



## Our Water. Our Future. Our Choice.

The purposes of the District include planning for and facilitating the long-term conservation, development, protection, distribution, management, and stabilization of water rights and water supplies for domestic, irrigation, power, manufacturing, municipal, recreational, and other beneficial uses, including the natural stream environment, in a cost-effective way to meet the needs of the residents and growing population of Cache County.  
[www.cachewaterdistrict.com](http://www.cachewaterdistrict.com)

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### CACHE WATER DISTRICT BOARD OF TRUSTEES MEETING MINUTES October 2, 2023

The Cache Water District Board of Trustees convened for a regular meeting on October 2, 2023, at 5:30 p.m. in the Cache County Historic Courthouse Council Chambers, 199 North Main Street, Logan, Utah.

#### **MEMBERS OF THE BOARD IN ATTENDANCE:**

Jared Clawson – At-Large Position  
Kirt Lindley – At-Large Position  
Beth Neilson – Southeast Council District  
Jeff Ostermiller - Logan #2 Council District  
Max Pierce – North Council District  
Bret Randall – Northeast Council District  
Brett Roper – At Large Position  
Jeannie Simmonds – Logan #1 Council District  
Regan Wheeler – Agricultural Representative

#### **MEMBERS OF THE BOARD EXCUSED:**

Mark Anderson – Logan #3 Council District  
Jonathan Hardman – South Council District

#### **ATTENDANCE:**

Tim Smith (CCSD), Ann Neville (TNC), Steven Wood, Garrett Cammans

#### **CALL TO ORDER**

Chairman Pierce called the meeting to order at 5:30 p.m.

Tonight's meeting agenda and the minutes from September 6, 2023, were approved.

**ACTION: Motion by Mr. Clawson to approve the agenda and the minutes as submitted with a change from the Willow Park Subdivision to the Willow Lakes Subdivision. Motion seconded by Mr. Ostermiller. The motion was approved unanimously (7-0).**

**Yea: Clawson, Lindley, Neilson, Ostermiller, Pierce, Roper, Wheeler**

**Absent: Anderson, Hardman, Randall, Simmonds**

## **PUBLIC COMMENT**

No public comments.

5:35 p.m. Jeannie Simmonds arrived.

## **FINANCIAL REPORT**

Ms. Simmonds reviewed the report. She said the negative number in the budget is what CWD is theoretically using with the budget balance from previous years. There is currently \$502,000 in the checking account (some of which is carried forward funds from previous years). She will add more clarification on funds that have been carried forward. There were not many expenditures in the first few years until a manager was hired. Ms. Neilson asked why having extra funds in an account would show a negative number in the report. Ms. Simmonds said it was because there were expenses greater than income. The overall income was projected (not counting reserves) to be \$1,928,000, the total expenses were projected to be \$2,187,250, utilizing \$259,250 of reserves to balance the budget, currently, we are not over budget in any category. Mr. Roper asked about cloud seeding. Ms. Simmonds said we are billed after January (the season runs from December – April). See [-Attachment 1-](#)

Mr. Randall arrived at 5:40 p.m.

## **CALENDAR EVENTS**

- Oct. 11 – Utah Water Task Force @ 1:30 p.m.
- Oct. 12 – Utah Watersheds Council @ 1:00 p.m.
- Oct. 16 – APO Subcommittee Budget Workshop @ 5:30 p.m.
- Nov. 16 – Fall Irrigator’s Workshop @ the Fairgrounds ~ 6:00 p.m.

## **MANAGER’S REPORT**

### **LEGISLATIVE UPDATES**

No major changes from last month.

### **PL-566 UPDATES**

Logan River & and Wellsville-Mendon projects are still working through the EIS to EA process with NRCS.

### **BENEFITS OF BEAR RIVER UPDATE**

The information is not quite ready to be released to the public. There will be more discussion at next month’s meeting.

### **GSL BASIN STUDY UPDATE**

The steering committee meets every two weeks, however, they are looking at splitting the committee out to the five watershed councils in the Great Salt Lake Basin.

## **NOVEMBER SCHOOL BOND PRESENTATION – CCSD**

Tim Smith, the Assistant Superintendent of the Cache County School District provided the presentation. Cache County School District serves 27 communities within the

place a \$139 million general obligation bond proposition on the November 2023 ballot. The Board's decision comes after a year of careful study by the Building Task Force, consisting of community members from each voting precinct, school, and district staff, and members of the Board of Education.

Dr. McKee introduced his assistant Tim Smith to provide further information. Smithfield currently has 3,500 students in the school system. Cache County School District is the 11th largest school district (out of 41) in the State of Utah. 2013 was the last bond initiative (for 129 million) to help address growth. Two new high schools (Green Canyon and Ridgeline) were built. Seismic upgrades and additions were made to several schools. A new elementary was built in Lewiston and converted Cedar Ridge, White Pine, and Willow Valley from middle schools to elementary schools. A new Cache Alternative High School was built next to the Bridgerland Technology campus in Logan.

Since voters passed the last bond in 2013, the Cache County School District has experienced significant growth, adding 4,197 students. Due to that unprecedented growth, 11 of the District's 17 elementary schools and one middle school are operating above capacity. To accommodate growth at these locations, the District is utilizing 38 portable classrooms. The State of Utah now provides funding for all-day kindergarten. Due to a lack of classroom space, the District cannot fully provide this option to all of its 27 communities. The District relies on a lottery system in six schools and cannot offer the option at all in five additional schools, due to a lack of classrooms.

The safety and security of students and staff is a top priority. Bond funds will allow for enhanced safety and security measures at each of the schools including being directly connected with Cache County Dispatch, enhancing intercom systems, better access controls, controlled entry, and improved surveillance.

The proposed projects for this bond would include the addition of two new middle schools, the construction of a new elementary school, and the conversion of the District's smallest middle school into an elementary school. These additions allow the District to move sixth grade out of the elementary schools and back to a middle school environment.

This course of action will help resolve capacity issues for all 17 elementary schools and allow the District to offer all-day kindergarten for all 27 communities. It also has the added benefit of providing four feeder middle schools--one for each of the four high schools. It also provides room in both elementary and secondary schools to accommodate growth well into the future.

### **BREAKDOWN OF PROPOSED 2023 BOND PROJECTS**

- New 6th-8th grade middle school in Hyde Park
- New 6th-8th grade middle school in Nibley
- New elementary school in Hyde Park
- Conversion of Spring Creek Middle School to an elementary school
- Secured School Entryways and Other Safety Improvements

To save taxpayer money, the District will utilize the same floor plan for both new middle schools and a previously purchased floor plan for the new elementary school.

- New Hyde Park Middle School (200 West 250 South, Hyde Park)
- New Nibley Middle School (915 West 3200 South, Nibley)

Property owners can anticipate no tax rate increase related to this bond. Based on conservative estimates and assuming taxable value remains steady, payment of the 2023 bond would fit within the existing rate or possibly be even lower. This is possible because the District would structure future bond payments to layer with existing bond payments in a way that keeps the total amount of taxes assessed per year within the current tax rate.

Property taxes are calculated by multiplying the tax rate by the property value. While some taxpayers may experience increases in taxes paid for the school district bond debt, this would be the result of increased property values and not due to a higher tax rate.

By approving this bond, taxpayers would be taking on additional debt, which will require a longer period of time to pay. In other words, without the issuance of this new debt, taxes would be lowered in upcoming years. If this debt is issued according to the plan, the overall tax burden on district taxpayers should remain approximately the same as now going forward. The District has a reputation for paying off its debt early through refinancing opportunities and aggressive at restructuring bonds. The District also has a strong reputation for meeting project timelines and staying within budget. The tax rate right now is at its lowest point it has been since 1997 (debt survey levy on buildings). The last time the bond was surveyed the average home was \$300,000, the average price in Cache County currently is \$524,000. The average debt service levy is ~ \$234/yearly and similar tax values would be ~\$426,000. Due to the layering of the bonds, there is no expectation for a tax increase.

#### **CLOUD SEEDING PRESENTATION**

See [-Attachment 2-](#)

The meeting adjourned at 7:27 p.m.

# -Attachment 1-

## Cache Water District Profit & Loss Budget vs. Actual January through August 2023

	Jan - Aug 23	Budget	% of Budget
<b>Ordinary Income/Expense</b>			
<b>Income</b>			
Cache County Property Taxes	320,381.92	275,000.00	116.5%
PL-566 Watershed Grant	470,953.00	700,000.00	67.3%
<b>Restricted Income</b>			
Northern Utah Water Conference	800.00	0.00	100.0%
Restricted Income - Other	86,850.55	153,000.00	56.8%
<b>Total Restricted Income</b>	87,650.55	153,000.00	57.3%
<b>Wellsville Mendon Study</b>	176,339.73	800,000.00	22.0%
<b>Total Income</b>	1,055,325.20	1,928,000.00	54.7%
<b>Gross Profit</b>	1,055,325.20	1,928,000.00	54.7%
<b>Expense</b>			
<b>Office</b>			
Bank Charges	70.00	0.00	100.0%
Insurance and Bonding	3,500.00	5,000.00	70.0%
Office Supplies	891.74	2,000.00	44.6%
Publications	0.00	4,500.00	0.0%
Rent	8,100.00	5,500.00	147.3%
<b>Technology</b>			
Cell Phone	447.80	0.00	100.0%
Computer and printer	96.10	0.00	100.0%
Technology - Other	0.00	3,000.00	0.0%
<b>Total Technology</b>	543.90	3,000.00	18.1%
<b>Vehicle</b>			
Fuel	0.00	2,500.00	0.0%
Vehicle - Other	0.00	50,000.00	0.0%
<b>Total Vehicle</b>	0.00	52,500.00	0.0%
<b>Total Office</b>	13,105.64	72,500.00	18.1%
<b>Outreach</b>			
Conservation	10,500.00	30,000.00	35.0%
Dues	1,166.00	2,500.00	46.6%
Lobbyist	0.00	10,000.00	0.0%
Northern Utah Water Conference	2,212.42	0.00	100.0%
Sponsorships	200.00	2,750.00	7.3%
Training	1,180.69	6,000.00	19.7%
Website	457.00	2,000.00	22.9%
<b>Total Outreach</b>	15,716.11	53,250.00	29.5%

**Cache Water District**  
**Profit & Loss Budget vs. Actual**  
 August 2023

	Aug 23	Budget
Ordinary Income/Expense		
Income		
Cache County Property Taxes	2,205.70	0.00
PL-566 Watershed Grant	37,023.50	0.00
Restricted Income		
Northern Utah Water Conference	0.00	0.00
Restricted Income - Other	0.00	0.00
Total Restricted Income	0.00	0.00
Wellsville Mendon Study	0.00	0.00
Total Income	39,229.20	0.00
Gross Profit	39,229.20	0.00
Expense		
Office		
Bank Charges	0.00	0.00
Insurance and Bonding	3,500.00	0.00
Office Supplies	0.00	0.00
Publications	0.00	0.00
Rent	0.00	0.00
Technology		
Cell Phone	74.99	0.00
Computer and printer	51.08	0.00
Technology - Other	0.00	0.00
Total Technology	126.07	0.00
Vehicle		
Fuel	0.00	0.00
Vehicle - Other	0.00	0.00
Total Vehicle	0.00	0.00
Total Office	3,626.07	0.00
Outreach		
Conservation	0.00	0.00
Dues	0.00	0.00
Lobbyist	0.00	0.00
Northern Utah Water Conference	0.00	0.00
Sponsorships	0.00	0.00
Training	0.00	0.00
Website	0.00	0.00
Total Outreach	0.00	0.00

# An Introduction to Cloud Seeding

## Cloud Seeding Overview: How It Works

# Understanding Water in the Atmosphere

The Pacific Northwest National Laboratory.

It is surprisingly difficult for water to freeze just below its melting point: water resists freezing unless it has something to get it started, like dust or some other solid to cling to. In pure water, it takes an energetic nudge to jostle the molecules into the special arrangement needed to freeze.



## Formation of Precipitation

- Water in a cloud deck can remain a liquid until it reaches temperatures as low as  $-15^{\circ}\text{C}$ .
- Precipitation occurs when water freezes and forms ice crystals that congregate to form snowflakes.
- Eventually the snowflakes grow heavy enough to fall.
- **Nucleating agents** expedite the formation of snowflakes by providing the necessary energetic nudge.
- Nucleating agents can be **natural** (fine dust particles), **circumstantial** (pollution and smog) or **intentional** (cloud-seeding).

Seeding Presentation

Seeding Presentation

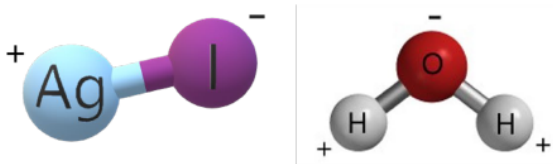
## Putting this Together



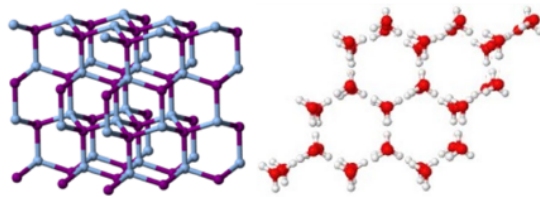
Seeding Presentation

## Silver Iodide as a Seeding Agent

Silver Iodide molecules exhibit strong electrical polarity



Silver Iodide crystals have a shape similar to ice crystals.



Seeding Presentation

# SNOWIE Research

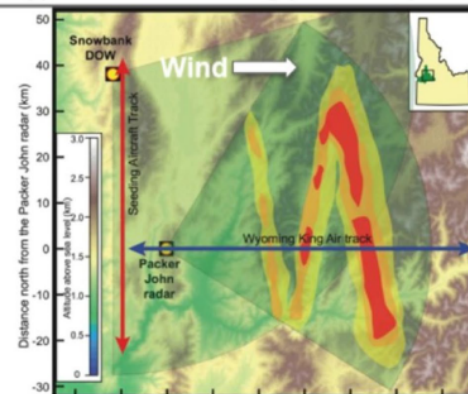
Seeded and Natural Orographic Wintertime clouds: The Idaho Experiment

Using recent advancements in instrumentation and computer modeling, the SNOWIE project (Seeded and Natural Orographic Wintertime Clouds: the Idaho Experiment) observed the microphysical response from seeding orographic clouds addressing the critical questions about using cloud seeding to enhance precipitation.

## SNOWIE - Methodology and Predictions



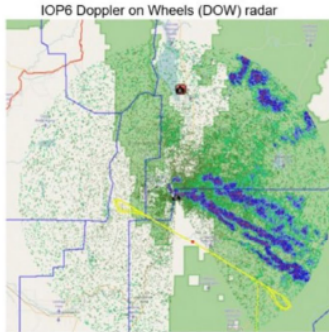
Hypothesized seeding plume dispersion



# SNOWIE – Results

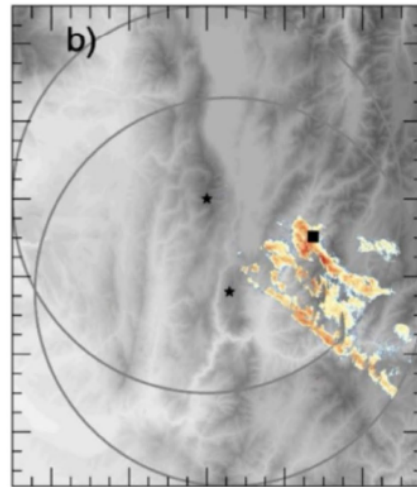
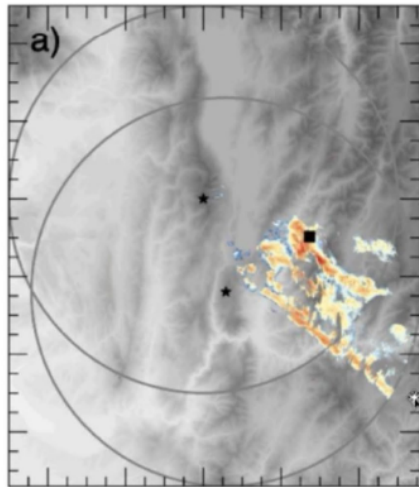
## High Resolution Radar – Composite Reflectivity

- High resolution radar (Doppler on Wheels and aerial radar) were used to monitor the composite reflectivity of the clouds before, during and after seeding.
- During the SNOWIE experiment the DoW validated lab and wind-tunnel tests, proving the impact of cloud seeding in orographic storm systems

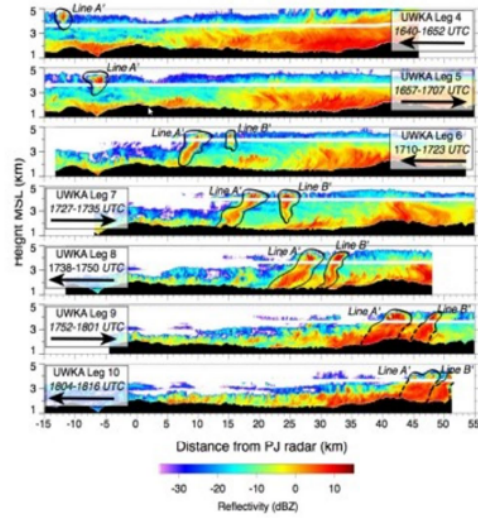


- In 3 Intensive Observing Periods (IOPs) during SNOWIE, unambiguous lines attributed to seeding were observed by the DOW radar
- These IOPs have allowed us to study the microphysical response to cloud seeding using both in situ measurements and radar observations
- We have also quantified the snowfall reaching the ground in these cases
- These cases are also ideal for evaluating and improving numerical modeling of cloud seeding impacts

# SNOWIE – Results



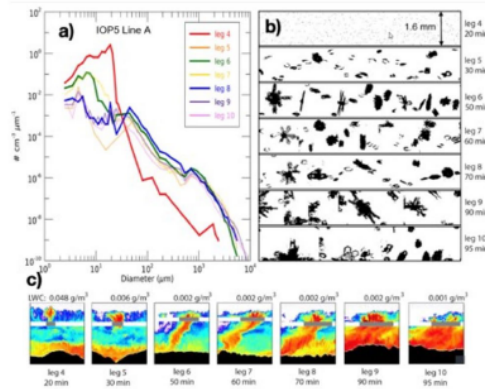
# SNOWIE – Results



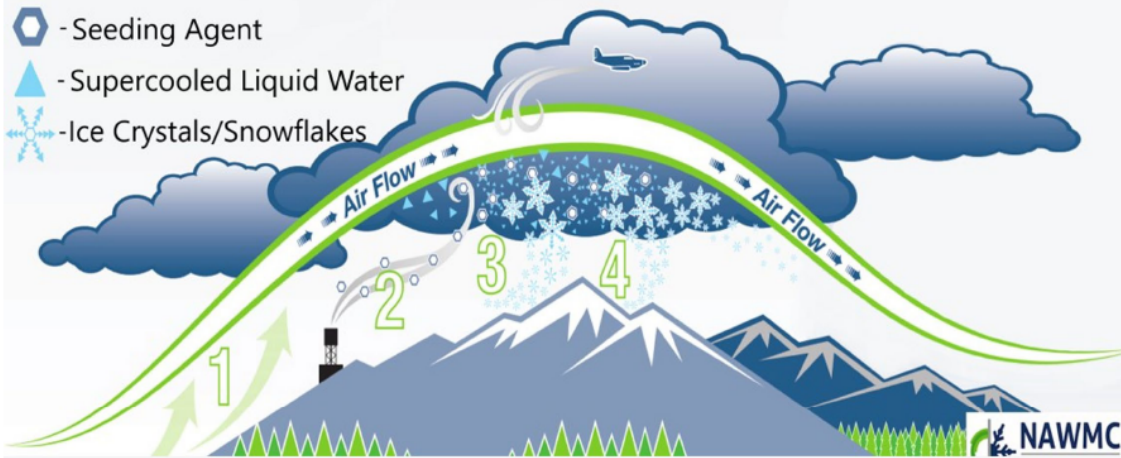
# SNOWIE – Results

## Ice Crystal Observations

- Prior to seeding, there was little-to-no ice in the cloud.
- After seeding, ice depleted nearly all of the liquid.
- Dendrite structures were observed in the cloud.



## Artificial Induction of Nucleating (Seeding) Agents



Seeding Presentation

## Ground Based Seeding – Manual Generators



CNG's (Cloud Nuclei Generators)

- Ideal for orographic lift (movement of air over mountain barriers)
- Create a continuous plume of seeding agents
- Inexpensive to install and efficient to operate for extended periods of time

Seeding Presentation

## Ground Based Seeding – Manual Generators



Seeding Presentation

## Ground Based Seeding – Remote Generators



### Remotely Operated Generators

- Deliver a higher concentration of Silver Iodide – rapid release
- Operated remotely
- Can be placed in otherwise unreachable locations during winter conditions

Seeding Presentation

## Aerial Seeding



### State Legislative Action – Cloud Seeding

- \$12,000,000 in one time funding
  - Remotely Operated Generators
  - Additional Research
  - Additional Meteorological Equipment
  - Program Outreach and Support
- \$5,000,000 in annual spend
  - 2 – Aerial Programs
  - Operating Costs for Remotely Operated Generators
  - Program Expansions
- Only Request
  - Spend add on to local sponsorship not replace it



# Cloud Seeding – Materials

## Silver Iodide

- When exposed to sunlight Silver Iodide quickly deconstructs to silver and molecular iodine.
- Silver is biologically inert.
- Molecular Iodine is a critical building block of animal hormones, including human hormones.
- Iodine is a common food additive, often found in household staples like table salt and baby formula.



Seeding Presentation

## Cloud Seeding Suspension Criteria

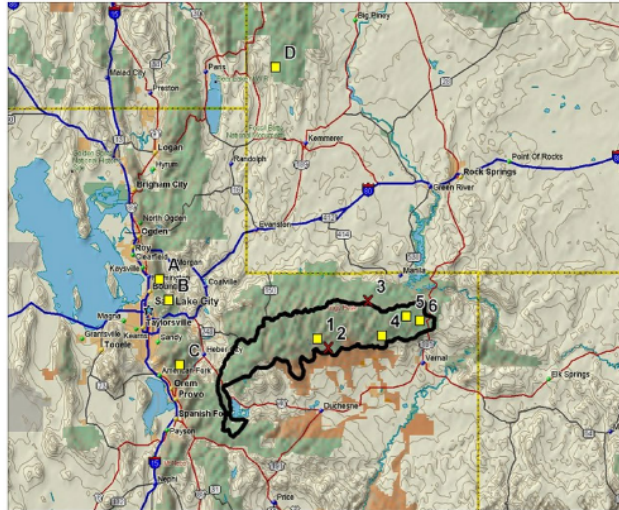
- Avalanche warnings, particularly in populated areas
- Basin snowpack

Month	SWE Threshold
January 1	200%
February 1	180%
March 1	160%
April 1	150%

Seeding Presentation

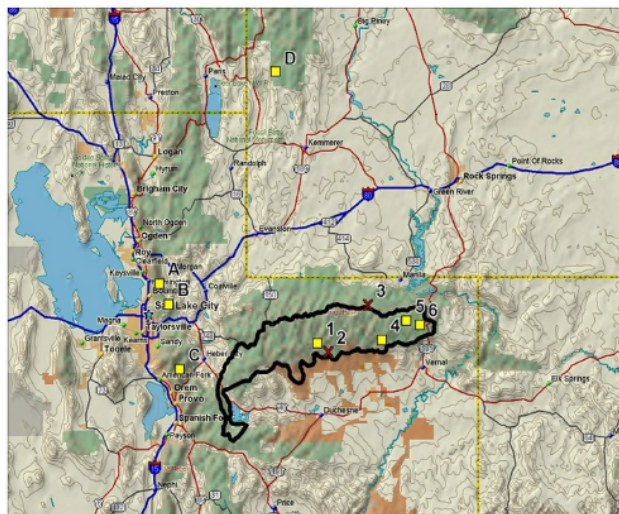
## Target/Control Analysis 2019-2020 Season

- Target verses control analysis is conducted each season to determine the benefit from cloud seeding
- Control Sites are selected in areas that are upwind from seeding activity
- Target sites are selected at the onset of a new program and represent areas inside the targeted area.



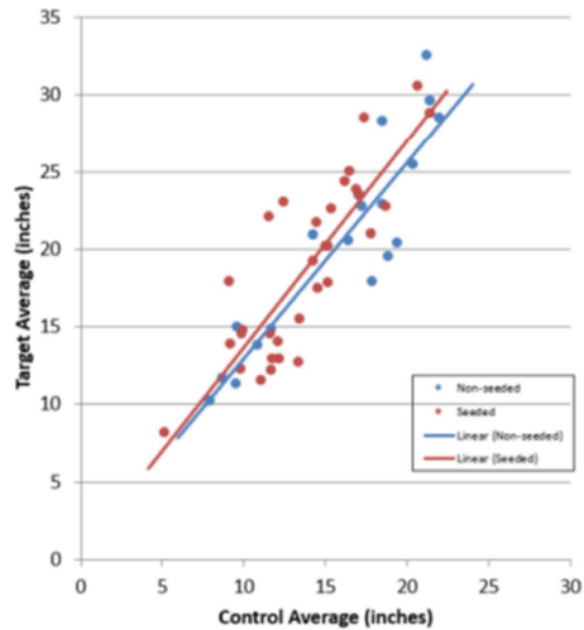
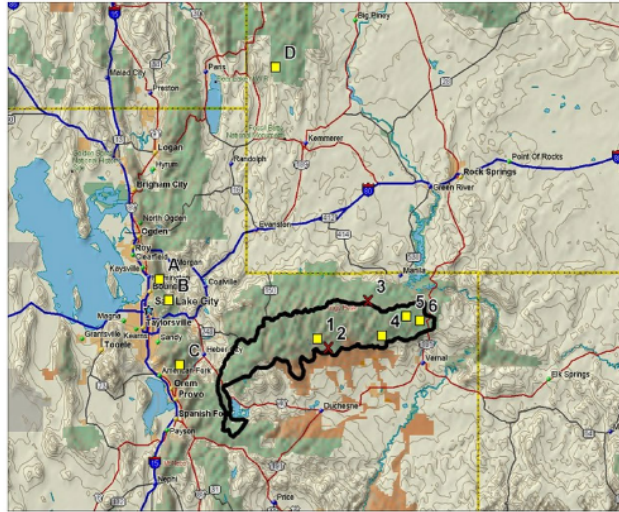
## Target/Control Analysis 2019-2020 Season

- An advanced relationship based on decades of pre-seeding snowpack data is compiled.
- This data is used to establish a baseline (unseeded) relationship between snowpack in the desired target area vs snowpack in the control area.
- For each seeded season the model described above, and the snowpack level in the control area can be used to predict what the snowpack levels should be in the target area



## Target/Control Analysis 2019-2020 Season

- The mathematically derived snowpack values for the target area are then compared to the actual snowpack values recorded.
- When performed over a number of years, this analysis produces an increase estimate with a high confidence interval.



## Target/Control Analysis Long Term Results

Comparative studies based on mathematical models, conducted across all operational areas individually, consistently point to a 1.5-12% increase resulting from cloud seeding.

This covers 40+ years of seeding in the Rocky Mountains.

Highest percentage increases are achieved across mountain ranges with a north-south orientation.

Highest production (in terms of additional water generated on an acre-foot basis) are achieved in Northern Utah, including the Uinta Range.

Dollar Cost Average for Utah is estimated to be less than \$15 per acre foot of additional runoff. Dollar Cost to participating sponsors is estimated at less than \$8 per acre-foot.