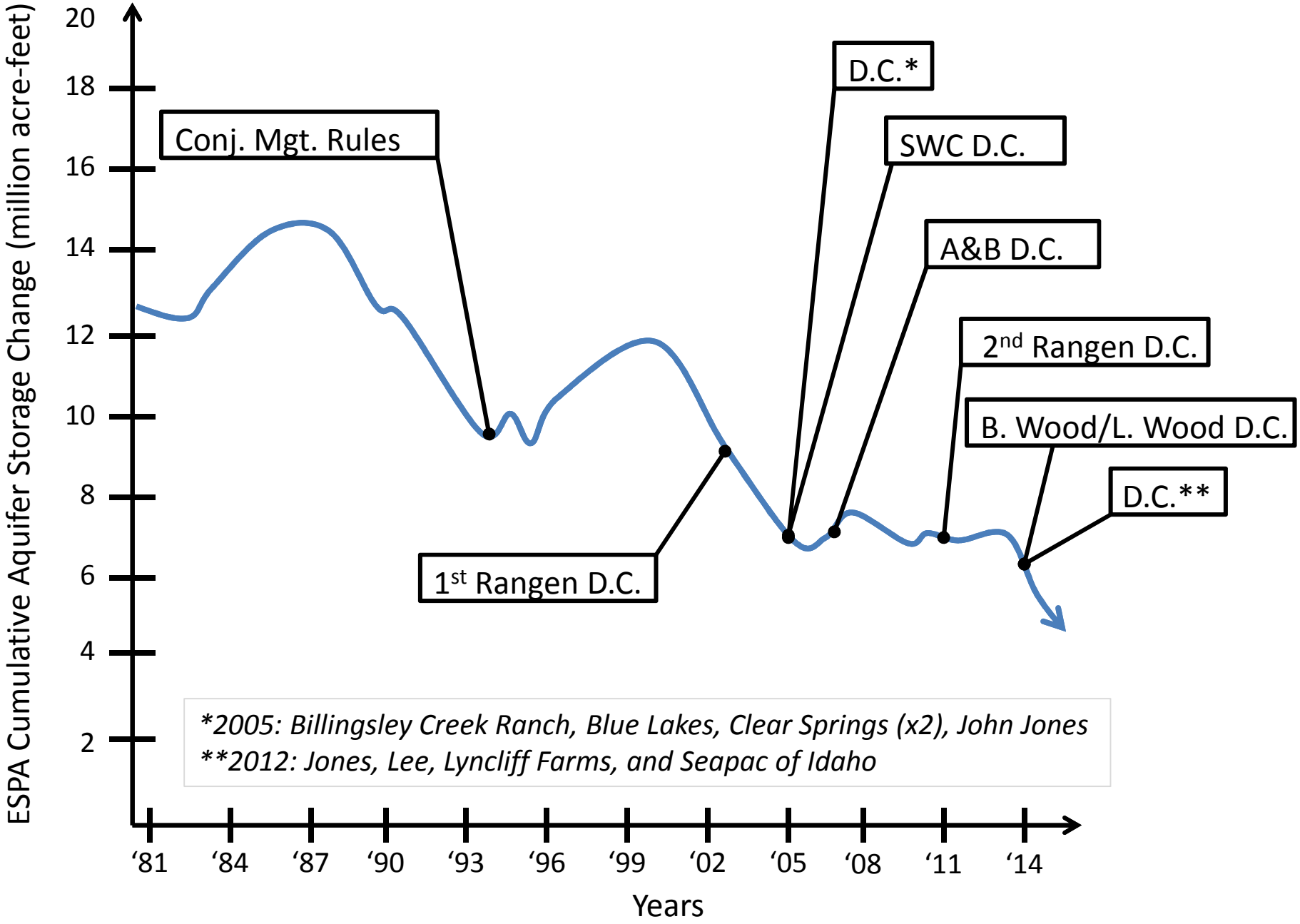



AFRD2 – 62,361 acres
NSCC – 154,067 acres
TFCC – 183,589 acres
Minidoka – 70,144 acres
A&B – 15,924 acres
Burley – 44,715 acres
Milner – 13,335 acres
544K acres
Rexburg
Hailey
Idaho Falls
Ammon
Blackfoot
Aquifer Discharge to Snake River
Chubbuck
Pocatello
Jerome
Rupert
Twin Falls
Burley
Surface Water Coalition

Near Blackfoot to Minidoka River Reach Gains



Cumulative Change in Aquifer Volume vs. ESPA Delivery Calls



ESPA Stabilization and Swan Falls Agreement

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

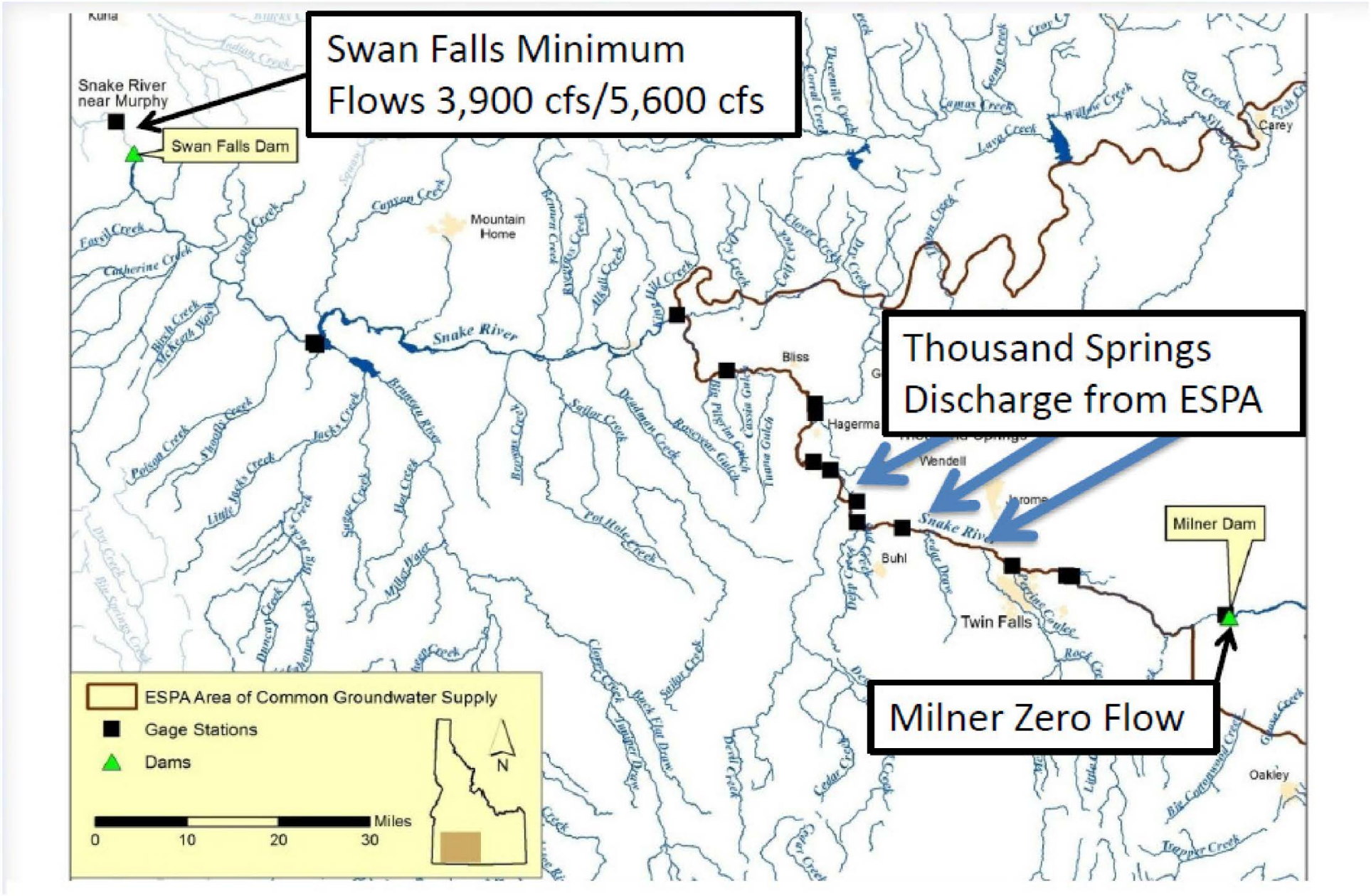
- 3,900 cfs (4/1 through 10/31)
- 5,600 cfs (11/1 through 3/31)

Swan Falls Dam

However, 180 miles Upstream at Milner Dam

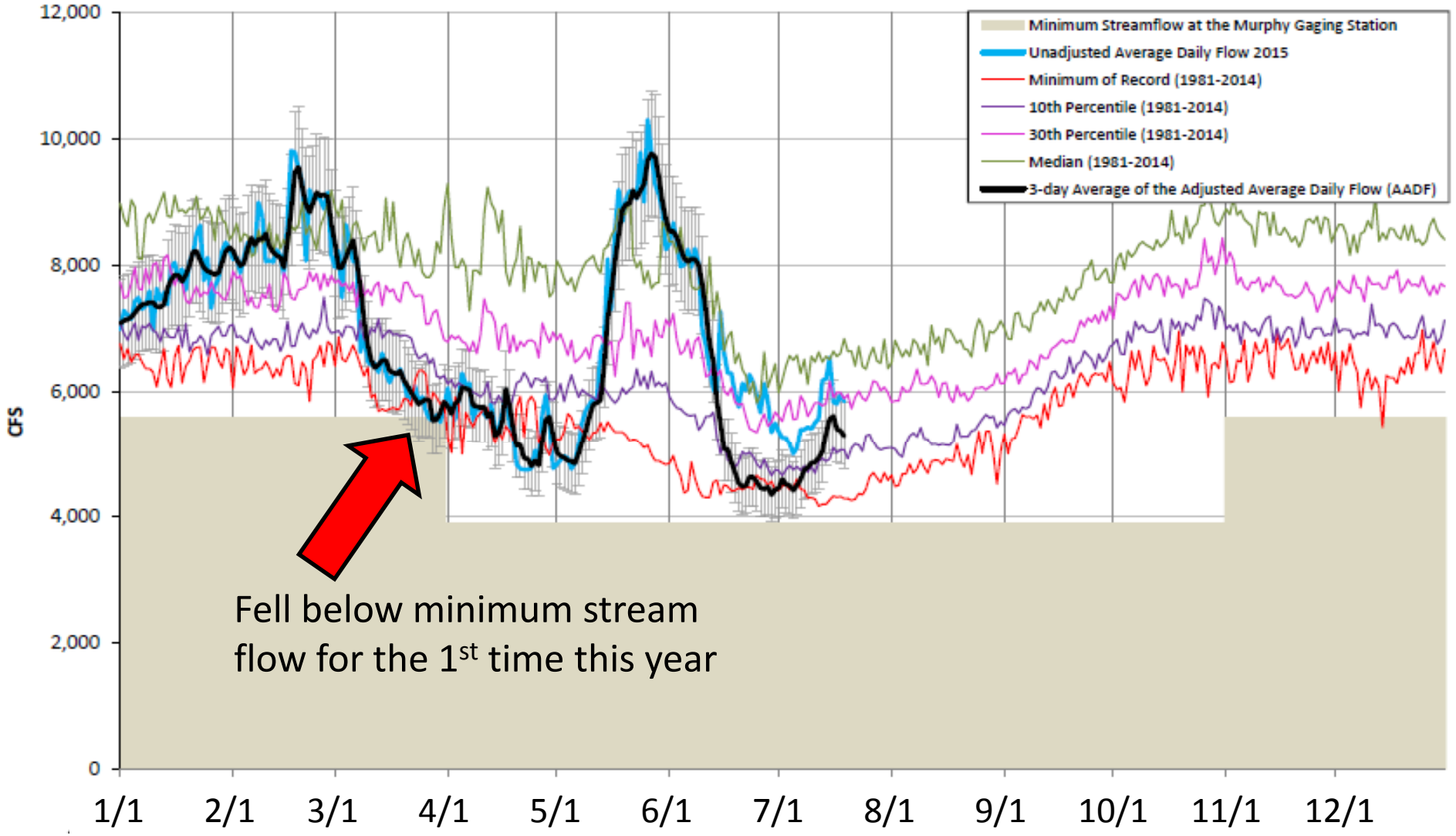
Milner Dam

- 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 Dam, flow at Swan Falls Dam is made up almost entirely of spring flows from the ESPA.

2015 Snake River Hydrograph at Swan Falls Dam



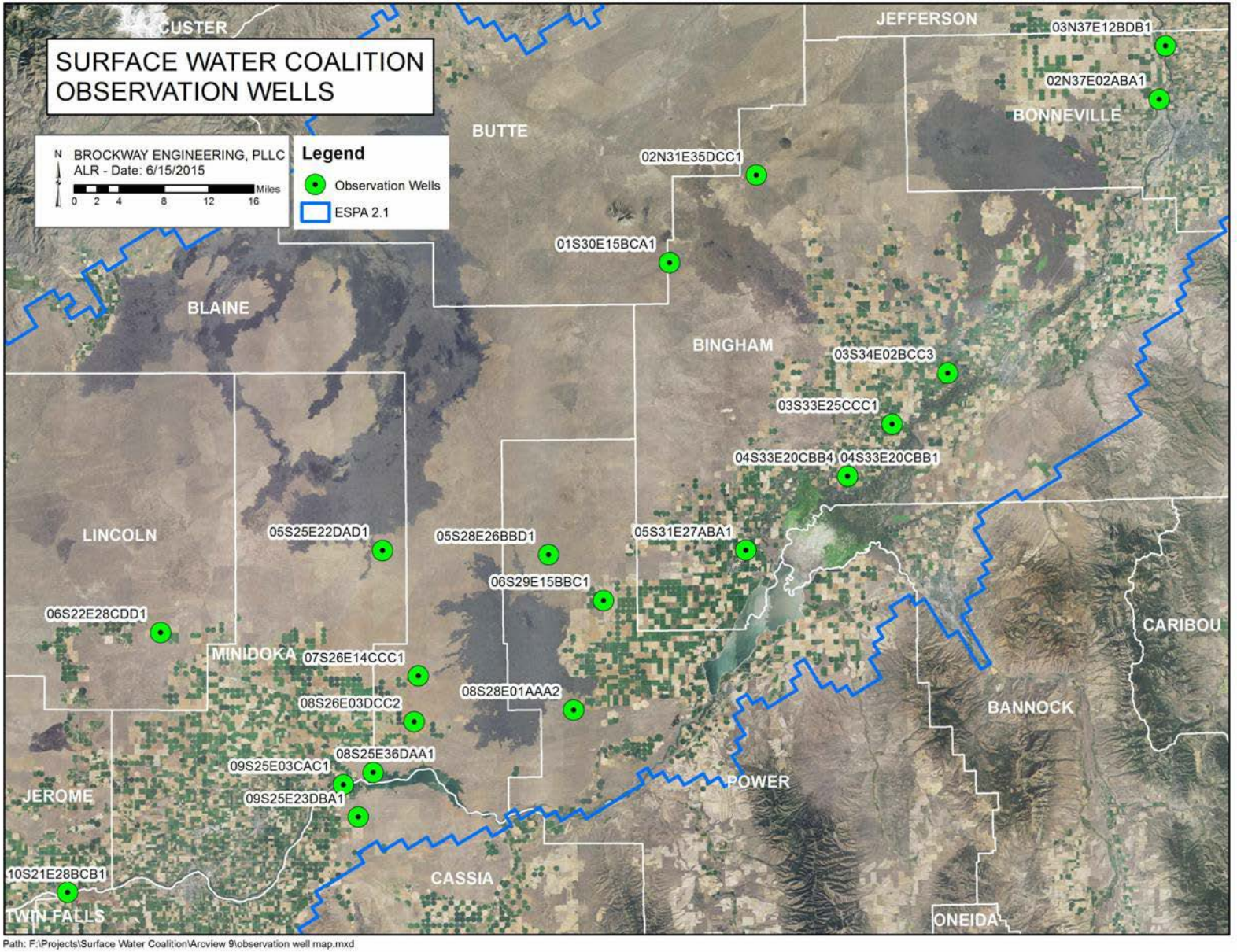
Swan Falls Agreement Minimum Streamflow
Unadjusted Average Daily Flow 2015
Minimum of Record (1981-2014)
10th Percentile (1981-2014)
30th Percentile (1981-2014)
Median (1981-2014)
3-day Average Adjusted Daily Flow

The End

STOP the DROP

SURFACE WATER COALITION DELIVERY CALL SETTLEMENT AGREEMENT OVERVIEW
AGREEMENT ENTERED INTO JUNE 30, 2015 AND FINALIZED AUGUST 1, 2015 BETWEEN PARTICIPATING MEMBERS OF THE SURFACE WATER COALITION AND THE IDAHO GROUND WATER APPROPRIATORS, INC.

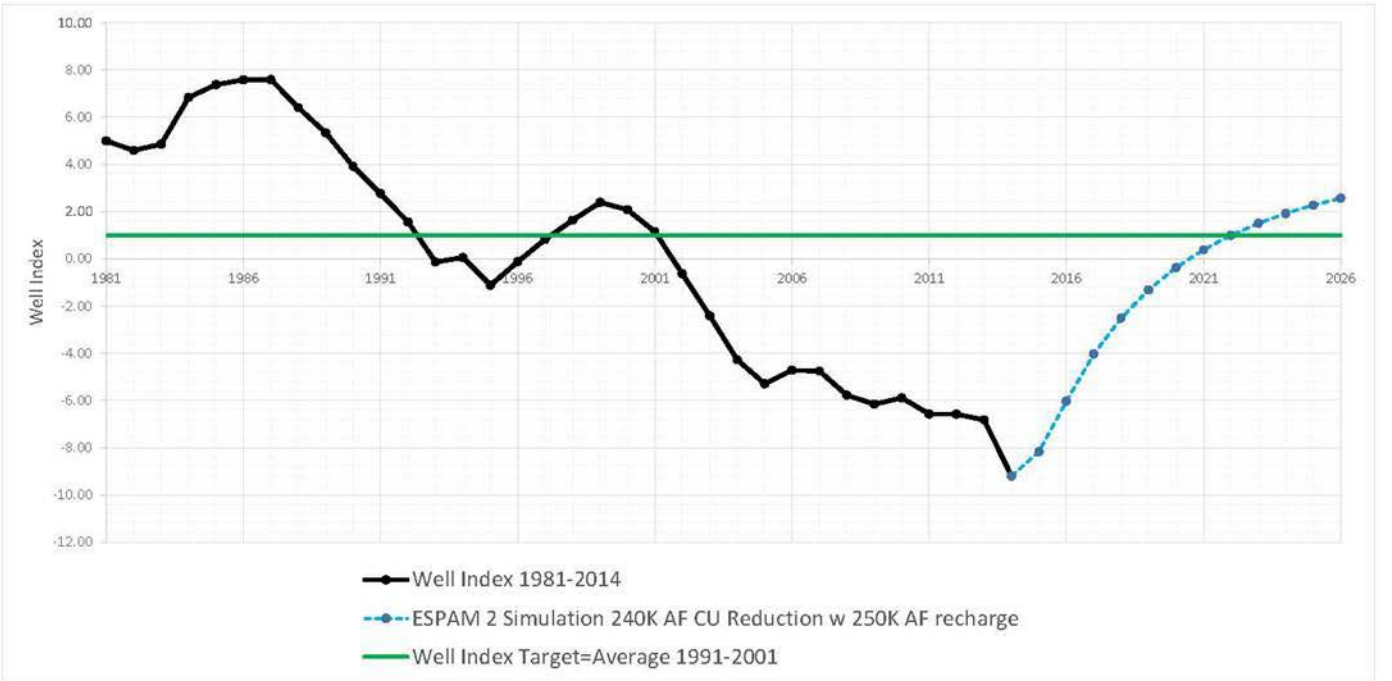
1. **Objectives**
    a. Mitigate for material injury to senior water users in the Surface Water Coalition (SWC) Delivery Call
    b. Provide safe harbor to participating ground water users in participating Ground Water Districts (GWD)
    c. Minimize economic impact to water users and the State economy
    d. Increase reliability and enforcement of water use, measurement, and reporting across the Eastern Snake Plain
    e. Develop adaptive management plan to stabilize and enhance the Eastern Snake Plain Aquifer (ESPA) ground water levels to meet existing water right needs
2. **Near Term Practices (2015 Water Year)**
    a. Delivery of 110,000 acre-feet of storage water to SWC by Idaho Ground Water Appropriators (IGWA)
    b. Dedication of $1.1 million to provide water to existing conversion projects
3. **Long Term Practices (Commencing 2016)**
    a. Consumptive use reduction of ground water by 240,000 acre-feet annually
    b. Annual storage water delivery of 50,000 acre-feet
    c. Irrigation season reduction: April 1 – October 31 (benefit to Swan Falls min. flows)
    d. Mandatory installation of approved measurement devices by 2018
    e. Support State sponsored recharge program of 250,000 acre-feet annually
    f. Additional support for the following: NRCS conservation programs; new conversion projects; management of Trust Water Rights; and participation in review and possible recommendations of changes to IDWR administrative processes on the ESPA.
4. **Term Sheet Benchmarks and Ground Water Level Goal**
    a. Goal: stabilize and ultimately reverse the trend of declining ground water levels and return ground water levels to levels equal to the average ground water levels from 1991-2001
    b. Benchmarks: (1) by 2020 ground water levels will equal ground water levels in 2015; (2) by 2023 ground water levels will be halfway between 2015 ground water levels and the goal; and (3) by 2026 goal is reached and ground water levels equal or exceed 1991 – 2001 average.
    c. Metrics: ground water levels are measured in 19 mutually agreed to sentinel wells
5. **Adaptive Management**
    a. If any benchmarks or the ground water level goal is not met, additional recharge, consumptive use reduction, or other measures shall be implemented by the participating water parties to meet the goal.



Path: F:\Projects\Surface Water Coalition\Arcview 9\observation well map.mxd

7/15/2015

Figure 1: IGWA-SWC Well Index with ESPAM2 Simulated Benefit from 240K AF of Consumptive Use Reduction & 250K AF Recharge



This figure shows a time-series of the IGWA-SWC Well Index. The historic index values cover 1981-2014 and represent an integration of water level data across a set of mutually agreed to wells. The time-series over the period from 2015-2026 is an ESPAM2 simulated result showing the increase in the projected Well Index from 240K AF of consumptive use reduction (evenly distributed across the GWDs) and 250K AF of recharge. The green line across the chart marks the average value for the Well Index over the period 1991-2001 or the "Well Index Target".

Lynker Technologies
5485 Conestoga Court Suite 220
Boulder, Colorado 80301

Tel: 303.284.8627

ESPA Managed Recharge Program Update

Idaho Water Resource Board
Hagerman, Idaho

Brian Patton

September 17, 2015

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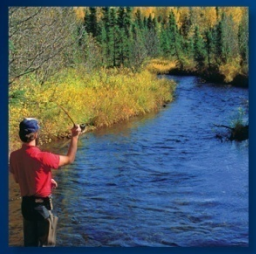

Topics

- ✓State's goals for ESPA recharge
- ✓Factors that define how ESPA recharge is accomplished
- ✓2014-2015 recharge season recap
- ✓Moving forward

Recharge test – Wilson Lake on North Side Canal March 5, 2015

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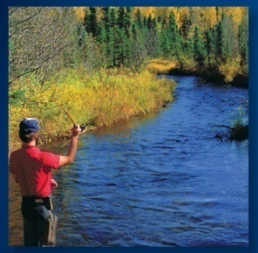
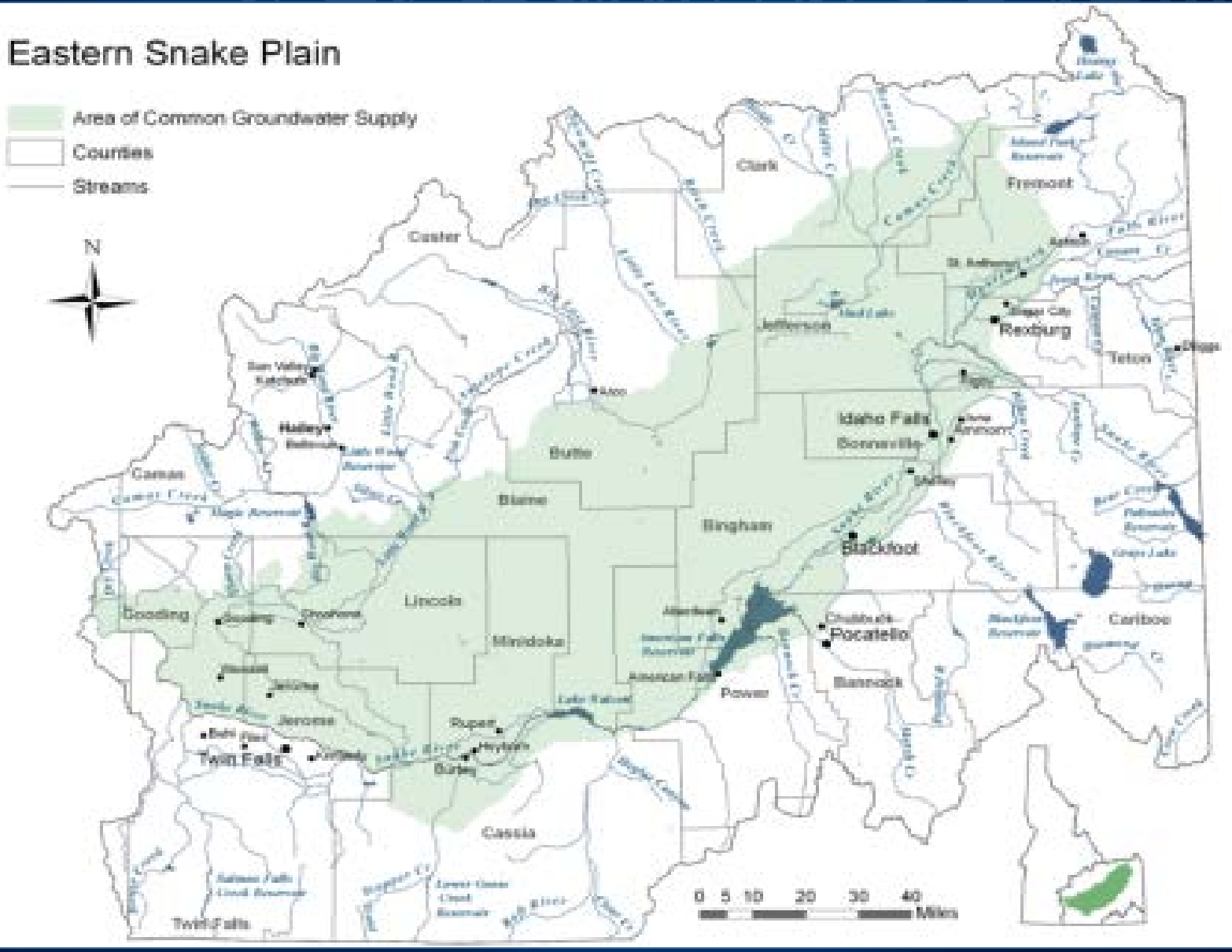
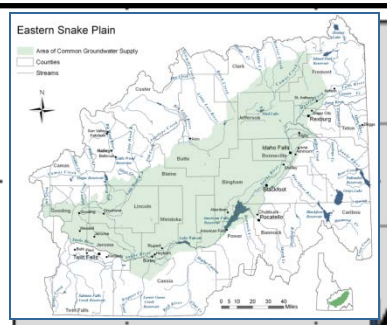


Eastern Snake Plain



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



Aquifer Storage

Thousand Springs Discharge

40 years of "up"

60 years of "down"

1912 – 1952 Change +17,000,000 AF

1952 – 2015 Change -13,000,000 AF

Average annual 1952-2015 loss of aquifer storage is about 215,000 AF

Aquifer storage and flows from the Thousand Springs are directly correlated

Cumulative Storage Change (acre-feet)

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

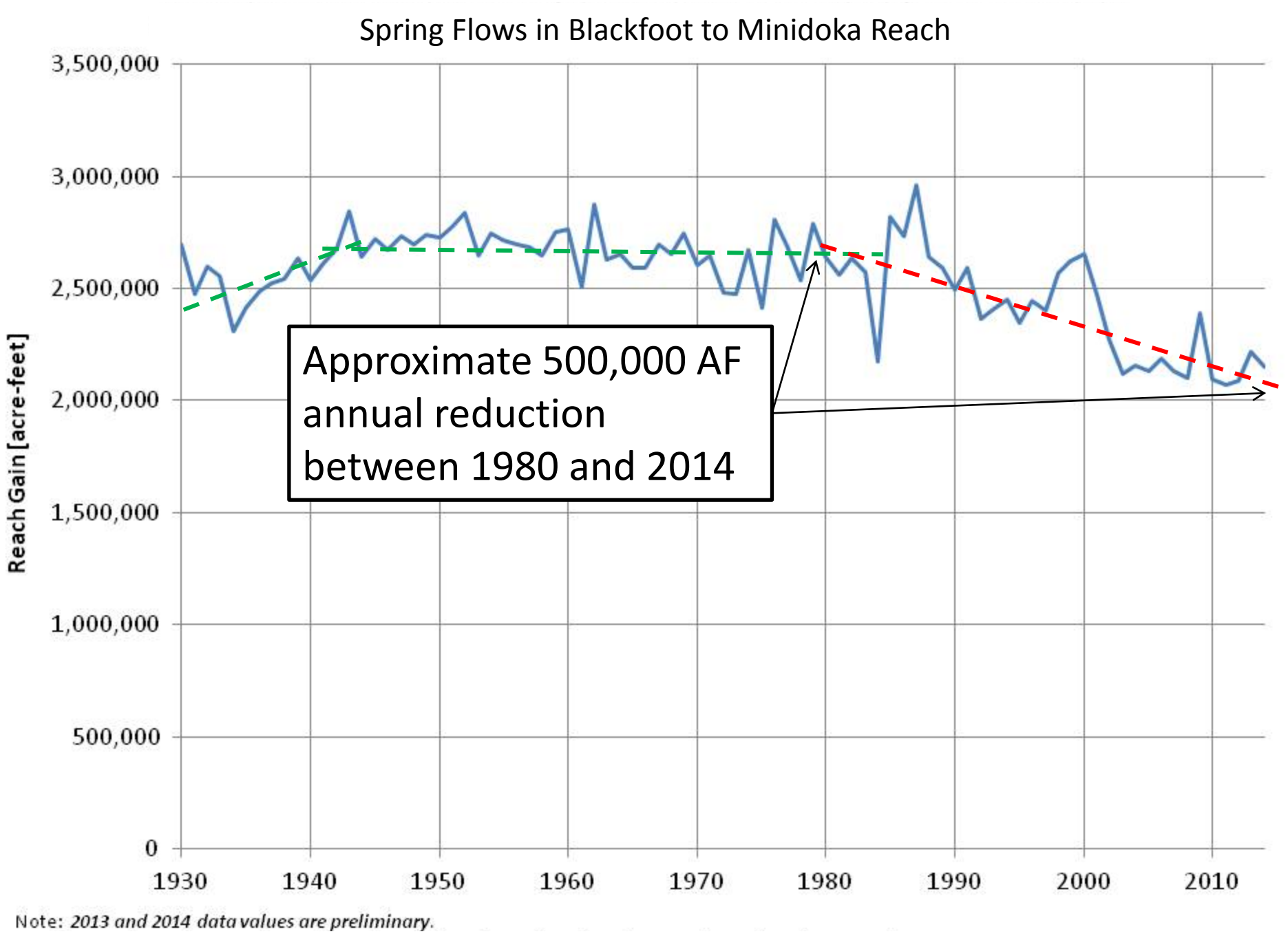
Spring Discharge (cfs)

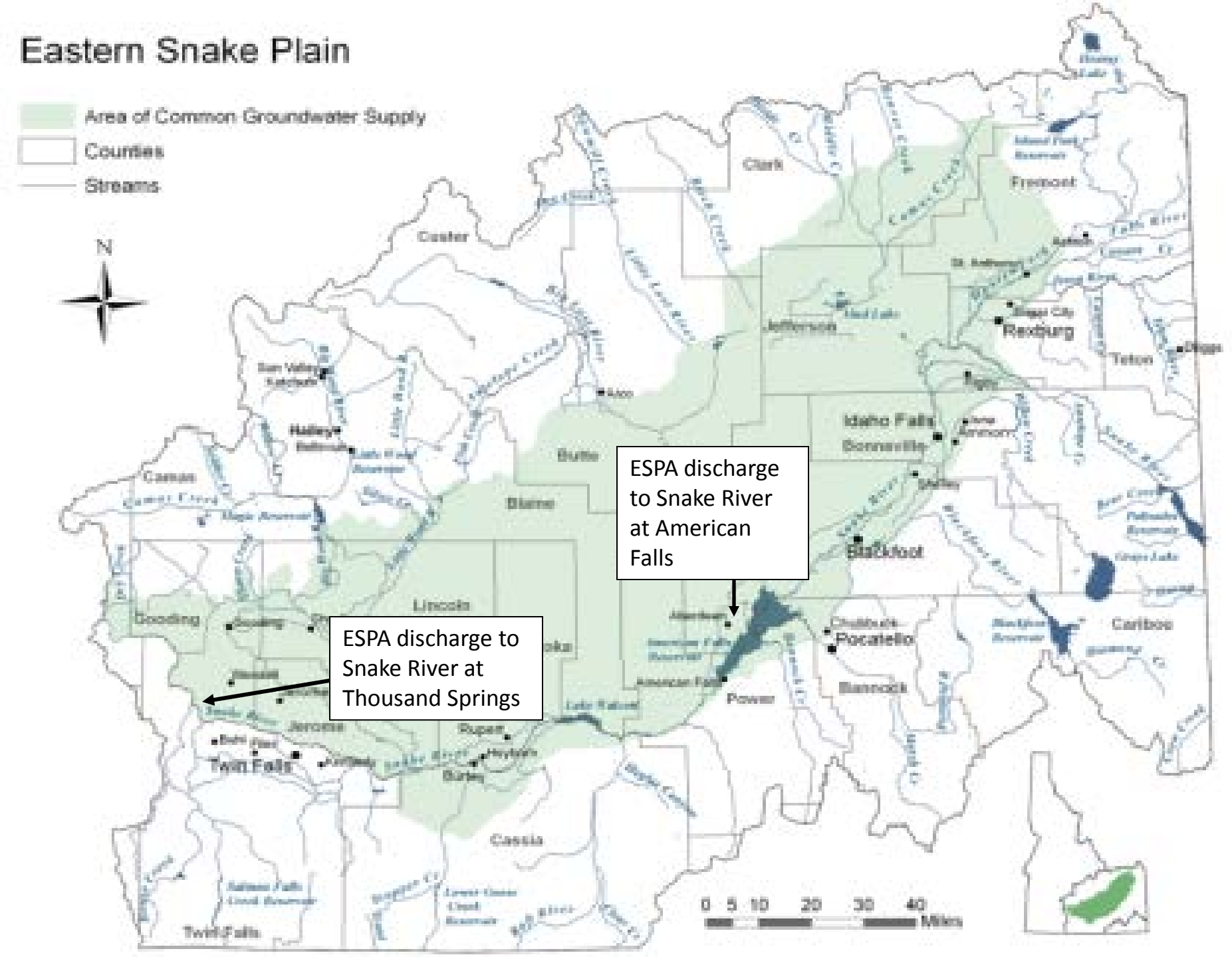
7,000
6,500
6,000
5,500
5,000
4,500
4,000

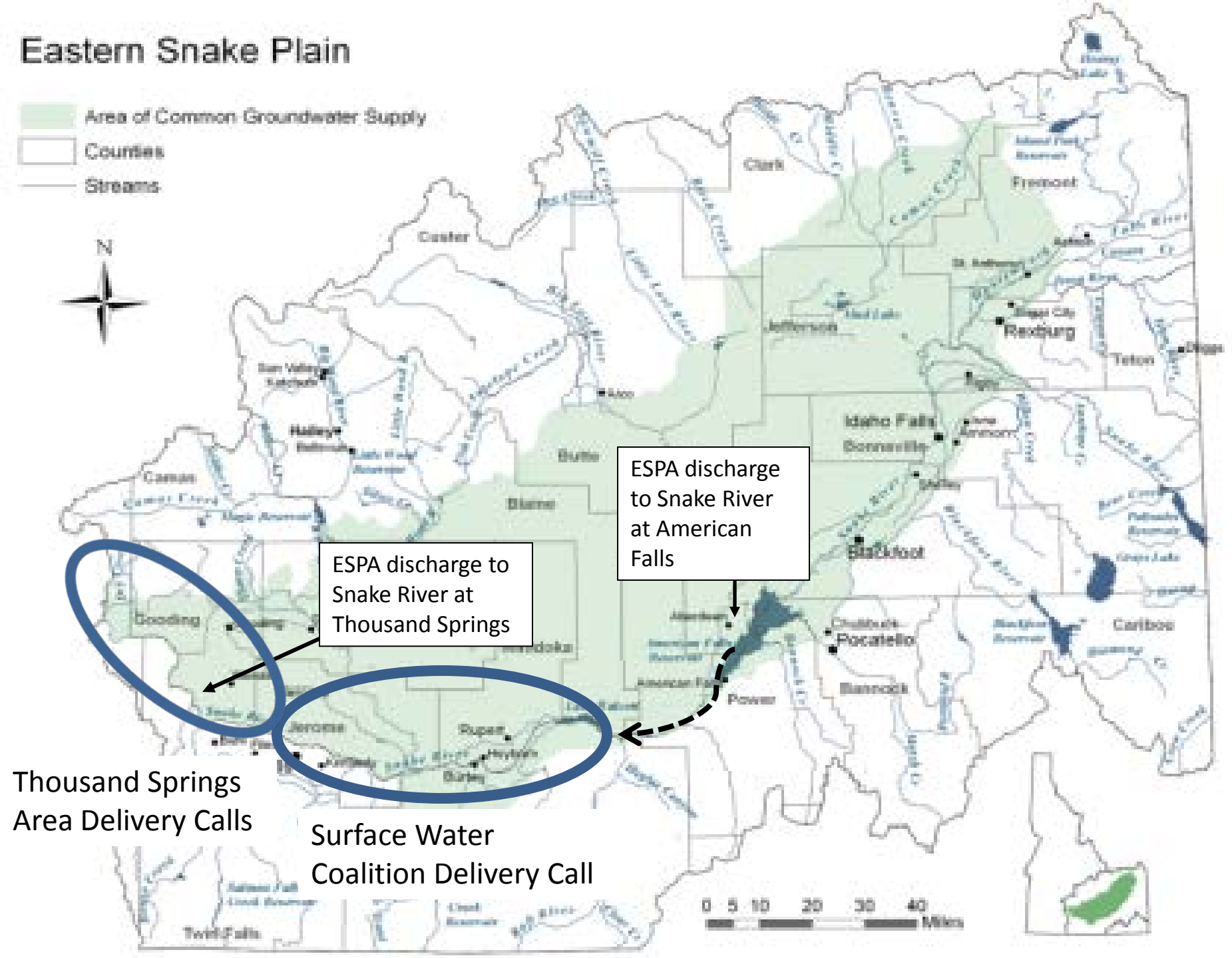
1912 1915 1918 1921 1924 1927 1930 1933 1936 1939 1942 1945 1948 1951 1954 1957 1960 1963 1966 1969 1972 1975 1978 1981 1984 1987 1990 1993 1996 1999 2002 2005 2008 2011 2014

Total Thousand Springs Flows

Volume Change


Spring Flows in Blackfoot to Minidoka Reach
Reach Gain [acre-feet]
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1930
1940
1950
1960
1970
1980
1990
2000
2010
Approximate 500,000 AF annual reduction between 1980 and 2014
Note: 2013 and 2014 data values are preliminary.


Eastern Snake Plain
Area of Common Groundwater Supply
Counties
Streams
N
ESPA discharge to Snake River at American Falls
ESPA discharge to Snake River at Thousand Springs
Clark
Fremont
Custer
Jefferson
Madison
Teton
Rexburg
Idaho Falls
Bonneville
Butte
Blaine
Blackfoot
Lincoln
Gooding
Power
Pocatello
Bannock
Caribou
Jerome
Twin Falls
Cassia
0 5 10 20 30 40
Miles


Eastern Snake Plain
Area of Common Groundwater Supply
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ESPA discharge to Snake River at American Falls
ESPA discharge to Snake River at Thousand Springs
Thousand Springs Area Delivery Calls
Surface Water Coalition Delivery Call
Clark
Fremont
Custer
Jefferson
Madison
Teton
Idaho Falls
Bonneville
Butte
Blaine
Blackfoot
Caribou
Pocatello
Bannock
Power
Gooding
Jerome
Lincoln
Twin Falls
0 5 10 20 30 40
Miles

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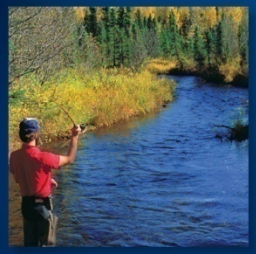

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However, 180 miles Upstream at Milner Dam

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- At times this reduces Snake River flow at Milner Dam to zero

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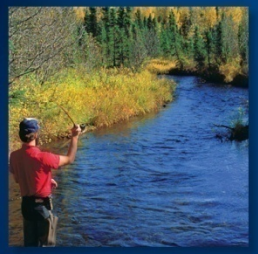

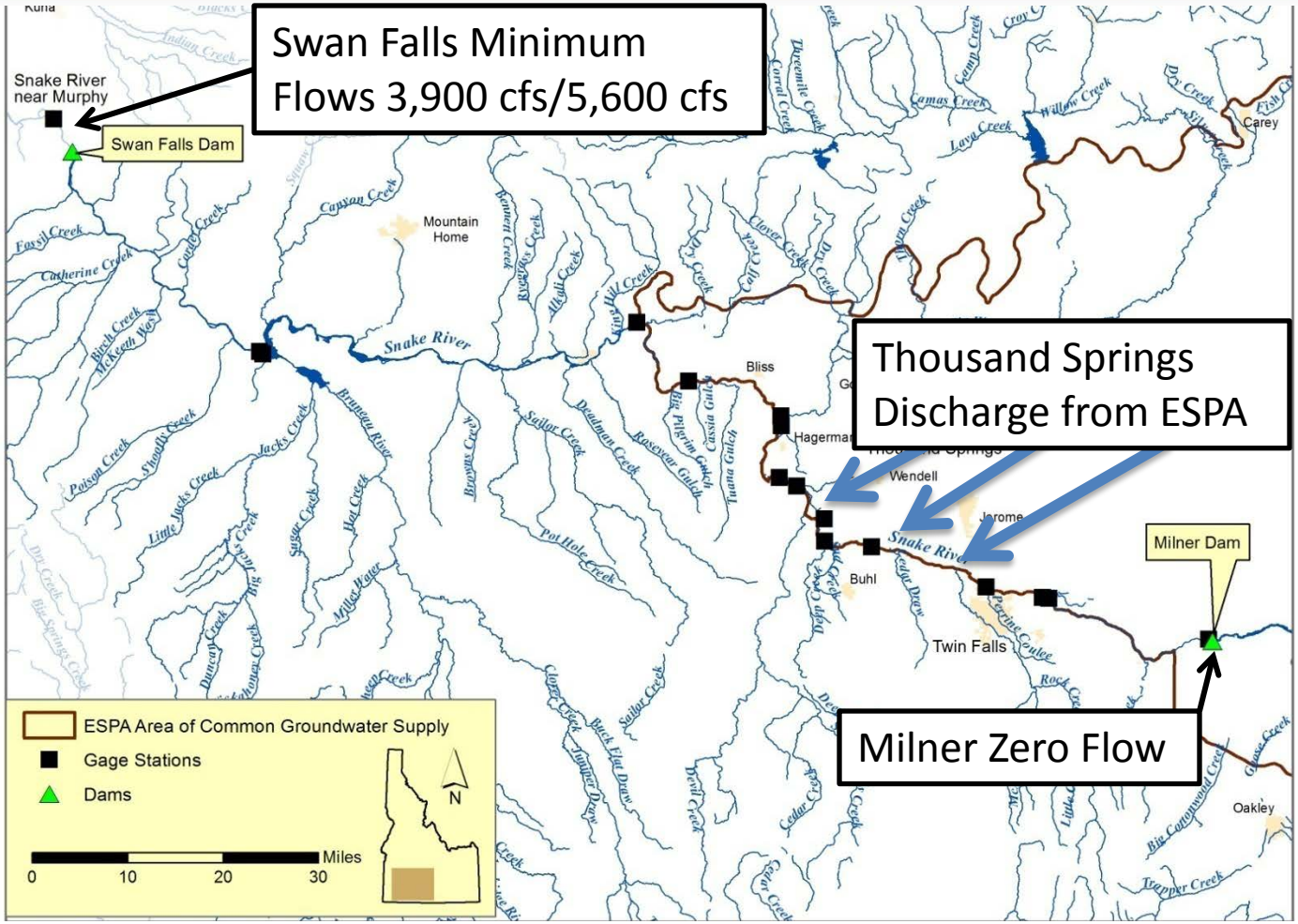

When flow is zero at Milner, flow at Swan Falls Dam is made up almost entirely of spring flows from the ESPA

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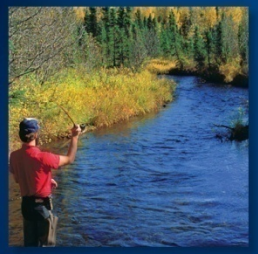
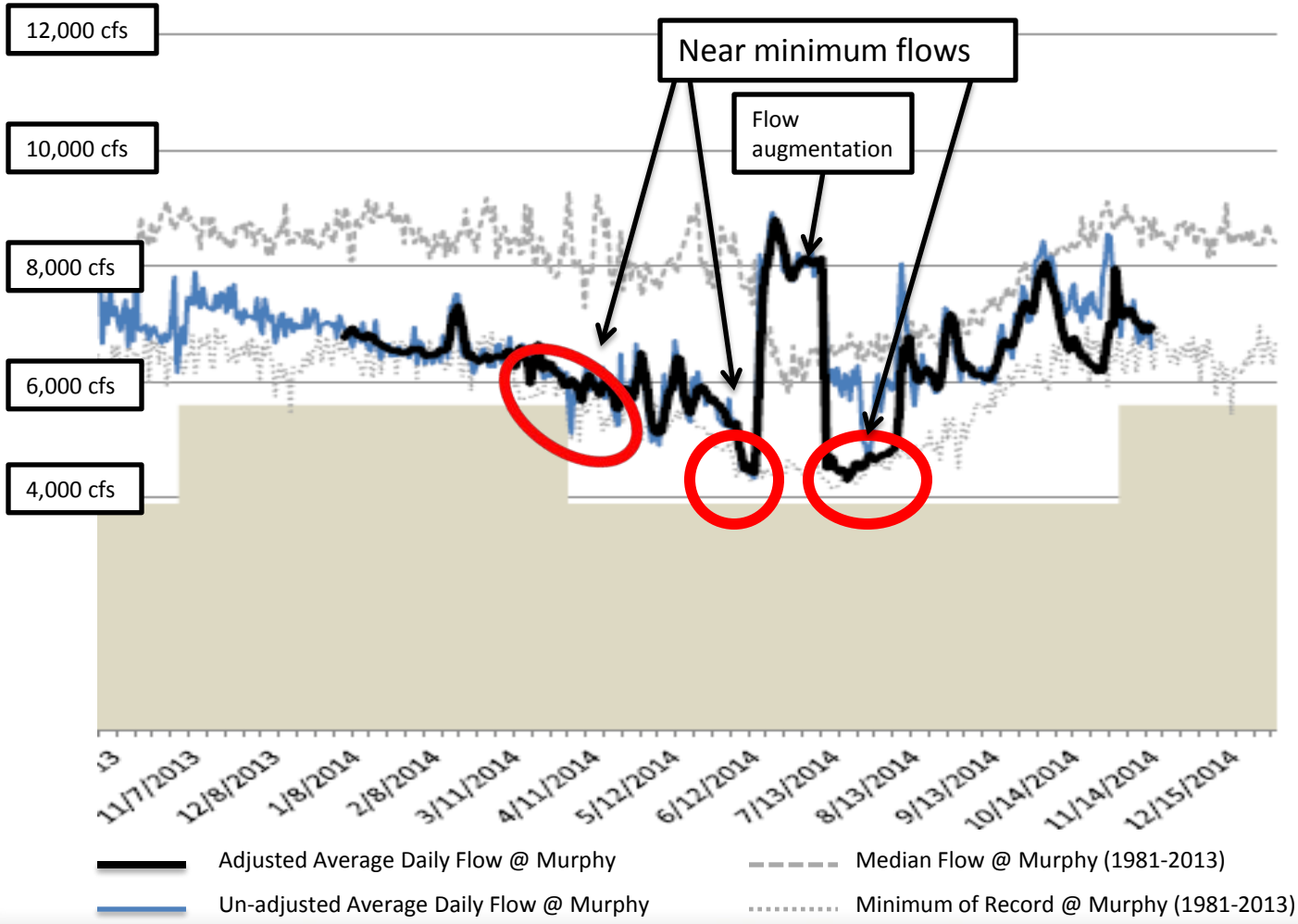


Snake River Near Murphy Gage

Swan Falls Dam - 2014



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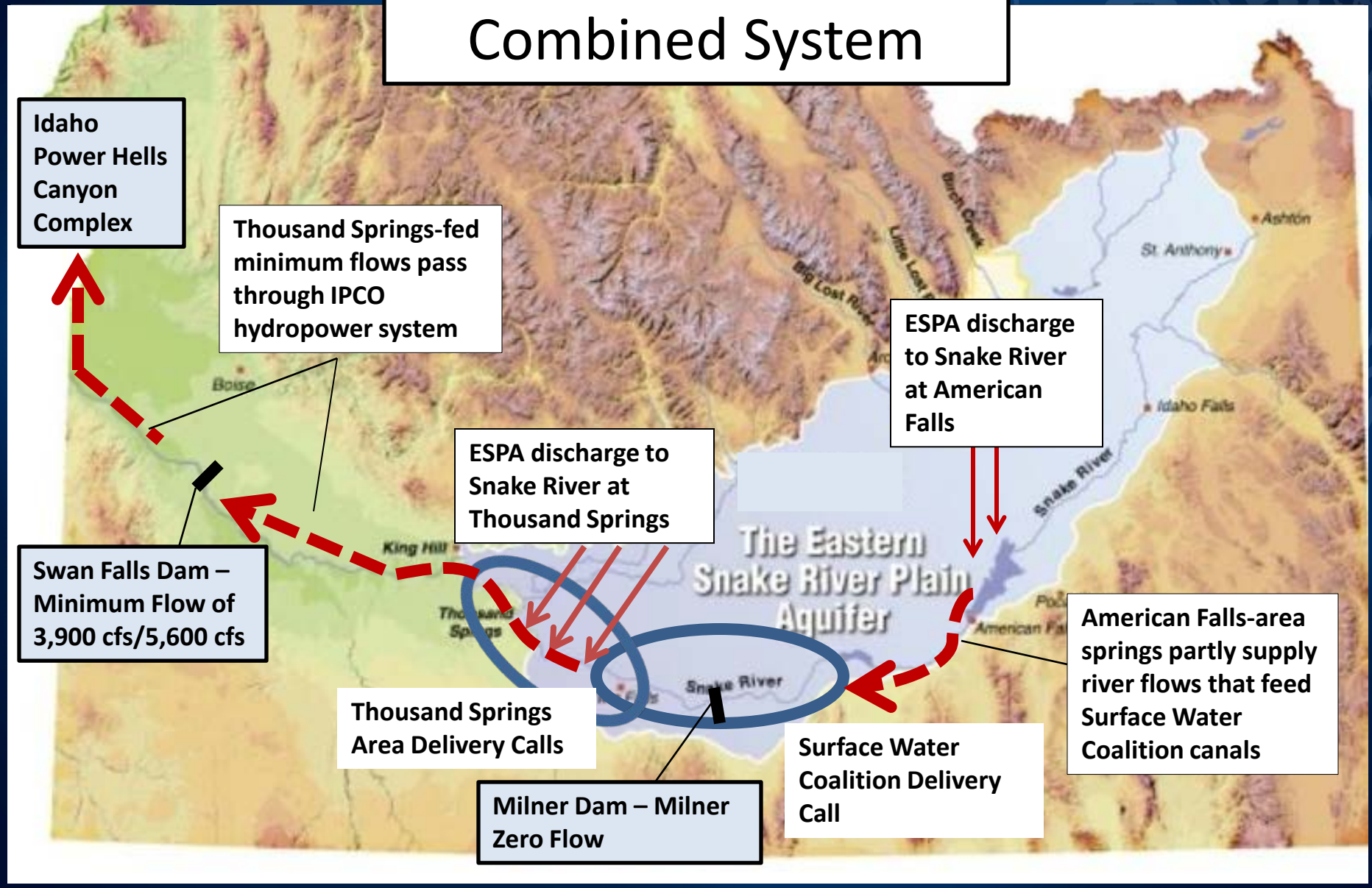
Combined System



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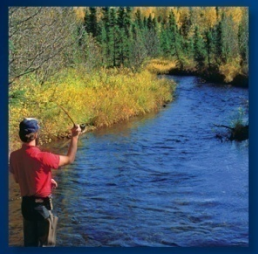

Implications of Aquifer Situation

✓ESPA can no longer meet all the uses that have been assigned to it – delivery calls determine what water uses come off the system

✓ESPA must be managed to sustain spring flows sufficient to meet the Swan Falls minimum flows

✓If economic damage is to be minimized, ESPA must be managed to sustain spring flows sufficient to reduce need for conjunctive water delivery calls

✓Current situation is due partly to “deferred maintenance” of the ESPA

✓Need to “re-build” ESPA

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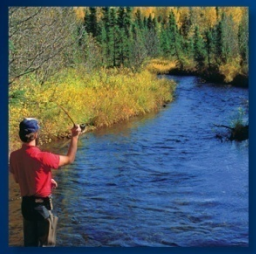

Recharge Goal: Stabilize & Rebuild ESPA

✓HB 547 passed by 2014 Legislature allocates $5 million annually from cigarette tax to Water Resource Board for ***"statewide aquifer stabilization"***

✓ESPA is first priority

✓HB 479 allocated $4 million one-time to Water Board for ESPA recharge infrastructure

✓2015 Legislature allocated additional one-time funds

Milepost 31 recharge basin along Milner-Gooding Canal

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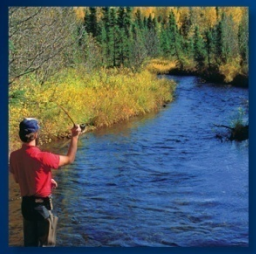

Recharge Goal: Stabilize & Rebuild ESPA

Need to continue and expand recharge:

- State Water Plan goal of 250,000 AF/year
- Component of SWC Settlement Term Sheet
- Needed to maintain Swan Falls Minimum Flows
- Needed to maintain Idaho's economic viability

Recharge operations in
Twin Falls Canal
November 12, 2014

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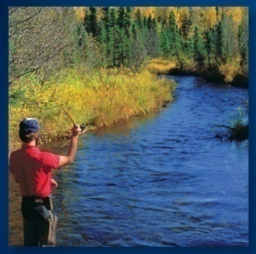


Factors That Define ESPA Recharge – two different water supply patterns

✓Lower Valley at Milner:

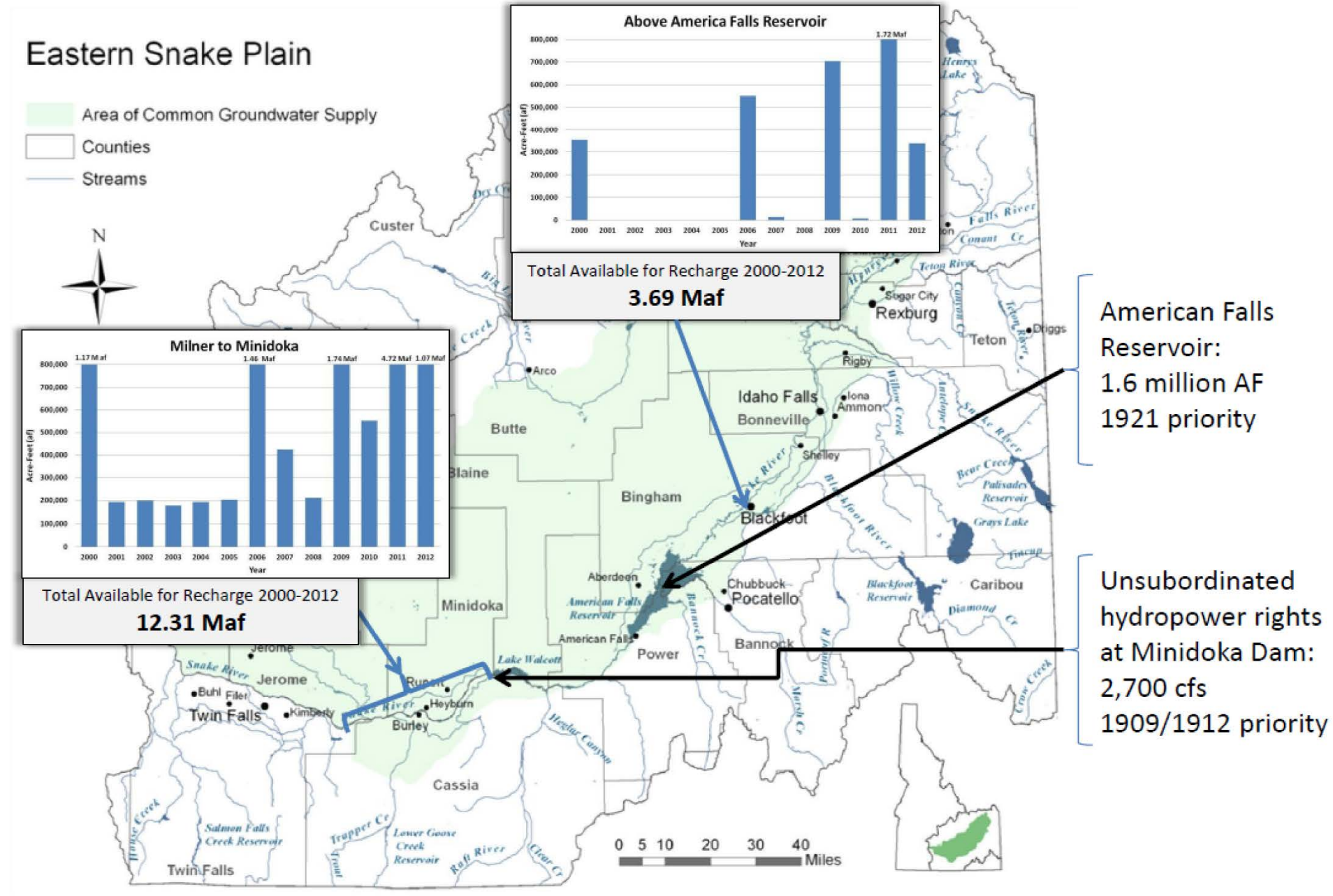
- Downstream of all Upper Snake reservoirs
- Recharge water available all winter (Nov-Mar)
- Even in driest years 500 cfs spills past Milner

✓Upper Valley upstream of American Falls:

- Recharge water available during flood control releases from reservoirs
- Need to ensure reservoirs fill first
- Senior hydro right at Minidoka

Recharge operations in the Great Feeder Canal System – February 2015

Water Available for Recharge 2000 - 2012



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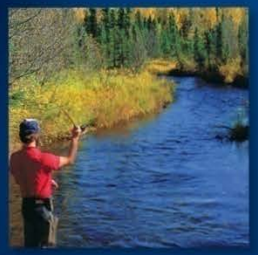


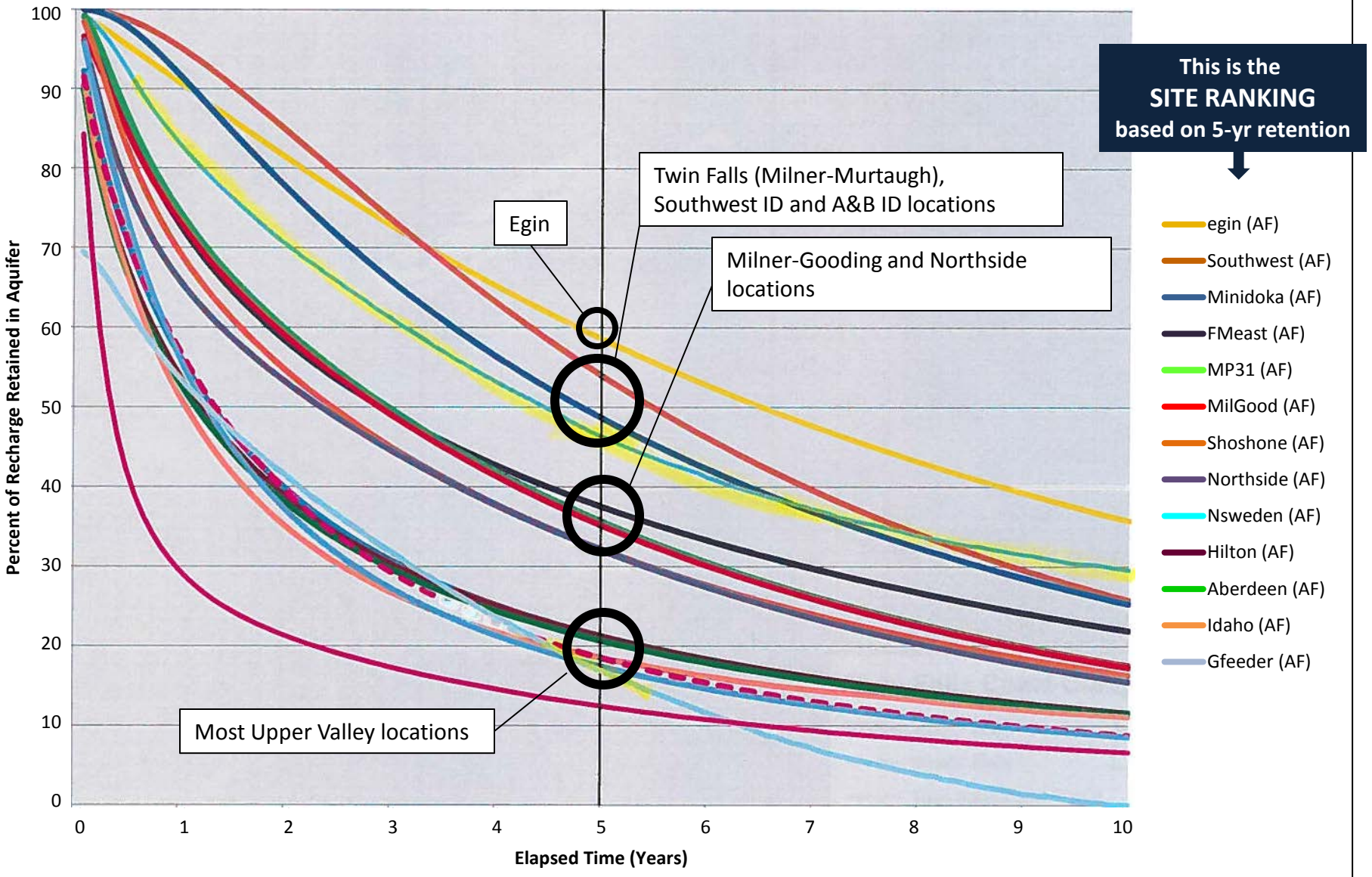
Factors That Define ESPA Recharge – Water Rights

IWRB holds 1980-priority water right for recharge

- 1,200 cfs
- Divert anywhere on Snake River
- Junior to irrigation and existing reservoirs
- Junior to Minidoka Hydropower (2700 cfs)
- Senior to Milner Hydropower
- Senior to other recharge rights
- Additional recharge water right applications in progress by IWRB and others

Retention of Recharged Water within the Aquifer

ESPAM 2.1 Ground Water Model



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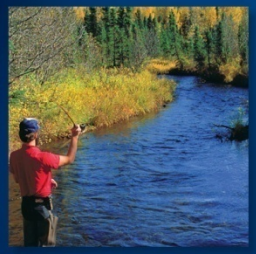
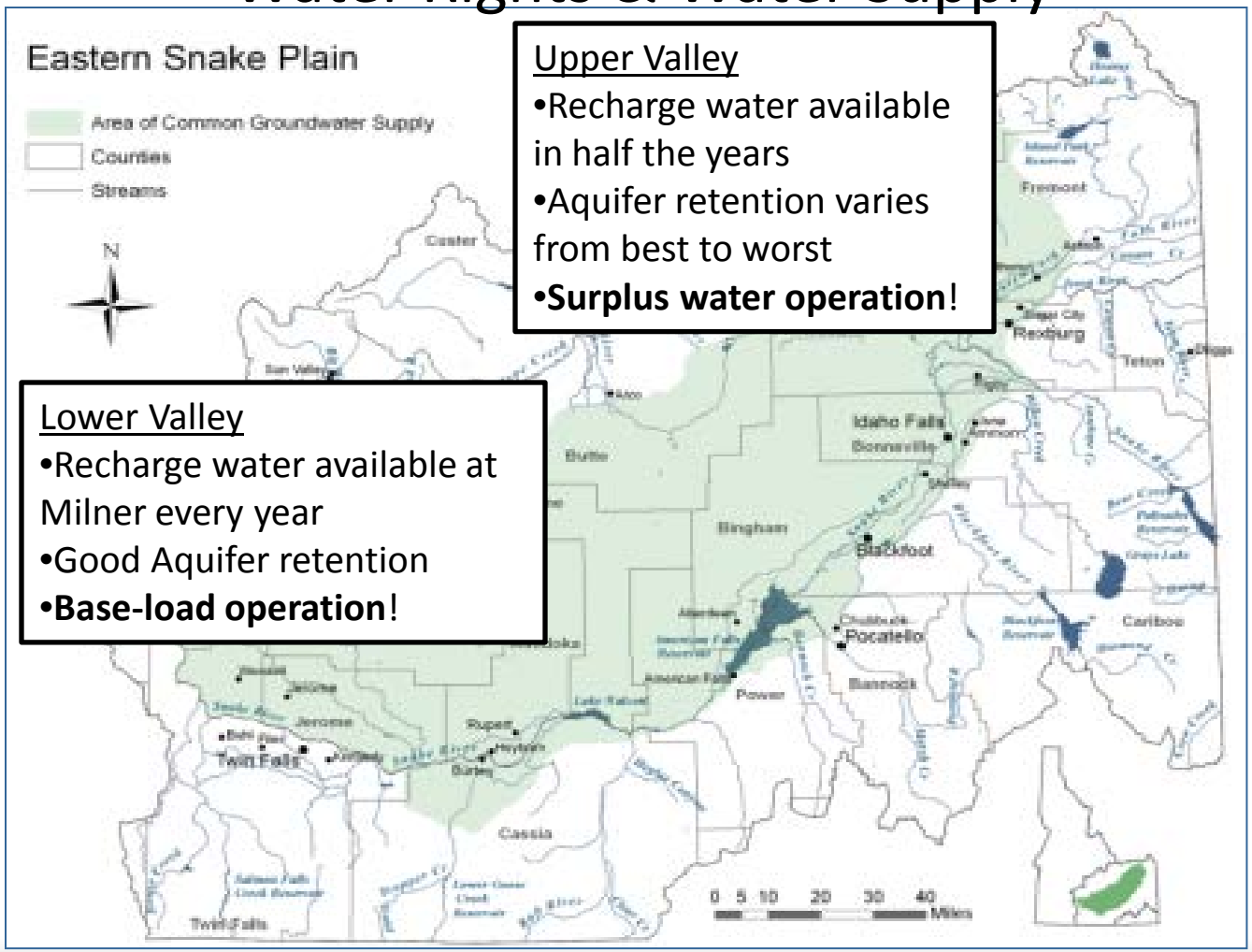


Factors that Define ESPA Recharge Water Rights & Water Supply



Upper Valley
- Recharge water available in half the years
- Aquifer retention varies from best to worst
- **Surplus water operation**!

Lower Valley
- Recharge water available at Milner every year
- Good Aquifer retention
- **Base-load operation**!

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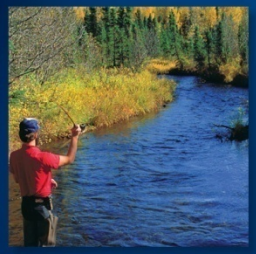

Factors that Define ESPA Recharge
How to get water in ground?

- Unlined canals that divert from river and cross the plain!
- Most cost effective way to divert & recharge large volumes of water – contract with canal companies & irrigation districts to carry water to recharge
- Supplement with spreading/spill basins
- Injection wells used in a few cases

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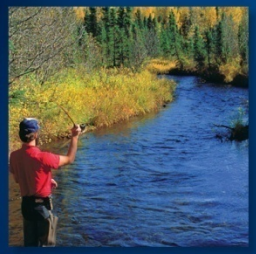

Winter Recharge 2014-2015

- Taking recharge from "pilot scale" to "full scale"
- Use existing canals to extent possible to deliver recharge water
- Water Board adopted incentivized payment schedules for canals – **MAKE RECHARGE A PARTNERSHIP!**

Recharge at MP31 recharge basin/Milner-Gooding Canal – Jan 16, 2015

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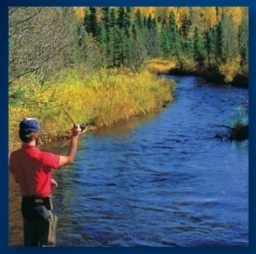

Winter Recharge 2014-2015

October 27 to February 15:

- ✓Recharge water right “on” at Milner Dam
- ✓Recharged 37,000 AF in canals diverting from Milner
- ✓Also spilled 200,000 AF past Milner due to lack of capacity
- ✓Water Board working with canal company partners to address this capacity issue

Recharge operations in
Twin Falls Canal
November 12, 2014

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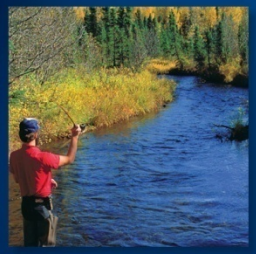

Winter Recharge 2014-2015

February 16 to March 4:

- ✓Recharge water right “on” <u>both</u> upstream American Falls and at Milner Dam
- ✓Recharge began in canals upstream of American Falls
- ✓500 cfs recharged in canals upstream of American Falls & 700 cfs in canals at Milner (full right is 1,200 cfs)
- ✓Must maintain 2,700 cfs passing Minidoka Dam for recharge to occur upstream of AMF

Recharge operations in the Great Feeder Canal February 2015

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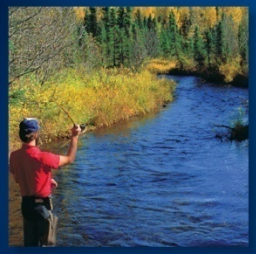

Winter Recharge 2014-2015

March 5 to March 24:

- ✓Recharge water right turned “off” above American Falls
- ✓Recharge right still “on” at Milner
- ✓12,800 AF recharged, but 17,070 AF spilled past Milner due to lack of diversion capacity
- ✓Recharge shut down with start of irrigation on Mar. 24th

Shoshone Recharge Basin
Milner-Gooding Canal
March 5, 2015

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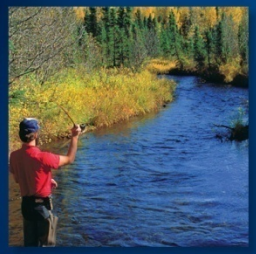


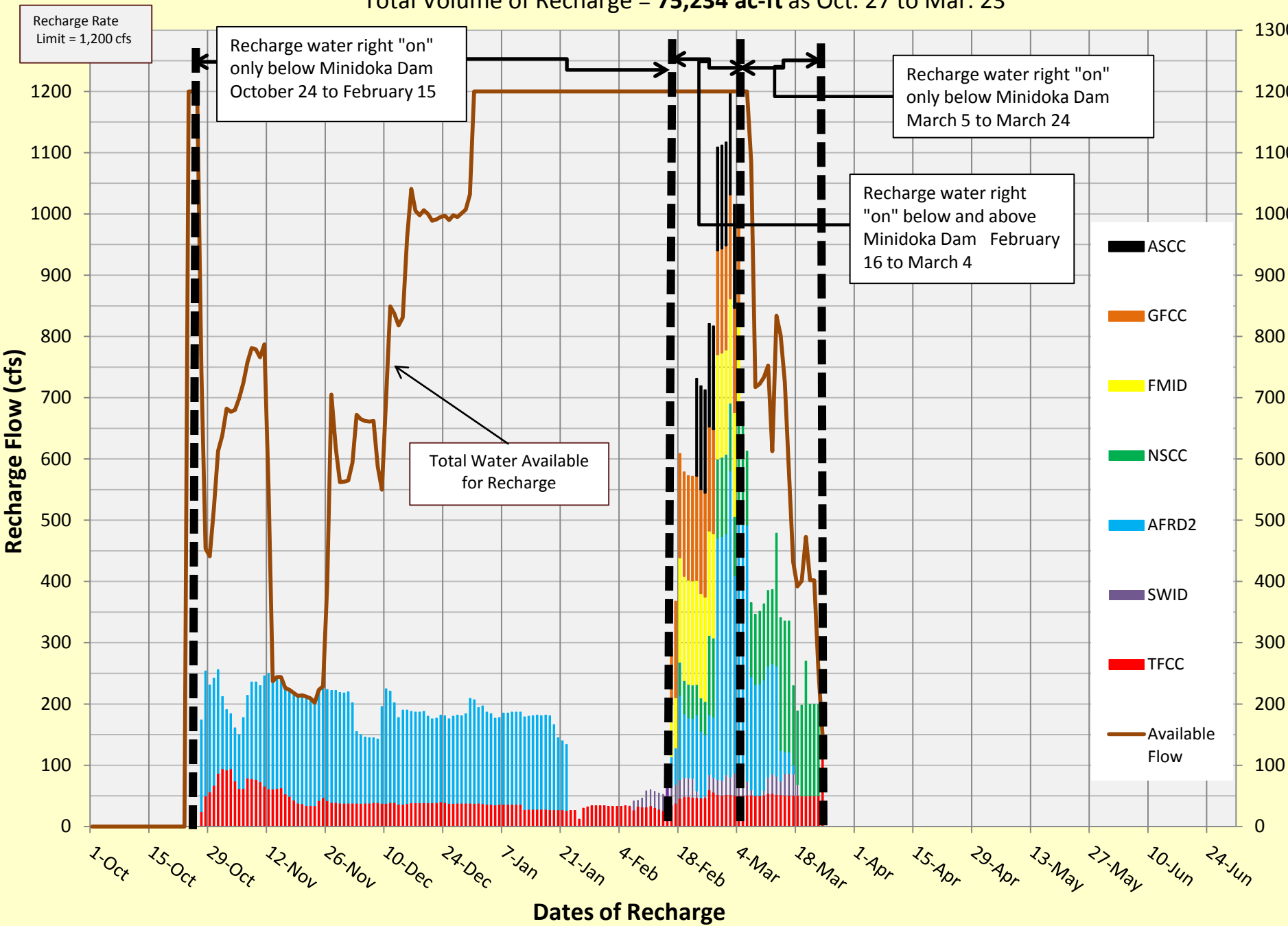
Winter Recharge 2014-2015

- Total ESPA recharge: 75,234 AF
- Amount below Minidoka: 61,068 AF
- Amount above American Falls: 14,166 AF
- Total spill past Milner Oct - Mar: ~ 300,000 AF

Recharge operations in Aberdeen-Springfield Canal & Hilton Spill February 26, 2015

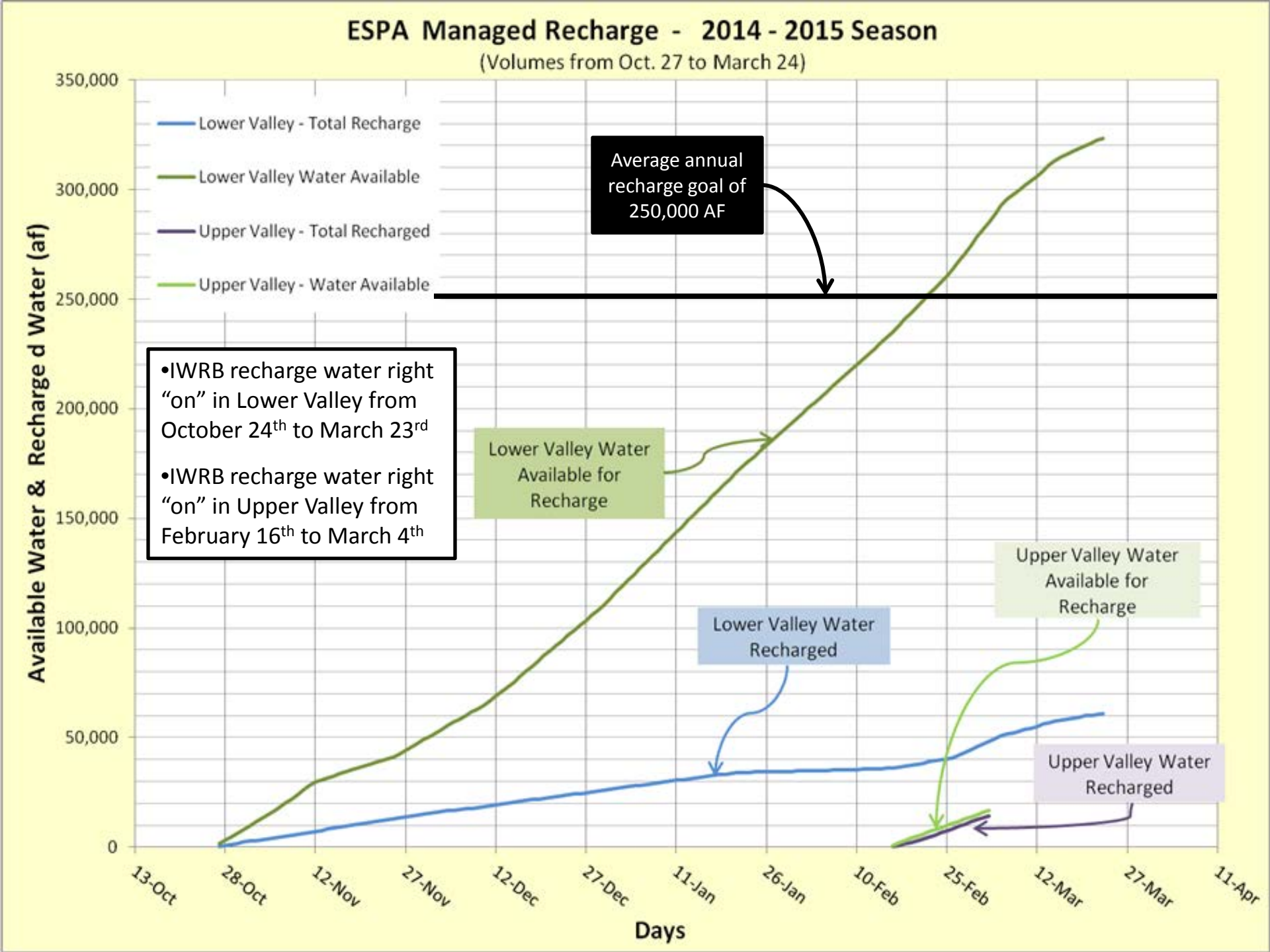
Total Water Board Recharge Rates During 2014 - 2015 Season

Total Volume of Recharge = **75,234 ac-ft** as Oct. 27 to Mar. 23



ESPA Managed Recharge - 2014 - 2015 Season

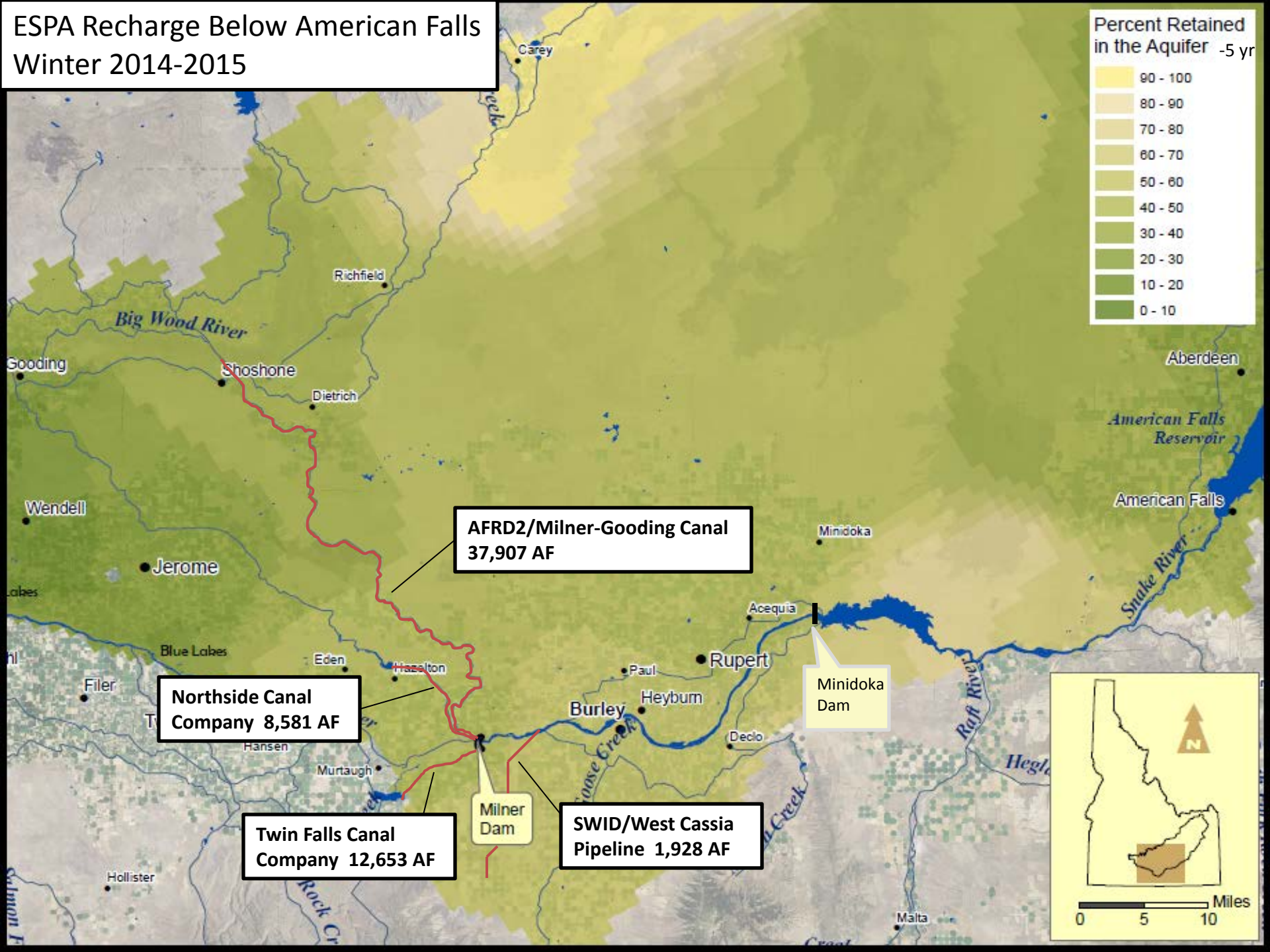
(Volumes from Oct. 27 to March 24)

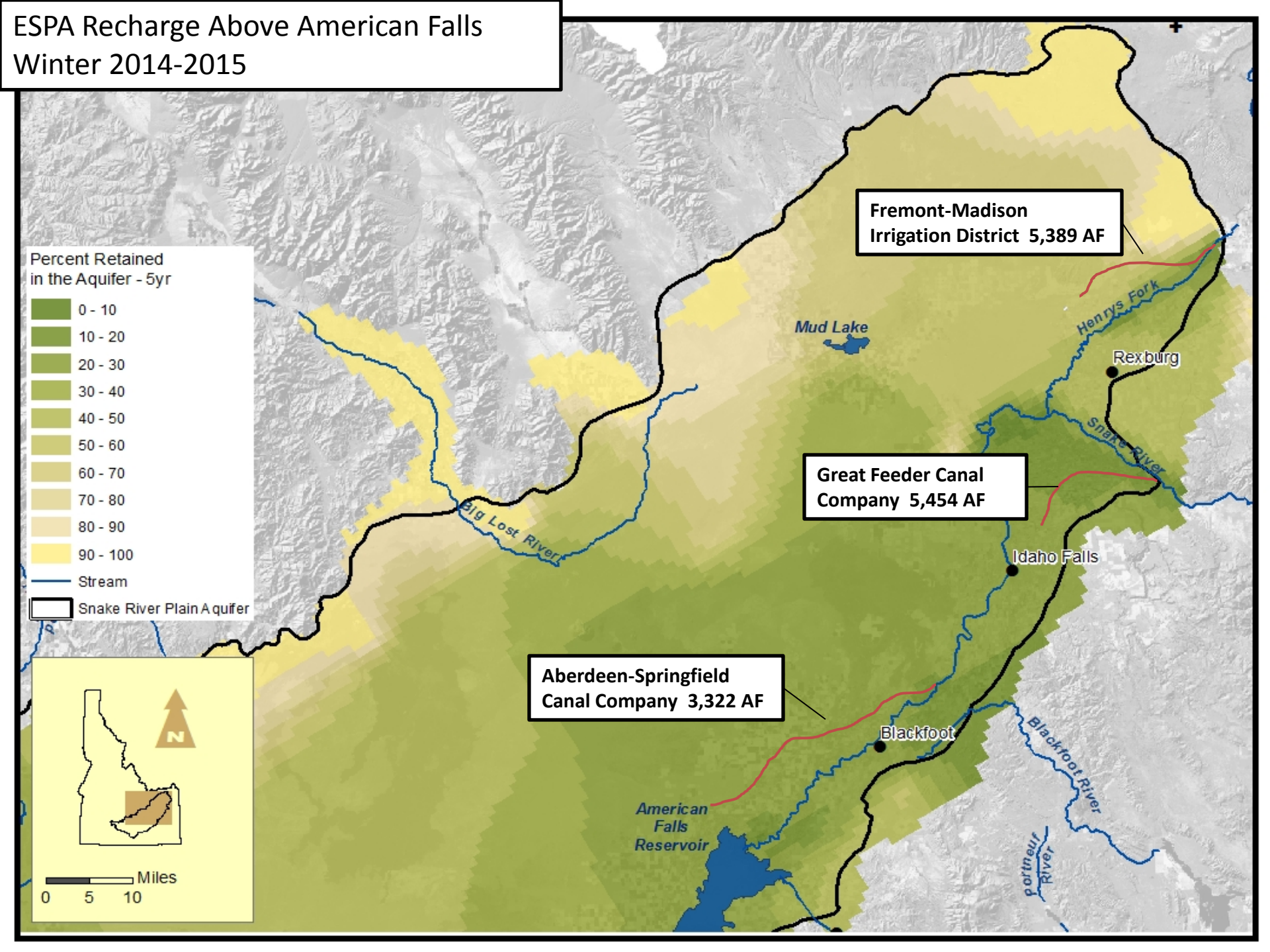


ESPA Managed Recharge Summary

Oct 27th, 2014 to March 23rd, 2015

ESPA Area	Canal System	5-Year Retention Time (%)	Median Recharge Rate (cfs)	Days Recharged	Volume Recharged (Acre-feet)
Upper Valley	Aberdeen-Springfield Canal Company	~26	169	10	3,322
	Great Feeder Canal Company	~18	170	17	5,454
	Fremont Madison Irrigation District	~44	170	17	5,389
				Upper Valley Total	14,165
Lower Valley	American Falls Reservoir District No. 2 (Milner-Gooding Canal)	~40	153	118	37,907
	Northside Canal Company	~40	127	34	8,581
	Southwest Irrigation District	~55	25	47	1,928
	Twin Falls Canal Company	~50	39	148	12,653
				Lower Valley Total	61,069
				TOTAL	75,234


ESPA Recharge Below American Falls
Winter 2014-2015
Percent Retained in the Aquifer -5 yr
90 - 100
80 - 90
70 - 80
60 - 70
50 - 60
40 - 50
30 - 40
20 - 30
10 - 20
0 - 10
Carey
Richfield
Big Wood River
Gooding
Shoshone
Dietrich
Aberdeen
American Falls Reservoir
American Falls
Wendell
Jerome
Minidoka
Snake River
AFRD2/Milner-Gooding Canal
37,907 AF
Acequia
Rupert
Paul
Heyburn
Burley
Declo
Blue Lakes
Eden
Hazelton
Filer
Northside Canal Company 8,581 AF
Minidoka Dam
Raft River
Hansen
Murtaugh
Milner Dam
SWID/West Cassia Pipeline 1,928 AF
Twin Falls Canal Company 12,653 AF
Hollister
Malta
N
Miles
0
5
10


ESPA Recharge Above American Falls
Winter 2014-2015
Percent Retained
in the Aquifer - 5yr
0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100
Stream
Snake River Plain Aquifer
N
Miles
0 5 10
Fremont-Madison
Irrigation District 5,389 AF
Great Feeder Canal
Company 5,454 AF
Aberdeen-Springfield
Canal Company 3,322 AF
Mud Lake
Henrys Fork
Rexburg
Snake River
Big Lost River
Idaho Falls
Blackfoot
Blackfoot River
American
Falls
Reservoir
portneuf
River

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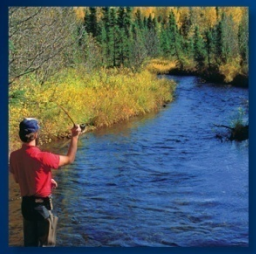

Working with Canal Company Partners to Improve Systems for Recharge



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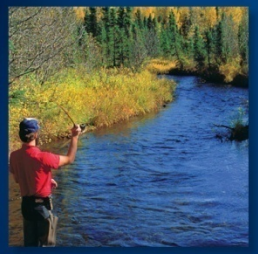
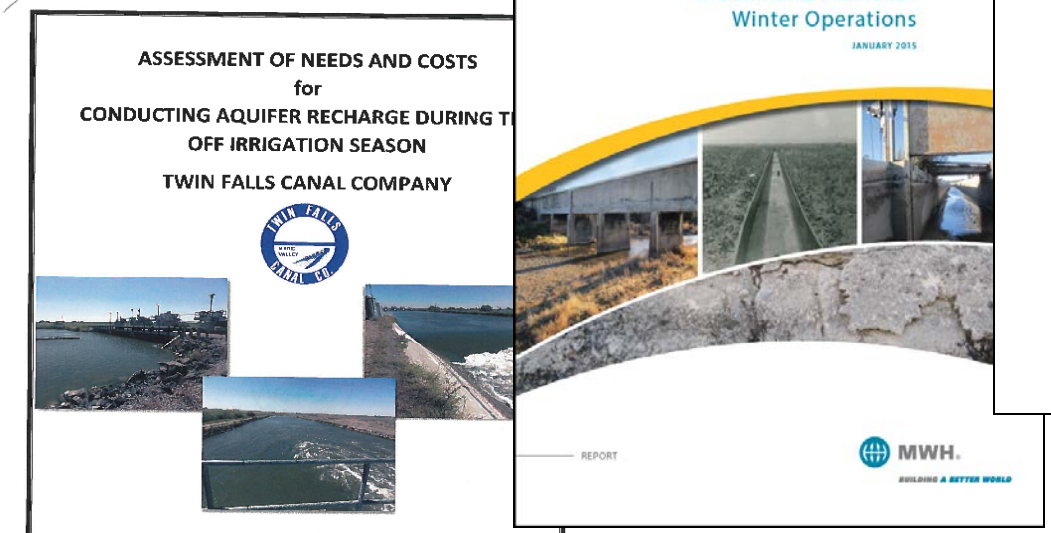


Working with Canal Company Partners to Improve Systems for Recharge



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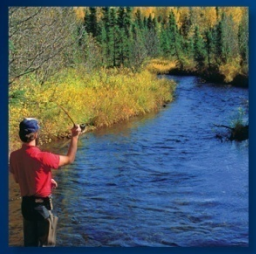

IWRB FY 2016 Budget for Aquifer Stabilization

ESPA Managed Recharge Operations & GW level monitoring	1,200,000
ESPA Managed Recharge Infrastructure	
Milner-Gooding Recharge Capacity Projects (Flume, MP31, Road, 28 hydro)	1,110,000
Twin Falls Canal recharge improvements	500,000
Northside canal hydro plant bypasses	2,000,000
Great Feeder Canal recharge improvements	500,000
Milner Pool Development and other Projects	2,000,000
Egin Recharge Enlargement	500,000
Investigation/engineering for further ESPA recharge capacity improvements	300,000
Administrative expenses	50,000
Ground water conservation grants in priority aquifers (Roger's proposal)	200,000
Amount reserved for projects in other priority aquifers	1,000,000
TOTAL FY2016 BUDGETED FUNDS	**9,360,000**

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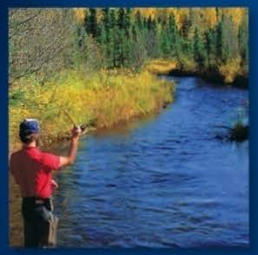
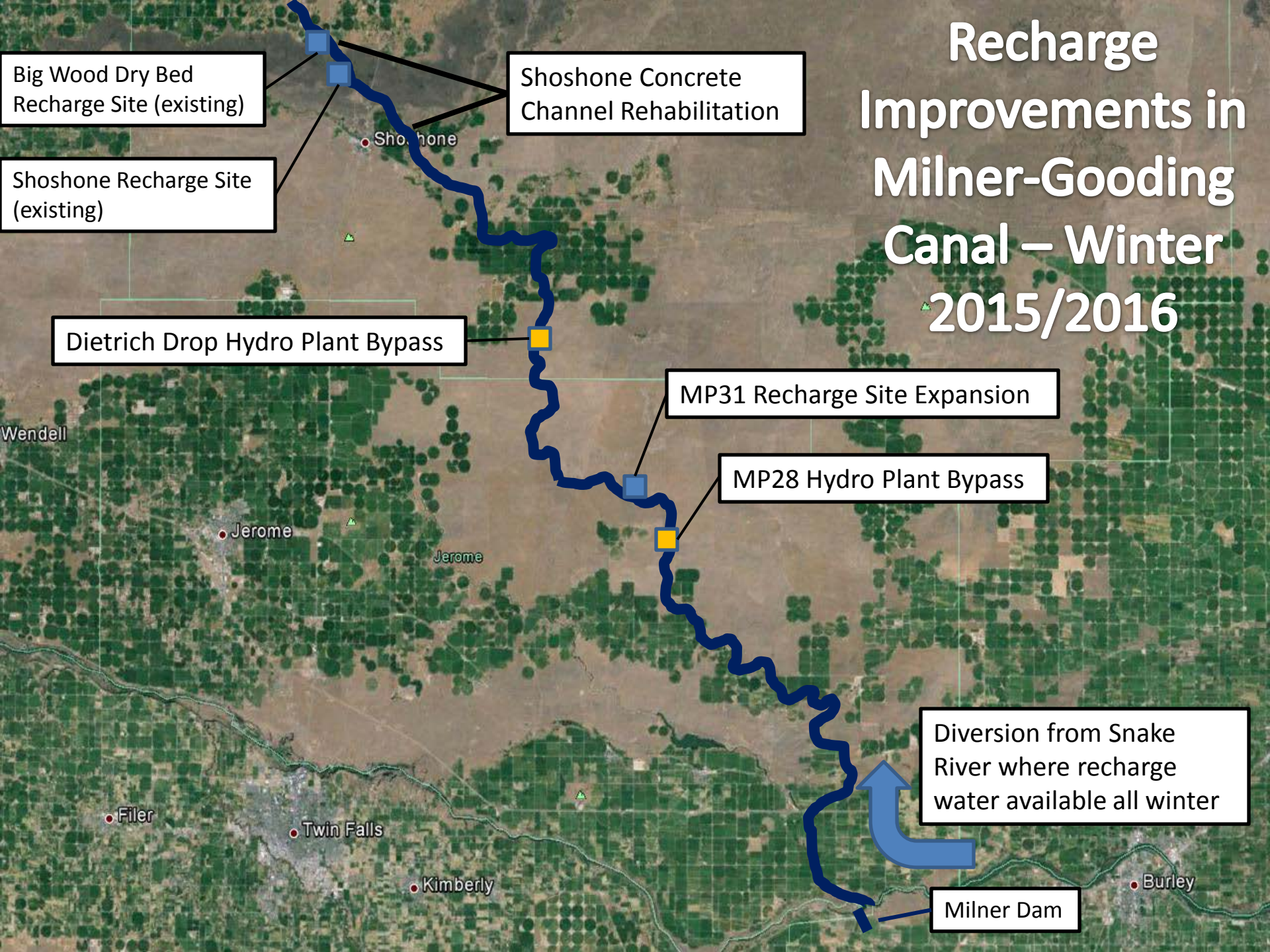


Recharge Improvements in Milner-Gooding Canal – Winter 2015/2016

- Recharge water is available all winter
- Existing recharge sites along canal include MP31, Shoshone, and Big Wood Dry Bed – Shoshone and Big Wood cant be used in winter because of conveyance limitations
- Projects this coming winter will increase recharge capacity from:
  - ✓ 200 cfs (40,000 AF over 100 winter days) to
  - ✓ 600 cfs (120,000 AF over 100 winter days)
- Projects:

✓MP31 expansion	$200,000
✓Concrete channel rehab at Shoshone	$700,000 (state share)
✓Access road improvements	$150,000
✓MP28 Hydro Plant bypass	$60,000
✓Dietrich Drop Hydro Plant bypass	TBD


Recharge Improvements in Milner-Gooding Canal – Winter 2015/2016
Big Wood Dry Bed Recharge Site (existing)
Shoshone Concrete Channel Rehabilitation
Shoshone Recharge Site (existing)
Dietrich Drop Hydro Plant Bypass
MP31 Recharge Site Expansion
MP28 Hydro Plant Bypass
Diversion from Snake River where recharge water available all winter
Milner Dam
Wendell
Jerome
Jerome
Filer
Twin Falls
Kimberly
Burley

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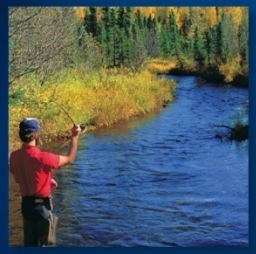
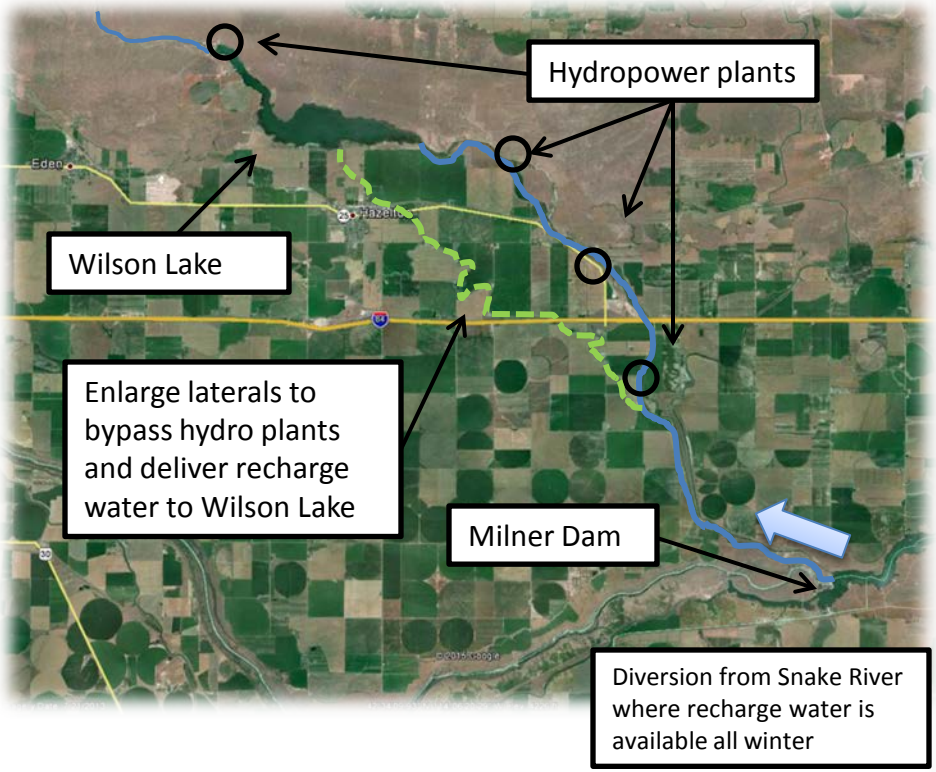


North Side Canal Recharge Improvements – Winter 2016/2017

- Northside Canal – Milner to Wilson Lake
- 125 cfs recharge rate in Wilson Lake (25,000 AF over 100 days in winter)
- Recharge water all winter long
- Four hydropower plants
- Engineering underway by CH2M-Hill



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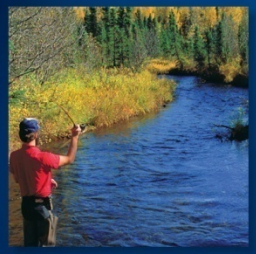

Working with Canal Company Partners to Improve Systems for Recharge

Twin Falls Canal – improvements for every-year recharge deliveries

•De-icing systems, spill structures

Icing on Murtaugh Lake outlet gates, Nov. 2014

Southwest Irrigation District – retrofit West Cassia Pipeline for winter deliveries

SWID Injection Well, 10 cfs, Feb 18th, 2015

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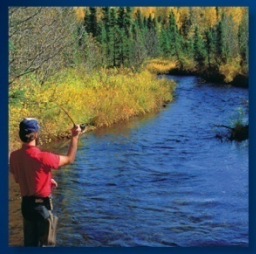

Upper Valley Recharge Infrastructure Projects

•Fremont-Madison Irrigation District – expand delivery capacity to Egin Bench Recharge areas

•Great Feeder Canal Company – recharge conveyance project

•Others – Aberdeen Springfield Canal?
Peoples Canal?
Idaho Irrigation District?
Other canals?

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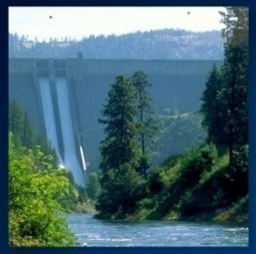
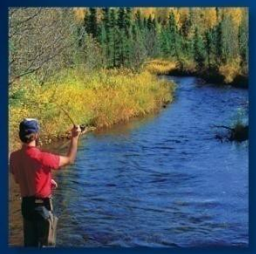

ESPA Recharge – Monitoring Program

- **QA/QC Program**
  - Recharge Flow Measurements
    - Cooperative Effort with:
      - Water District 01
      - Canal Companies
      - Idaho Power
      - IDWR Staff
- **Water Level Monitoring**
- **Dye Testing**
- **Water Quality Monitoring**

IDWR and NSCC staff measuring flows at the inlet to Wilson Lake on March 11th.

LSRARD and Idaho Power assisting IDWR staff with borehole camera Milner Reservoir test well.

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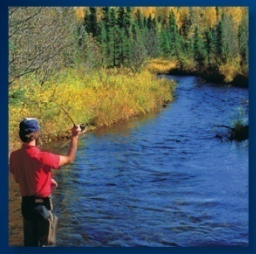

Winter 2015-2016 Recharge Projection

1. Downstream of Minidoka Dam

	1-Nov	1-Dec	1-Jan	1-Feb	1-Mar	1-Apr
TFCC	50 cfs	50 cfs	50 cfs	50 cfs	50 cfs	
NSCC	125 cfs	canal/hydro maintenance	canal/hydro maintenance	125 cfs	125 cfs	
AFRD2	construction/maint.	300 cfs	300 cfs	300 cfs	300 cfs	
SWID				30 cfs	30 cfs	

- Projected total recharge ~ 110,000 AF
- Projected delivery costs ~ $750,000

2. Upstream of American Falls Reservoir

- Projected total recharge = ?
- Projected delivery costs = ?
- Depends on water supply conditions!

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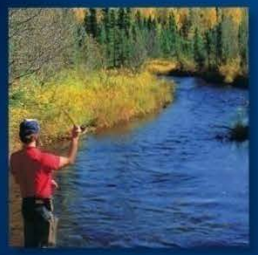

ESPA Recharge for Aquifer Stabilization and Recovery – Costs & Timeline

- 200,000 AF/year average in 2019 (+/-)
- 250,000 AF/year average full build-out in 2025 (+/-)
- $30M capital cost
- $2-to-3M/year ongoing, for operations, maintenance, and replacements
- Schedule contingent on adequate resources (Cigarette Tax funds)

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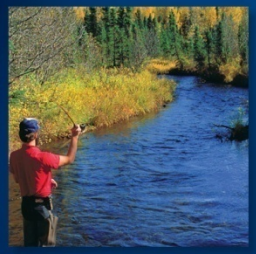


We need your help & support to get this done!

Measuring recharge flow in Milner-Gooding Canal January 16, 2015

THOUSAND SPRINGS WATER SUPPLY RESTORATION FRAMEWORK

1. **Objectives**
    a. Proactively mitigate for material injury to senior spring water rights caused by diversions under junior ground water rights so that delivery calls will not be necessary.
    b. Develop an adaptive management plan to stabilize and enhance the ESPA spring flows to meet existing water rights and future needs.
2. **Billingsley Creek Component – Goal to restore stream flow**
    a. Direct delivery of up to 10 CFS of spring water to head of Billingsley Creek
    b. Curren Ditch Exchange
    c. Capture North Side tail water for reuse
3. **Spring Component – Goal to address water supply shortfalls**
    a. Direct delivery of substitute water where feasible
    b. Lease agreement
    c. Subordination Agreement
4. **Above the Rim Component**
    a. Recharge Program
    b. Conservation Program
5. **Adaptive Management Component**
    a. Spring flow monitoring program
    b. Steering Committee to oversee implementation and to address changed circumstances
    c. Measureable goals and targets

THOUSAND SPRINGS WATER SUPPLY RESTORATION FRAMEWORK

IDAHO WATER RESOURCE BOARD
HAGERMAN VALLEY MEETING
SEPTEMBER 17, 2015

OBJECTIVES

- Proactively mitigate for material injury to senior spring water rights caused by diversions under junior ground water rights so that delivery calls will not be necessary.
- Develop an adaptive management plan to stabilize and enhance the ESPA spring flows to meet existing water rights and future needs.

RESTORATION FRAMEWORK

- Billingsley Creek Component
- Spring Component
- Above the Rim Component
- Adaptive Management Component

BILLINGSLEY CREEK COMPONENT

- Direct delivery of 10 CFS of spring water to head of Billingsley Creek
- Curren Ditch Exchange
- Capture North Side tail water in Sandy Ponds for reuse

SPRING COMPONENT

- Direct delivery of substitute water where feasible
- Lease Agreement
- Subordination Agreement

ABOVE THE RIM COMPONENT

- Recharge Program
- Conservation Program

ADAPTIVE MANAGEMENT COMPONENT

- Spring flow monitoring program
- Steering Committee to oversee program implementation and to address changed circumstances
- Measureable goals and targets

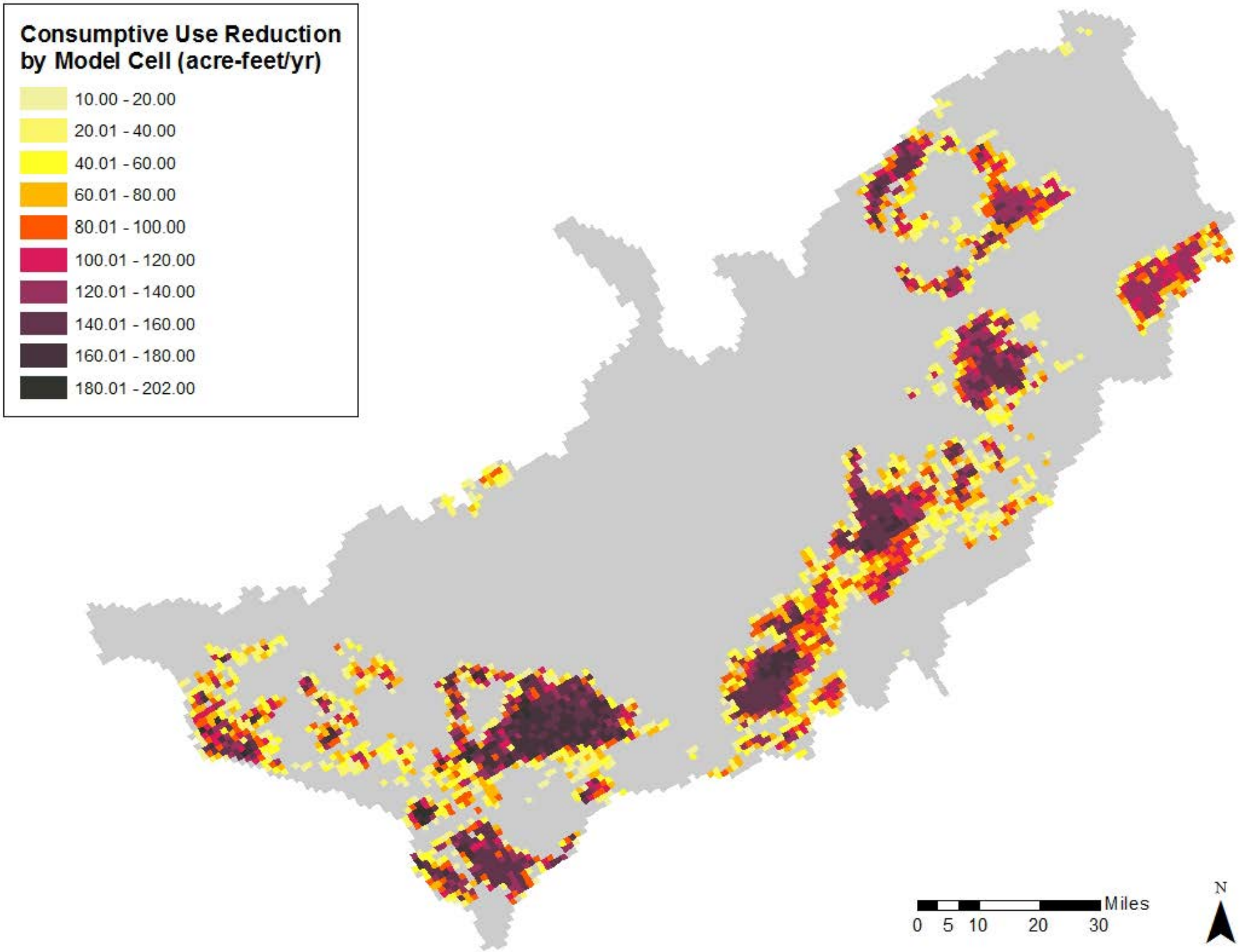
QUESTIONS

Analysis of SWC Settlement Agreement Actions using ESPAM2.1

Presented by Mike McVay P.E., P.G.
9/17/2015

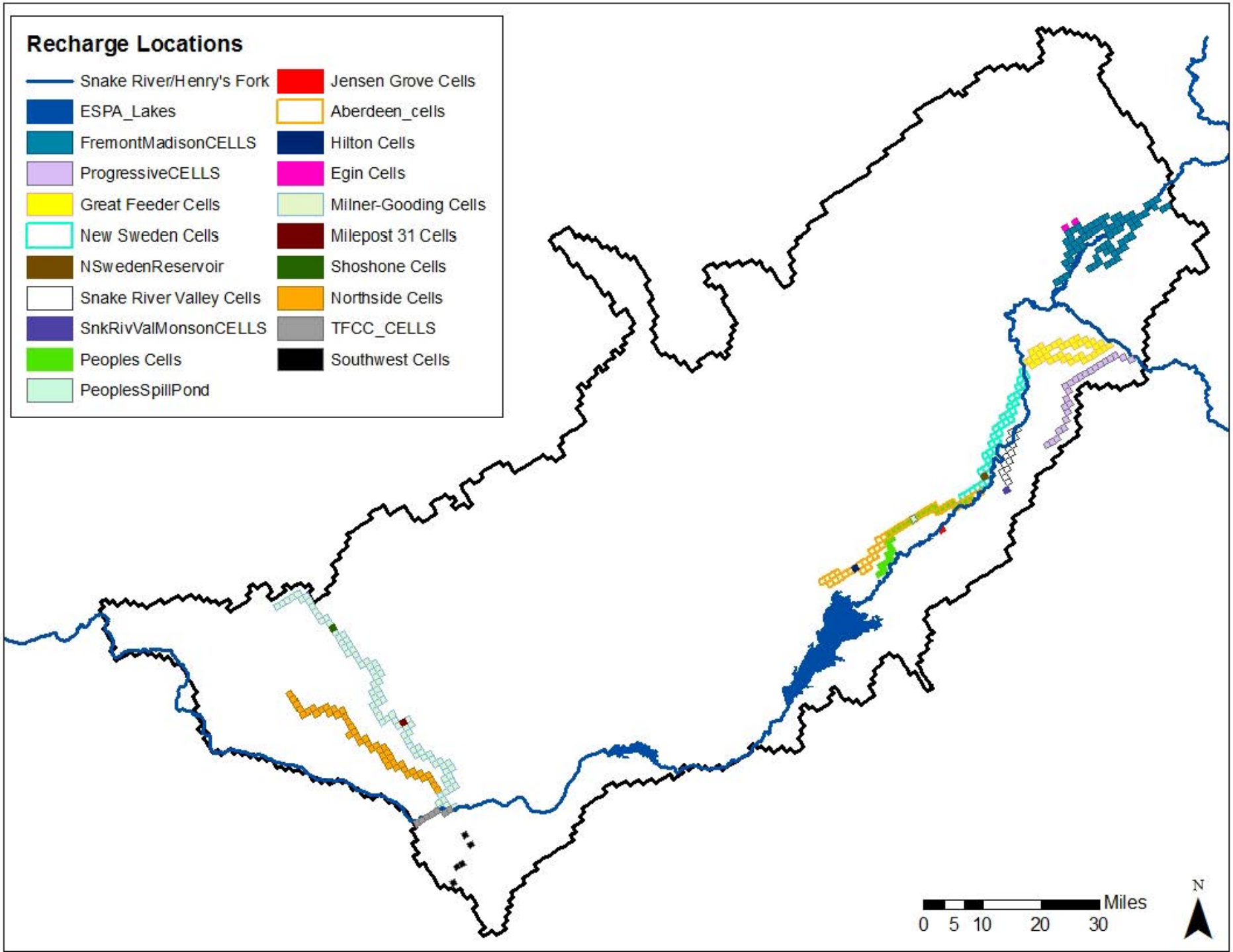
Consumptive Use Reduction

Average consumptive use has been used to model reductions of 240,000 acre-feet/year.


Consumptive Use Reduction by Model Cell (acre-feet/yr)
10.00 - 20.00
20.01 - 40.00
40.01 - 60.00
60.01 - 80.00
80.01 - 100.00
100.01 - 120.00
120.01 - 140.00
140.01 - 160.00
160.01 - 180.00
180.01 - 202.00
Miles
0 5 10 20 30
N

Managed Recharge

Current and proposed sites were used to model recharge at 260,000 acre-feet/year.

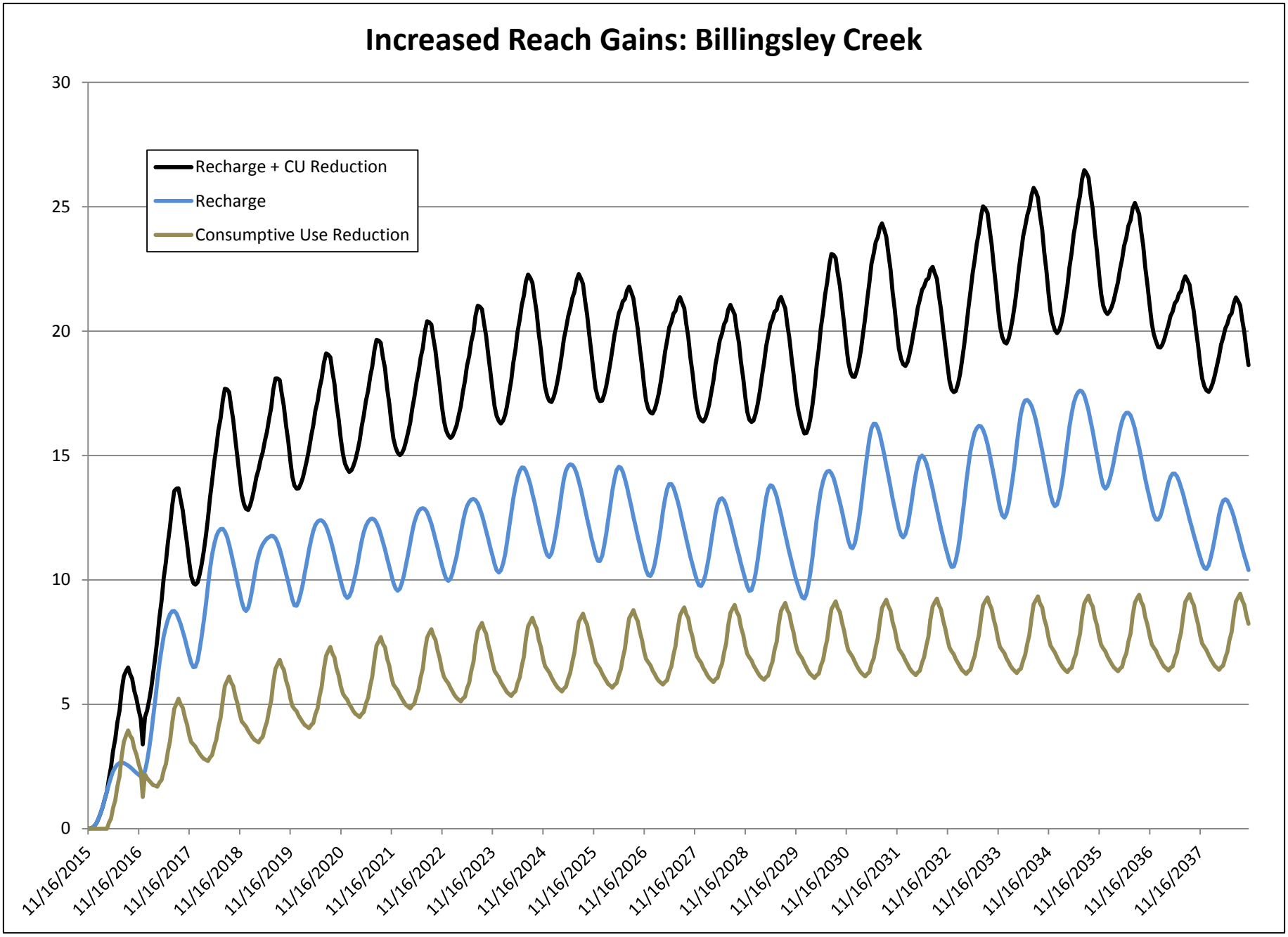

Recharge Locations
Snake River/Henry's Fork
ESPA_Lakes
FremontMadisonCELLS
ProgressiveCELLS
Great Feeder Cells
New Sweden Cells
NSwedenReservoir
Snake River Valley Cells
SnkRivValMonsonCELLS
Peoples Cells
PeoplesSpillPond
Jensen Grove Cells
Aberdeen_cells
Hilton Cells
Egin Cells
Milner-Gooding Cells
Milepost 31 Cells
Shoshone Cells
Northside Cells
TFCC_CELLS
Southwest Cells
Miles
0 5 10 20 30
N

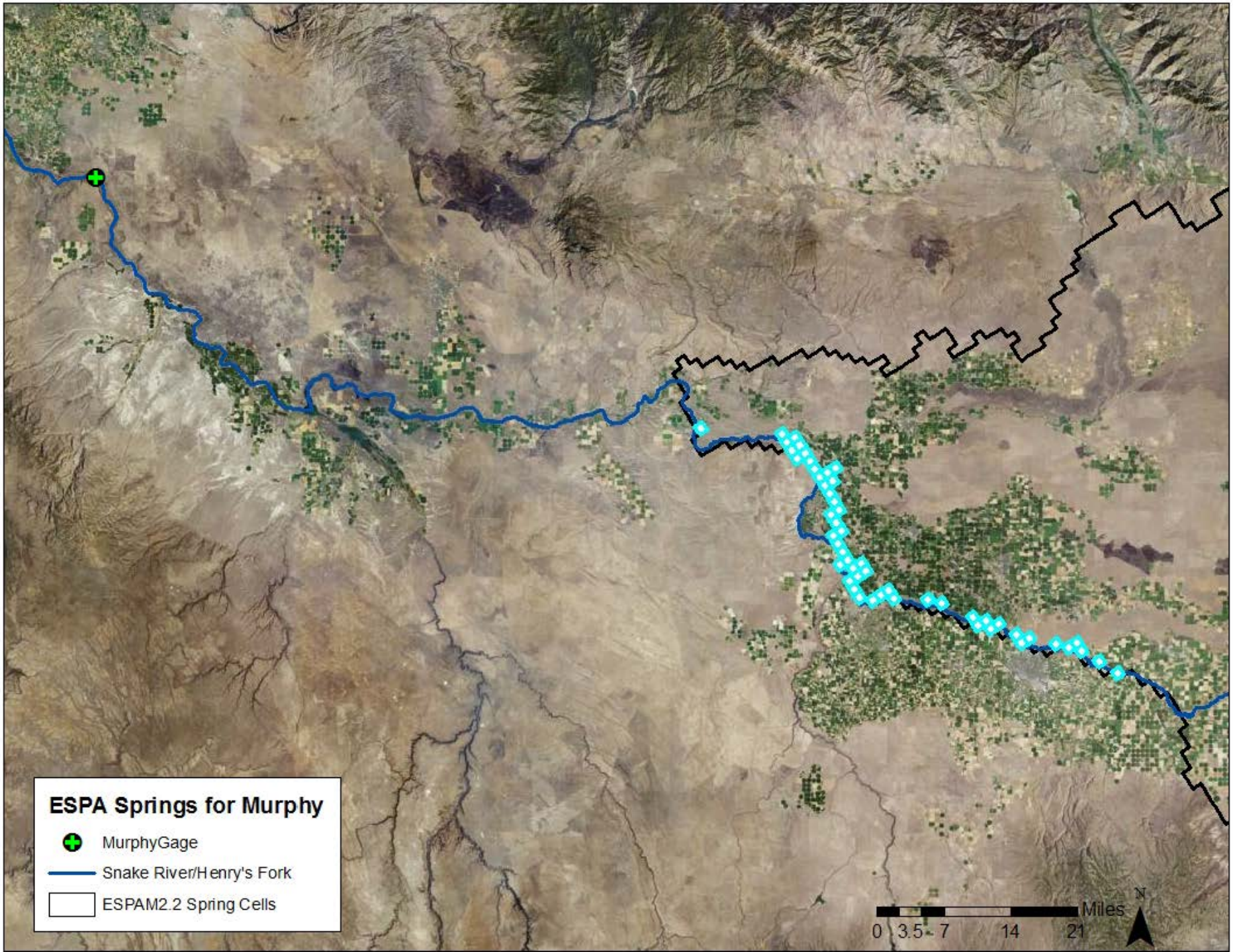
Benefits to Surface Water

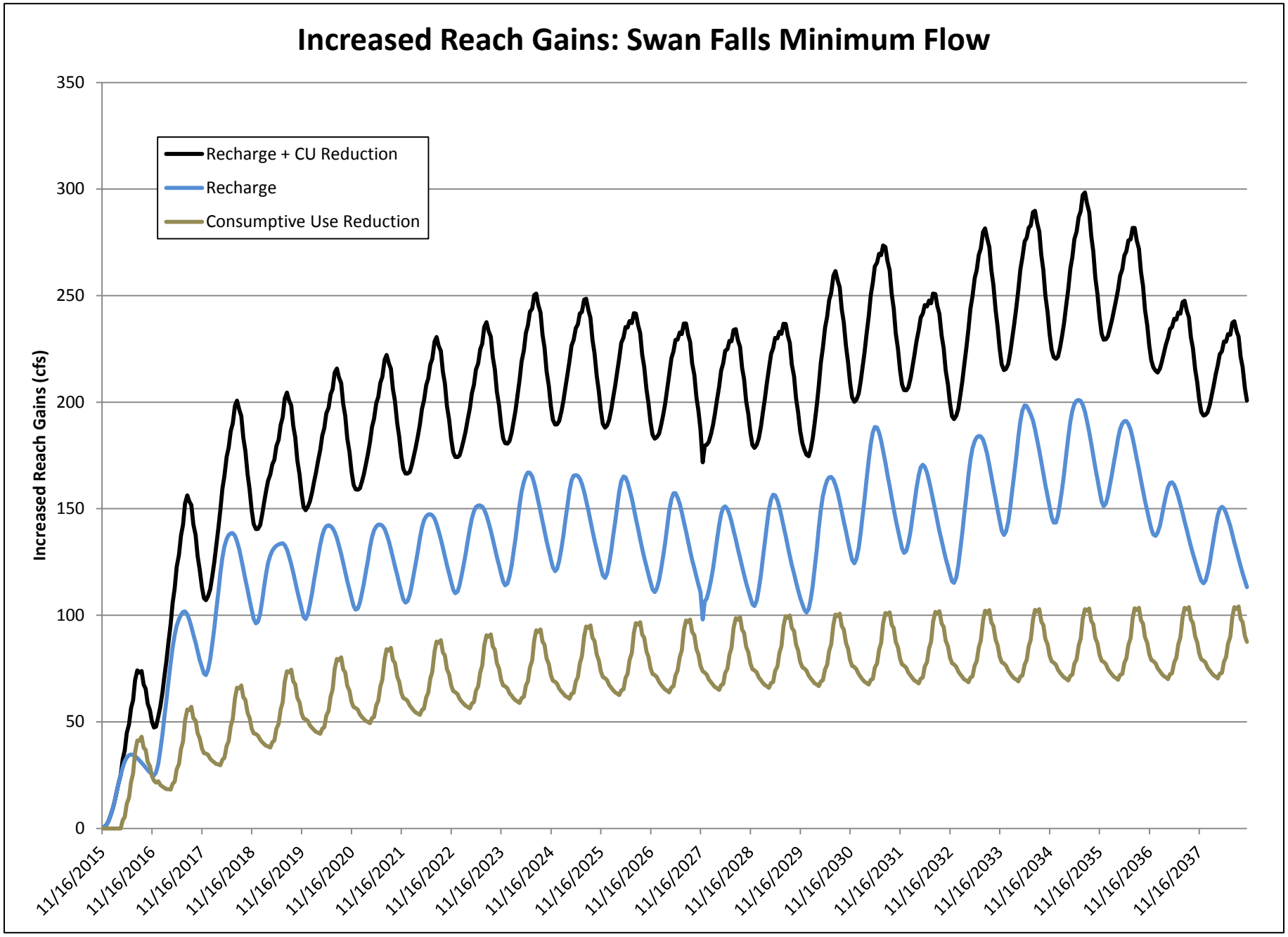
Benefits to Surface Water have been assessed relative to:

1. Increased reach gains in Billingsley Creek.
2. Increased reach gains in relation flow at Murphy.


Billingsley Creek
Snake River/Henry's Fork
ESPAM2.2 Spring Cells
Miles
0 2.5 5 10 15
N


Increased Reach Gains: Billingsley Creek
Recharge + CU Reduction
Recharge
Consumptive Use Reduction
30
25
20
15
10
5
0
11/16/2015
11/16/2016
11/16/2017
11/16/2018
11/16/2019
11/16/2020
11/16/2021
11/16/2022
11/16/2023
11/16/2024
11/16/2025
11/16/2026
11/16/2027
11/16/2028
11/16/2029
11/16/2030
11/16/2031
11/16/2032
11/16/2033
11/16/2034
11/16/2035
11/16/2036
11/16/2037


ESPA Springs for Murphy
MurphyGage
Snake River/Henry's Fork
ESPAM2.2 Spring Cells
0 3.5 7 14 21
Miles
N


Increased Reach Gains: Swan Falls Minimum Flow
Recharge + CU Reduction
Recharge
Consumptive Use Reduction
Increased Reach Gains (cfs)
350
300
250
200
150
100
50
0
11/16/2015
11/16/2016
11/16/2017
11/16/2018
11/16/2019
11/16/2020
11/16/2021
11/16/2022
11/16/2023
11/16/2024
11/16/2025
11/16/2026
11/16/2027
11/16/2028
11/16/2029
11/16/2030
11/16/2031
11/16/2032
11/16/2033
11/16/2034
11/16/2035
11/16/2036
11/16/2037

Conclusions

Efforts to solve ESPA issues associated with the SWC Settlement Agreement provide significant reach gains to both Billingsley Creek and the larger Kimberly-to-King Hill Springs reach.

Questions?