

Red Rock Canyon Storm Summary
November 8, 2022

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On 2022 November 8 a large cold-low pressure system centered over northern California moved on-shore. A cold front associated with the Low moved on-shore over southern and central California. Tropical moisture and associated precipitation was pumped northeast across the Spring Mountains ahead of this cold front Figure 1.

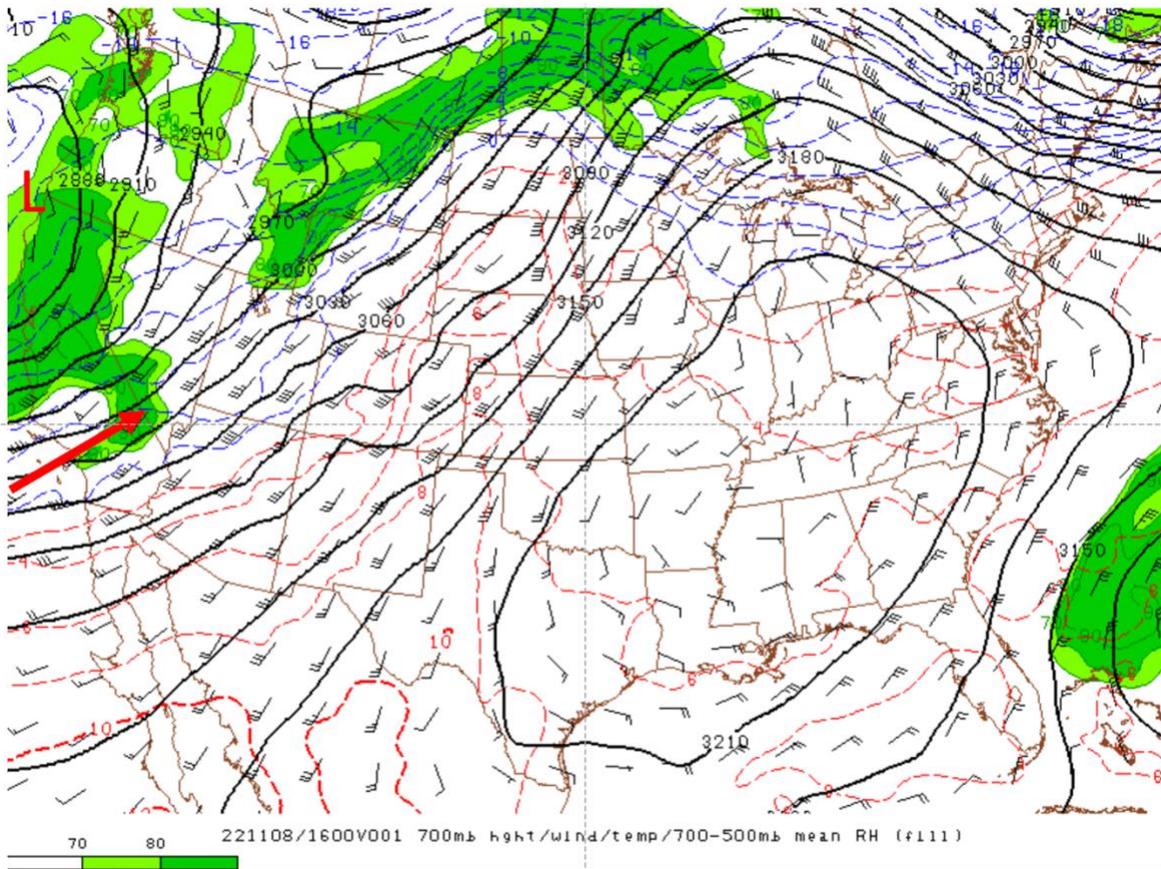


Figure 1. 700mb (10,000' MSL) weather map at 9AM on November 8, 2022

The cold front approached the Spring Mountains at 7PM and crossed the area over the next few hours. Temperatures cooled below -5C at ridge top and the winds became more west-southwesterly. The cloud seeding generator was operated between 7:30PM on November 8, 2022 through 12:30 AM on November 9. With the west-southwesterly winds the seeding plume impacted the northern end of the Red Rock Canyon Park and the adjacent mountains north of the Park.

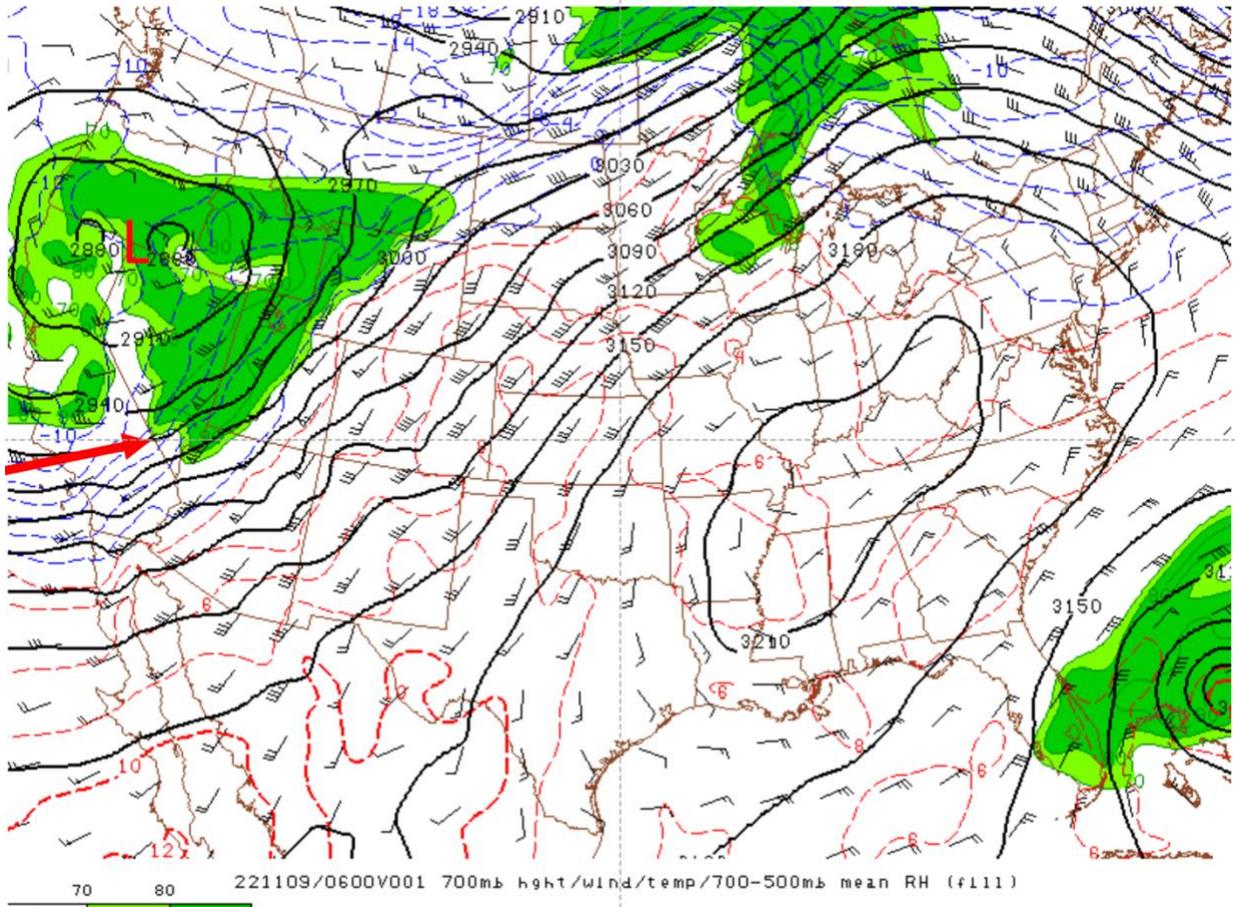


Figure 2 700mb (10,000' MSL) weather map at 10PM on November 8, 2002. The cold front is cross the Rec Rock Canyon area at this time.

The storm produced significant precipitation 2.2" of precipitation at Lee Canyon and 3.5" of precipitation at Rainbow Canyon, 7 miles north of Red Rock Canyon.

With the precipitation gauge at Rainbow Canyon only 7 miles north of Red Rock Canyon, it along with the northern end of the park, were under the cloud seeding plume.

Figure 3 shows the time-series of precipitation on November 8. The front side of the storm was too warm for seeding but the final 5:30 hours of the storm were cold enough to seed. 0.9" of precipitation fell during that period of which about 0.1" was attributed to the cloud seeding operations. The generator impact area is ~40 square miles (mi²). So the total estimated yield from the generator is **213 acre-ft.**

$$\text{Total yield in acre-feet} = (0.1 \text{ in} \times (1 \text{ ft}/12 \text{ in}) \times 40 \text{ mi}^2 \times (640 \text{ acres}/\text{mi}^2)) = \mathbf{213 \text{ acre-ft}}$$

For perspective, the average household in the Las Vegas area uses about 0.36 acre-ft of water per year. So, the Red Rock generator produced enough water for nearly 600 households for a year.

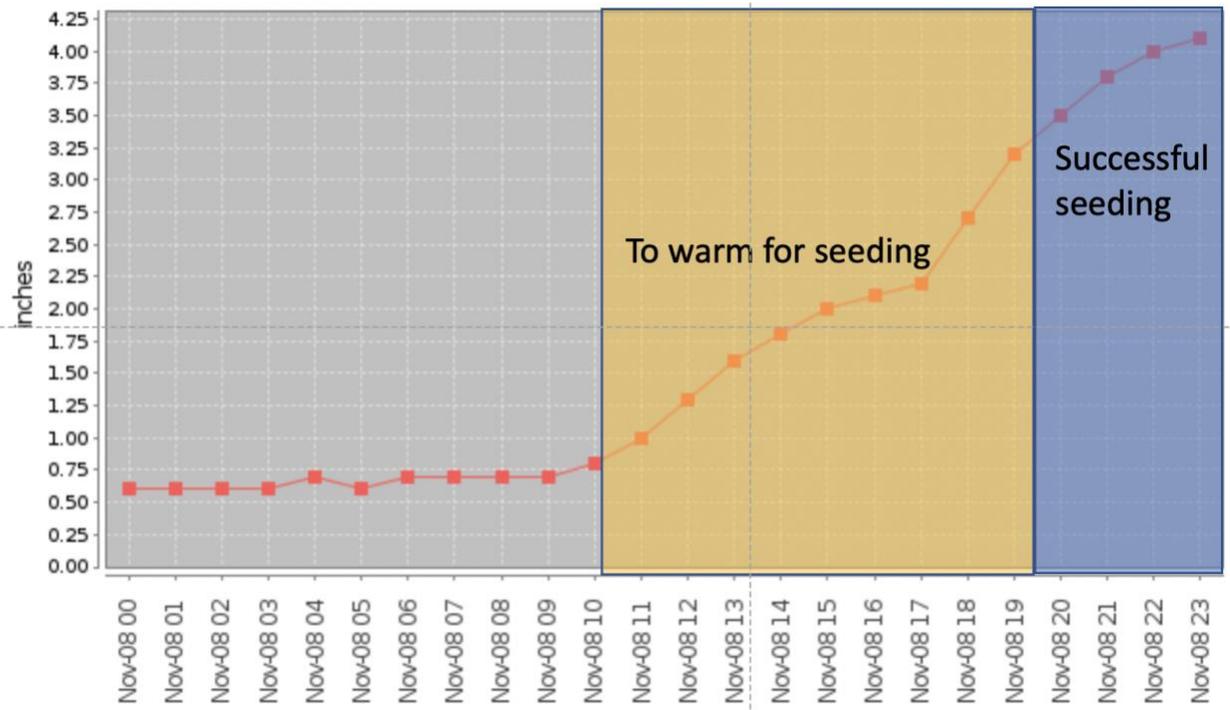


Figure 3 Hourly time-series of precipitation at Rainbow Canyon on November 8. The orange shading is the precipitation period which was too warm for seeding and the blue area the seeded portion of the storm.