



Cloud seeding can marginally enhance the amount of snowfall in mountainous regions of primary water sources.

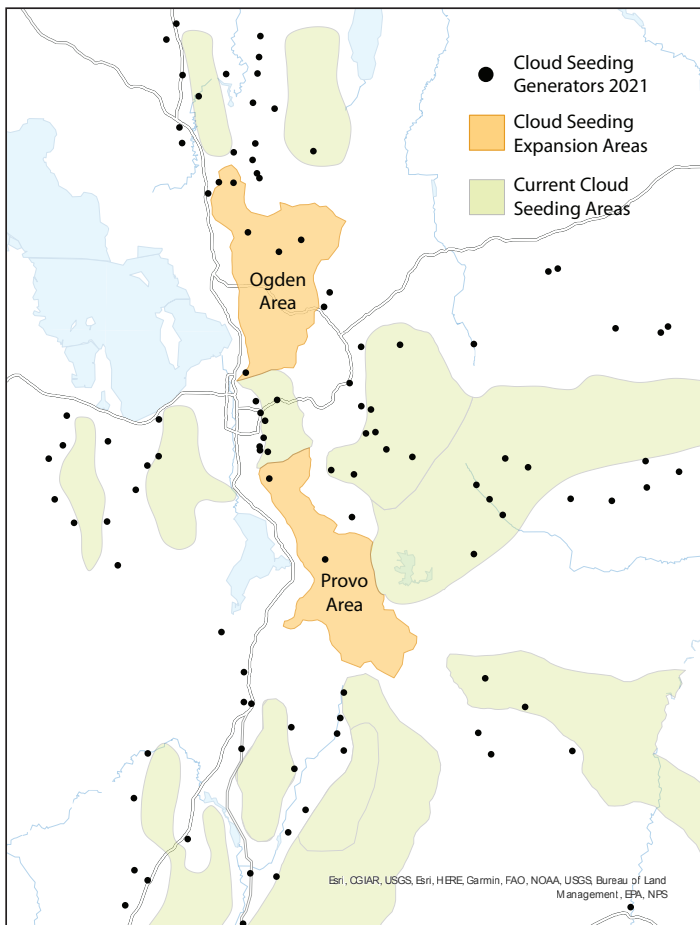
Summary

Under certain weather conditions, it is possible to intentionally modify snowstorms using existing cloud seeding methodologies. However, the amount of additional snowpack is uncertain and can vary between project types and locations. The amount of runoff produced is also uncertain. Program evaluations in Utah suggest cloud seeding could produce an average annual increase in snowfall between 4% and 13%, though more research is needed to improve these estimates. Peer reviewed research documenting increased snowfall or runoff from cloud seeding is minimal.

Key Facts and Insights

- **Ongoing Research** – Several experiments have shown cloud seeding increases precipitation in wintertime storm systems. However, the ability to measure runoff resulting from cloud seeding is low and objective evaluations on non-randomized operational projects continue to be challenging.
- **Ground and aircraft-based Seeding** – Wintertime cloud seeding projects use aircraft and ground-based systems that disperse silver iodide to seed clouds.
- **Low State Investment** – Utah's budget for cloud seeding remains relatively low compared to other Mountain West states. Local entities typically pay operational costs (most often water conservation districts).

Figure 18:
Cloud Seeding
Generators and
Program Areas



Expert Assessment Scorecard Results

	Low	High
Benefits		
Water brought to the lake	1	2 3 4 5
Air quality improvements	1	2 3 4 5
Biological health	1	2 3 4 5
Costs, Challenges, and Adaptations		
Financial cost	1	2 3 4 5
Agriculture changes	1	2 3 4 5
Extractive industry changes	1	2 3 4 5
Cultural shift	1	2 3 4 5
Feasibility		
Speed of implementation	1 2 3	4 5
Legal/regulatory feasibility	1 2 3 4	5

Source: Great Salt Lake Strike Team

Policy Options and Tradeoffs

The primary limitation to expanding cloud seeding in Utah is budgetary constraints and program evaluation. With additional funding, the state could consider the following options.

Policy Options

- Sponsor cloud seeding programs directly
- Target new mountain ranges
- Expand cloud seeding beyond what local entities can support
- Improve methods for evaluation of cloud seeding programs

Tradeoffs

- Expenditure of public funds on a policy which yields an indefinite water quantity.
- Public perception of cloud seeding
- Public concerns of safety

For relevant research on cloud seeding, please see the following:

- Rauber, M. et al. (2019). Wintertime Orographic Cloud Seeding – A Review. *Journal of Applied Meteorology and Climatology*, 58 (2117-2140). <https://doi.org/10.1175/JAMC-D-18-0341.1>
- Friedrich, K. et al. (2019). Quantifying snowfall from orographic cloud seeding. *Proceedings of the National Academy of Sciences*, 117(5190-5195). <https://doi.org/10.1073/pnas.1917204117>