AGENDA

AQUIFER STABILIZATION COMMITTEE MEETING NO. 2-15

September 14, 2015 at 1:00 pm

Idaho Fish and Game
Magic Valley Regional Office
Main Conference Room
324 South 417 East - Suite 1, Jerome, ID 83338

1. Introduction and Attendance
2. ESPA Managed Recharge Update
    a. Projections - Lower Valley Recharge/Construction Projects
    b. Projections - Upper Valley Recharge/Construction Projects
    c. Proposed Projects
3. Cloud Seeding Program Updates and Future Activities
4. New Business
5. Adjourn

Committee Members – Bert Stevenson (Chairman), Jeff Raybould, Vince Alberdi, Al Barker, Roger Chase

ESPA Managed Recharge Update

IWRB Aquifer Stabilization Committee

Wesley Hipke

September 14, 2015

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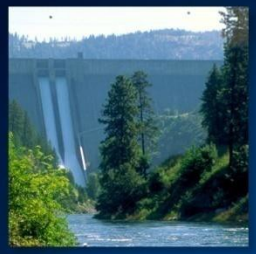
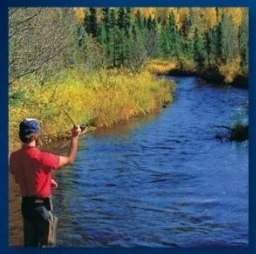

ESPA Managed Recharge Update

- Lower Valley Managed Recharge Projections & Construction Projects
- Upper Valley Managed Recharge Status & Potential Projects
- Proposed Managed Recharge Projects


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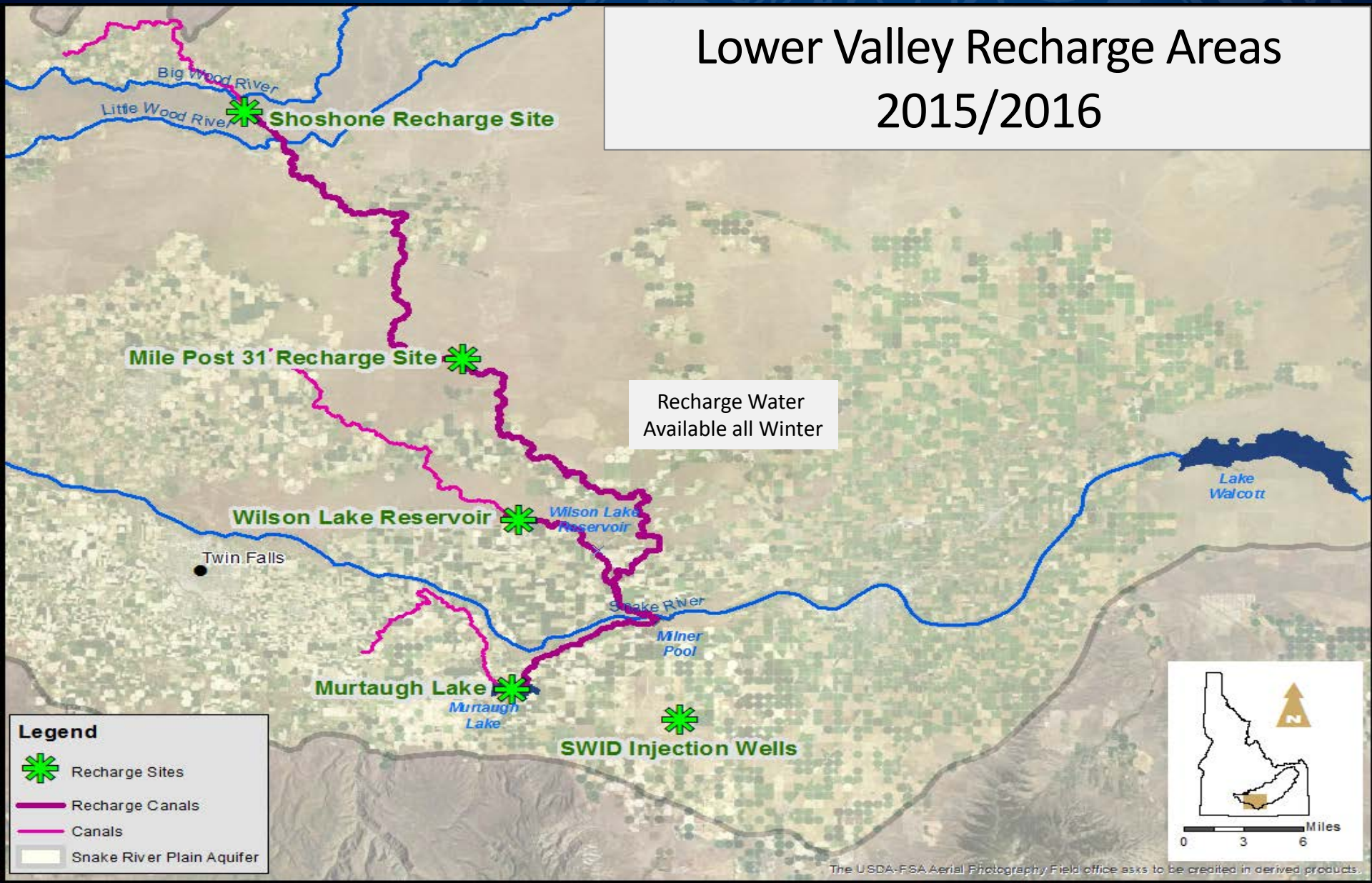
Lower Valley Recharge Areas 2015/2016



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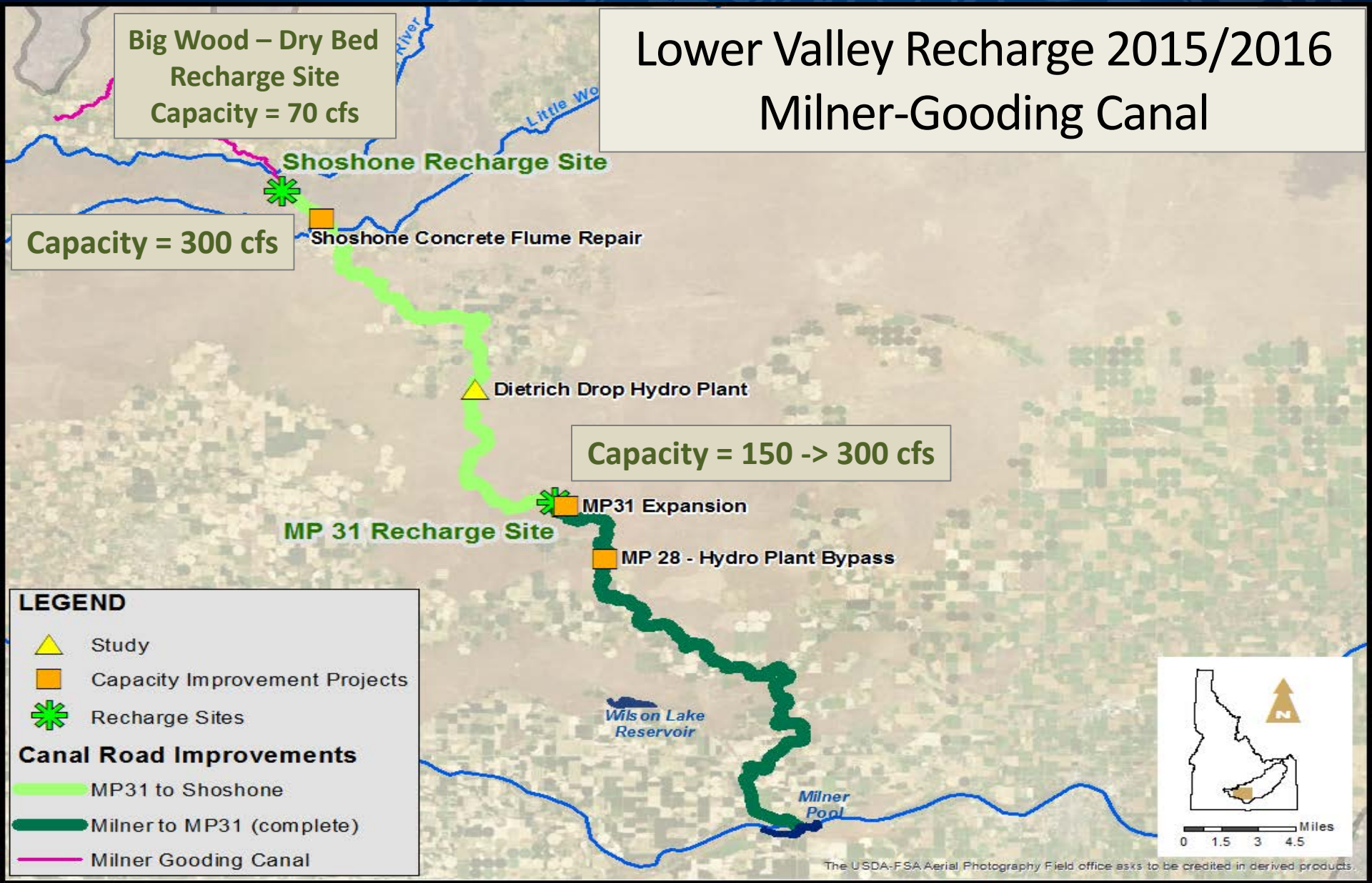
Lower Valley Recharge 2015/2016
Milner-Gooding Canal



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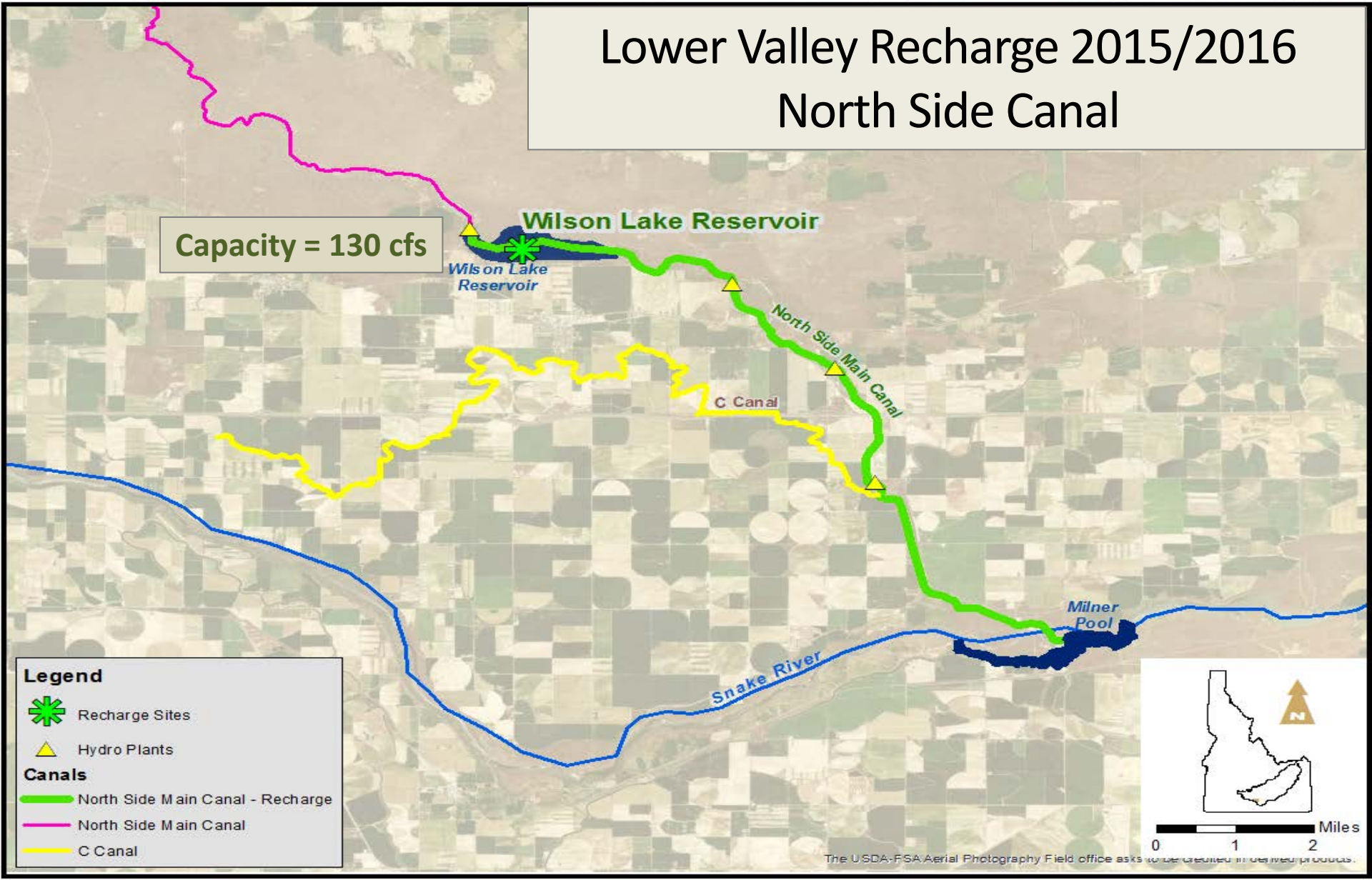
Lower Valley Recharge 2015/2016
North Side Canal



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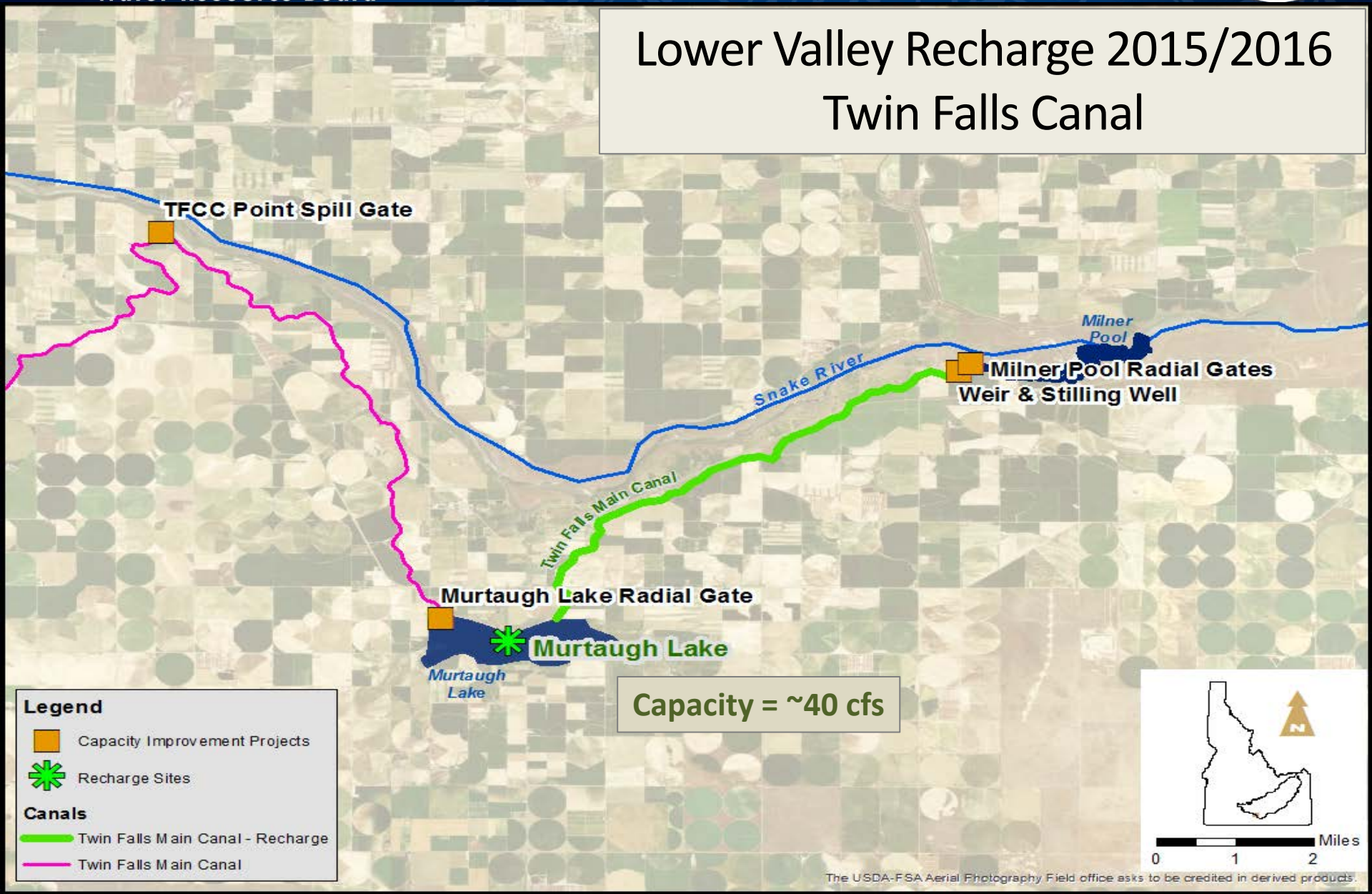
Lower Valley Recharge 2015/2016
Twin Falls Canal



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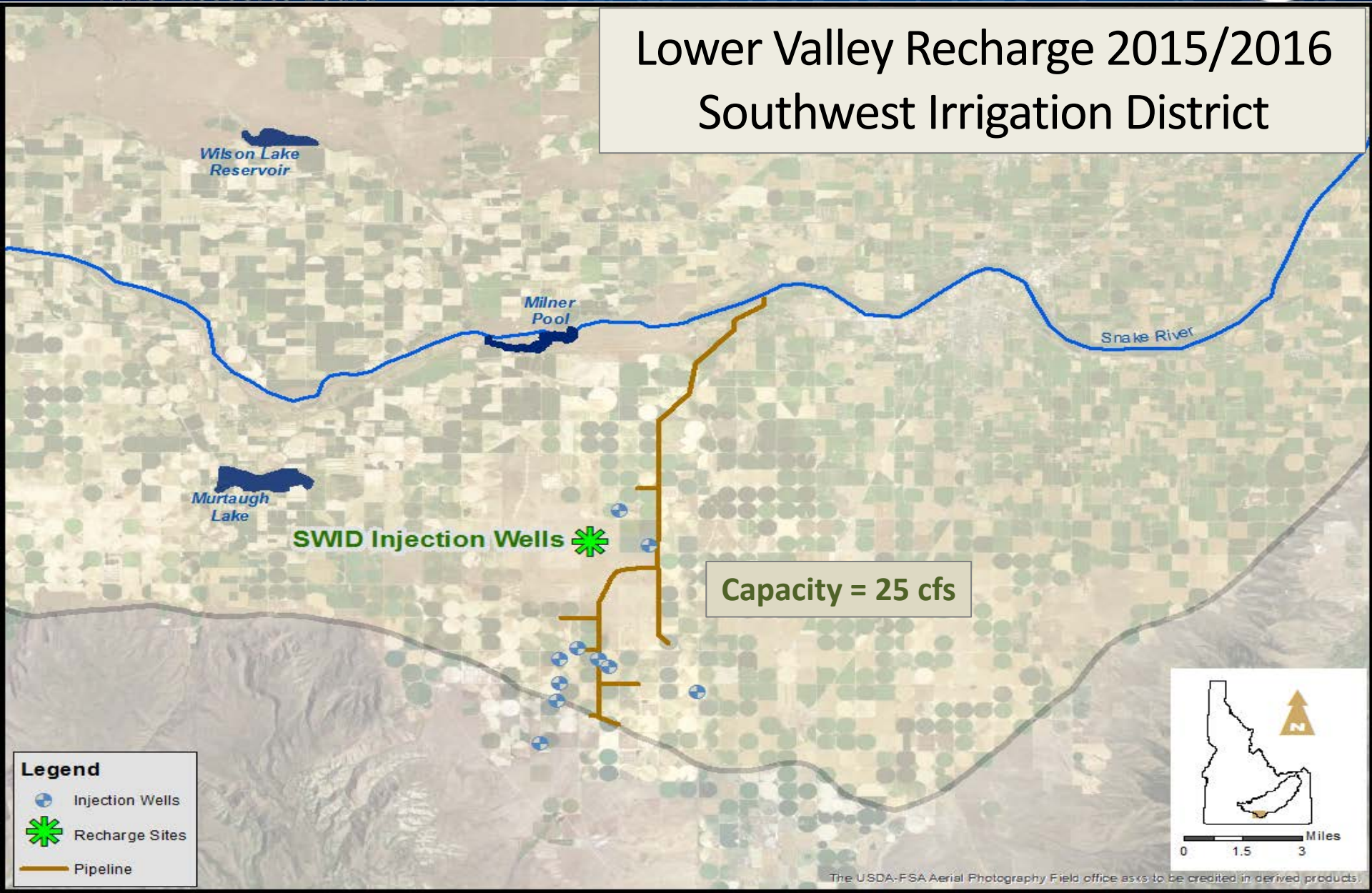
Lower Valley Recharge 2015/2016
Southwest Irrigation District



Lower Valley - Projected Managed Recharge 2015/2016

Canal System	Months Available for Recharge	Projected Recharge Rate (cfs)	Projected Volume Recharged (Acre-feet)	Projected Conveyance Costs ($)
American Falls Reservoir District No. 2	4	300	72,000	$490,300
North Side Canal Company	3	130	23,000	$129,000
Twin Falls Canal Company	5	40	12,000	$98,700
Southwest Irrigation District	2	25	2,900	$13,000
		TOTAL	**109,900**	**$731,000**

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Lower Valley Recharge & Project Schedule

CANAL	2015				2016					
	S	O	N	D	J	F	M	A	M	J
Milner-Gooding Canal					300					
MP 31 Site					300					
Mile Post 28 Hydro Plant		$45,000								
Mile Post 31 Expansion		$200,000								
Shoshone Site										
Flume Repair @ Shoshone					$700,000					
MP31-Shoshone Road Improvement					$120,000					
Dietrich Drop Hydro Plant			$30,000							
North Side Canal			130			130				
Hydro Plant Modifications	$122,000									
Twin Falls Canal					40					
Infrastructure Modifications		$18,800								
Point Spill										
Southwest I.D.						25				

Recharge (cfs)

Study

Construction Project

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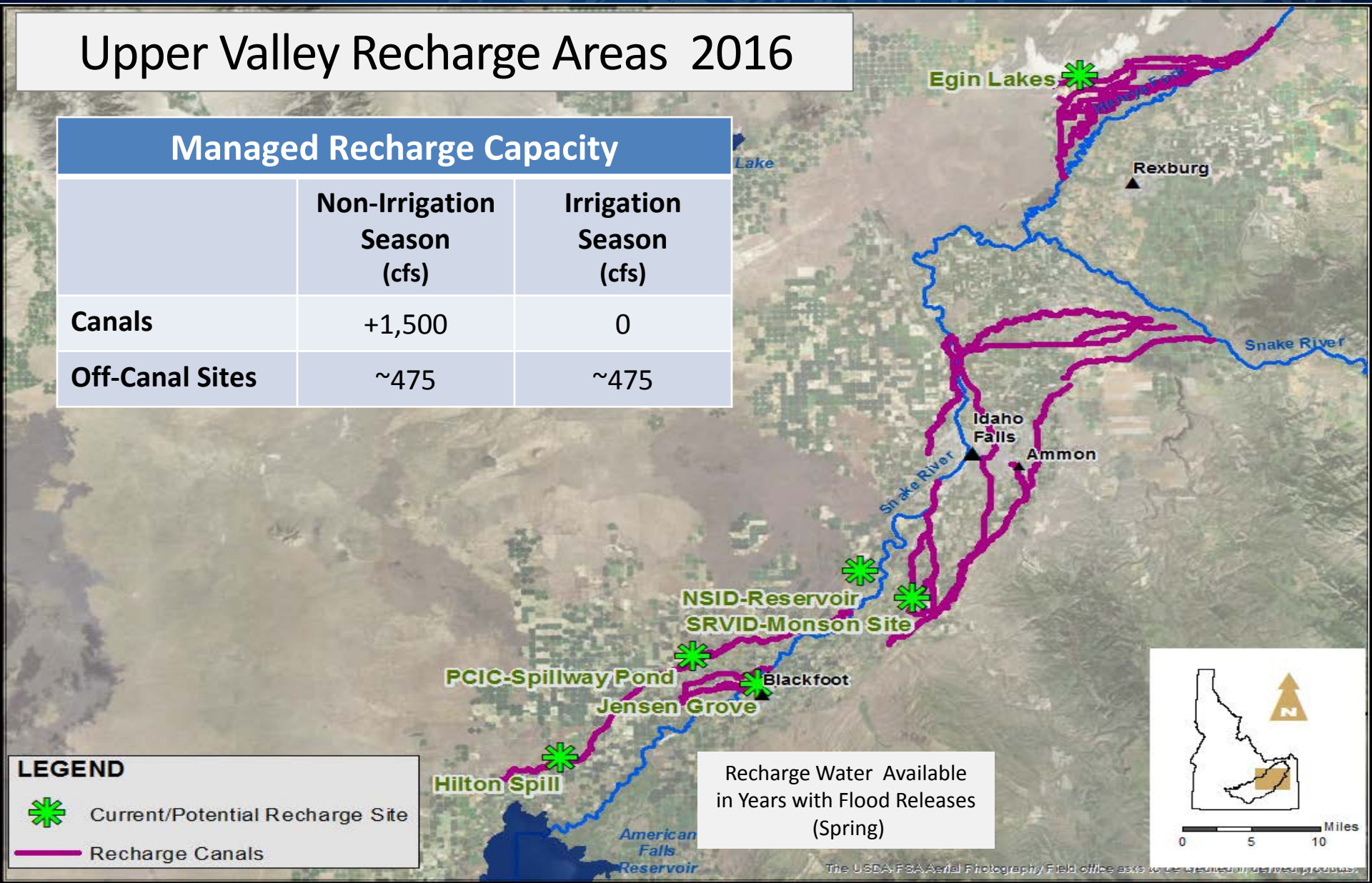
Upper Valley Recharge Areas 2016

Managed Recharge Capacity		
	Non-Irrigation Season (cfs)	Irrigation Season (cfs)
Canals	+1,500	0
Off-Canal Sites	~475	~475



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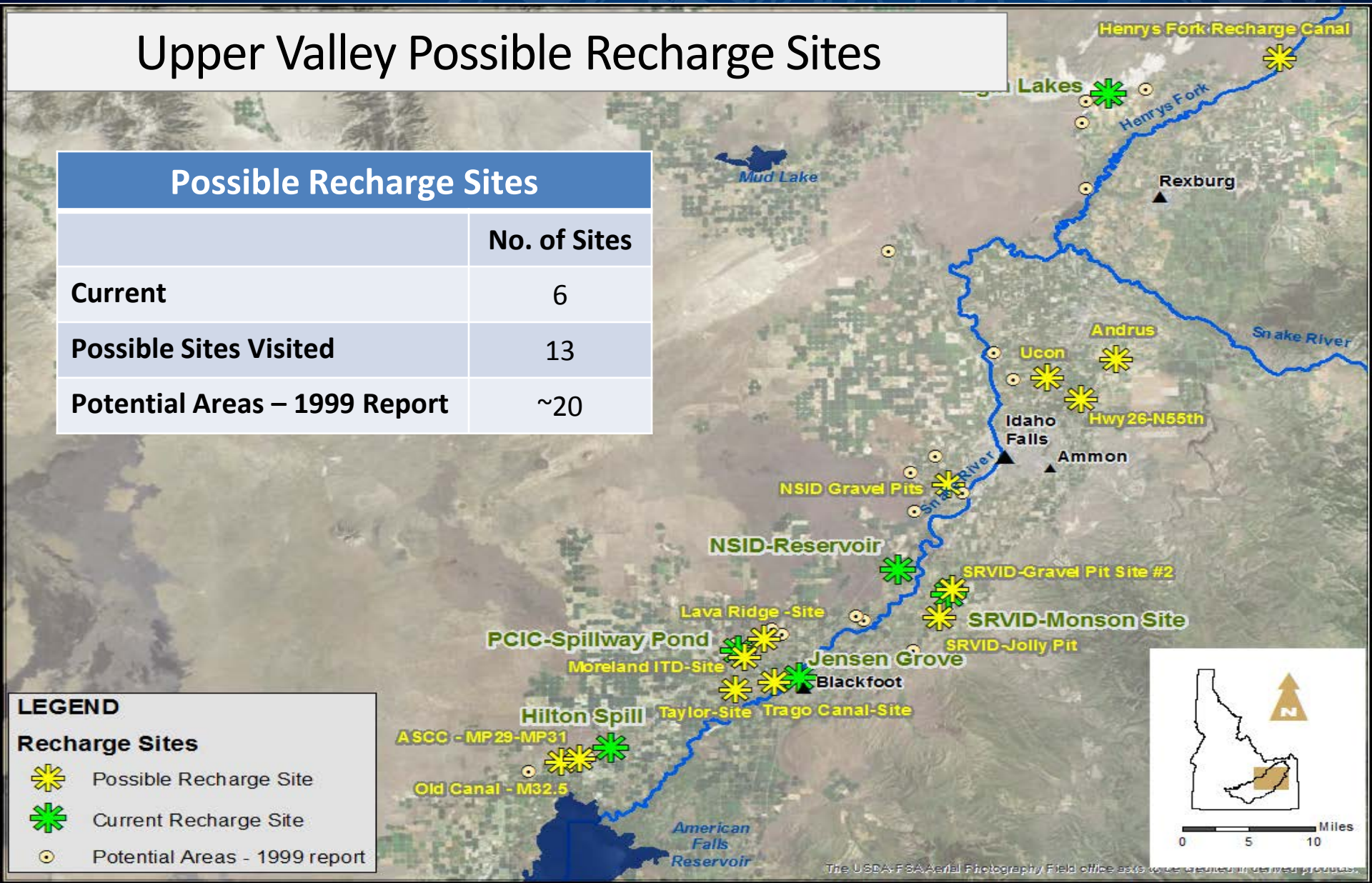
Upper Valley Possible Recharge Sites

Possible Recharge Sites	
	No. of Sites
Current	6
Possible Sites Visited	13
Potential Areas – 1999 Report	~20



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Potential Upper Valley Managed Recharge Projects - Off-Canal

No.	Project	Operator	Estimated Recharge Capacity (cfs)	Estimated Project Cost ($)
1	Egin Lake Improvements	FMID	150 - 300	$722,688 - $1,372,316
2	Hilton Spill Improvements	ASCC	150	~$100,000
3	Old Canal Site	ASCC	15	~$10,000
4	People's Canal Spillway Pond	PCIC	50 - 70	$73,010
5	Monson Site	SRVID	30	$5,000
6	Jensen Grove	CoB[1]	30	$53,000
7	GFCC-Various Sites	GFCC	?	?
8	ASCC - Mile 29 & 31.5	ASCC	600 - 1,200	?
9	Moreland ITD Site	ASCC?	~30	?
10	Lava Ridge Site	PCIC	?	?
11	Trago Canal Site	UCC?	?	?
12	Taylor Site	UCC?	?	?
13	Jolly Pit	SRVID	~15	?
14	NSID Reservoir	NSID	20 - 50	?
15	NSID-Gravel Pits	NSID	~30	?
16	Henrys Fork Recharge Canal	FMID?	?	?
17	SRVID-Gravel Pit - Site #2	SRVID	~25	?

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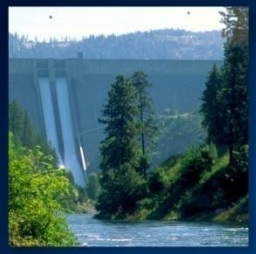
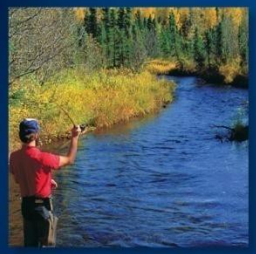
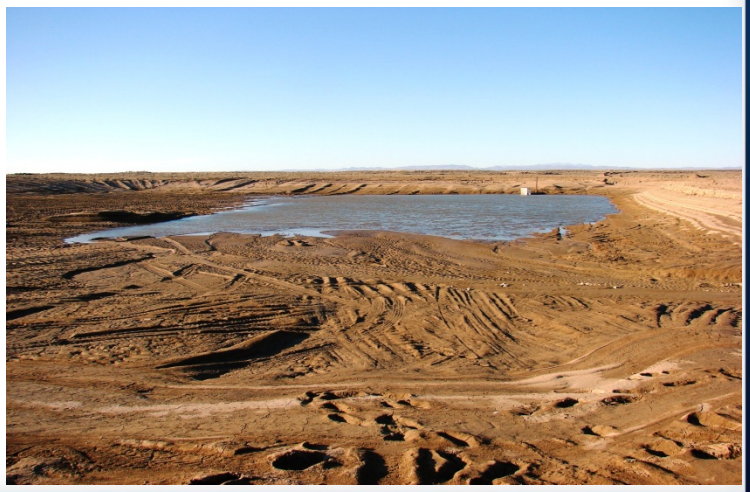




IWRB Managed Recharge Projects

- Review Current Proposals
- Determine IWRB Resolution Conditions
- Long-Term Managed Recharge Commitment



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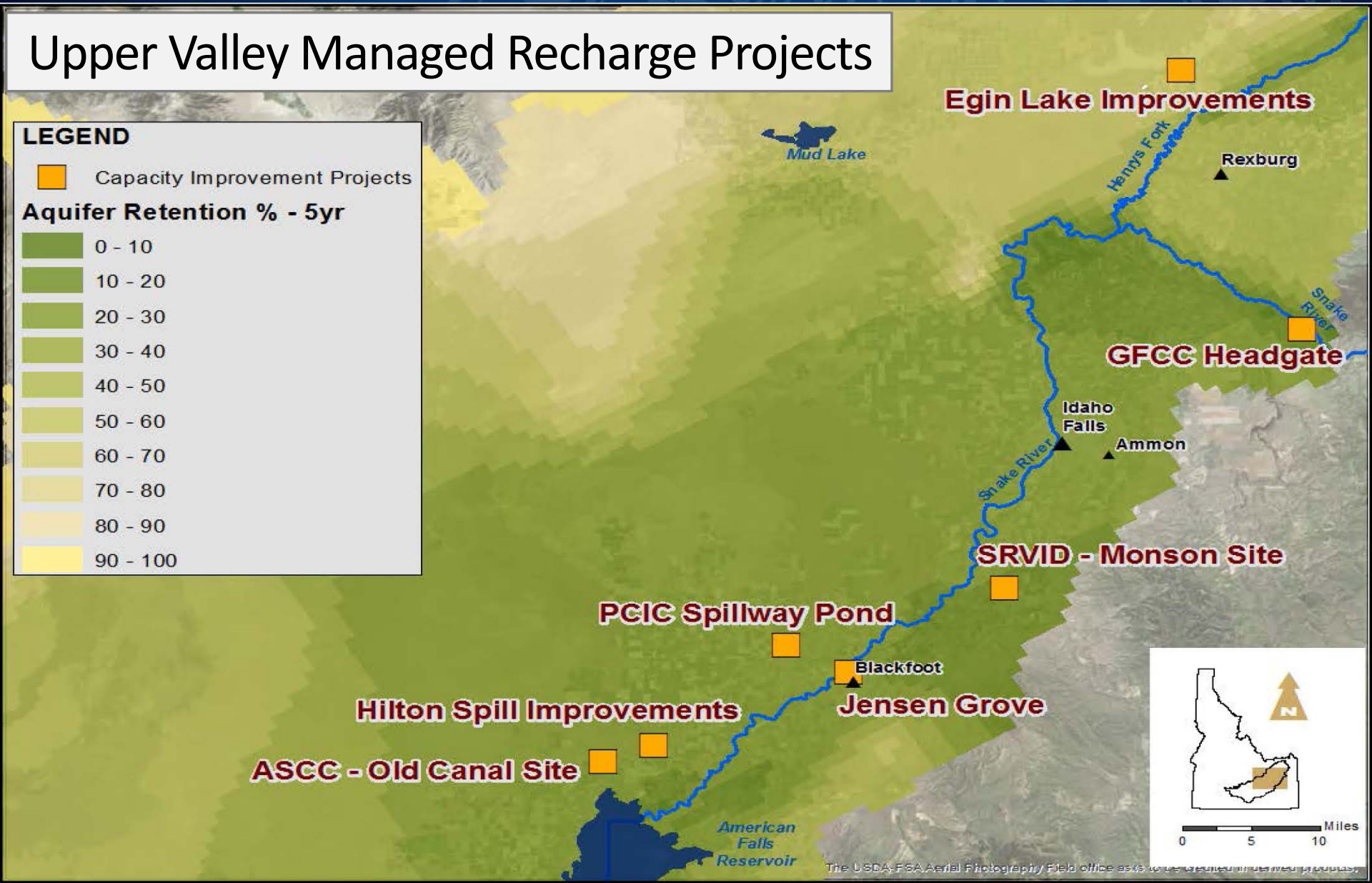
Upper Valley Managed Recharge Projects



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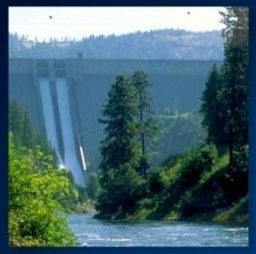

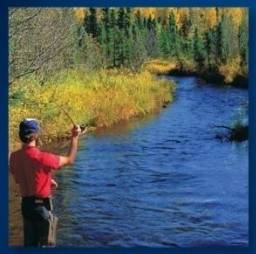

Egin Lakes Improvements

- Improve Delivery Capacity — 50 to 150-300 cfs
- IWRB Long-Term Median Volume — 6,500 – 13,000 af/yr
- Cost
  - Construction est. — $722,688 - $1,372,316
  - IWRB FY16 Budget = — $500,000
- Key Project Details
  - Improve Delivery to Maximize Site
  - Developed Site

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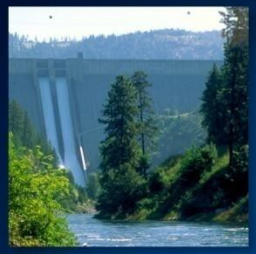
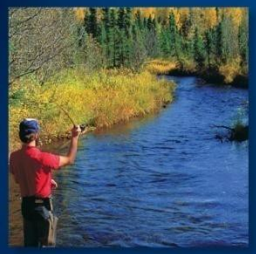

Great Feeder Headgates

- Potential Capacity Improvement
- IWRB Long-Term Median Volume — unknown
- Cost
  - Total est. — ~$1,000,000
  - IWRB FY16 Budget = — $500,000
- Key Project Details
  - Improve Delivery Ability for IWRB's Recharge Water

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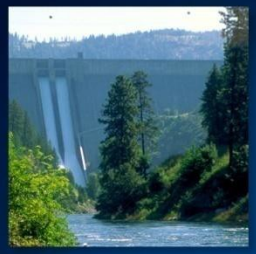
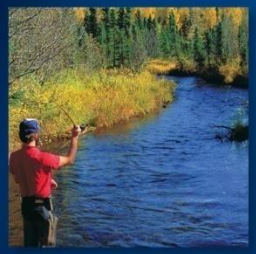

SRVID – Monson Site

- Managed Recharge Capacity — 30 cfs
- IWRB Long-Term Median Volume — 1,300 af/yr
- Cost — $5,000
- Key Project Details
  - Developed Site
  - Adding Monitoring Equipment


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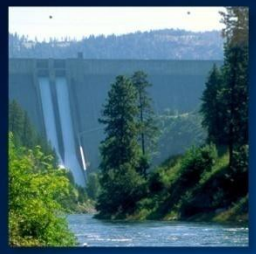
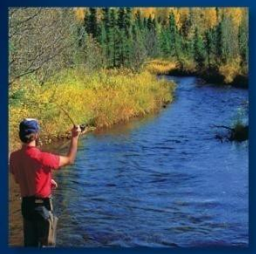

PCIC – Spillway Pond

- Managed Recharge Capacity — 50 - 70 cfs
- IWRB Long-Term Median Volume — 2,200 – 3,000 af/yr
- Cost — $73,010
- Key Project Details
  - Developed Site
  - GW Quality Monitoring Wells ?


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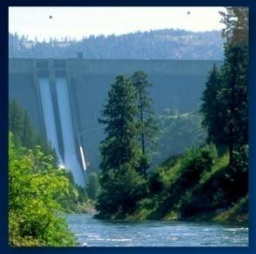
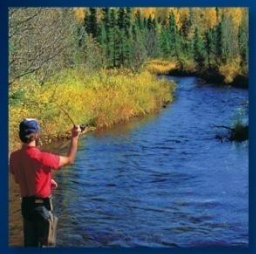

Jensen Grove

- Managed Recharge Capacity ~30 cfs
- IWRB Long-Term Median Volume ~1,300 af/yr
- Cost
  - Total est. $53,054
  - Request from IWRB (50%) = $26,527
- Key Project Details
  - Infrastructure Improvements & Monitoring Equipment


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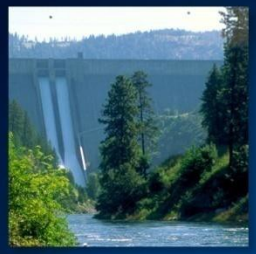

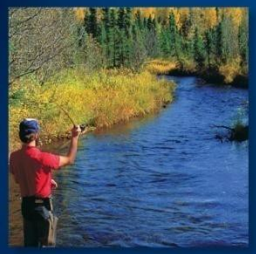

ASCC – Hilton Spill Improvements

- Improve Recharge Capacity — 100 to ~130 cfs
- IWRB Long-Term Median Volume — 5,700 af/yr
- Cost — ~$100,000
- Key Project Details – No Proposal
  - Developed Site
  - Remove Dirt to Improve Infiltration

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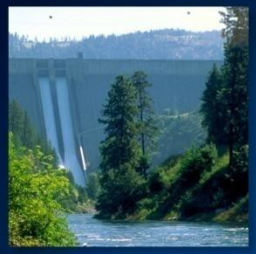
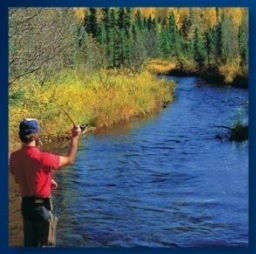

ASCC – Old Canal Site

- Improve Recharge Capacity ~15 cfs
- IWRB Long-Term Median Volume 650 af/yr
- Cost ~$10,000 ?
- Key Project Details – No Proposal
  - Old Canal
  - Excavation to Utilize the Entire Canal


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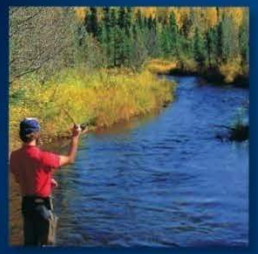

Questions

BEFORE THE IDAHO WATER RESOURCE BOARD

IN THE MATTER OF AQUIFER STABILIZATION AND EASTERN SNAKE PLAIN AQUIFER RECHARGE	))))	A RESOLUTION TO APPROVE FUNDS FOR RECHARGE INFRASTRUCTURE IMPROVEMENTS FOR [NAME]

WHEREAS, House Bill 547 passed and approved by the 2014 legislature allocates $5 million annually from the Cigarette Tax to the Idaho Water Resource Board (IWRB) for statewide aquifer stabilization, with the funds to be deposited into the Secondary Aquifer Planning, Management, and Implementation Fund; and

WHEREAS, House Bill 479 passed and approved by the 2014 legislature allocated $4 million in one-time funds for managed aquifer recharge infrastructure on the Eastern Snake Plain; and

WHEREAS, aquifer stabilization and recovery was identified as a key strategy and goal of the Eastern Snake Plain Aquifer Comprehensive Aquifer Management Plan (ESPA CAMP); and

WHEREAS, the ESPA must also be stabilized in order to prevent future ground water user-versus-surface water user conflicts; and

WHEREAS, Resolution 5-15 (Secondary Aquifer Fund) budgeted funds for ESPA managed recharge infrastructure improvements, provided the funds are approved by the IWRB by resolution for each individual project, detailing the terms and conditions of the approval of such funding, including long-term access for recharge by the IWRB in any facilities owned by others; and

WHEREAS, Resolution 5-15 (Secondary Aquifer Fund) contemplated funding for the [NAME] recharge improvements in line item [LINE ITEM NO.] for $[IWRB BUGETED FUNDS]. ; and

WHEREAS, [NAME] proposes to replace the diversion structure of the [CANAL NAME] on the Snake River to increase capacity to divert water for managed recharge from the South Fork of the Snake River and to enhance [NAME]'s ability to regulate the flow of water diverted for managed recharge.

NOW THEREFORE BE IT RESOLVED that the IWRB authorizes expenditures from the Secondary Aquifer Planning, Management, and Implementation Fund, for funds in an amount equal to [IWRB PERCENTAGE]% of the actual costs to [PROJECT SUMMARY], provided that the total amount funded shall not exceed $[IWRB MAXIMUM FUNDS]. Any additional costs above $[TOTAL PROJECT COST] will be borne by [NAME].

BE IT FURTHER RESOLVED that [NAME] shall submit copies of the engineering design and construction plans, specifications, and project cost estimates to the Board prior to

commencing construction. All plans and specifications shall be signed by an engineer licensed in the state of Idaho.

BE IT FURTHER RESOLVED that [NAME] shall deliver the Board's recharge water right for a minimum period of twenty years pursuant to a Water Conveyance Contract and a Memorandum of Intent between the Board and [NAME].

BE IT FURTHER RESOLVED that [NAME] and their project manager(s) are solely responsible and accountable for the oversight, construction, and management of this project.

DATED this 18th day of September 2015.

_____

ROGER CHASE, Chairman
Idaho Water Resource Board

ATTEST_____

Vince Alberdi, Secretary
Idaho Water Resource Board

BEFORE THE IDAHO WATER RESOURCE BOARD

IN THE MATTER OF AQUIFER STABILIZATION AND EASTERN SNAKE PLAIN AQUIFER RECHARGE	)))))	A RESOLUTION TO APPROVE FUNDS FOR RECHARGE INFRASTRUCTURE IMPROVEMENTS FOR THE GREAT FEEDER CANAL COMPANY

WHEREAS, House Bill 547 passed and approved by the 2014 legislature allocates $5 million annually from the Cigarette Tax to the Idaho Water Resource Board (IWRB) for statewide aquifer stabilization, with the funds to be deposited into the Secondary Aquifer Planning, Management, and Implementation Fund; and

WHEREAS, House Bill 479 passed and approved by the 2014 legislature allocated $4 million in one-time funds for managed aquifer recharge infrastructure on the Eastern Snake Plain; and

WHEREAS, aquifer stabilization and recovery was identified as a key strategy and goal of the Eastern Snake Plain Aquifer Comprehensive Aquifer Management Plan (ESPA CAMP); and

WHEREAS, the ESPA must also be stabilized in order to prevent future ground water user-versus-surface water user conflicts; and

WHEREAS, Resolution 5-15 (Secondary Aquifer Fund) budgeted funds for ESPA managed recharge infrastructure improvements, provided the funds are approved by the IWRB by resolution for each individual project, detailing the terms and conditions of the approval of such funding, including long-term access for recharge by the IWRB in any facilities owned by others; and

WHEREAS, Resolution 5-15 (Secondary Aquifer Fund) contemplated funding for the Great Feeder Canal recharge improvements in line item 2.e for $500,000; and

WHEREAS, Great Feeder Canal Company (GFCC) proposes to replace the diversion structure of the Great Feeder Canal on the South Fork of the Snake River to increase capacity to divert water for managed recharge from the South Fork of the Snake River and to enhance GFCC's ability to regulate the flow of water diverted for managed recharge.

NOW THEREFORE BE IT RESOLVED that the IWRB authorizes expenditures from the Secondary Aquifer Planning, Management, and Implementation Fund, for funds in an amount equal to 50% of the actual costs to replace the diversion structure of the Great Feeder Canal on the South Fork of the Snake River, provided that the total amount funded shall not exceed $500,000.00. Any additional costs above $1,000,000.00 will be borne by GFCC.

BE IT FURTHER RESOLVED that GFCC shall submit copies of the engineering design and construction plans, specifications, and project cost estimates to the Board prior to

commencing construction. All plans and specifications shall be signed by an engineer licensed in the state of Idaho.

BE IT FURTHER RESOLVED that GFFC shall deliver the Board's recharge water right for a minimum period of twenty years pursuant to a Water Conveyance Contract and a Memorandum of Intent between the Board and GFCC.

BE IT FURTHER RESOLVED that GFFC and their project manager(s) are solely responsible and accountable for the oversight, construction, and management of this project.

DATED this 18th day of September 2015.

_____

ROGER CHASE, Chairman
Idaho Water Resource Board

ATTEST_____

Vince Alberdi, Secretary
Idaho Water Resource Board

Memorandum

To: Idaho Water Resource Board

From: Cynthia Bridge Clark, Rick Collingwood

Date: September 14, 2015

Re: Status of Cooperative Cloud Seeding Program and Upper Snake Aircraft Pilot Project

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Cloud Seeding will be discussed at an Idaho Water Resource Board (IWRB) Aquifer Stabilization Committee meeting scheduled for September 14, 2015. The Committee will review the status of cloud seeding activities in the Upper Snake, Wood and Boise River basins and discuss a proposal by Idaho Power Company (IPC) to initiate a one-year pilot program for aircraft cloud seeding operations in the Upper Snake River Basin.

Cloud seeding (also referred to as Weather Modification) was identified as a key strategy for improving water supplies in the Eastern Snake Plain Aquifer Comprehensive Aquifer Management Plan (ESPA CAMP) and in the draft Treasure Valley CAMP (TV CAMP). The science generally indicates that a professionally managed program can increase winter snowpack and thereby increase runoff by up to 10%, resulting in more surface water for all uses, including aquifer management projects.

An existing water user and county-led cloud seeding program has been operating in the Upper Snake River Basin since the late 1980's, and was formalized by the High Country Resource and Conservation Development Council (HCRC&D) in 2007. A similar water user led program has been operating in the Boise River Basin using manually operated ground-based generators. IPC has been operating a cloud seeding program in the Payette River Basin since 2003. As a result of the ESPA CAMP, IPC also established a remote-operated "pilot program" in 2008 in the Upper Snake River Basin that operates in parallel with the locally-led effort managed by HCRC&D.

On September 23, 2014, the IWRB approved funding for a 5-year (2015-2019) Cooperative Cloud Seeding Program between the IWRB, IPC and water users to establish IPC run programs in the Boise River and Wood River Basins, and to expand cloud seeding operations in the Upper Snake River. Water users in the Boise and Wood River Basins agreed to share in the operation and maintenance costs of the cloud seeding program, and the IWRB authorized expenditure of up to $492,000 for capital expenses associated with the cooperative program, not to exceed 40% of actual capital costs. It is estimated that the fully expanded cloud seeding program, with a dedicated aircraft in each basin, will increase yearly runoff in the Upper Snake River Basin by 685,000 acre-feet, the Boise River Basin by 197,000 acre-feet, and the Wood River Basin by 100,000 acre-feet.

An update on the progress of the expanded program will be presented to the Aquifer Stabilization Committee as well as a proposal by IPC to initiate a one-year pilot aircraft cloud seeding operations project (Aircraft Pilot Project) in the Upper Snake River Basin during the 2016 water year. Specifically, IPC will discuss the effectiveness of the use of aircraft to increase precipitation and snowpack in conjunction with ground operated generators (remote and manual). Execution of the pilot project is expected to enhance water supply and provide water users, the IWRB and IPC with additional information about the value of a comprehensive cloud seeding program.

BEFORE THE IDAHO WATER RESOURCE BOARD

IN THE MATTER OF AQUIFER STABILIZATION AND CLOUD SEEDING IN THE UPPER SNAKE RIVER BASIN	)))))	A RESOLUTION TO APPROVE FUNDS FOR ONE-YEAR AIRCRAFT PILOT PROJECT THROUGH THE COOPERATIVE CLOUD SEEDING PROGRAM

WHEREAS, House Bill 547 passed and approved by the 2014 legislature allocates $5,000,000 annually from the Cigarette Tax to the Idaho Water Resource Board (IWRB) for statewide aquifer stabilization, with the funds to be deposited into the Secondary Aquifer Planning, Management, and Implementation Fund; and

WHEREAS, cloud seeding was identified as a strategy in the Eastern Snake Plain Aquifer Comprehensive Management Plan (ESPA CAMP) which has stabilization and recovery of the ESPA as a goal; and

WHEREAS, cloud seeding was identified as a strategy in the draft Treasure Valley Comprehensive Management Plan currently under consideration by the IWRB; and

WHEREAS, a well-managed cloud seeding program can increase winter snow pack, thereby increasing surface water runoff by perhaps 10%, resulting in more surface water for all uses, including aquifer management projects, and also results in less supplemental ground water pumping; and

WHEREAS, an existing water user and county-led cloud seeding program has existed in the Upper Snake River Basin and a similar water user led program has existed in the Boise River Basin that has resulted in some increased runoff; and

WHEREAS, the Idaho Power Company (IPC) established a remote-operated "Pilot Program" and brought its operational experience gained from its Payette River Basin program to the ESPA as a result of the ESPA CAMP; and

WHEREAS, the two cloud seeding programs in the Upper Snake River Basin are currently operating in parallel but are cooperating on operational matters; and

WHEREAS, water users in the Boise River and the Wood River Basins agreed to share in the operation and maintenance costs of an operational cloud seeding program with IPC; and

WHEREAS, discussions between IPC, the IWRB and water users resulted in establishment of a Cooperative Cloud Seeding Program to expand IPC's cloud seeding operations in the Upper Snake River Basin and establish IPC run programs in the Boise River Basin, and Wood River Basin with support from the IWRB and water users; and

WHEREAS, on September 23, 2014, the IWRB authorized the expenditure of up to $492,000 from the Secondary Aquifer Planning, Management, and Implementation Fund, for necessary capital expenses for ground operated generators and weather information gathering systems associated with the Cooperative Cloud Seeding Program; and

WHEREAS, cloud seeding using aircraft is estimated to be more effective than ground operated

generators for increasing snowpack and provide added benefit to a comprehensive, versatile cloud seeding program;

WHEREAS, discussions between IPC and the IWRB have resulted in a proposal to execute a one-year Aircraft Pilot Project (Aircraft Pilot Project) that would further expand the Cooperative Cloud Seeding Program's operations in the Upper Snake River Basin; and

WHEREAS, estimated expenses for a Aircraft Pilot Project are approximately $XXX, and include aircraft, pilot, hangar, fuel, flairs, and a meteorologist; and

WHEREAS, the IWRB Aquifer Stabilization Committee met on September 14, 2015, and considered the proposal for a Aircraft Pilot Project, and recommended the expenditure of $XXX to assist with expenses associated with project operation.

NOW THEREFORE BE IT RESOLVED that the IWRB authorizes the expenditure of up to $XXX from the Secondary Aquifer Planning, Management, and Implementation Fund, for expenses associated with the one-year Aircraft Pilot Project in partnership with IPC.

BE IT FURTHER RESOLVED that the Aircraft Pilot Project shall be consistent with the proposal provided by IPC to the IWRB Aquifer Stabilization Committee on September 14, 2015, in Jerome, Idaho and shall support objectives of the Cooperative Cloud Seeding Program.

BE IT FURTHER RESOLVED that IPC shall make its analysis of additional runoff generated from cloud seeding available to staff at the Idaho Department of Water Resources for technical review.

BE IT FURTHER RESOLVED that IPC shall make a formal presentation to the IWRB at least annually describing the operation and benefits from the Cooperative Cloud Seeding Program.

DATED this 18th day of September, 2015.

_____

ROGER W. CHASE, Chairman
Idaho Water Resource Board

ATTEST _____
VINCE ALBERDI, Secretary

Idaho Power Company's Cloud Seeding Program

IWRB Sept. 14, 2015

Jon Bowling, P.E.
Engineering Leader

Derek Blestrud
Meteorologist

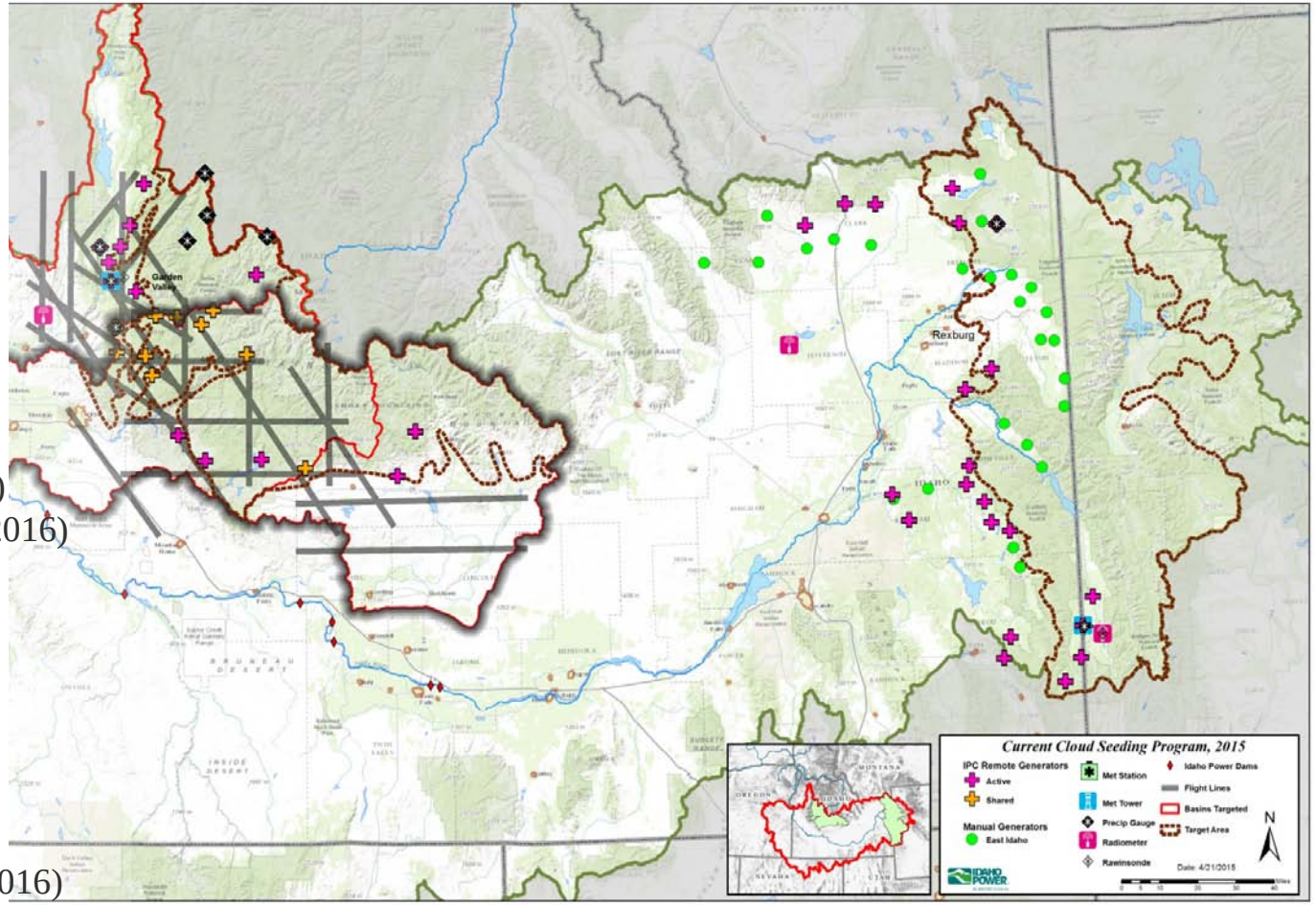
Idaho Power's History with Cloud Seeding

- Began investigating cloud seeding in 1993 (shareholder question)
- Literature review 1993 and 1994
- Climatology study 1994-95
- **Operational in fall of 2003 (7 generators, aircraft, assessment)**
- *Completed second year of assessment and third year of operations in May 2005*
- **In 2008 started working with HC RC&D and E Idaho Counties to enhance their program (motivated by ESPA CAMP 5-year Pilot Project)**
- In 2010 started working with WW RC&D to evaluate cloud seeding opportunities in western Wyoming.
- **In 2011 started working with NCAR to develop WRF model to guide and evaluate CS operations and projects**
- In 2013 – contracted with Big Wood Canal Company to seed Wood River with aircraft
- **WY 2015 Expansion**:
  - Boise and Wood Basin's – O&M cost share w/water users for remote generators and aircraft seeding
  - Continued expansion in Salt and Wyoming Range
  - IWRB grant funding for equipment associated with expansion
- **WY 2016 Continue Expansion**
  - Work with IDWR and IDL staff to obtain new and renew existing State land site leases

Current Program (WY 2016)

Payette, Boise, Wood & Upper Snake

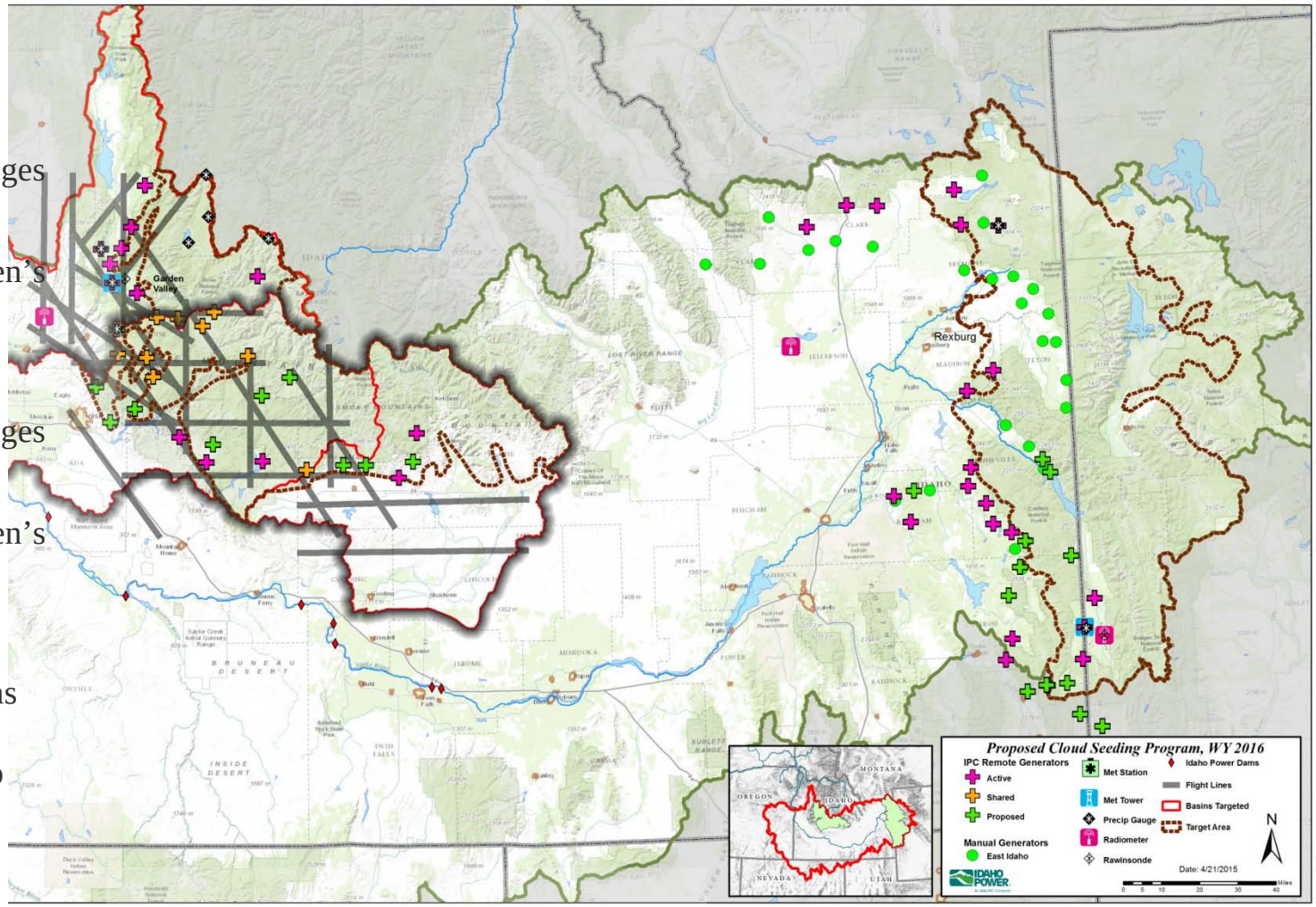
- Payette
  - 17 Remote Gen's
  - Aircraft
  - Radiometer
  - Weather Balloon
  - Weather Tower
  - 7 hi-res precip gauges
- Boise and Wood
  - ≈11 Remote Gen's
    - **5 new 2016**
  - Aircraft
  - Radiometer (2016)
  - Weather Balloon (2016)
  - 2 hi-res precip gauges(2016)
- Upper Snake
  - ≈28 Remote Gen's
    - **7 new 2016**
  - 25 Manual Gen's
  - 2 Radiometers
  - 2 Weather Balloons
  - Weather Tower
  - 2 hi-res precip gauge (2016)
  - **Potential Aircraft Pilot Project (2016)**



Potential Future Program

Payette, Boise, Wood & Upper Snake

- Payette
  - 17 Remote Gen's
  - Aircraft
  - Radiometer
  - Weather Balloon
  - Weather Tower
  - 7 hi-res precip gauges
- Boise and Wood
  - 20 - 26 Remote Gen's
  - Aircraft
  - Radiometer
  - Weather Balloon
  - 4 hi-res precip gauges
- Upper Snake
  - 30 - 40 Remote Gen's
  - 25 Manual Gen's
  - Aircraft
  - 2 Radiometers
  - 2 Weather Balloons
  - Weather Tower
  - 2 to 5 hi-res precip gauges

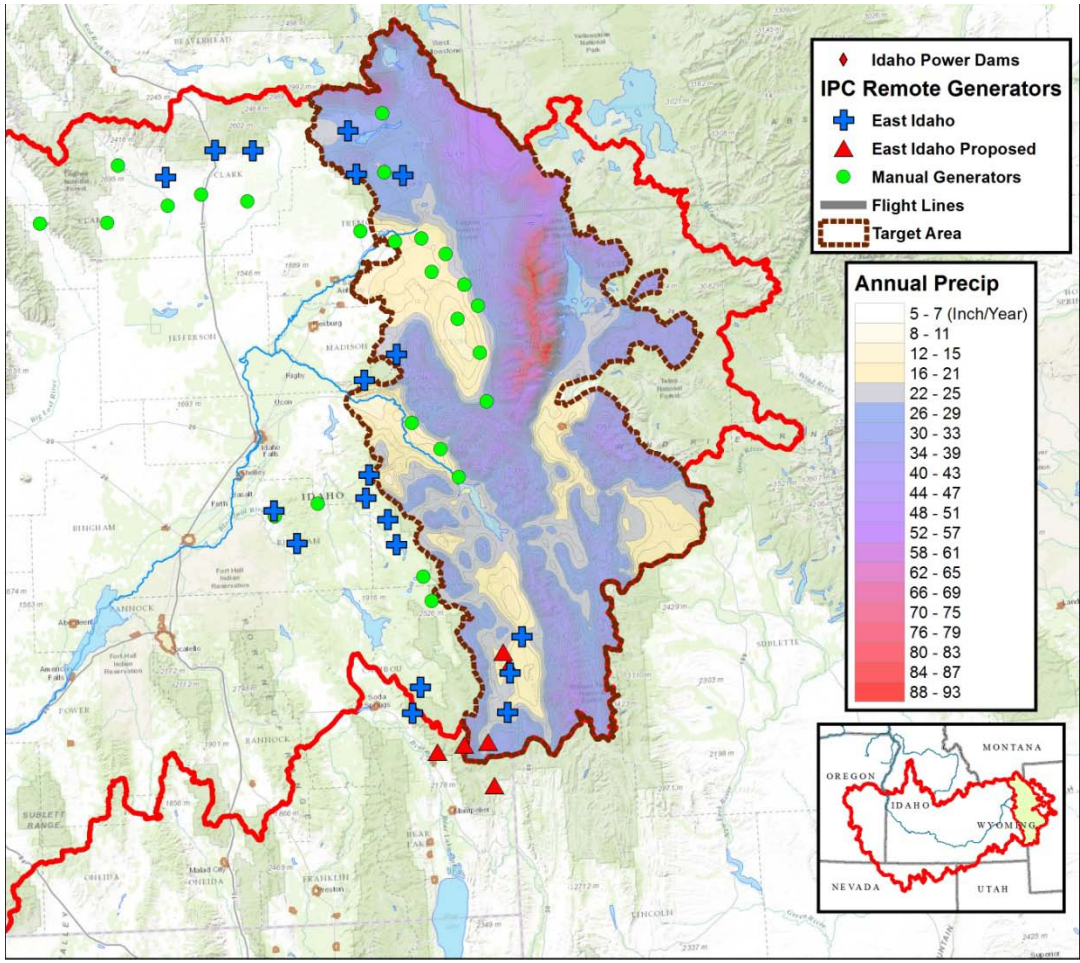


Hydrologic Modeling

IPC River Forecast System

Upper Snake Benefit Estimate

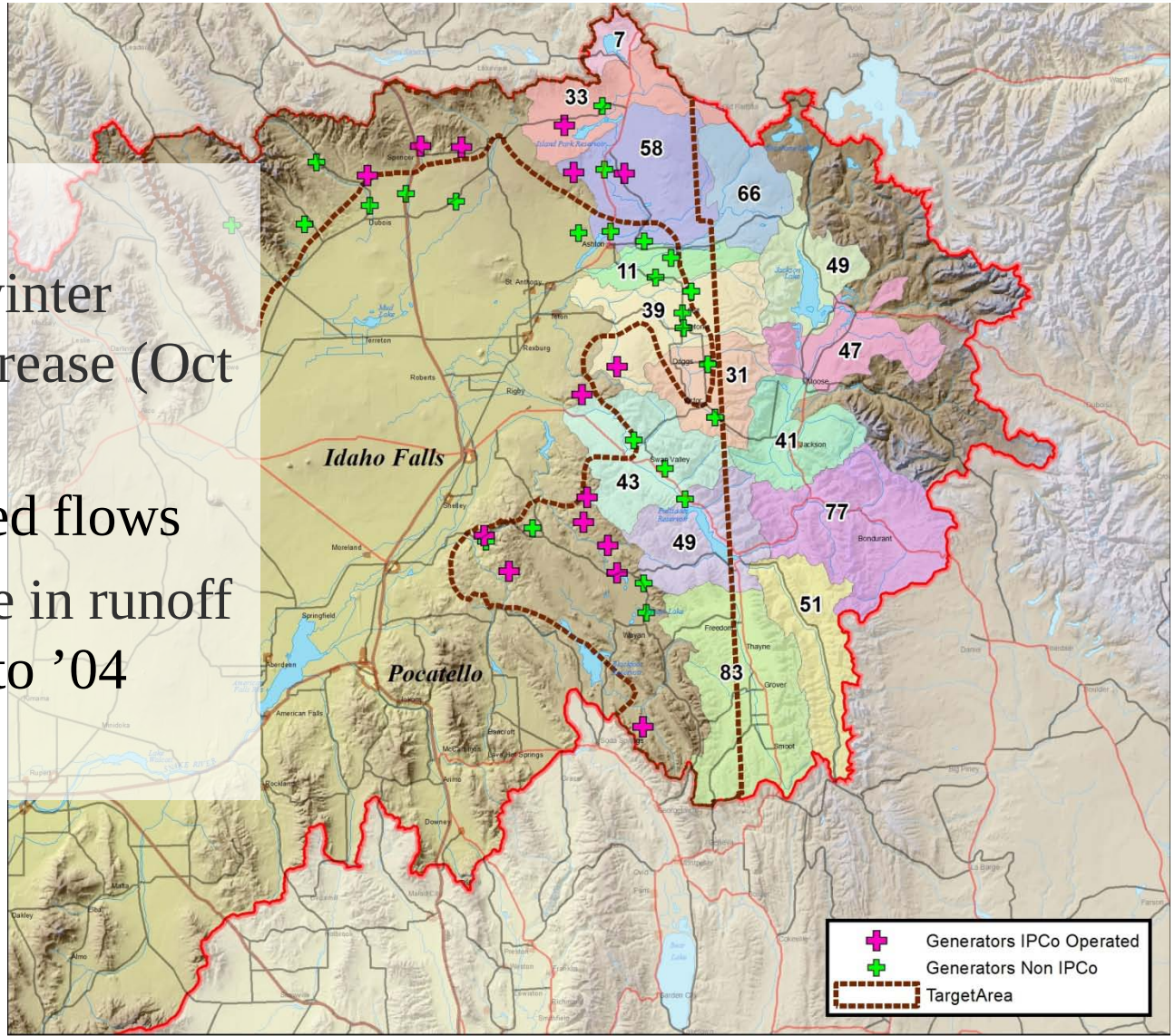
- Additional runoff estimated using IPC's River Forecast System. Simulated water years 1951 – 2001.
- Two scenarios…with and without cloud seeding
- Precipitation increase of 5% used for 'with cloud seeding'
- Streamflow increase below Milner :
  - 5% - **270 KAF / year**
- Additional generators needed to reach 5%
- Additional generators plus aircraft – Est. between 5% and 10% increase



Upper Snake Potential

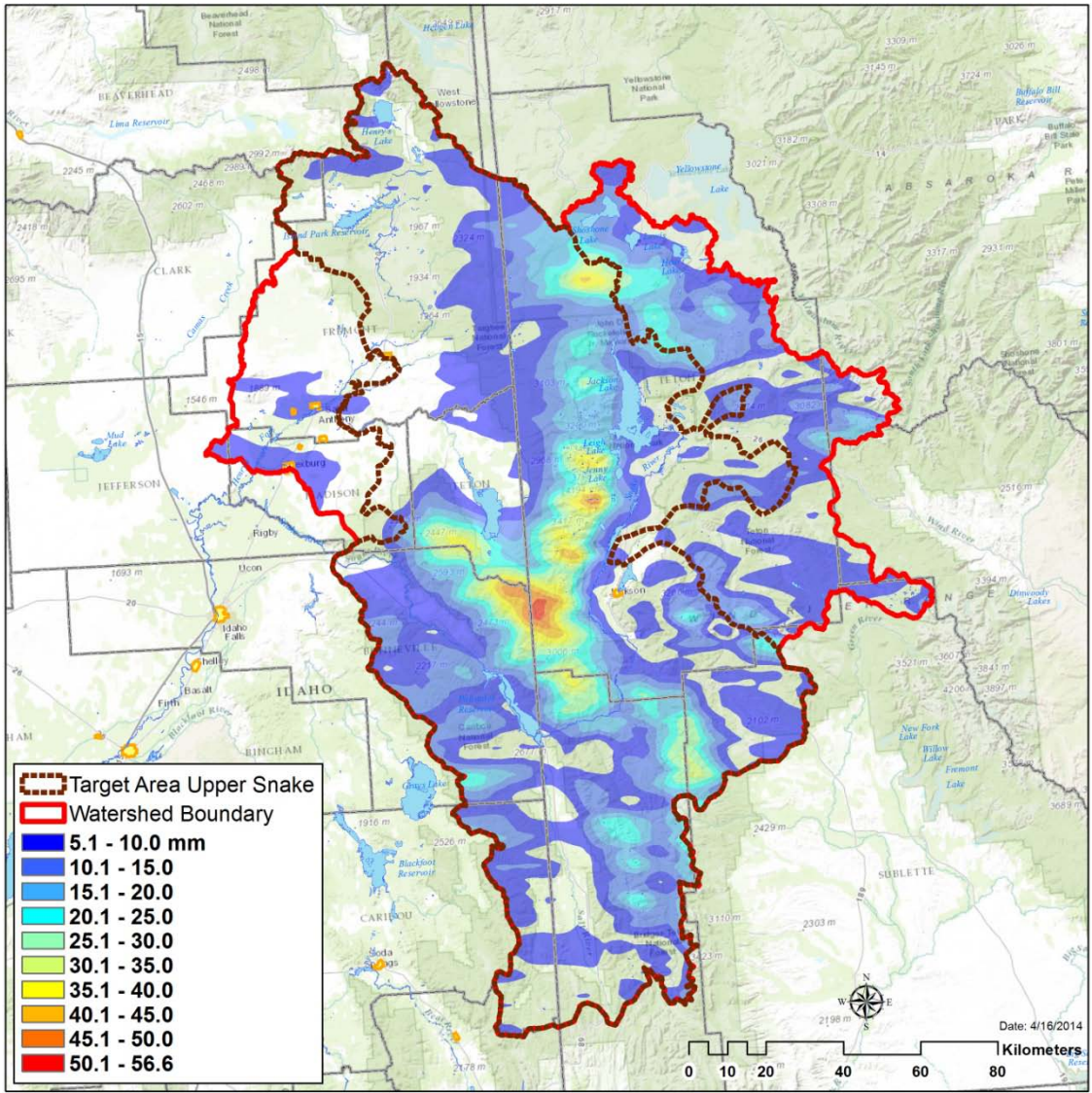
Using the IPCRFS:

- Assumes 10% winter precipitation increase (Oct – Mar)
- Local unregulated flows
- Average increase in runoff over period ‘49 to ’04
- Total - 685 KAF



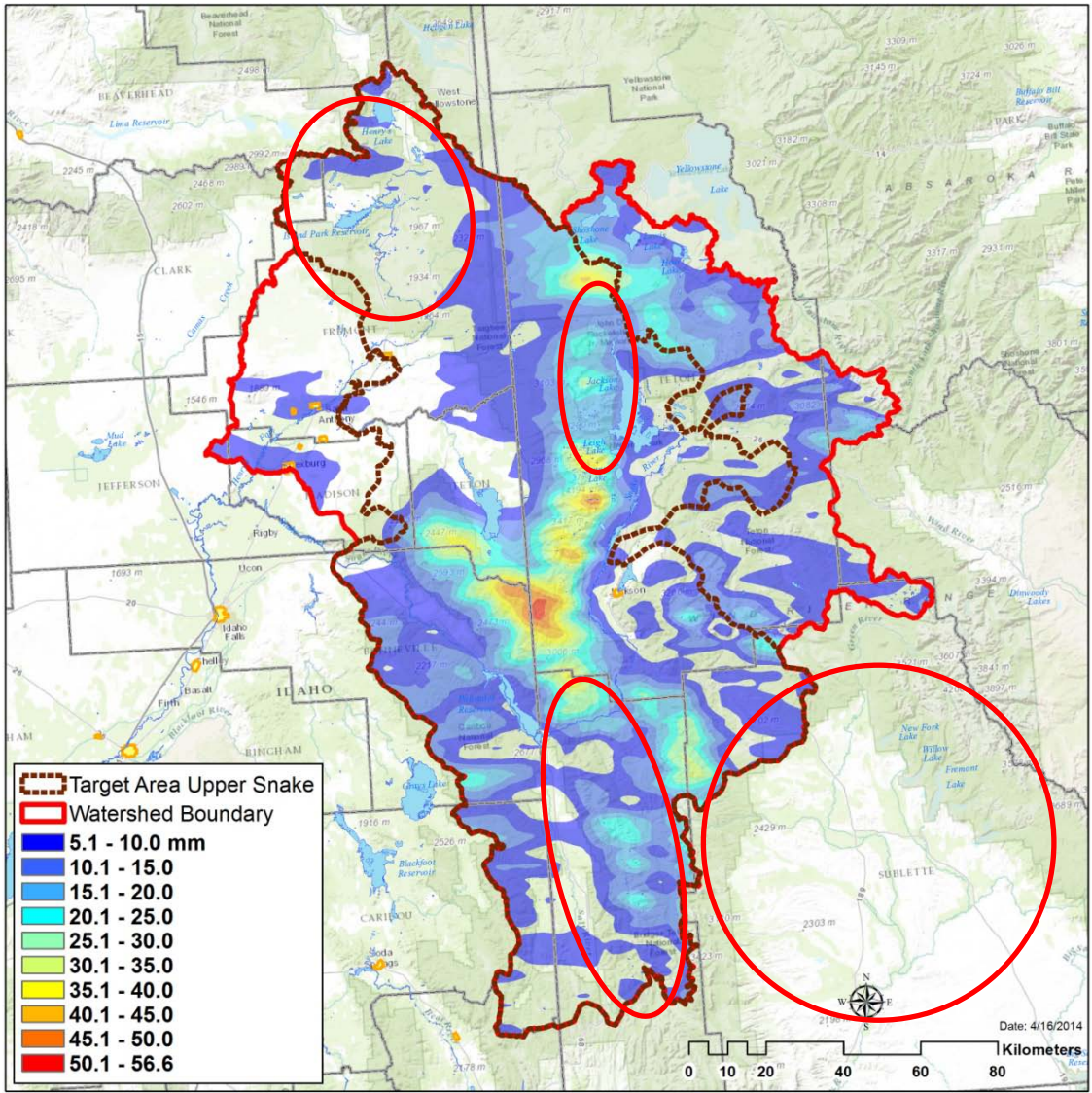
WRF CS Simulation Upper Snake

- 2014 ~190 KAF of SWE
- In future, will be able to compare to precipitation gauges



WRF CS Simulation Upper Snake

- Evaluate enhancement and expansion opportunities.



Aircraft Pilot Project Objectives

Measure

- Effectiveness
- Coverage
- Material Dispersion

Dispatchability

- Pocatello Based ?
- Operational Safety

Questions?