Complete in accordance with instructions on reverse and forward copy:

TO: National Oceanic and Atmospheric Administration
Office of Oceanic and Atmospheric Research
1315 East-West Highway SSMC-3 Room 11554
Silver Spring, MD 20910

Form Approved: OMB No. 0648-0025 Expires 10/31/2001

NOAA FORM 17-4 (4-81) U.S. DEPARTMENT OF COMMERCE
NAT'L OCEANIC AND ATMOSPHERIC ADM.

INITIAL REPORT ON WEATHER MODIFICATION ACTIVITIES (P.L. 205, 92ND. CONGRESS)

1. PROJECT OR ACTIVITY DESIGNATION, IF ANY
Kaweah Cloud Seeding Program

3. PURPOSE OF PROJECT OR ACTIVITY
Snowpack Augmentation

2. DATES OF PROJECT

a. DATE FIRST ACTUAL WEATHER MODIFICATION ACTIVITY IS TO BE UNDERTAKEN: 11/01/2017

b. EXPECTED TERMINATION DATE OF WEATHER MODIFICATION ACTIVITIES: 04/30/2018

4. (a) SPONSOR

NAME: Mark Larsen

AFFILIATION: Kaweah Delta Water Conservation District

PHONE NUMBER: (559) 909-1554

STREET ADDRESS: 2875 Farmersville Blvd.

CITY: Farmersville | STATE: CA | ZIP CODE: 93223

4. (b) OPERATOR

NAME: Richard Stone

AFFILIATION: RHS Consulting, Ltd.

PHONE NUMBER: (775) 338-9323

STREET ADDRESS: 2227 Bellanca St., Hangar A

CITY: Minden | STATE: NV | ZIP CODE: 89423

5. TARGET AND CONTROL AREAS (See Instructions)

TARGET AREA		CONTROL AREA	
LOCATION: Kaweah River Basin	SIZE OF AREA: 828 SQ.MI	LOCATION: Merced River, Tule River, Cottonwood Creek	SIZE OF AREA: 750 SQ.MI.

6. DESCRIPTION OF WEATHER MODIFICATION APPARATUS, MODIFICATION AGENTS AND THEIR DISPERSAL RATES, THE TECHNIQUES EMPLOYED, ETC. *(See Instructions)*

This is a continuation of the Kaweah River Basin Program, a long-term project that began operations in 1976. During the 2018 winter season winter storm systems will be seeded using PA-31P aircraft equipped with seeding equipment, data and telemetry systems. The operational program office is located at the Visalia (KVIS). Silver iodide type aerosols and/or hygroscopic aerosols are generated using ejectable and end-burning pyrotechnics released 20-30 miles upwind of the target area. Seeding materials are typically released between 9,000-16,000' depending on temperatures and wind velocities. Seeding material release rates very between 200-400 gAgI/hr depending on cloud conditions, temperatures and distance to the target. Seeding is conducted near the top of the water saturated layer in supercooled liquid or mixed phase cloud conditions as predicted explicitly by a regional version of the WRF model. Evaluations are conducted annually based on streamflow and snow survey data. Multiple control areas are used that surround the target area to the north, west and northeast sides of the target area.

7. LOG BOOKS: *Enter name, affiliation, address, and telephone number of responsible individual from whom log books or other records may be obtained.*

NAME: Richard Stone

AFFILIATION: RHS Consulting, Ltd

PHONE NUMBER: (775) 338-9323

STREET ADDRESS: 2227 Bellanca St., Hangar A

CITY: Minden | STATE: NV | ZIP CODE: 89423

THIS REPORT IS REQUIRED BY PUBLIC LAW 92-205; 85 STAT 735; 15 U.S.C. 330b. KNOWING AND WILLFUL VIOLATION OF ANY RULE ADOPTED UNDER THE AUTHORITY OF SECTION 2 OF PUBLIC LAW 92-205 SHALL SUBJECT THE PERSON VIOLATING SUCH RULE TO A FINE OF NOT MORE THAN $10,000, UPON CONVICTION THEREOF.

8. SAFETY AND ENVIRONMENT

- [ ] YES [x] NO — Has an Environmental Impact Statement, Federal or State been filed? If yes, please furnish a copy as applicable.
- [x] YES [ ] NO — Have provisions been made to acquire the latest forecasts, advisories, warnings, etc. of the National Weather Service, Forest Service, or others when issued prior to and during operations? If yes, please specify on a separate sheet.
- [x] YES [ ] NO — Have any safety procedures *(operational constraints, provisions for suspension of operations, monitoring methods, etc.)* and any environmental guidelines *(related to the possible effects of the operations)* been included in the operational plans? If yes, please furnish copies or a description of the specific procedures and guidelines.

9. OPTIONAL REMARKS *(See Instructions. Use Separate Sheet.)*

NAME: Richard Stone

CERTIFICATION: I certify that the above statements are true, complete and correct to the best of my knowledge and belief.

AFFILIATION: RHS Consulting, Ltd.

SIGNATURE:

STREET ADDRESS: 2227 Bellanca St., Hangar A

OFFICIAL TITLE: Principal

CITY: Minden | STATE: NV | ZIP CODE: 89423 | DATE: 02/13/2018 | PHONE NUMBER: (775) 338-9323

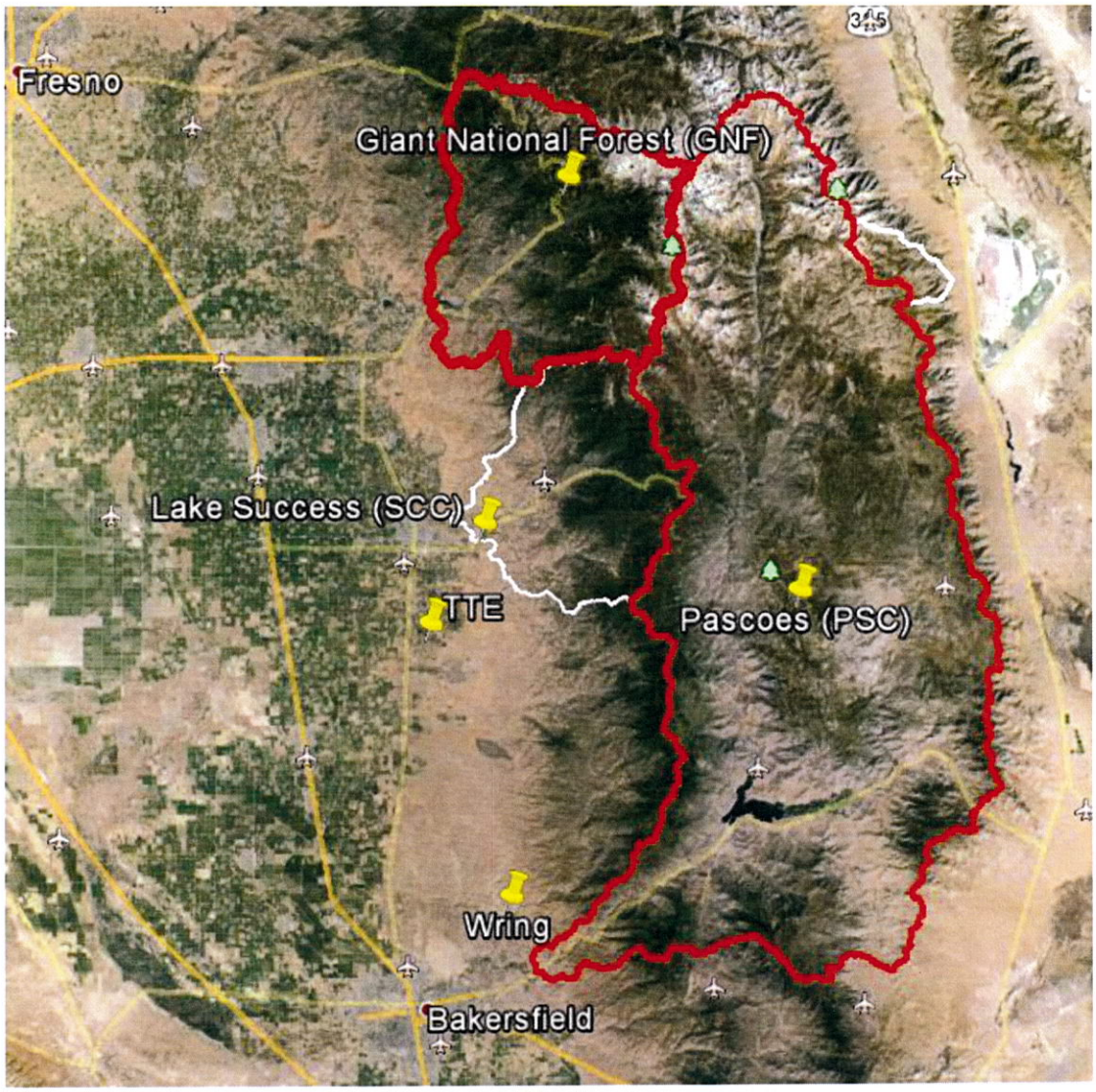


Figure 1. Project areas for RHS Consulting include the Kern and Kaweah River Basins. Both target areas are outlined in red. The control areas for use in streamflow and snowpack evaluations are outlined in white. These include the Merced River Basin (not shown), the Tule River Basin (south of the Kaweah and west of the Kern) and Cottonwood Creek (east of the Kern). Both areas can be contaminated by upwind seeding program on occasion but RHS takes every effort to avoid seeding these basins.

Suspension Criteria

As in any well designed and responsibly conducted weather modification program, the program includes basic guidelines for temporary suspension or curtailment of cloud seeding operations under certain conditions. These program safeguards are designed to avoid runoff or reservoir storage beyond manageable limits and to avoid contributing (or appear to contribute to) hazardous situations, such as increased flooding, erosion and sedimentation, or avalanches, resulting from naturally occurring weather or hydrologic related phenomena. The parameters used to trigger suspension of cloud seeding operations include:

- *Total snow pack status*
- *Reservoir storage*
- *Potential flood situations (including rain-on-snow)*
- *Severe weather threats*
- *Special Circumstances*

Consideration of these five parameters is a routine facet of ongoing forecasting and operational activities conducted as part of cloud-seeding operations. The decision-making time frame within these parameters is far shorter than commonly used in periodic snowfall assessments. These factors are monitored on a storm-by-storm basis, and even on a sub-hourly basis during rapidly changing weather conditions. National Weather Service (NWS) Flash Flood or Severe Weather Warnings pertinent to the target area or to adjacent watersheds will trigger curtailment of cloud-seeding operations. While curtailment relative to severe weather threat is typically infrequent and short-lived, suspension during potential flood situations might span several days. Special circumstances such as search and rescue missions or other emergency situations within the target area may result in temporary curtailment of seeding operations as deemed prudent.

Total Snowpack Status

Snowpack development in the basin can begin as early as October and continues through April, and even into May. Analysis has shown that potential hazard from snowmelt will only be of concern during excessive snow accumulations generating water contents not easily managed by the reservoir system or when runoff is anticipated to increase stage height to flood levels. Therefore, certain percentages of April 1 basin-wide average water content will be established and used as cutoff criteria for seeding operations. Total snowpack status will be estimated from data gathered by other agencies such as the Natural Resources Conservation System (NRCS) and can be based on snow survey and snow pillow data. Once suspended, the program may resume operational seeding if subsequent snow survey or snow pillow data indicate the accumulation has fallen below the cutoff percentages. Table 1 provides an example of the typical cutoff thresholds used in these winter cloud seeding programs.

Table 1. Project Suspension Criteria.

Date	Cutoff value (% of April 1 average)
January 1	95%
February 1	110%
March 1	125%
April 1	140%

Rain-Induced Winter Floods

There is potential for wintertime flooding from excessive rainfall and hence frequently receives rain rather than snow. Sometimes heavy rain falls well above the 8000' contour. The project takes every precaution to ensure accurate forecasting and the timely suspension of operations during these potential flooding situations. The desired objective of suspension under these conditions is to limit the effect of cloud seeding at times when any increase in precipitation has a high probability of contributing to potential flood hazard.

River flows and encroachment forecasts are based upon information and predictions supplied by the NWS and California Nevada River Forecast Center (CNRFC). Streamflow conditions that exist in the basin prior to and during seeding operations are monitored as needed to avoid a potential flooding hazard. Primary inputs to the model include existing basin wetness and the project quantitative precipitation forecast (QPF). Suspension of seeding activities occurs whenever the NWS and/or CNRFC criteria are exceeded.

Severe Weather

Seeding operations are suspended whenever the NWS issues a severe weather warning for the project target or nearby downwind areas that could be affected by the program. Usually these warnings are issued when intense convective activity is expected to cause heavy rainfall and/or hail. The project forecaster is responsible for staying abreast of the potential for these conditions. The project director will be informed as soon as possible if the potential exists for severe weather, even before the NWS issues a bulletin.

Other Special Circumstances

The project director has the authority to suspend seeding activities under any special or unusual circumstances, which may be deemed hazardous. Examples of special circumstances are extreme avalanche hazard, very strong winds, warm temperatures, heavy snow at low elevations, and other unforeseen conditions that could be hazardous or perceived by the public as hazardous.
Details of suspension criteria and procedures for implementing are discussed in the operations plan

of each project. If suspension criteria are met during an operational seeding period, seeding is stopped immediately. Such intervals are not included in any measurement unit used to assess to program.

Safety

Over the past nine seasons RHS aircraft have logged several hundred hours flying in icing conditions without incident. On occasion aircraft have descended to shed ice from the airframe, but these situations are routinely encountered and handled with established procedures as they develop. RHS requires new pilots to fly for a season as copilot or at least until they can successfully demonstrate that they can handle the aircraft in these conditions. Each Aircraft is equipped with GPS WAAS units and XM weather which helps pilots plan ahead and avoid some of the most difficult situations. It also helps reduce pilot workloads. The meteorologist is equipped to assist pilots with the overall synoptic and mesoscale weather situation when severe icing situations are encountered and can often provide valuable updates of local storm and airport conditions during operations.

RHS maintains a strict policy of flying aircraft certified for flight in known icing conditions by the FAA to ensure that all of the aircraft can provide adequate safety margins. RHS monitors all the latest NWS forecasts for advisories, warnings and special weather statements as they pertain to the operational program.

Optional Remarks

The current projects use aircraft seeding methods only. All design and environmental documents filed in the past with California Department of Water Resources and NOAA apply to these projects with the possible exception of seeding aircraft type, some new flight tracks and seeding material application rates. Both ejectable and end burning flares are used to seed depending on the temperature, depth of cloud and time for new ice crystal to fall, wind velocities and cloud type.