The Value of Hydropower and Cloud Seeding to the State of Idaho

Senate Resources and Environment Committee

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We have been managing this finite resource for more than a century.

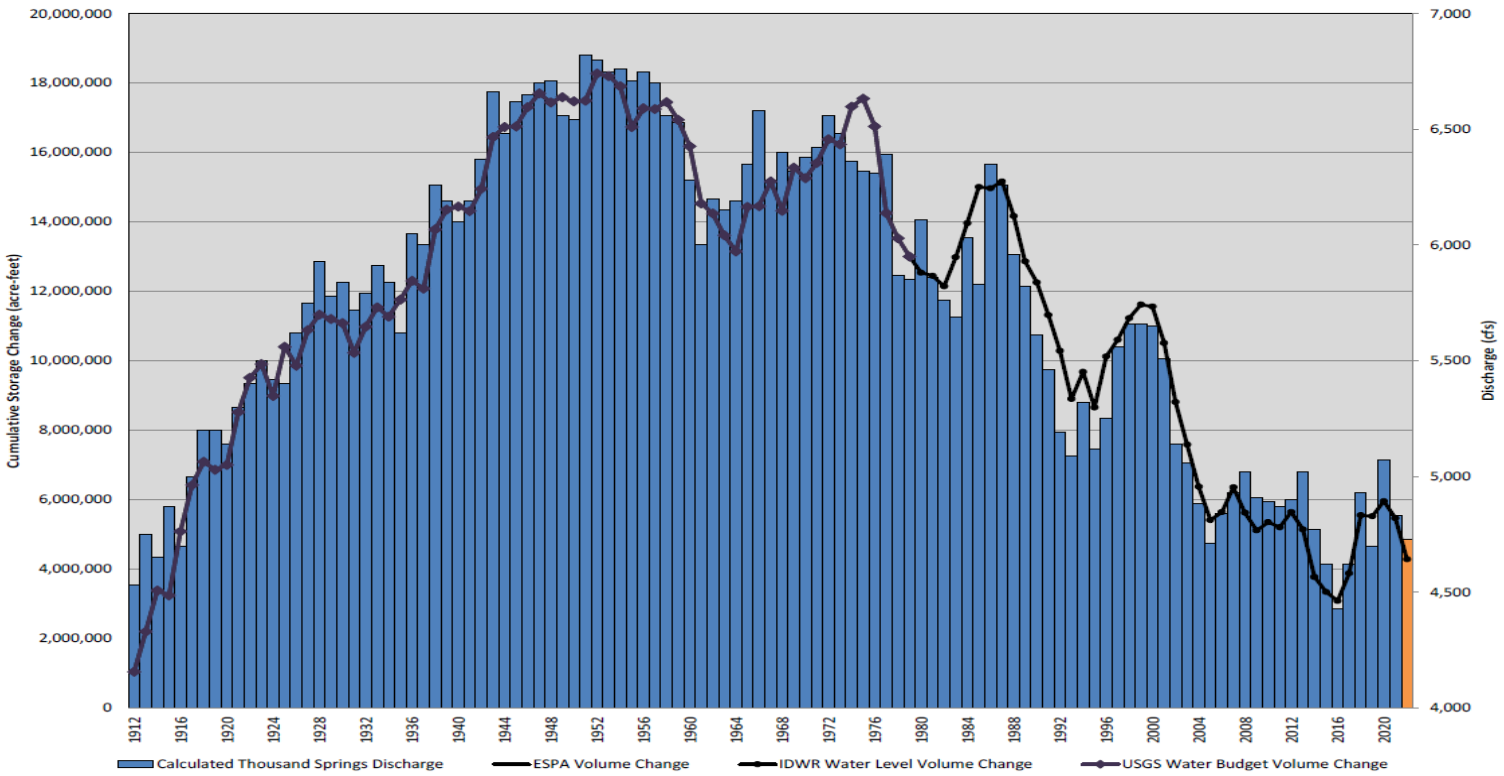
Hydro is Key to Reliability

1	Hells Canyon	391,500 kW
2	Oxbow	190,000 kW
3	Brownlee	675,000 kW
4	Cascade	12,420 kW
5	Swan Falls	27,170 kW
6	C.J. Strike	82,800 kW
7	Bliss	75,038 kW
8	Lower Malad	13,500 kW
9	Upper Malad	8,270 kW
10	Lower Salmon	60,000 kW
11	Upper Salmon	34,500 kW
12	Thousand Springs	6,800 kW
13	Clear Lake	2,500 kW
14	Shoshone Falls	14,729 kW
15	Twin Falls	52,898 kW
16	Milner	59,448 kW
17	American Falls	92,340 kW

More Than Just Power

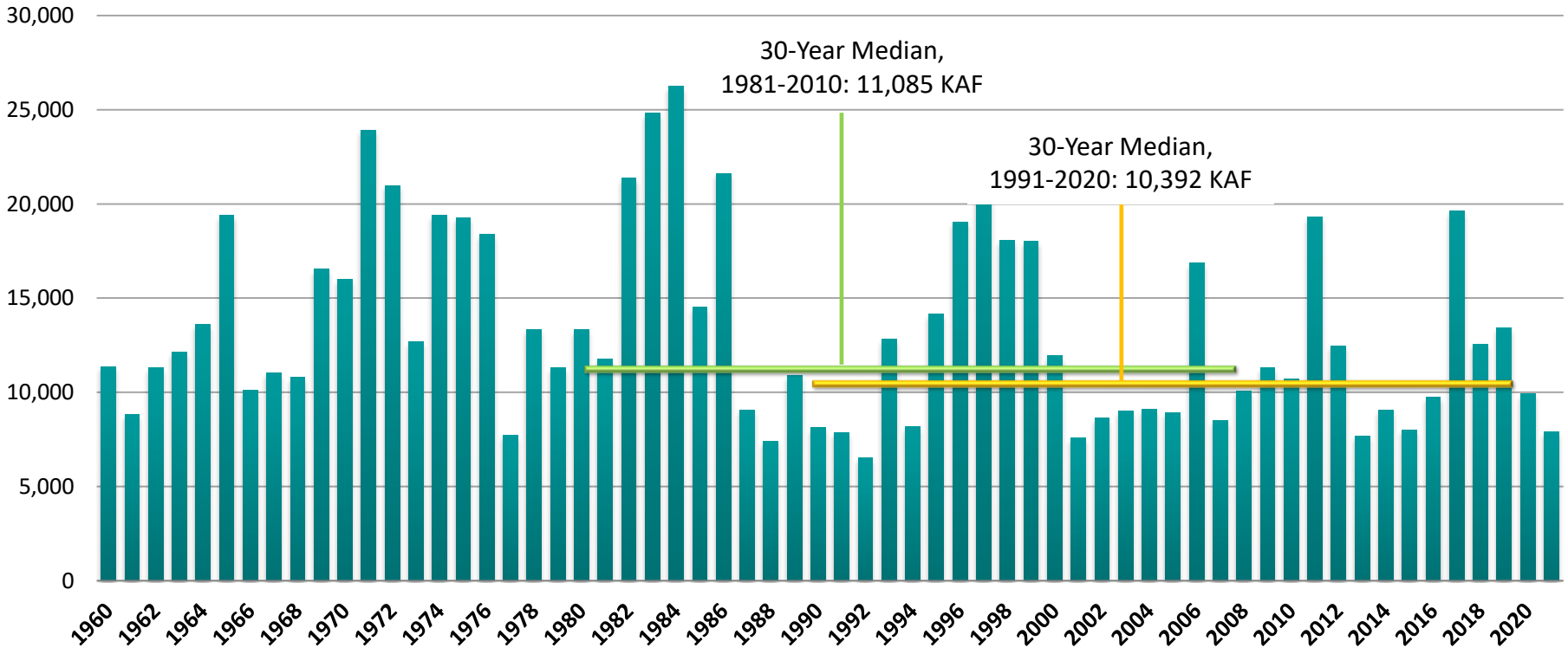
Demand is Growing

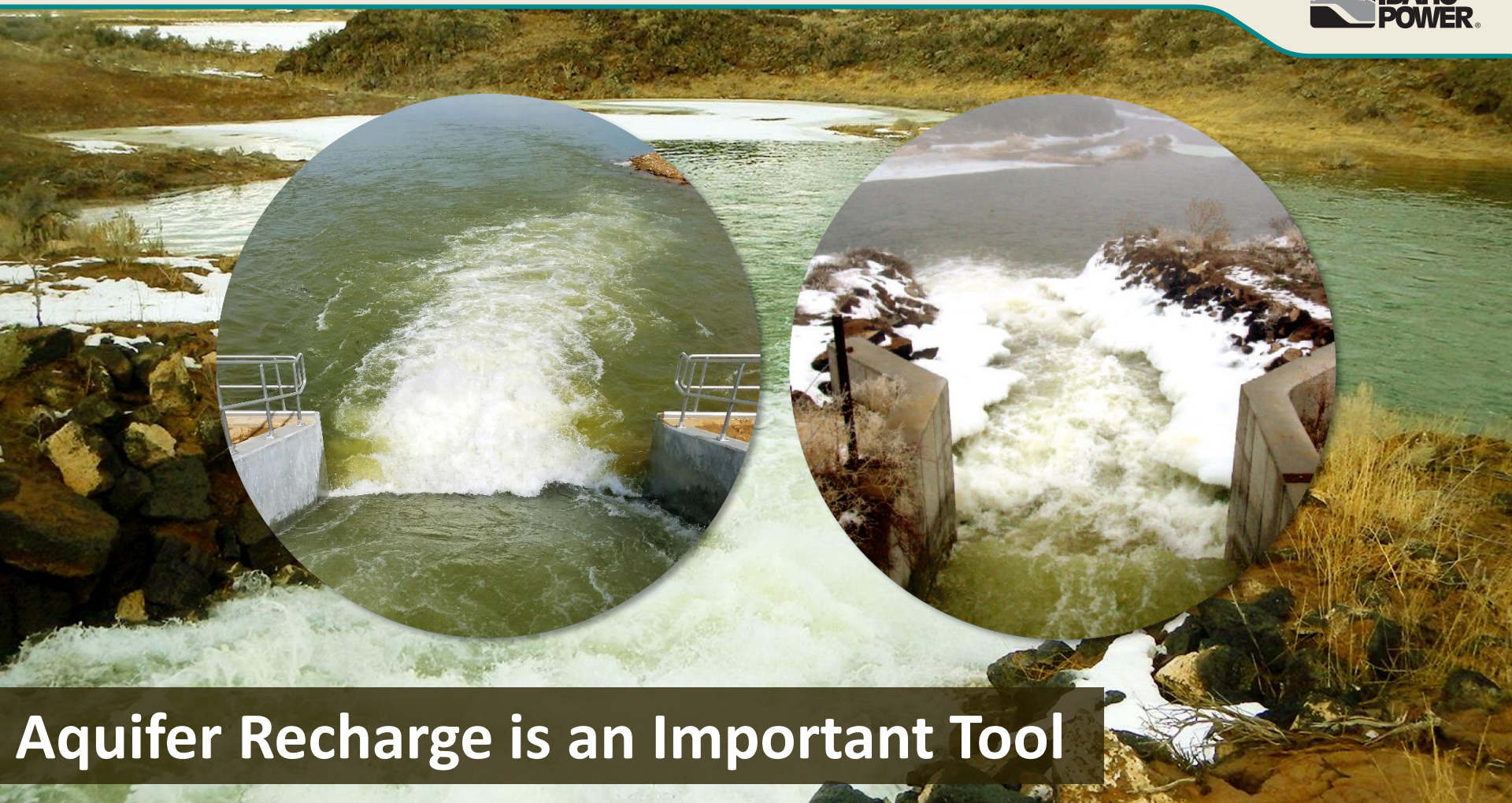
ESPA Change in Volume of Water and Thousand Springs Discharge



Brownlee Reservoir Inflow Volume

In Thousands of Acre-Feet



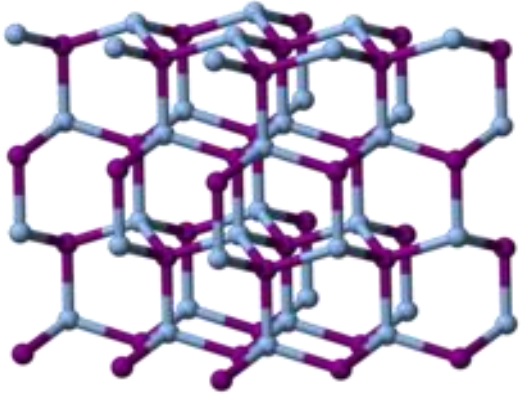


Aquifer Recharge is an Important Tool

Cloud Seeding is Another Tool

What is Cloud Seeding?

- Cloud seeding depends upon an ***abundance of super cooled liquid (SLW) water*** in the atmosphere
- Cloud seeding provides ***additional efficient ice nuclei***
  - Silver Iodide released into the atmosphere creates additional ice nuclei
  - Works at warmer temperatures, allowing ice formation
- Cloud seeding has been used as:
  - Fog suppression
  - Hail suppression
  - Rainfall enhancement
  - ***Snowpack enhancement***
- Snowpack enhancement utilizing orographic lift



Environmental Safety

More than 20 comprehensive studies and data reviews of the environmental affect of the use of silver iodide for cloud seeding all concur that there is ***no evidence of adverse effects to human health or the environment*** from the use of silver iodide for cloud seeding.

- PG&E EA – 1995, 2006
- Snowy Hydro – 2004-2014, ongoing
- Williams and Denholm – 2009
- USBR Project SkyWater – 1977, 2009, 2013
- Cardno/Entrix Geochemistry and Impacts of Silver Iodide Use in Cloud Seeding (for PG&E) – 2011
- Santa Barbara County CEQA – 2013
- BSU and Heritage Environmental: Literature Review – 2015
- Sacramento Municipal Utility District – 2017
- State of Wyoming Level III Feasibility Study Laramie Range Siting and Design Final Report – 2017
- Placer County Water Agency CEQA – 2018

Environmental Safety - IDEQ Review

- IDEQ reviewed cloud seeding with respect to water and air quality.
- Water quality - DEQ determined it is **unlikely that cloud seeding will cause a detectable increase in silver concentrations in target area** or pose a chronic effect to sensitive aquatic organisms.
- Air quality permit not needed based on screening thresholds.

- http://www.idwr.idaho.gov/waterboard/WaterPlanning/CAMP/ESPA/WorkingGroups/PDF/WM//2010/02-09-10_MtgPresent.pdf

Why Cloud Seed?

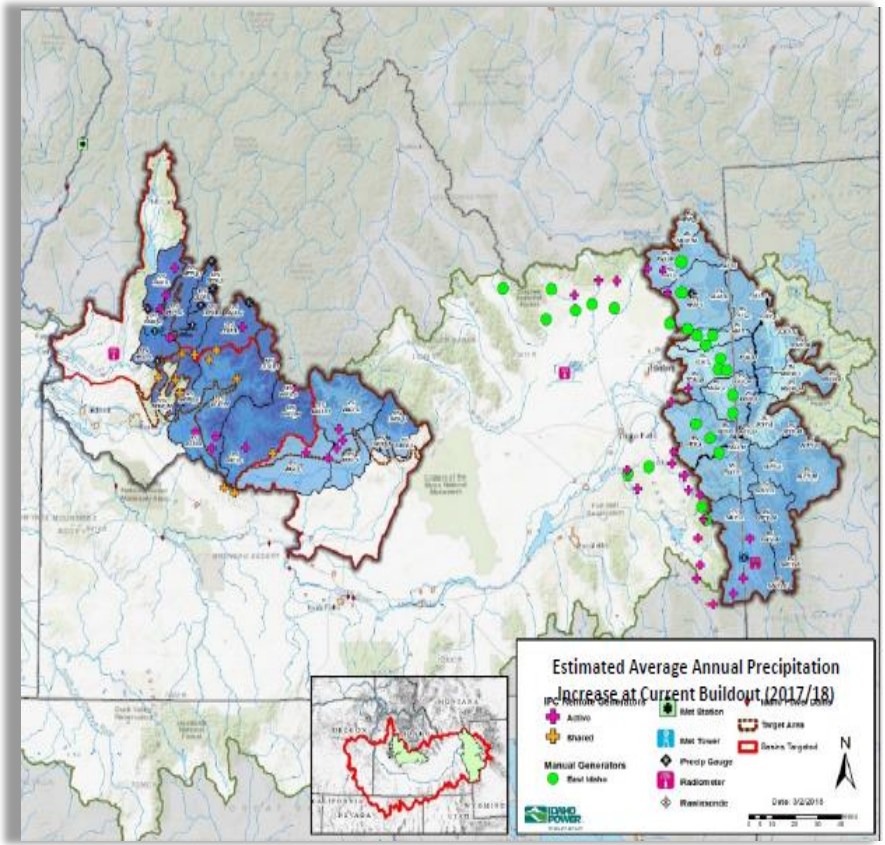
State Benefits of Additional Water Supply

- Greater reliability for storage and natural flow water users
- Higher reservoir carryover from year to year
- Water quality
- Improved fisheries conditions
  - Federal flow augmentation program
  - Resident fisheries
- Additional recreation opportunities
- Improved aquifer management through managed recharge and other activities
- Further supports low cost, clean hydropower
- Supports state economy and growth

Idaho Power's Cloud Seeding History

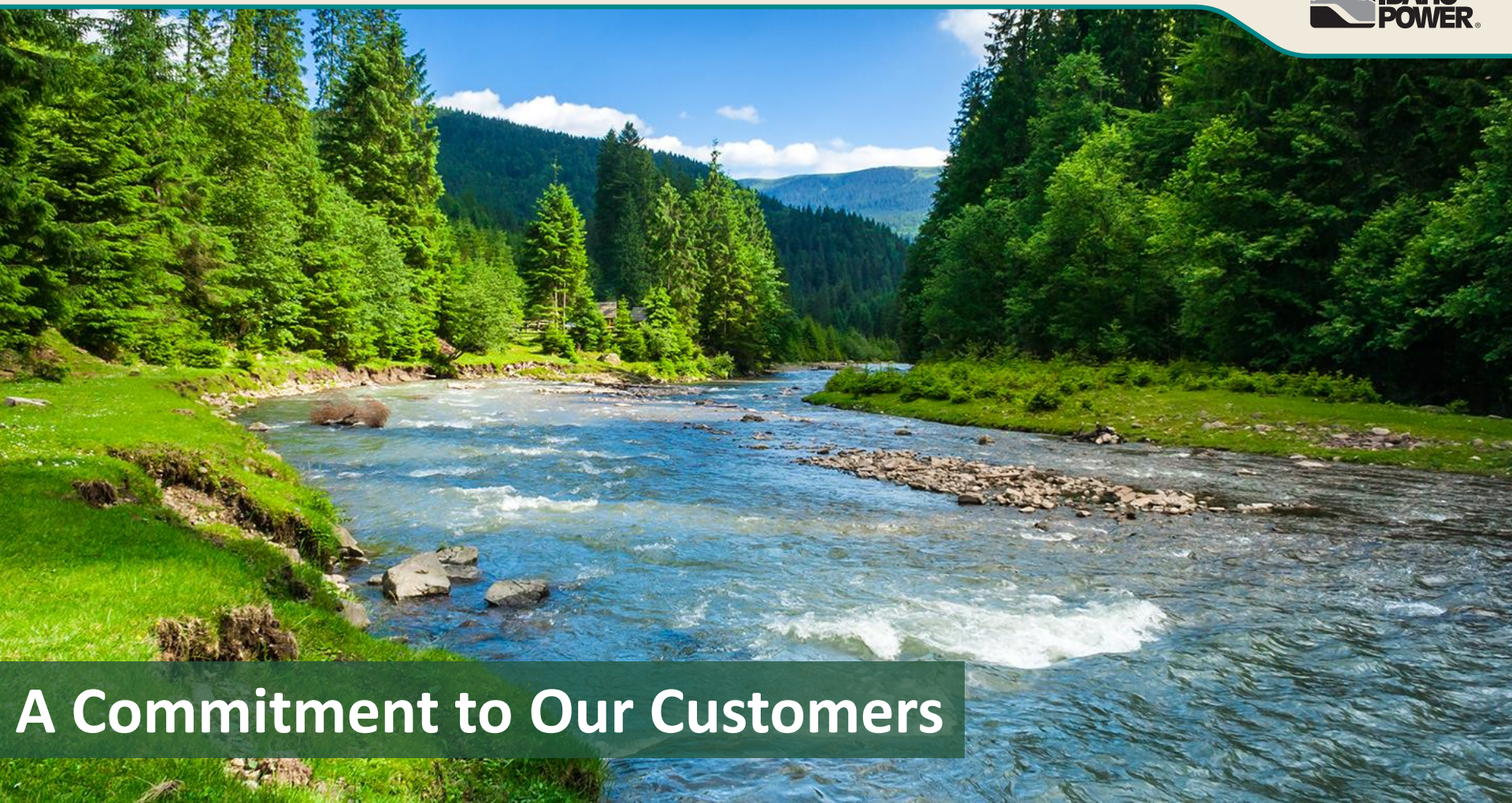
- Began investigating cloud seeding in 1993 (shareholder question)
  - Take home: Long-term water management tool
- Operational in fall of 2003 (7 generators, aircraft, assessment)
  - Completed second year of assessment and third year of operations in May 2005
- In 2008 collaborated with HC RC&D and E Idaho Counties to enhance their program 5 year pilot project under CAMP
- 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 (44 generators, 2 aircraft)
  - Boise and Wood Basin's – remote generators and aircraft seeding
  - Continued expansion in Salt and Wyoming Ranges
  - IWRB funding a grant for equipment associated with expansion
- WY 2016 Expansion
  - Additional remote generators in Central Mountains and Upper Snake (Total of 53)
  - Third aircraft
- WY 2022 (Current)
  - Total 57 remote generators, 3 aircraft

Annual Benefit Estimates



Average annual natural flow benefits

Boise Basin	270,000 acre-ft
Wood River Basin	110,000 acre-ft
Upper Snake Basin	630,000 acre-ft
Above Palisades	*460,000 acre-ft*
Henry's Fork	*170,000 acre-ft*
Payette (Idaho Power)	220,000 acre-ft
Total	**1,230,000 acre-ft**



A Commitment to Our Customers

Thank you