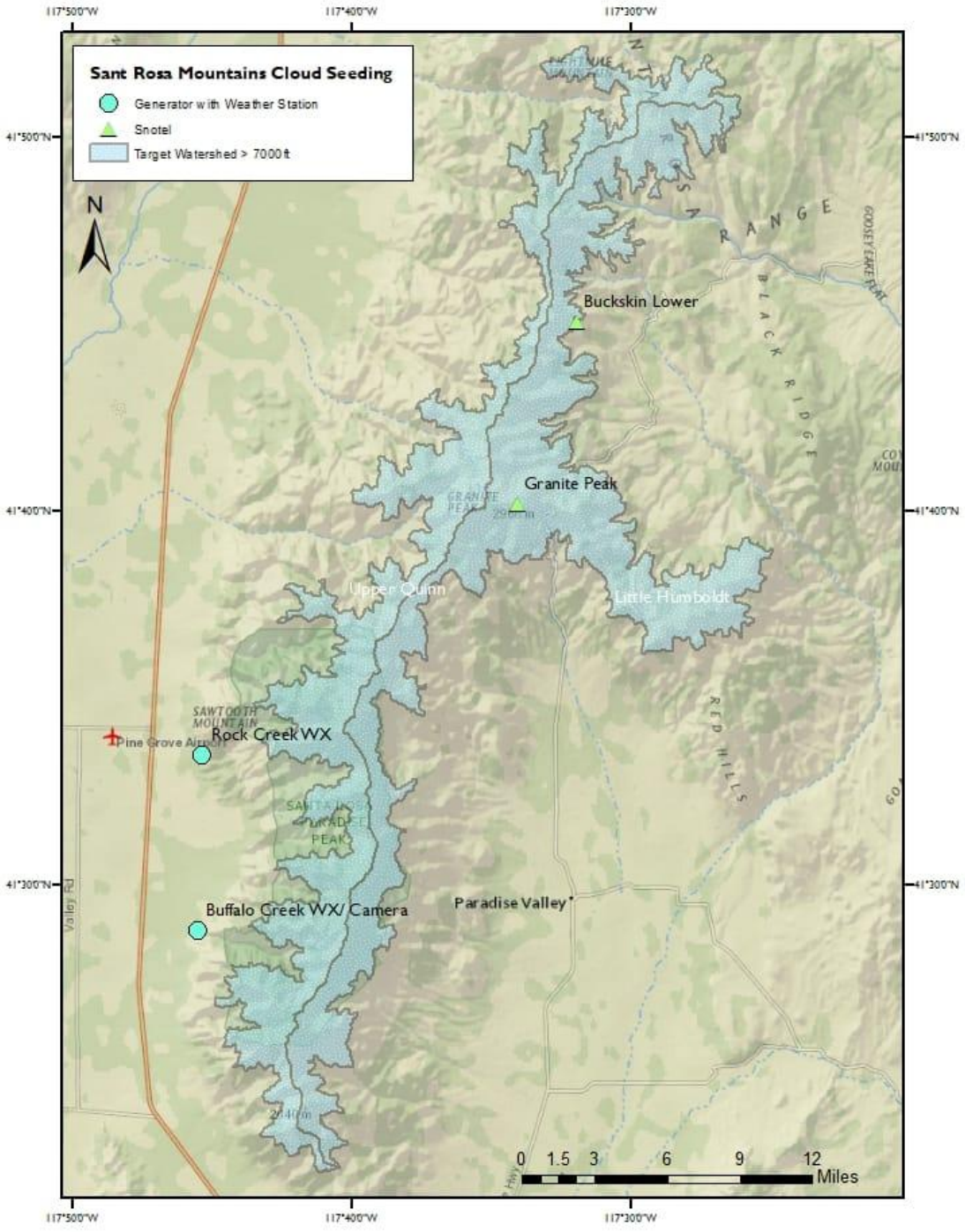
Project Map Website Link: https://www.dri.edu/project/santa-rosa-mountains/



Website Link: Cloud Seeding Operations Criteria - DRI

The following weather and cloud conditions should exist in order to initiate or continue cloud seeding operations in any area where DRI has a seeding project. Operations can also be initiated based on a 0-3 h forecast of these conditions existing in an operational area.

Seeding ***suspension criteria*** will always override seeding ***operations criteria***.

1. Cloudiness of sufficient areal extent to cover at least 50% of the intended target area. Verification is by means of GOES visible or infrared satellite images and NEXRAD radar images.

2. Clouds of sufficient depth, with cloud bases at least as low as the highest mountain peaks, to provide the potential for precipitation over the target areas. Verification of these conditions can be obtained by one or more of the following:

- NWS hourly reports of cloud conditions and precipitation from reporting sites within a cloud seeding target area.
- Visual observations and/or reports of cloud conditions by the project meteorologist, other project staff, contacts in any of the project areas, or internet links to webcams with views of target areas.
- Observation of precipitation from any automatic recording gauge whose data are telemetered by telephone modem or the Internet to DRI. The DRI has access to many such gages in the Sierra Nevada and other mountain ranges throughout the western U.S.
- WSR-88D (NEXRAD) radar images showing echo coverage of any DRI project area.

3. Wind directions that are conducive to transporting seeding material toward the target areas. This criterion will vary by area and will be verified by data from upper air soundings, NEXRAD radar wind measurements, mountain top weather stations, and wind data from instruments at seeding sites.

- Truckee-Tahoe area: Wind direction at 700 mb (~10,000 feet), as measured by the Reno NWS soundings or measured by weather stations close to the 10,000 ft altitude level, should be from 180 degrees clockwise through 330 degrees.
- Ruby Mountains: Wind directions in the cloud layer should range from 190 degrees clockwise through 330 degrees as verified by the NWS Elko upper air sounding, the Elko NEXRAD radar, or remote weather station data.

- Tuscarora area: Wind directions in the cloud layer should range from 120 degrees clockwise through 270 degrees as verified by the NWS Elko upper air sounding, the Elko NEXRAD radar, or remote weather station data.

4.Wind speeds at or near 700 mb should not exceed 30 m s-1 (~60 kts) to ensure that adequate time is available for growth and fallout of seeded ice crystals onto the target area. Mountain top weather stations, NWS upper air soundings, and NEXRAD radars will provide verification of wind speed.

5. The existence of supercooled liquid water in clouds is a condition necessary for successful cloud seeding. This quantity is not routinely measured over all the target areas, but the observation of icing at a mountain top site, or the observation of liquid water from one of DRI's microwave radiometers will be given strong consideration in the decision to initiate a seeding operation in any area where these data are available. When available these data will also be used in postseason evaluations of seeding operations.

6. To increase the likelihood of ice crystal formation by AgI seeding aerosols from ground generators, the temperature near mountain top level should be -5°C, or colder, as verified by data from mountain top weather stations, or upper air soundings. Operations may be initiated at a temperature as warm as -3°C, provided the -5°C threshold is forecast to be met within 0 to 3 hours.

The project meteorologist is responsible for forecasting and verifying seedable conditions, and also for initiating and terminating operations. Logs documenting the weather conditions during an operation will be kept on file at DRI by the meteorologist or other staff members.

Website Link: Cloud Seeding Safety Guidelines - DRI

In the event of any emergency which affects public welfare in the region of any seeding operations being carried on by the DRI Cloud Seeding Program, the seeding operations in that region will be suspended until the emergency conditions are no longer a threat to the public.

Seeding suspensions are generally expected to occur due to one or more of the following conditions:

A) When an **extreme avalanche danger** exists as determined by the U.S. Forest Service.

B) When the National Weather Service (NWS) forecasts a **warm winter storm**(freezing level >8000 ft.) with the possibility of considerable rain at the higher elevations which might lead to local flooding.

C) When the Project Meteorologist determines that **potential flood conditions may exist** in or around any of the project areas, the National Weather Service Flood Forecast Services at Reno or Sacramento will be consulted about the possibility of any of the following warnings or forecasts being in effect.

1. Flash flood warnings by the NWS.
2. Forecasts of excessive runoff issued by the CA/NV River Forecast Center, including such forecasts for rivers on the adjoining west slope of the Sierra Nevada.
3. Quantitative precipitation forecasts issued by the NWS that would produce excessive runoff in or around the project area.

In addition to the above, if any of the following conditions or forecasts exist; seeding operations may be suspended, at the discretion of the Project Meteorologist, in and around the areas of concern:

A) When the **wind speed is 60 knots or more** for over 30 minutes at the 700 mb level (~10,000 ft). For monitoring purposes in the western part of Nevada, the winds measured at Slide Mountain (9,650 ft) are considered equivalent to the 700 mb level winds. The Reno and Elko upper air soundings can also be used to monitor this criterion, as can the Doppler winds from the Reno and Elko NEXRAD radars.

B) When **wind directions lie outside of the range** between 180 and 330 degrees during ground-based seeding operations on the west side of the Sierra Nevada crest. The winds measured at Slide Mountain or Ward Peak (8,480 ft), and the upper air soundings and NEXRAD Doppler winds from Reno and Elko can be used to monitor wind direction.

C) When the **water content of the snowpack** in the target area, as measured at existing snow courses or SNOTEL sites, **exceeds the accumulation envelope** defined by the following percentages to date of long-term averages on the same date. NRCS SNOTEL data and reports are used to monitor snowpacks.

December 1…175%	February 1…150%	April 1…140%
January 1…..150%	March 1….150%	May 1….140%

Intermediate limits shall be derived by linear interpolation between the percentages given above.

D) During major holidays such as Thanksgiving, Christmas, New Year's Day, and President's Day, in **areas and times of heavy traffic** on Highways 50 and 80, over the Sierra Nevada.