

### Efforts to Resolve Eastern Snake Plain Aquifer Issues

Presentation to the Wood River Collaborative Hailey, Idaho

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✓ Background✓ Surface Water Coalition Settlement

Topics

✓ Managed Recharge

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















Eastern Snake Plain Aquifer

✓ Fractured basalt aquifer

✓ About 10,000 square miles

✓ World-class aquifer







## ESPA Annual Water Budget

(0.3 MAF)

"Goes-ins"

**ID**AHO

•Canal seepage	2.9 MAF			
<ul> <li>Leakage from surface water-irrigated lands</li> </ul>	2.4 MAF			
<ul> <li>Non-Snake River seepage</li> </ul>	0.6 MAF			
<ul> <li>Tributary basin underflow</li> </ul>	1.1 MAF			
<ul> <li>Non-irrigated lands recharge</li> </ul>	0.7 MAF			
<u>"Goes-outs"</u>				
<ul> <li>Crop consumptive use on GW-irrigated lands</li> </ul>	2.2 MAF			
<ul> <li>Offsite/exchange/Mud Lake pumping</li> </ul>	0.2 MAF			
•Wetlands ET	0.1 MAF			
<ul> <li>Urban pumping</li> </ul>	0.1 MAF			
<ul> <li>Net reach gains/losses upstream from Minidoka1.0 MAF</li> </ul>				
<ul> <li>Spring flows below Milner</li> </ul>	4.4 MAF			

#### **NET CHANGE IN AQUIFER STORAGE**



Note: 2013 and 2014 data values are preliminary.

#### Eastern Snake Plain















## 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) and

✓ 5,600 cfs (11/1 through 3/31)



## However, 180 miles Upstream at 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, flow at Swan Falls Dam is made up almost entirely of spring flows from the ESPA



















## **IDAHO** Water Resource Board











## 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



## Surface Water Coalition Delivery Call

- Delivery Call Filed in 01/14/2005
- Final Order 09/05/2008
- Second Amended Methodology Order 06/23/2010
- Third Amended Methodology Order 04/16/2015
- Delivery Call Injury Based on Water Supply for Current Year
- Injury: (1) in-season; and (2) "reasonable carryover"
- Because the Water Supply changes from year to year, so does the injury obligation
- Uncertainty is the great frustration of the Junior...and the Senior

## How Does the Methodology Work

## **IN-SEASON INJURY**

- April forecast the SWC's water supply
- April forecast the SWC's demand (i.e. crop need)
- April if demand > supply, in-season injury to the SWC exists and Juniors must mitigate or curtail
- July repeat water supply/demand/injury analysis
- Aug/Sep repeat water supply/demand/injury analysis at the "time of need"

## CARRYOVER INJURY

- November determine injury, if any, to SWC's "reasonable carryover" (up to 125,000 acre-feet)
- If injury to "reasonable carryover" exists, Juniors must mitigate or curtail

# What Changed with the Third Amendment?

- No finality for the Junior until the "time of need" "mid-season adjustment" can be up or down
- Full obligation from the Area of Common Ground Water Supply
- New Prediction Models Tied to Aquifer Levels
- New Crop Distribution Data
- No "phased curtailment" of injury to "reasonable carryover"
- New Baseline Years, based on hotter and drier years
- New Methodology provides more certainty to the Senior
- New Methodology determines larger injuries
- Shifts more risk to the junior

Under the New Methodology the April 2015 Injury Determination was 89,000 acre-feet

Approximately 1982 Priority Date

Approximately 86,000 acres

But for the Stipulation leading to the Settlement, there would have been significant curtailment in 2015!

Summary of Demand Shortfall Projections as of May 3, 2015								
			Estimated July Mid-	Estimated July Mid-				
	April As-Applied	Estimated As-	Season Adjustment w/	Season Adjustment w/				
	Order as Issued	Applied using May 1	April Diversions & base-	April Div. & 2012 Analog				
	(4/16/15)	Forecast	line years	Year				
A&B	0	0	0	0				
AFRD2	-15,300	-35,464	-54,728	-67,938				
BID	0	0	0	0				
Milner	0	0	0	0				
Minidoka	0	0	0	0				
NSCC	0	0	-26,327	-184,543				
TFCC	-73,700	-90,250	-170,259	-318,387				
Total	-89,000	-125,714	-251,314	-570,868				
Approx.								
Curtailment	1982	1980	1974	1957				
Priority Date								
Approx. Curtailed Acres	86,000	121,000	259,000	594,000				

These numbers are calculated using the 3<sup>rd</sup> Amended Methodology Order for the Surface Water Coalition Delivery Call. Natural flow supplies are predicted using the NRCS's May 1 50% Exceedance Forecast of April-July Runoff Volume at the Heise Gage (i.e. 2,239,000 AF).

## **Final Settlement Agreement**

#### 1. Objectives

- Mitigate for material injury to senior water users in the Surface Water Coalition (SWC) Delivery Call
- Provide safe harbor to participating ground water users in participating Ground Water Districts (GWD)
- Minimize economic impact to water users and State economy
- Increase reliability and enforcement of use, measurement, and reporting across the Easter Snake Plain (ESP)
- Develop adaptive management plan to stabilize and enhance the Eastern Snake Plain Aquifer (ESPA) ground water levels



## -- Completed in 2015

-- beginning in 2016

## Final Settlement Agreement – Goal and Benchmarks

- 3. Term Sheet Benchmarks and Ground Water Level Goal
  - 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"
  - 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 goal; and (3) by 2026 goal is reached and ground water levels equal or exceed 1991-2001 average.
  - Metrics: ground water levels are measured in 19 mutually agreed to sentinel wells





## **New Water Pact a 'Momentous Occasion'**

p d to bring major changes for irrigators

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TWIN FALLS • Details of a historic agreement between groundwater and surface water users are coming to light after the groups say they reached a landmark deal last week.

Water managers on

Thursday negotiated a deal intended to settle all short - and long-term disputes brought on by overallocation of water from the aquifer that supports much of south-central Idaho.

Groundwater and surface water users have had a long and contentious battle over water rights. While most of the spats have been handled administratively through the state, some have gone to the Supreme Court.

The deal reached last week aims to end the fighting and bring back health to the aquifer, which has reached its lowest levels since 1912.

"This is a momentous occasion," said Randy Budge, a lead attorney for the groundwater users.

In 2016 and beyond, groundwater users will give up a whopping 240,000 acre-feet — enough water to cover Twin Falls County with 2.33 inches of water per year. This will require an estimated 13.1 percent reduction in diversions by each water user.

On Friday, Gary Spackman, director of the Idaho Department of Water Resources, approved the agreement and outlined how the 2015 mitigation obligation will be met.

The state has given water managers until July 1 to complete the agreement to avoid massive shutdowns that could devastate many farmers and businesses with junior water rights.

"Groundwater users were pretty well represented during negotiations," Brian Olmstead, general manager of Twin Falls Canal Co., said Monday. "If there is any push-back, it would come from those groundwater users with senior water rights. They may not feel they need to carry the burden for those with junior rights."

Idaho's first-in-time, first-in-line water law stipulates that older senior water rights have priority over generally younger junior rights. Surface water rights tend to be senior to junior groundwater water rights, but many irrigators have a mix of senior and junior rights.

According to a document obtained by the Times-News, Idaho Ground Water Appropriators and the Surface Water Coalition agreed on a set of objectives including stabilizing the Eastern Snake Plain Aquifer, increasing Blackfoot to Milner reach gains,

Please see PACT, A9













## 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
- ✓ 2016 legislature firming up funds for long-term















## Recharge Goal: Stabilize & Rebuild ESPA

- State Water Plan goal of 250,000 AF/year
- ✓ Component of SWC Settlement Term Sheet
- Component of draft Hagerman Valley/Thousand Springs 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











## 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















## 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















## Factors that Define ESPA Recharge Water Rights & Water Supply















## 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















## Winter Recharge 2014-2015

- •Took recharge from "pilot scale" to "full scale" – proof of concept
- •Use existing canals to extent possible to deliver recharge water
- •Water Board adopted incentivized payment schedules for canals – <u>MAKE RECHARGE A</u> PARTNERSHIP!













## Winter Recharge 2014-2015

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

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



14,166 AF

#### **Total Water Board Recharge Rates During 2014 - 2015 Season**

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





## **IDAHO** Water Resource Board











## 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  $11^{t_{i}}$  201



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

















**DRAFT REPORT** 

Key Finding by CH2M-Hill: "We believe the state is on the right path"













## Working with Canal Company Partners to Improve Systems for Recharge









#### **Total IWRB Managed Recharge Rates During 2015 - 2016 Season** Total Volume of Recharge = **66,536** AF as of April 1, 2016 **Recharge Rate** 1300 Limit = 1,200 cfs NOTE: recharge water Recharge Season below K Minidoka Dam **October** right not "on" in Upper 1200 1200 23rd to April 1st Valley to date this 1100 1100 recharge season **Total Water** 1000 1000 Available for Recharge 900 900 SWID 800 800 Recharge Flow (cfs) NSCC 700 700 AFRD2 600 TFCC 600 Available Flow 500 500 400 400 300 300 200 200 TOTAL SPILL PAST 100 100 MILNER = 111,326 AF 0 0 J.Oct 15.Oct 31-Mar 14-Apr 28-Apr 23-140 12.May 26-NOV 10.Dec ·6.May Jun Jan **Preliminary Data Dates of Recharge**

## IWRB ESPA Managed Recharge Summary

Oct. 23, 2015 – April 1, 2016

ESPA Area	Canal System	5-Year Retention Time (%)	Mean Recharge Rate (cfs)	Days Recharged	Volume Recharged (Acre-feet)
Lower Valley	American Falls Reservoir District No. 2 (Milner-Gooding Canal)	~36	183	130	47,312
	North Side Canal Company	~37	80	58	9,236
	Southwest Irrigation District	~54	21	21	886
	Twin Falls Canal Company	~45	30	154	9,102
				TOTAL	66,536

ESPA Recharge Below American Falls Winter 2015-2016 (as of 4/8/16)

(No natural flow recharge upstream of Minidoka Dam this winter to date)



Care

Percent Retained in the Aquifer -5 yr

> 90 - 100 80 - 90

## Recharge Operations 2015-2016 Milner-Gooding Canal



Turn-out to MP31 recharge site (Nov. 30, 2015)

New Mile28 Hydro Plant bypass upstream side (above) and downstream side (below) (Nov. 30, 2015)



Frozen-over canal with water running under ice (Dec. 29, 2015)

## Recharge Operations 2015-2016 Twin Falls Canal



Recharge flow in the Twin Falls Canal entering Murtaugh Lake – Nov. 6, 2015

Recharge flow in the Twin Falls Canal – Nov. 30, 2015

Recharge water in Murtaugh Lake & de-icing system at gates Nov. 30, 2015

## Recharge Operations 2015-2016 Northside Canal



Recharge flow in the Northside Canal – Nov. 4, 2015 Recharge water in Wilson Lake March 23, 2016

Recharge flow in the Northside Canal – February 22, 2016







## **Building to Increase Recharge Capacity**

Milner-Gooding Canal – rehabilitating concrete channel near Shoshone so winter flows can be delivered to Shoshone Recharge Site

> Milner-Gooding Canal – Mile 28 Hydro Plant recharge water bypass under construction

## **Building to Increase Recharge Capacity**

New canal under construction to the Egin Bench Recharge Site November 24, 2015



Recharge capacity increase at the Great Feeder Canal February 16, 2016













## 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 2024 (+/-)
- •\$40M capital cost
- •\$3M/year ongoing, for operations, maintenance, and replacements
- •Schedule contingent on adequate resources



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





7/15/2015

## Increased Reach Gains: Swan Falls Minimum Flow 350 Recharge + CU Reduction 300 Recharge Consumptive Use Reduction 250 Increased Reach Gains (cfs) 200 150 100 50 0

DAHO Bepariment of Water Resources













#### We need your help & support to get this done!

