NOAA FORM 17-4 (4-81) U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Form Approved OMB Control No. 0648-0025
Expires 05/31/2021

INITIAL REPORT ON WEATHER MODIFICATION ACTIVITIES

This report is required by Public Law 92-205; 85 Stat. 735; 145 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.

Complete in accordance with instructions on reverse and forward one copy to:
National Oceanic and Atmospheric Administration
Office of Oceanic and Atmospheric Research
1315 East-West Highway, WWMC-3, Rm 11216
Silver Spring, MD 20910

1. PROJECT OR ACTIVITY DESIGNATION, IF ANY
San Juan Mountains (SJM) Program

2. DATES OF PROJECT
a. DATE FIRST ACTUAL WEATHER MODIFICATION ACTIVITY IS TO BE UNDERTAKEN: 11/01/2022
b. EXPECTED TERMINATION DATE OF WEATHER MODIFICATION ACTIVITIES: 4/15/2023

3. PURPOSE OF PROJECT OR ACTIVITY
Winter snow pack and precipitation augmentation

4. (a) SPONSOR
NAME: see attached pages (SJM)
AFFILIATION:
PHONE NUMBER:
STREET ADDRESS:
CITY: STATE: ZIP CODE:

4. (b) OPERATOR
NAME: L. M. Hjermstad
AFFILIATION: Western Weather Consulta
PHONE NUMBER: 833-216-1820
STREET ADDRESS: P.O. Box 58
CITY: Durango STATE: CO ZIP CODE: 81302

5. TARGET AND CONTROL AREAS (See Instructions)

TARGET AREA		CONTROL AREA	
LOCATION: Western San Juan Mountains	SIZE OF AREA: 800 SQ. MI	LOCATION: SE Utah Mountains and Nor	SIZE OF AREA: 1,000 SQ. MI

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

Apparatus: There are a total of 33 ground based cloud nuclei generators used for seeding the San Juan Mountain Program. There are three regions (WDT, WSJ and ESJ) across the San Juan Mountains.

Modification Material: Acetone solution of 4% silver iodide and 1.25% sodium iodide. Rate of dispensing material will range from 3 gm/hr. to 25 gm/hr. depending on cloud base moisture and temperature, cloud base height and cloud type.

Precipitation Measurements: Standard NWS precipitation observations along with NRCS SNOTEL observations in both seeded

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

NAME: Mike Hjermstad
AFFILIATION: Western Weather Consultants
PHONE NUMBER: 833-216-1820
STREET ADDRESS: P.O. Box 58
CITY: Durango STATE: CO ZIP CODE: 81302

8. SAFETY AND ENVIRONMENT

☐ YES	☑ NO	Has an Environmental Impact Statement, Federal or State, been filed? If yes, please furnish a copy as applicable.
☑ 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.
☑ 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).

CERTIFICATION: I certify that all statements in this report on this weather modification project are complete and correct to the best of my knowledge and are made in good faith.

NAME OF REPORTING PERSON: Mike Hjermstad
AFFILIATION: Western Weather Consultants LLC
SIGNATURE:
STREET ADDRESS: P.O. Box 58
OFFICIAL TITLE: Asst. Manager
CITY: Durango STATE: CO ZIP CODE: 81302
DATE: 10/27/2022 PHONE NUMBER: 833-216-1820

INSTRUCTIONS FOR INITIAL REPORT ON WEATHER MODIFICATION ACTIVITIES

One completed copy of this form is to be received 10 days* or more prior to actual modification activities. A NOAA file number will be assigned by the Administrator after receipt of the initial report for each project or activity.

A supplemental report in letter form referring to the appropriate NOAA file number must be made to the Administrator if the "Initial Report" is found to contain any material inaccuracies, misstatements, omissions, or if there are changes in plans for the project or activity.

*For exceptions, see Sections 908.4(b) and (c), Part 908 of Title 15, Code of Federal Regulations.

Item 1 — Enter designation, if any, used by operator for the project or activity.

Item 2 — Enter: (a) Date first actual weather modification activity is to be undertaken;
(b) Date on which final weather modification activity is expected to occur.

Item 3 — Enter the purposes of the project or activity: e.g., rainfall increase, hail suppression, cold fog dispersal, etc.

Item 4 — Enter: (a) Name, phone number, affiliation, and address of the primary person for whom the project is to be performed (sponsor).
(b) Name, phone number, affiliation, and address of the person primarily responsible for carrying out the project (operator).

Item 5 — A map should be attached showing size and location of target area, control area, coded number and location of each item of ground-based weather modification apparatus and coded number and location of key rain gauges, radars, or other precipitation measuring devices. Also show location of airport for airborne operations.

Item 6 — Describe the weather modification apparatus, modification agents, and the techniques to be used. This would include type of ground or airborne apparatus to be used, type of modification material to be dispensed, rate of dispensing material in grams per hour or other appropriate units, type of precipitation gauges to be used in target and control areas, and any other pertinent information such as type of radars, type of aircraft to be used, techniques to be employed (e.g., cloud-based seeding at 10,000 feet msl).

Item 7 — List name, phone number, affiliation, and address of the responsible individual from whom log books or other records may be obtained.

Item 8 — Provide applicable answers to questions as indicated.

Item 9 — This item is to permit the reporting person to include any information not covered by items 1 through 8 but which he feels is significant or of interest. It is also to be used to include any information not covered elsewhere that the Administrator may request.

INFORMATION PROVIDED UNDER THE PROVISIONS
OF THE
PAPERWORK REDUCTION ACT OF 1995

The Paperwork Reduction Act o f1995 requires that individuals or organizations be provided with the following information if they provide information on paper forms which are collected by the Federal Government.

1. Public Law 92-205, enacted December 18, 1971 (amended by Public Law 94-490, Section 6(b), October 15, 1976) requires that all non-federal weather modification activities in the United States and its territories be reported to the Secretary of Commerce. The National Oceanic and Atmospheric Administration has implemented the Act and the current reporting requirements are published in the Code of Federal Regulations (15 CFR 908).

2. The intent of the program is to increase expertise in the field of weather modification, to allow scientists and other concerned persons to have access to information on current and past efforts at weather modification, to help avoid unneeded and wasteful duplications, to aid in preventing territorial overlapping of weather modification operations, to provide data to assess possible harmful or dangerous activities, and to furnish information to check both desirable and undesirable atmospheric changes against records of weather modification efforts. To meet this objective, information is collected on the location and size of the target area, names and addresses of sponsors and operators, beginning and ending dates of the project, specific purpose, description of apparatus and seeding agents to be used, number of days of operations, number of hours of operations of each type of weather modification apparatus, and total amount of seeing agent used.

3. A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995 unless the information collection has a currently valid OMB Control Number. The approved OMB Control Number for this information collection is 0648-0025. Without this approval, we could not conduct this information collection. Public reporting for this information collection is estimated to be approximately 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. All responses to this information collection are mandatory pursuant to Public Law 92-205, enacted December 18, 1971 (amended by Public Law 94-490, Section 6(b), October 15, 1976). Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the OAR Weather Program Office at Weather.Modification@noaa.gov.

San Juan Mountains Program (SJM Program) 2022-2023 Winter Cloud Seeding Program

Includes seeding for the following regions:
West Dolores and Telluride (WDT)
Western San Juan's (WSJ)
Eastern San Juan's (ESJ)

- WDT Sponsors: Dolores Water Conservancy District, Montezuma Valley Irrigation Company, Southwestern Water Conservation District and Telluride Skiing Co and Colorado Water Conservation Board.
- WSJ Sponsors: Purgatory Ski Area, Animas La Plata Water Conservancy District, Dolores Water Conservancy District, Southwestern Water Conservation District and New Mexico Interstate Stream Commission.
- ESJ Sponsors: Pine River Irrigation District, Florida Water Conservancy District, Florida Consolidated Ditch Company, San Juan Water Conservancy District, Southwestern Water Conservation District and New Mexico Interstate Stream Commission.

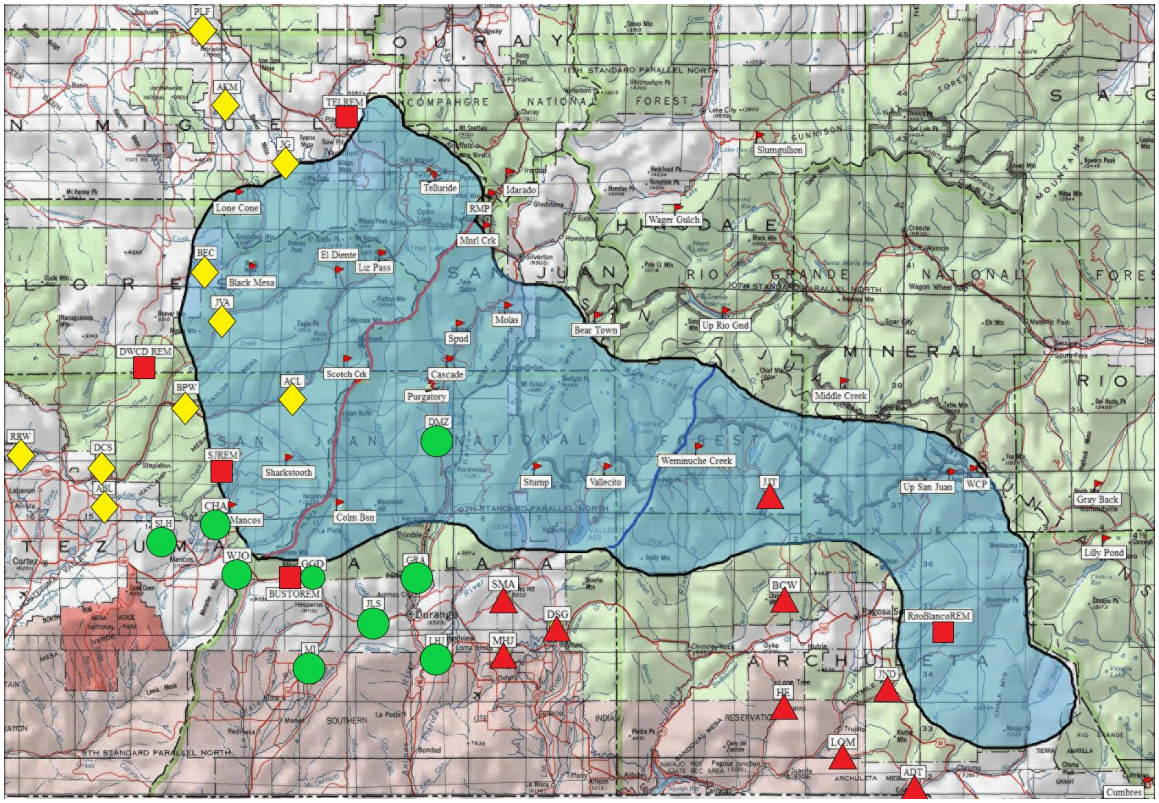
State of Colorado Weather Modification Permit # (2020-04)

Operational Plan

The 2022-2023 SJM Program is permitted to operate from November 1, 2022, to April 15, 2023, and will be operated by Western Weather Consultants LLC (WWC). Seeding can begin December 1, 2022, for non-ski area participants. Seeding for Telluride and Purgatory Ski Resorts may commence as early as November 1, 2022. An extension of the program may be implemented if funding is available and if there are appropriate seeding opportunities. At all times, WWC shall operate the SJM Program in compliance with all applicable State and Federal laws and regulations governing weather modification activities and other applicable laws. Up to 40 Cloud seeding Nuclei Generators (CNG) can be used for the SJM Program.

Target Area

The primary target area for the SJM Program is defined as follows: The San Juan Mountains above 8,500 feet mean sea level mainly targeting the upper regions of the West Dolores, San Miguel, Dolores, La Plata, Animas, Florida, Pine, San Juan and Blanco River Basins as well as Telluride and Purgatory Ski Resorts. The SJM Program is designed, operated, and intended to affect only the Target Area. Manual Generator locations are denoted by yellow diamonds, green circles, yellow circles, and red triangles on the map. Remote generators are shown as red squares and red flags indicate a SNOTEL location.



Yellow diamonds are the primary generators used for the WDT area while a few of the locations marked with green circles can be used as well. Green circles on the map are the primary generators used for the WSJ area while the locations with yellow diamonds, yellow circles and the red squares can be used, as well. Red triangles and yellow circles are primary sites used for the ESJ area. The sites marked by green circles (DMZ, JLS, GRA, GGD and WJO) can also be used.

Operational Procedure

The operational procedures used to enhance snowpack in the selected target areas is to produce plumes of silver iodide crystals (artificial cloud nuclei) at rates between 5 and 28 grams per hour from multiple ground based CNGs to be diffused by favorable wind flows into selected storms or cloud types suitable for precipitation increases meeting the seeding criteria over the Target Area. An analysis of low-level wind fields, cloud characteristics, stability parameters, terrain features, and synoptic meteorological features will determine the network of generators which will best seed the cloud system over the Target Area for each favorable weather system and will provide a method for adjusting the network as new weather information becomes available. Seeding events will be limited to those portions of selected favorable weather systems that have expected or forecasted precipitation rates and associated augmentation potentials capable of producing additional precipitation at least at the rate of one-tenth an inch of water or more per 24 hours of seeded duration. Any selected favorable weather events with the augmentation rate stated above that is expected to last less than 6 hours require prior approval by the Manager of the SWCD, and or Andrew Rickert with the CWCB. Seeding for the ski areas is exempt from the 6-hour minimum storm duration if the storm is forecast to produce the required precipitation amount of water over 24 hours.

With a "best" initial network to seed an established weather system, the generator operators are notified to turn on their generator at a specific time and operate them at a specific burn rate. On the same call, they will be given a specific turn-off time, this could be subject to change if the meteorologist at WWC notices significant changes in the weather system during the seeding event. Incoming weather data into the forecast office allows a continuous monitoring of any changes in conditions and any adjustments or termination in the seeding operation. Following each seeding operation, each generator operator who was instructed to operate the nuclei generator will submit a written report on the actual observation times; verify the seeding rates and note weather observations or operational discrepancies during the required operating period. No aircraft will be used for seeding for this Program. The seeding criteria WWC uses for seeding operations are as follows:

- Cloud bases are at least 500 feet below the mean mountain barrier crest of the Target Area and are forecast to move lower in elevation from the onset of seeding and continue throughout the seeding period. The weather system has clouds that are forecast to have vertical heights and moisture content capable of producing natural precipitation.
- Temperatures at the height of 500 feet below the mean mountain crest within the Target Area are -5 degrees C. (23 degrees F.) or colder and are forecast to become colder if at -5 degrees C.

- Wind directions and speeds from the surface to cloud-base are observed and forecast to favor the movement into the intended Target Area of the silver iodide nuclei being released from the ground-based generator sites.
- There are no stable regions or atmospheric inversions between the surface and cloud-base that would prevent the vertical dispersion of the silver iodide particles from the surface to at least the -5 degrees C. (23 degrees F.) level or colder within the cloud system.
- The temperature at approximately 10,000 feet (700 MB level) is warmer than -16 degrees C. (3 degrees F.)

Generator Locations

Site	Site Name	Program	Latitude	Longitude	Elevation
AKM	Gurley	WDT	38.072809	-108.234151	7761
JG	Specie Mesa	WDT	37.9623	-108.1190	8976
PLF	Norwood	WDT	38.1601	-108.2797	7057
TELREM	Hastings Mesa (DRI Remote)	WDT	38.02906	-108.00265	8825
BEC	Groundhog	WDT-WSJ	37.795884	-108.273068	8928
DOLREM	Kinder	WDT	37.651211	-108.389372	8080
JVA	Dunton	WDT-WSJ	37.7198	-108.2424	8045
BPW	Stoner	WDT-WSJ	37.5866	-108.3038	7541
ACL	Dolores River	WDT-WSJ	37.6079	-108.0987	8227
RRW	Lewis	WDT-WSJ	37.5211	-108.6294	6950
DCS	Dolores	WDT-WSJ	37.5032	-108.4670	7577
ABL	Lost Canyon	WDT-WSJ	37.4413	-108.4679	7181
SLH	Mancos	WSJ-WDT	37.3857	-108.3543	7123
SJREM	Spring Creek (DRI Remote)	WDT-WSJ	37.496008	-108.24179	8915
CHA	Jackson Lake	WSJ-WDT	37.4140	-108.2535	8065
WJO	Mancos Hill	WSJ-WDT	37.3391	-108.2092	8017
GGD	Mayday	WSJ-WDT	37.3277	-108.0690	8599
BUSTOREM	Montoya Peak	WSJ-WDT-ESJ	37.3153	-108.1012	8560
MI	Breen	WSJ-ESJ	37.1963	-108.0723	7393
GRA	Animas Mountain	WSJ-ESJ	37.3326	-107.8680	7073
JLS	Wild Cat	WSJ-ESJ	37.2672	-107.9498	7580
DMZ	Haviland Lake	WSJ-ESJ	37.5407	-107.8227	8250
LHJ	Grandview	WSJ-ESJ	37.2130	-107.8250	6905
MHJ	Salt Creek	ESJ-WSJ	37.2098	-107.6982	6928
SMA	Dry Creek	ESJ-WSJ	37.2935	-107.6970	7633
DSG	Bayfield	ESJ	37.2515	-107.5963	7106
HE	Lonetree	ESJ	37.1335	-107.1588	6928
JJT	Oakbrush Ridge	ESJ	37.4505	-107.1857	7926
BCW	Chris Mountain	ESJ	37.2957	-107.1562	8064
PAGREM	Rito Blanco	ESJ	37.2521	-106.8628	8554
JND	Turkey Mountain	ESJ	37.157771	-106.957877	7000
ADT	Coyote Creek	ESJ	37.0128	-106.9058	7247
LOM	Montezuma Creek	ESJ	37.0572	-107.0448	6958

WWC routinely monitors the weather conditions throughout the contracted operating period for systems with cloud seeding potential. Most of the data used comes from the National Weather Service (NWS) websites, University of Wyoming, Pennsylvania and Texas A&M Weather websites, National Center for Atmospheric Research (NCAR) website, and National Oceanic and Atmospheric Administration (NOAA), Pivotalweather.com for short and long-range model forecasts. There are numerous forecasting websites available beyond the previously listed that are used as well, but these tend to be the preferred forecasting sites. Other available resources are the Colorado Department of Transportation (CDOT) website to monitor road conditions and concerns, Colorado Avalanche Information Center (CAIC) for Weather Research Forecasting (WRF) point forecasts, as well as avalanche and potential avalanche conditions in and around the Target Area including the Natural Resources Conservation Service (NRCS) website to monitor snowpack in the Target Area as recorded by the network of SNOTELs in Colorado. Snowpack accumulation is monitored from SNOTEL stations within the Target Area and the first detailed analysis of snow accumulation is completed using these measurements.

From these sites, we review and, at times, archive, weather data such as: surface and upper air data, synoptic surface maps, significant level maps, model forecast data, rawinsonde data, satellite and radar data, surface observations, web cam images, and other forecast aids. This data assists in selecting favorable storms for modification and monitoring suspension criteria.

Suspension Criteria

The proposed Suspension Criteria provides safeguards to the program to ensure that risks associated with cloud seeding have been addressed. WWC will retain the right to suspend operations during any period if the weather system is determined detrimental. Facilities will be maintained to gather and analyze weather data providing a continuing weather watch. WWC will maintain communications with the Program Sponsors, the National Weather Service (NWS), the U.S. Forest Service and the Department of Natural Resources / Colorado Water Conservation Board regarding potential adverse conditions. The forecast and operations center of WWC will monitor on a seven day per week basis the weather patterns over Colorado and the Western United States during the winter operating period. Meteorologists permitted by the State of Colorado to operate weather modification programs will determine if weather events are suitable for precipitation augmentation by cloud seeding.

Prior to initiating any seeding operations, a thorough hazard analysis will be evaluated a potential weather system judged suitable for seeding will be evaluated for its potential to develop into a blizzard, severe storm, or heavy precipitation possibly

associated with a potential for major avalanche episode. Also, the effects of the weather event on ranching, agriculture, wildlife, highway travelers, municipal interests and industry will also be considered. This evaluation will be concentrated upon those areas to be seeded along with considerations of potential adverse effects to adjacent areas which may be influenced by augmented precipitation. No seeding will be initiated during a period determined to have a high potential hazard evaluation. Once a seeding operation has been initiated, monitoring of existing and forecast weather conditions will continue throughout the duration of the seeding operation. All new meteorological information will be assessed as well as generator reports from generator operators, the State Patrol, and field maintenance personnel in the seeded areas. The Colorado Avalanche Information Center (CAIC) has modified its website to include a "Cloud Seeder" avalanche hazard level suspension criteria page for all mountain passes in Colorado. Levels of Notice, Caution, and Warning are assigned to the passes with warning being used as a trigger for temporary suspension of neighboring generators. Changing weather conditions that would indicate the onset of potentially severe or hazardous weather conditions will result in the suspension of seeding operations throughout the duration of these potentially hazardous weather conditions. Snowpack accumulation will be monitored from SNOTEL stations from all SNOTEL sites within the target area and the first detailed analysis of snow accumulation will be completed using these measurements. Evaluations of snowpack indicate that minor flooding and stream flow problems can exist when late winter snowpack reaches 155% of normal. More substantial flooding problems can be anticipated when late winter snowpack is more than 175% of normal.

Since the SJM Program is designed for reasonable levels of snowpack enhancement for an outlook of adequately abundant summertime water supply for storage use, we propose to suspend seeding operations in any major portion of a seeding area when one or more of the following takes place: Snow Water Equivalent Thresholds exceed the following: 175% of average on December 1st, 175% of average on January 1st, 165% of average on February 1st, 155% of average on March 1st and 145% of average on April 1st. The following link can be used to see a map which will show the snowpack percentages of normal:

https://www.nrcs.usda.gov/wps/portal/wcc/home/quicklinks/imap

The CWCB Director or his or her designee will determine where and how snowpack water equivalents are to be measured, including at selected "SNOTEL" sites. The CWCB Director or his or her designee may permit weather modification operations to continue in a portion of the operation target area where snowpack water equivalents are below these suspension criteria percentages, if the operation will not impact the area where snowpack water equivalents are above these suspension criteria percentages. These thresholds are designed to keep the seeding effect to within the realm of natural

variability of the local climate as measured at each SNOTEL station. This comparative normal for these representative snow observation sites will be the long-term Snow Water Equivalent Medians data set from 1991 through 2020 as published by the Natural Resources Conservation Service (NRCS). WWC must suspend all weather modification operations whenever one of the following is issued by the NWS Hazardous Weather Statements that impacts any part of the Target Area:

a. An urban or small stream flood advisory.
b. A blizzard warning.
c. A flash flood warning; or
d. A severe thunderstorm warning.

Operations may resume after these statements expire.

As required by the "Colorado Weather As required by the "Colorado Weather Modification Rule and Regulations" effective July 1, 2012, WWC notifies the local NWS weather forecast office, CAIC, the County emergency managers, and the CSU Colorado Climate Center of intended weather modification activities and provide WWC's contact information prior to the 2022-2023 season of weather modification operations.

Contact Information

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