

JUNE 2025

Roosevelt Soil and Water Conservation District



Cloud Seeding Initiative
WNRC 10/29/2025

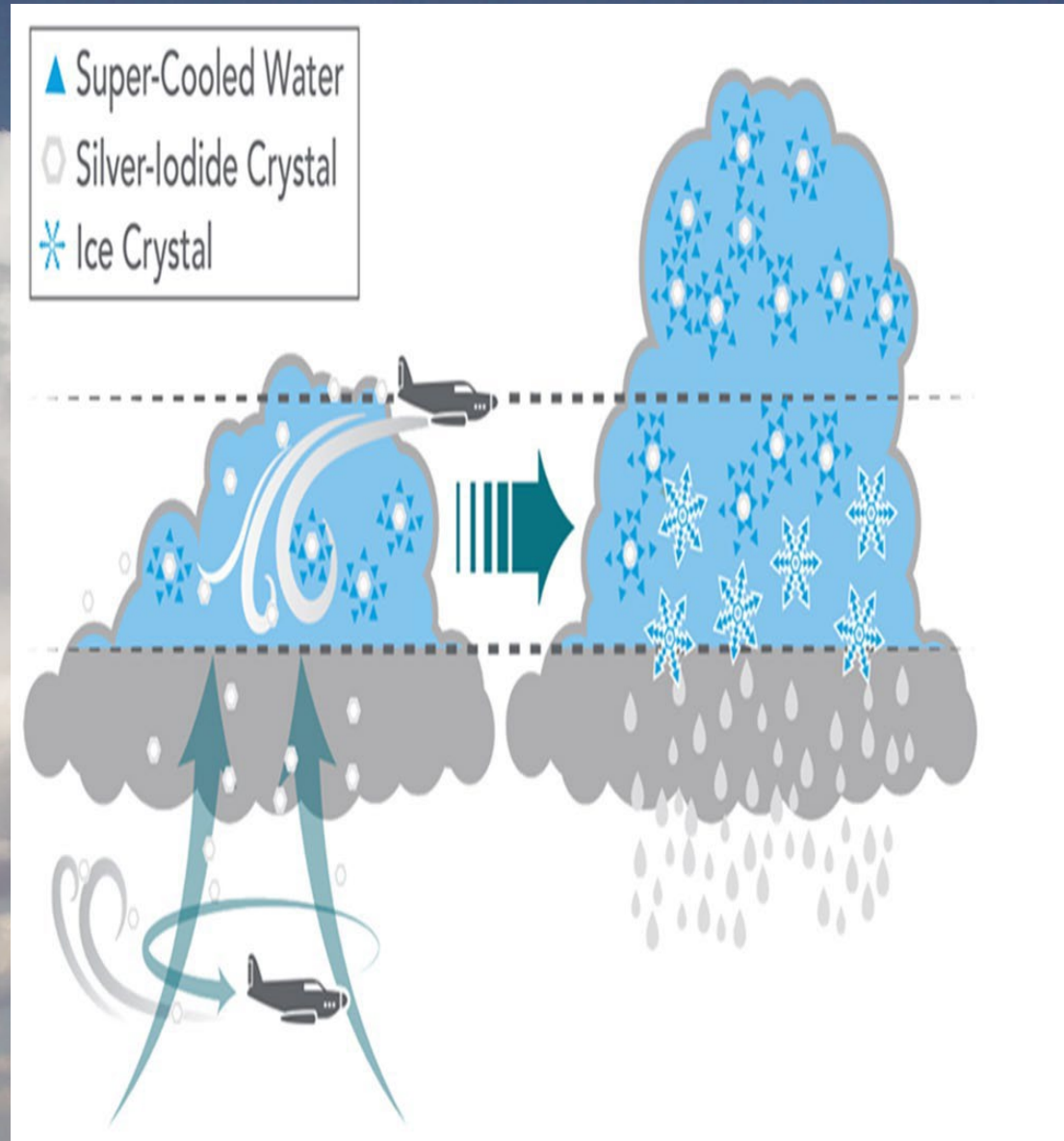


Program Participants

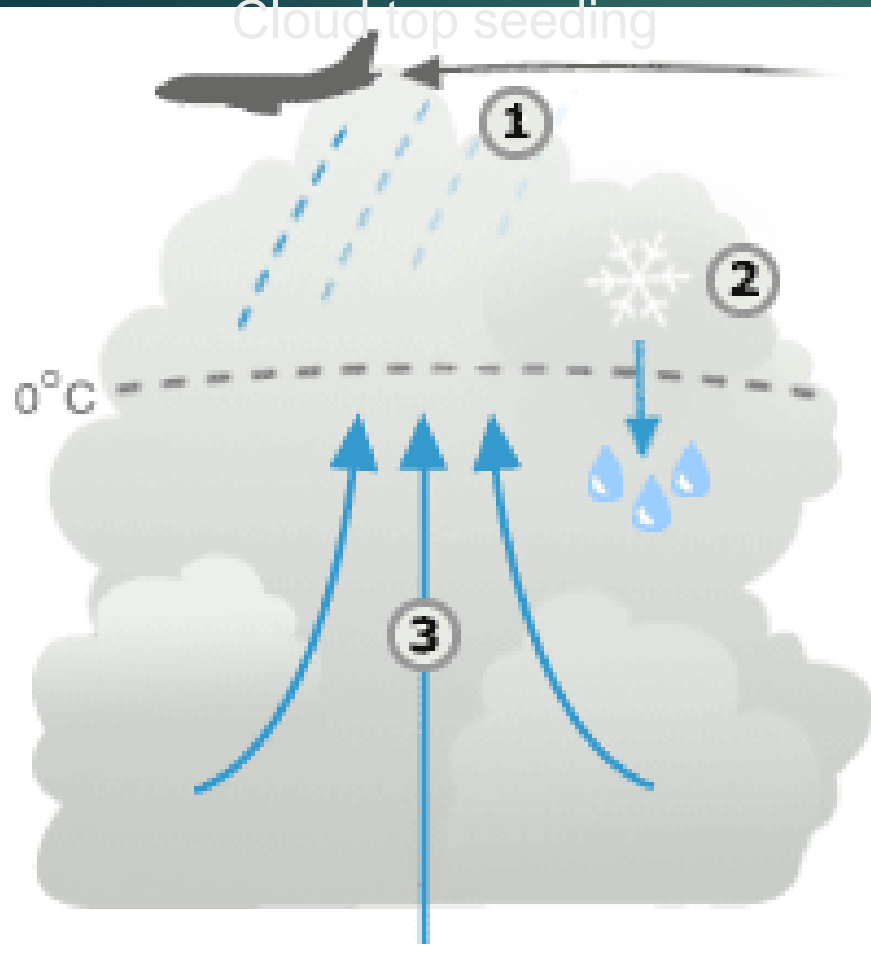
- RSWCD – Mike Cone Chairman of the Board/ Project manager
- RSWCD - Rick Ledbetter RSWCD Supervisor / Project manager
- George Bomar / Texas State Meteorologist (Ret.)
- Dr. Dave Du Bois / New Mexico State Climatologist
- Gary Walker/ Rainfall Enhancement Pilot (Soar)

What is Cloud Seeding

Seeding Clouds to increase rainfall by injecting more ice-producing material, such as silver iodide, whose crystalline makeup most resembles natural ice in the atmosphere. Silver iodide is released in the updraft, or like dry ice, placed directly in the cloud. These particles aid in the conversion of supercooled water droplets to ice crystals and eventually snowflakes that melt and become rain.

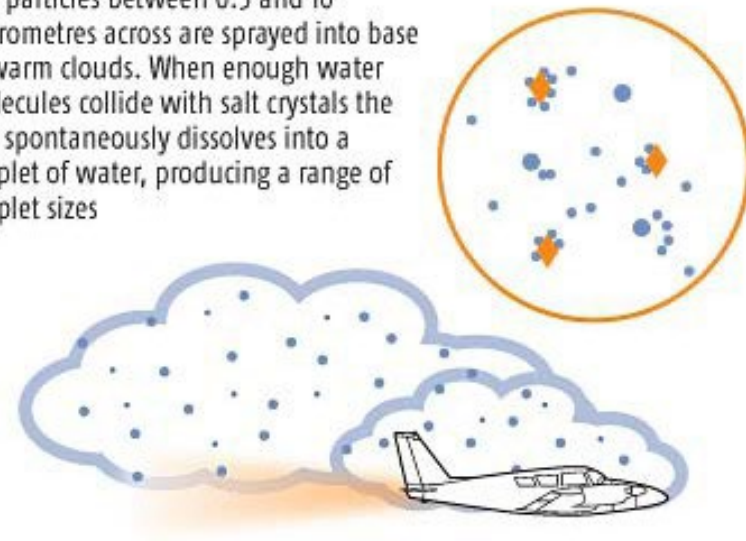


Cloud top seeding



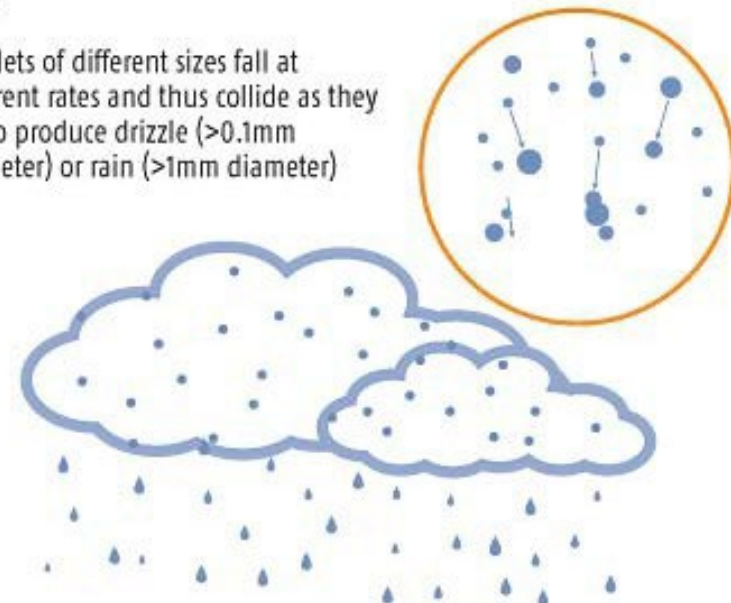
Seeding

Salt particles between 0.5 and 10 micrometres across are sprayed into base of warm clouds. When enough water molecules collide with salt crystals the salt spontaneously dissolves into a droplet of water, producing a range of droplet sizes



Rain

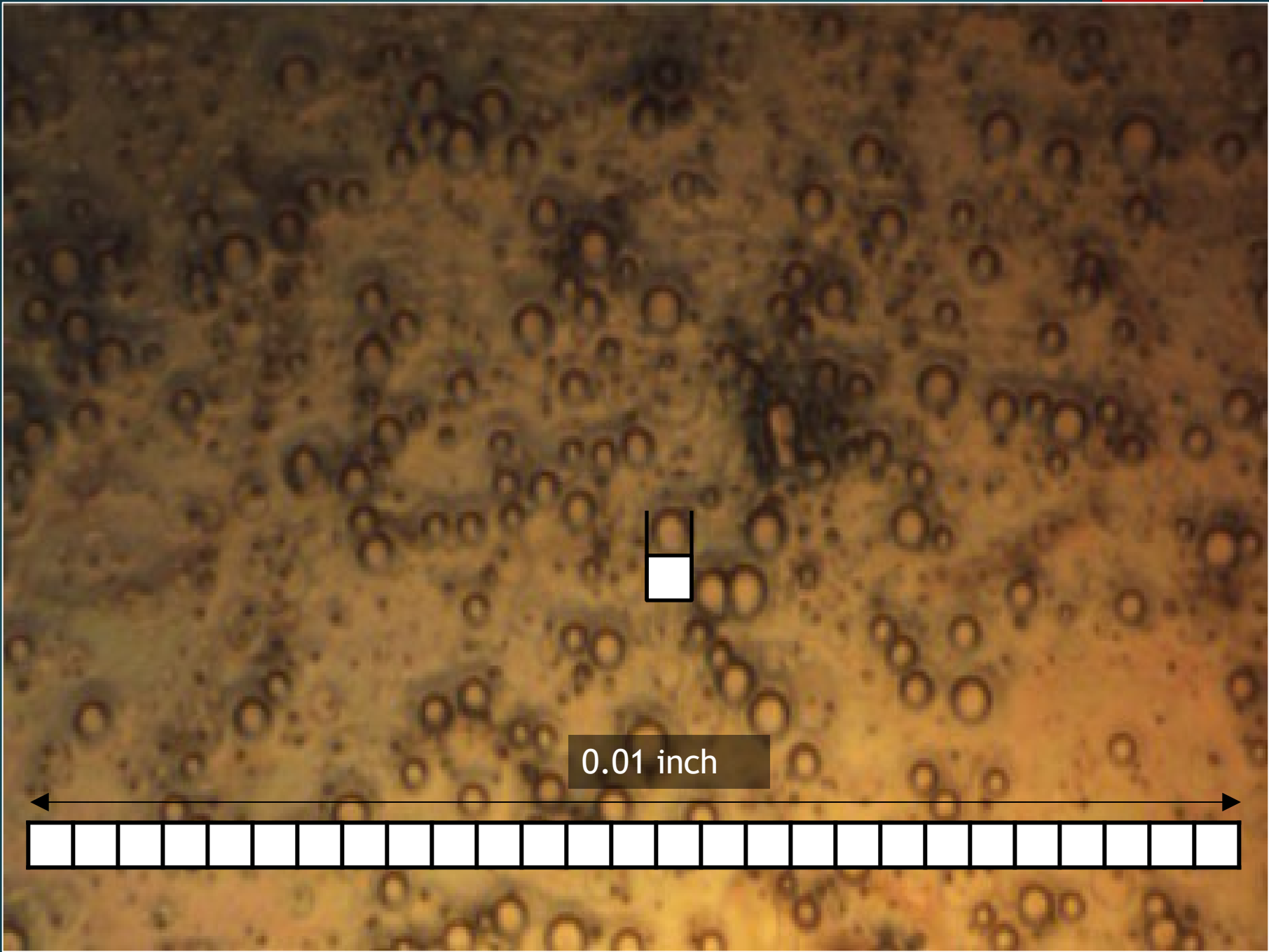
Droplets of different sizes fall at different rates and thus collide as they fall to produce drizzle ($>0.1\text{mm}$ diameter) or rain ($>1\text{mm}$ diameter)



Drop Formation

A microscopic image showing numerous small, spherical liquid droplets of varying sizes. The droplets are densely packed and appear to be in the process of colliding and coalescing, forming larger, irregular clusters. The background is a mottled, brownish-orange color, suggesting a liquid medium. The overall appearance is that of a dynamic process of drop formation.

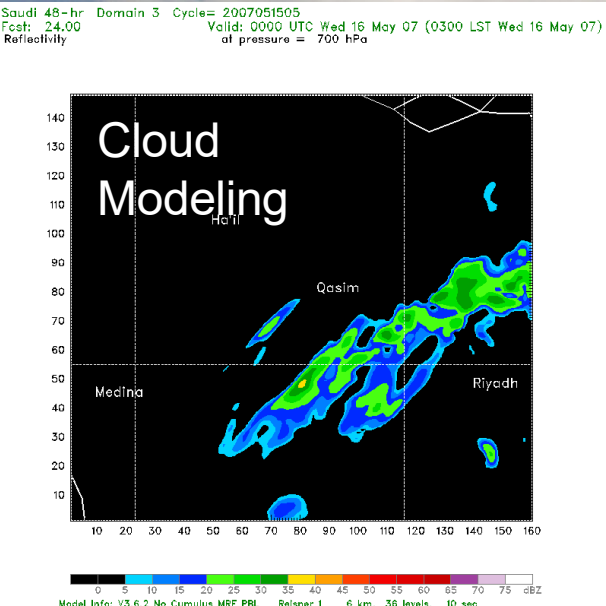
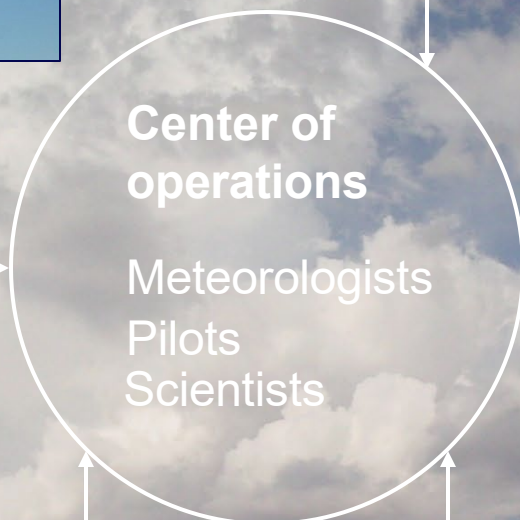
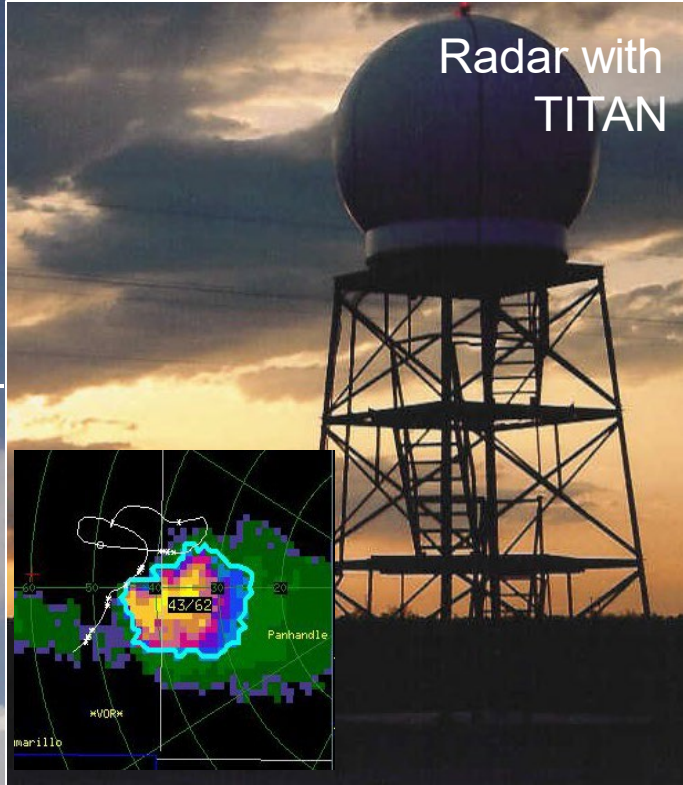
Liquid droplets are colliding (warm mechanism)



Essential components



Aerosol/Cloud Physics Research Aircraft



Technology transfer & training



Cloud seeding aircraft & flares (hygroscopic and/or glaciogenic)





Glaciogenic (Silver Iodide)

THE USE OF SILVER IODIDE IN THE ENVIRONMENT

Why silver iodide (AgI) is used as a seeding agent

Its crystalline structure resembles that of natural ice—making it a very effective surrogate for ice as a nucleating agent within clouds.

It is practically insoluble in water, i.e. it stays in solid form rather than dissolving in water. It does *not* dissociate to its component ions of silver and iodine.

(If it dissolved, it would no longer be useful as a nucleating agent. Also, **in solid form it does not become biologically available in the environment.**)

AgI's impact on the environment

- Numerous studies (cited below) are unanimous in concluding that **the use of AgI does not have an adverse effect to human health and the environment.**

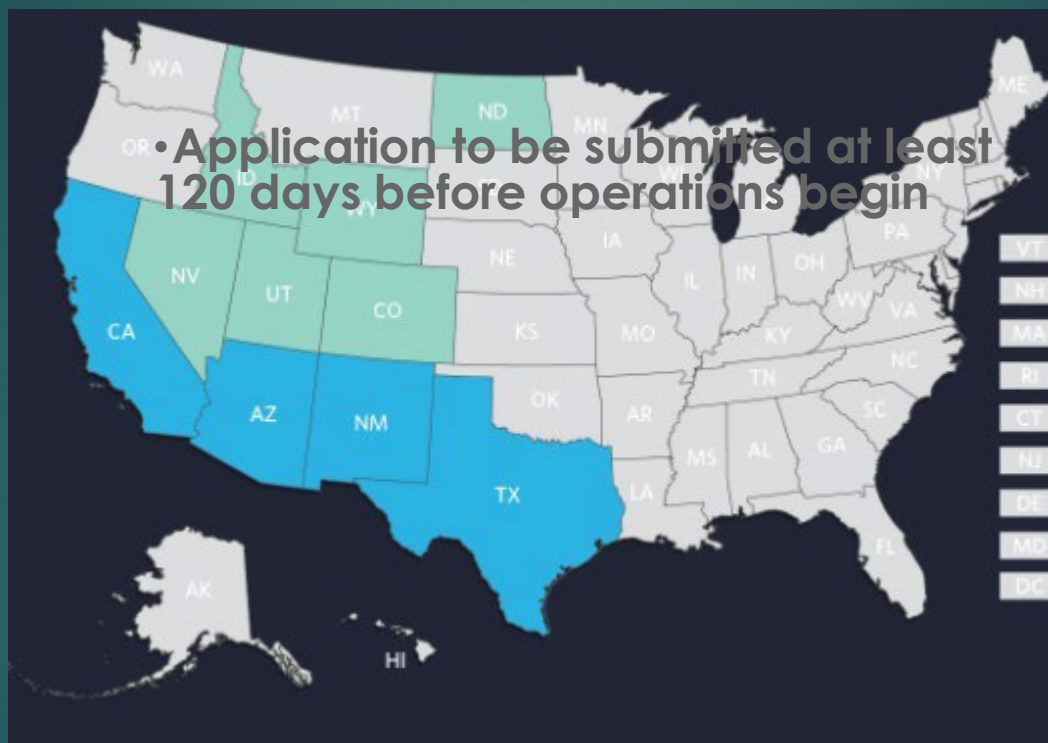
Project Skywater, a program of research of weather modification by cloud seeding conducted by the U. S. Bureau of Reclamation:

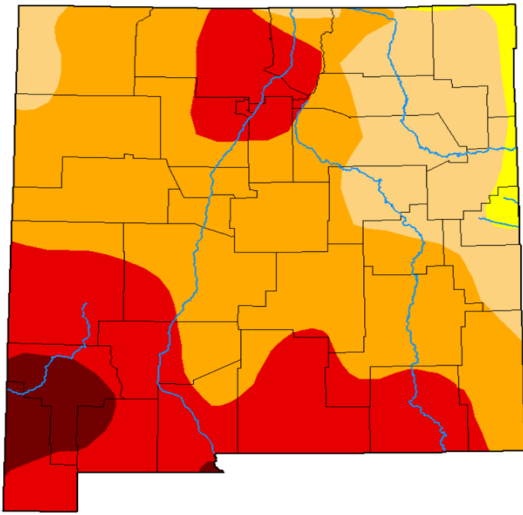
- “Critical Issues in Weather Modification Research,” a study by the National Academy of Sciences (NAS) to evaluate the efficacy of current cloud seeding approaches:
National Academy of Sciences (NAS). 2003. Committee on the Status of and Future Directions in’
U. S. Weather Modification Research and Operations.
Critical Issues in Weather

THE USE OF SILVER IODIDE IN THE ENVIRONMENT (Cont.)

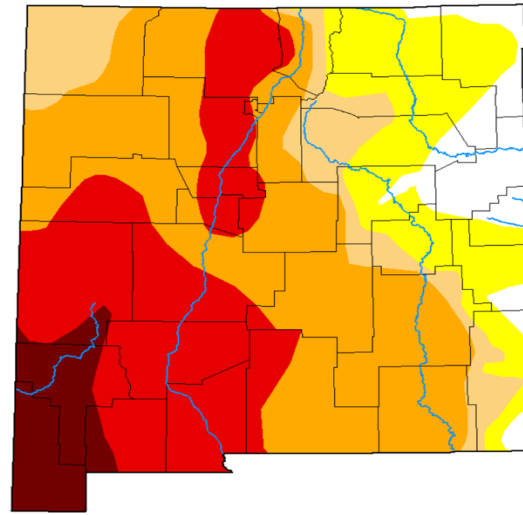
- *Modification Research*. Washington D.C: The National Academic Press. California Energy Commission Public Interest Energy Research Program, an examination of results from evaluating the state of the art in cloud seeding.
- Mokelumne Lake and Sediment Study, a comprehensive monitoring effort using high- precision analytical techniques to evaluate the effects of cloud seeding using AgI on surface waters and sediments:
 - Stone, Richard H. 2006. Mokelumne Watershed Lake and Sediment Study. Final Report to the Pacific Gas and Electric Company, Technical and Ecological Services, San Ramon CA
- The maximum possible concentration of silver, from dissolution of the AgI nucleus in contact with water, would be 0.984 micrograms per liter. Moreover, dilution from snowmelt or rainwater reduces the maximum concentration of the free silver ion to “far less than 0.9 micrograms per liter.” (*The human health-based drinking water standard sets the safe level at 100 micrograms per liter.*)
- Cardno ENTRIX. 2011. Geochemistry and Impacts of Silver Iodide Use in Cloud Seeding. Concord CA
 - “The contribution of AgI to the environment from cloud seeding is negligible (i.e. in quantities too small to be measured) . . . and is well below threshold limits for human safety, aquatic organisms and water quality standards”
 - U S Bureau of Reclamation. 2011. Finding of No Significant Impact: Walker River Basin Cloud Seeding Project. Carson City NV.

States with Cloud-Seeding Histories





< April 15, 2025 > [Download]

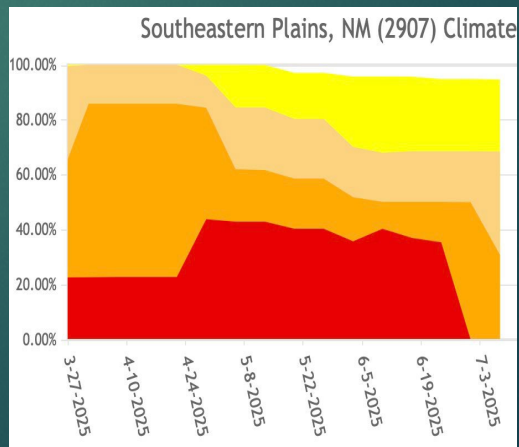
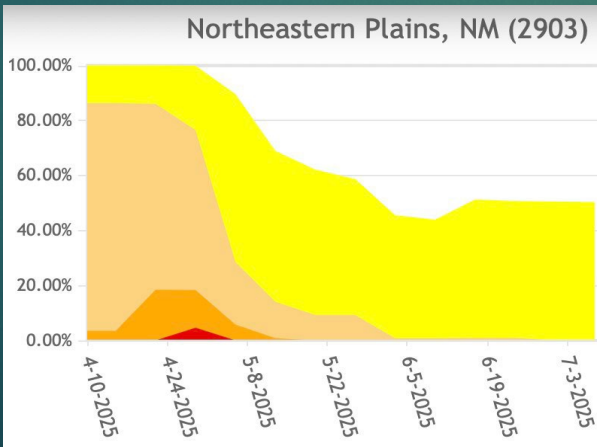


< July 1, 2025 > [Download]

APR 15

JUL 1

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2025-04-15	0.00	100.00	98.23	80.16	33.51	4.23	316
2025-07-01	7.17	92.83	77.54	67.44	33.03	6.59	277
Change	7.17	-7.17	-20.69	-12.72	-0.48	2.36	-39



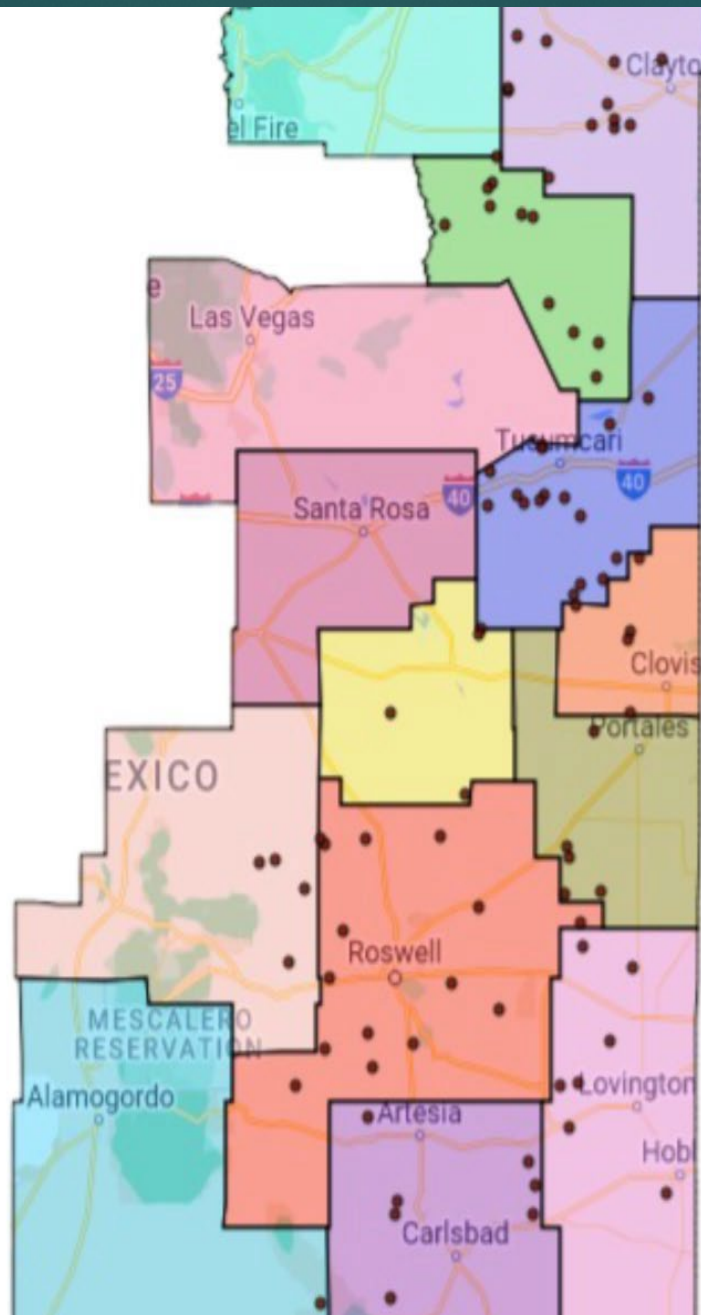
Regulating Rain Enhancement *in New Mexico*

A **license** issued by the Interstate Stream Commission (ISC) is required

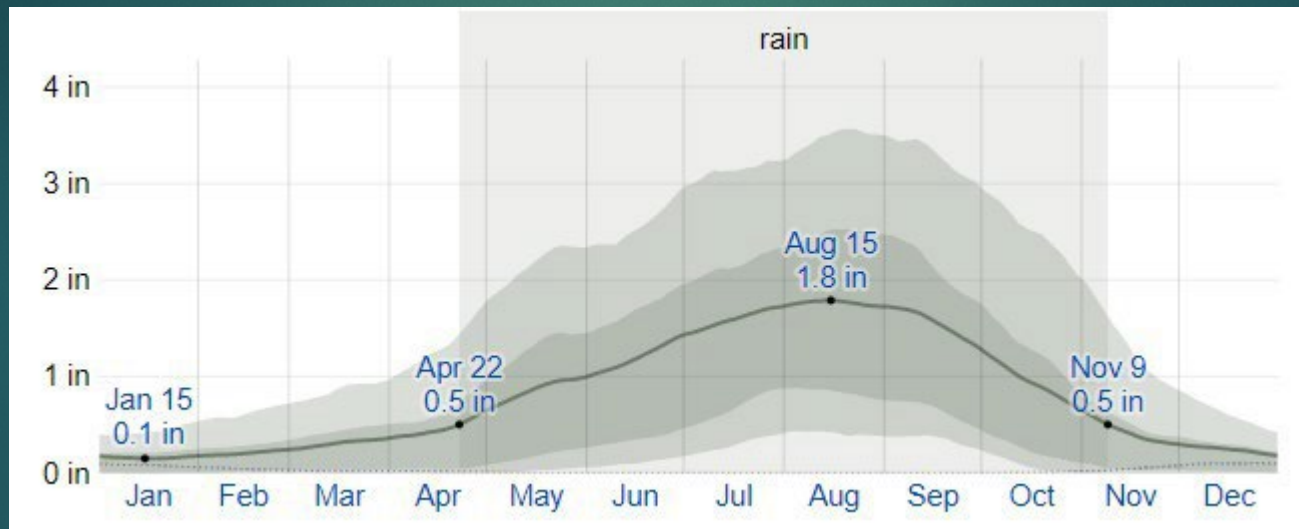
- Valid up to 12 months
- Renewable annually
- Application to be submitted at least 120 days before operations begin

Requirements of Licensee

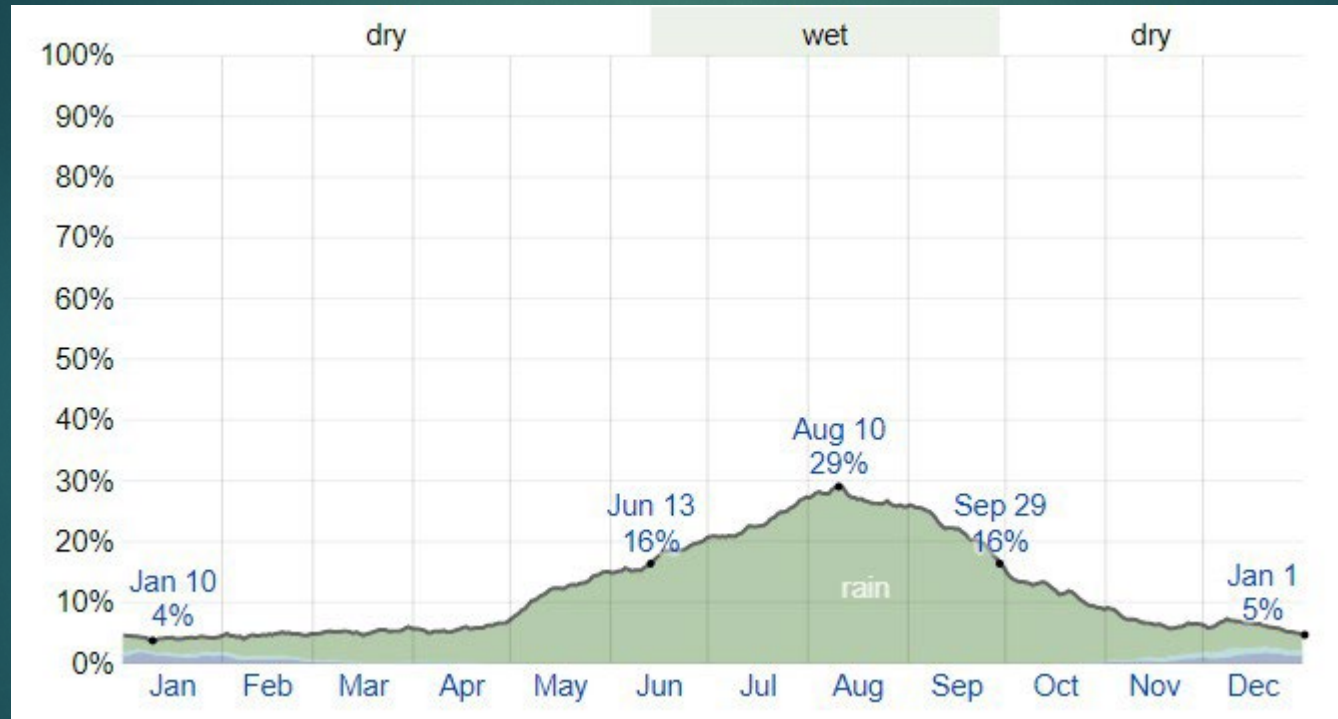
- ✓ File an application with ISC, pay fee
- ✓ Identify qualified persons to be in control of operations
- ✓ Publish a “Notice of Intention”
- ✓ Participate in public hearings
- ✓ Show evidence of insurability
- ✓ Provide summary report on “observed results”



Normal Monthly Rainfall ROSWELL NM



Daily Chance of Rainfall ROSWELL NM



What is the Cost

	<u>Cost per year</u>
• Summer Program	\$840,000
• Winter Program	\$ 60,000
• Administration Cost	\$100,000
• Cost study	\$200,000
• NM Eastern Counties... Annual Cost	\$1,200,000
<u>times 3 years</u>	<u>\$3,600,000</u>

Feasibility of Augmenting *Rainfall in Eastern NM*

- ❖ Prime opportunities exist April-Sept., with peak potential June 15 – Sept 15
- ❖ About 96 seeding targets occur in a typical year in eastern NM
- ❖ Since 2014, seeding could have yielded 4.24 million more acre-feet of rainwater
- ❖ Economic gain from seeding translates to a cost-benefit ratio of 1:13

Questions?



- Phone: 575-356-6629
- Email: rooseveltswcd@gmail.com