



Spectacular cloud development 20 minutes after seeding, near Cotulla, June 12, 1971. Seeded cloud towers in background, the white pileus cap above it a good indicator of vigorous growth. Before seeding, this cloud was no larger than those in foreground. Courtesy U.S. Air Force.

TEXAS WATER DEVELOPMENT BOARD

REPORT 175

**WEATHER MODIFICATION ACTIVITIES
IN TEXAS, 1970 - 72**

Prepared by
Weather Modification and Technology Division
Texas Water Development Board

August 1973

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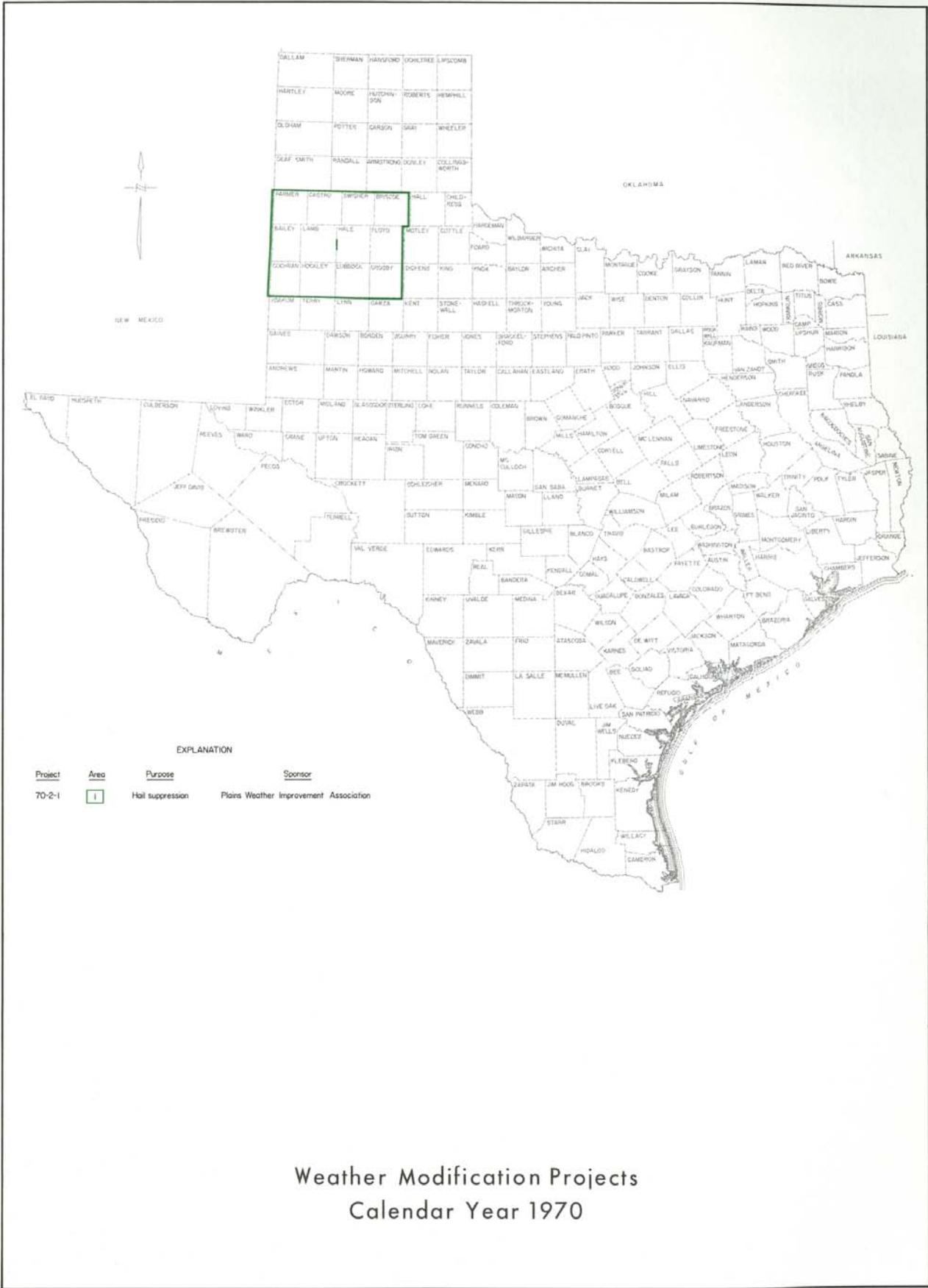
TABLE 1.—WEATHER MODIFICATION LICENSES AND PERMITS ISSUED, 1970-72

FISCAL YEAR, LICENSE, AND PERMIT IF ANY	LICENSEE OPERATOR	SPONSOR	TARGET AREA	OBJECTIVE
<u>CALENDAR YEAR 1970</u>				
70-1	World Weather, Inc. 620 Commercial Tower Midland, Texas 79701	None	None	None
70-2-1	Atmospherics Incorporated 5652 East Dayton Avenue Fresno, California 93727	Plains Weather Improvement Association Post Office Box 1627 Plainview, Texas 79072	Hale, Lamb, and western one-third of Floyd Counties	Hail suppression
<u>CALENDAR YEAR 1971</u>				
71-1	World Weather, Inc.	None	None	None
71-2-1	Atmospherics Incorporated	Plains Weather Improvement Association	All or portions of Crosby, Floyd, Swisher, Hale, Lubbock, Lamb, and Castro Counties	Hail suppression and rainfall en- hancement
71-2-2	Atmospherics Incorporated	Colorado River Municipal Water District Post Office Box 869 Big Spring, Texas 79720	All or parts of Dawson, Borden, Scurry, Martin, Howard, Mit- chell, and Nolan Counties	Rainfall stimula- tion
71-3	Sierra Research Corporation Post Office Box 3007 Boulder, Colorado 80303	None	None	None
71-4-1	Meteorology Research, Inc. Post Office Box 637 Altadena, California 91001	TWDB, and Division of Atmos- pheric Water Resources Management, Bureau of Recla- mation, Denver Federal Center Building 67 Denver, Colorado 80225	All or portions of Coke, Schleicher, Crockett, Upton, Glasscock, Sterling, Tom Green, Irion, and Reagan Counties	Precipitation management research
None Required	University of Washington Seattle, Washington 98195 University of Nevada Reno, Nevada 89501 Meteorology Research, Inc., and United States Air Force HQ Air Weather Service (MAC) Scott, AFB, Illinois	Office of Emergency Preparedness Washington, D.C. 20504 Bureau of Reclamation	See map, page 16 (Project T-Drop)	Rainfall stimu- lation—emergency drought relief
<u>CALENDAR YEAR 1972</u>				
72-1	World Weather, Inc.	None	None	None
72-2-1	Atmospherics Incorporated	Better Weather, Inc. Mr. H. C. Armstrong Star Route 2 Fieldton, Texas Plains Weather Improvement Association	All or portions of Castro, Swisher, Floyd, Hale, and Lamb Counties	Hail suppression and rainfall en- hancement

TABLE 1.—WEATHER MODIFICATION LICENSES AND PERMITS ISSUED, 1970-72—Continued

FISCAL YEAR, LICENSE, AND PERMIT IF ANY	LICENSEE OPERATOR	SPONSOR	TARGET AREA	OBJECTIVE
72-2-2	Atmospherics Incorporated	Colorado River Municipal Water District	All or portions of Dawson, Borden, Scurry, Nolan, Coke, Sterling, Glasscock, Howard, Martin, and Mitchell Counties	Rainfall stimulation
72-3-1	Meteorology Research, Inc.	TWDB, and Bureau of Reclamation	All or portions of Sterling, Coke, Runnels, Irion, Tom Green, Schleicher, Menard, Concho, Sutton, Reagan, Crockett, and Glasscock Counties	Precipitation management research
72-4-1	Irving P. Krick, Inc. 611 S. Palm Canyon Drive Suite 216 Palm Springs, California 92262	City of Lawton, Oklahoma City Hall Lawton, Oklahoma 73501	No target area in Texas. Oklahoma target area includes Comanche County.	Rainfall stimulation to increase water storage in Lakes Lawtonka and Ellsworth, Oklahoma
72-4-2	Irving P. Krick, Inc.	City of Guymon, Oklahoma, and Farmers and Ranchers Henry C. Hitch Ranch, Inc. Post Office Box 1308 Guymon, Oklahoma 73942	No target area in Texas. Oklahoma target area includes all or portions of Beaver, Harper, Woods, Woodward, Ellis, Major, Alfalfa, Cimarron, and Texas Counties.	Rainfall stimulation
72-4-3	Irving P. Krick, Inc.	Farmers and Ranchers in Ellis County, Oklahoma Ellis County Weather, Inc. Attn: Mr. Dick Hamilton Harmon, Oklahoma 73845	No target area in Texas. Oklahoma target area includes all or portions of Ellis, Beaver, Harper, Woods, and Woodward Counties.	Rainfall stimulation
72-5-1	Weather Science, Inc. Post Office Box FF Norman, Oklahoma 73069	Bureau of Reclamation	All or portions of Wheeler, Gray, and Hemphill Counties	Cloud physics research and increase runoff to Lakes Altus, Foss, and Mountainview, Oklahoma
73-1	World Weather, Inc.	None	None	None
73-4-1	Irving P. Krick, Inc.	City of Lawton, Oklahoma Cotton County Service, Inc. Rt. 1 Randlett, Oklahoma 73562	No target area in Texas. Oklahoma target area includes all or portions of Comanche and Cotton Counties	Augment precipitation in Comanche and Cotton Counties, Oklahoma
73-4-2	Irving P. Krick, Inc.	International Paper Co. Spring Hill, Louisiana 71075	No target area in Texas. Target area includes all or portions of Nevada, Hempstead, Columbia, and Lafayette Counties, Arkansas.	Increase rainfall in Arkansas for added runoff for paper mill operation
73-5	Weather Science, Inc.	None	None	None

**WEATHER MODIFICATION PROJECTS
CALENDAR YEAR 1970**



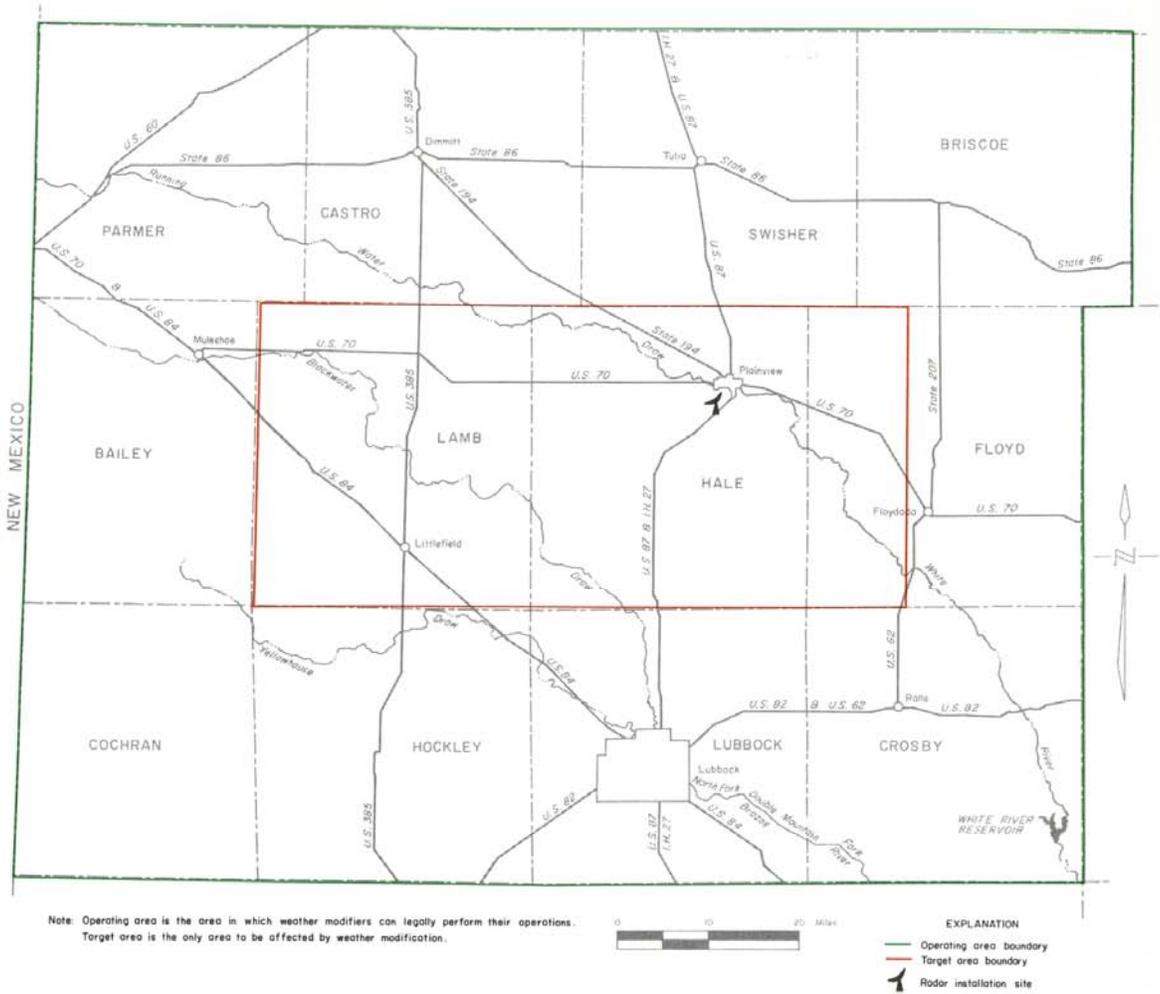
Weather Modification Projects
Calendar Year 1970

Project 70-2-1* — Hail Suppression

The first weather modification operation to be undertaken within Texas subsequent to the enactment of the Weather Modification Act was a project operated by Atmospherics Incorporated of Fresno, California, on behalf of the Plains Weather Improvement Association, a group of businessmen, ranchers, farmers, and citizens from the Plainview area. The aim of this project was to eliminate or reduce the occurrence of hail within a designated area north of Lubbock. The counties included in the target area were Hale, Lamb, and the western one-third of Floyd.

The operation, based at the Plainview Airport, was accomplished by dispensing silver iodide crystals into clouds from aircraft equipped with pyrotechnic seeding devices. These aircraft performed seeding missions on possible hail storms which threatened the target area. Ground-based 3-cm radar at the Plainview Airport provided the necessary guidance and surveillance functions for the operation.

The following is an operational summary of the project.



* License and Permit numbering system: First number is State Fiscal Year (September 1 to August 31) in which the license was granted, second number is license number, and the third number (if any) is permit number.

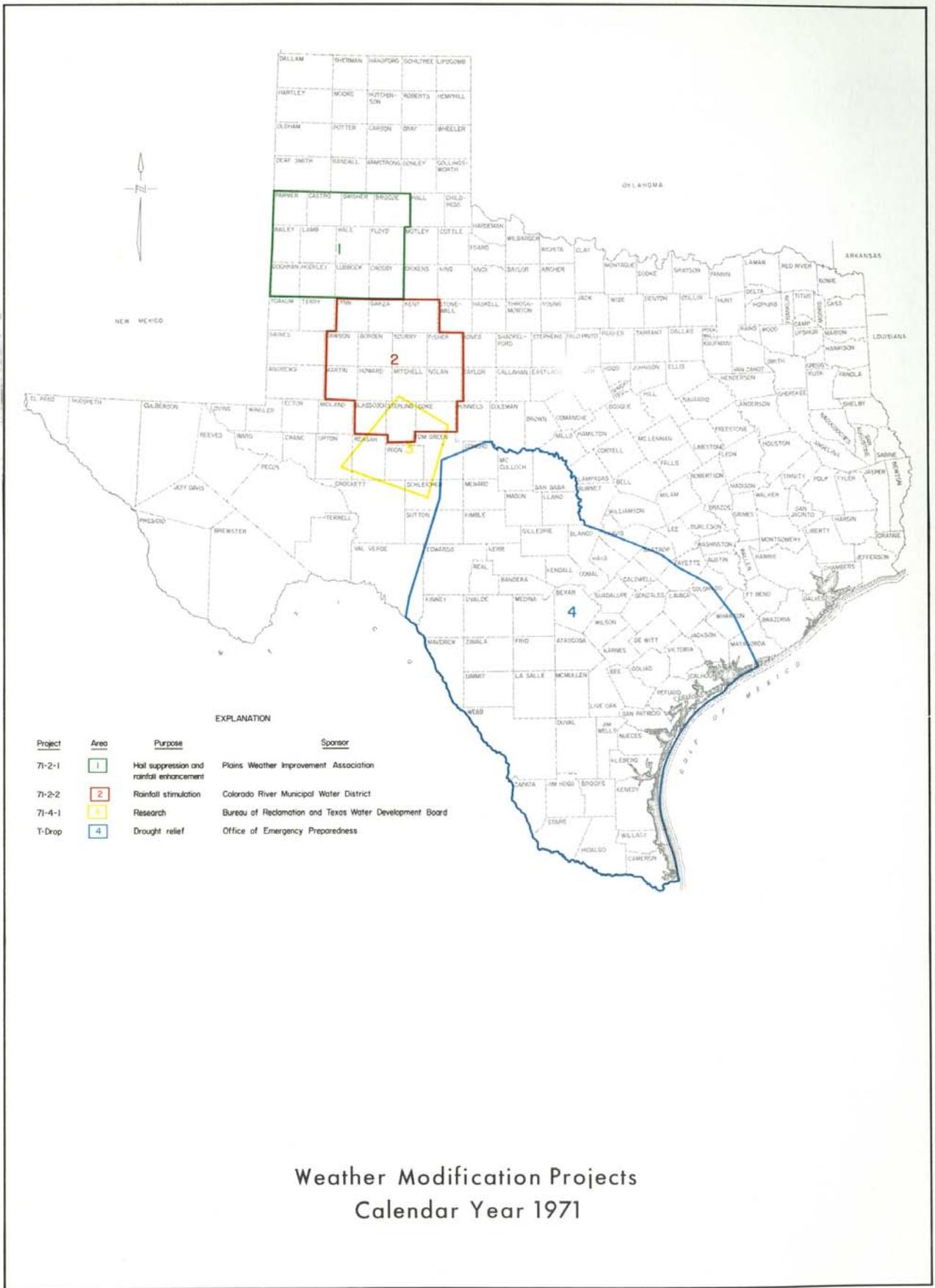
Operational Summary
May 14, 1970 - September 15, 1970

Number of Operational Days - 29
Total Number of Flights - 82
Total Seeding Material Used - 31,370 gm silver iodide
Total Number of Cells Seeded - 204

MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIAL USED	
May	28	52.6	10,530 gm	silver iodide
June	30	45.4	12,260 gm	silver iodide
July	5	5.3	960 gm	silver iodide
Aug.	9	11.3	3,860 gm	silver iodide
Sept.	10	16.0	3,760 gm	silver iodide

**WEATHER MODIFICATION PROJECTS
CALENDAR YEAR 1971**

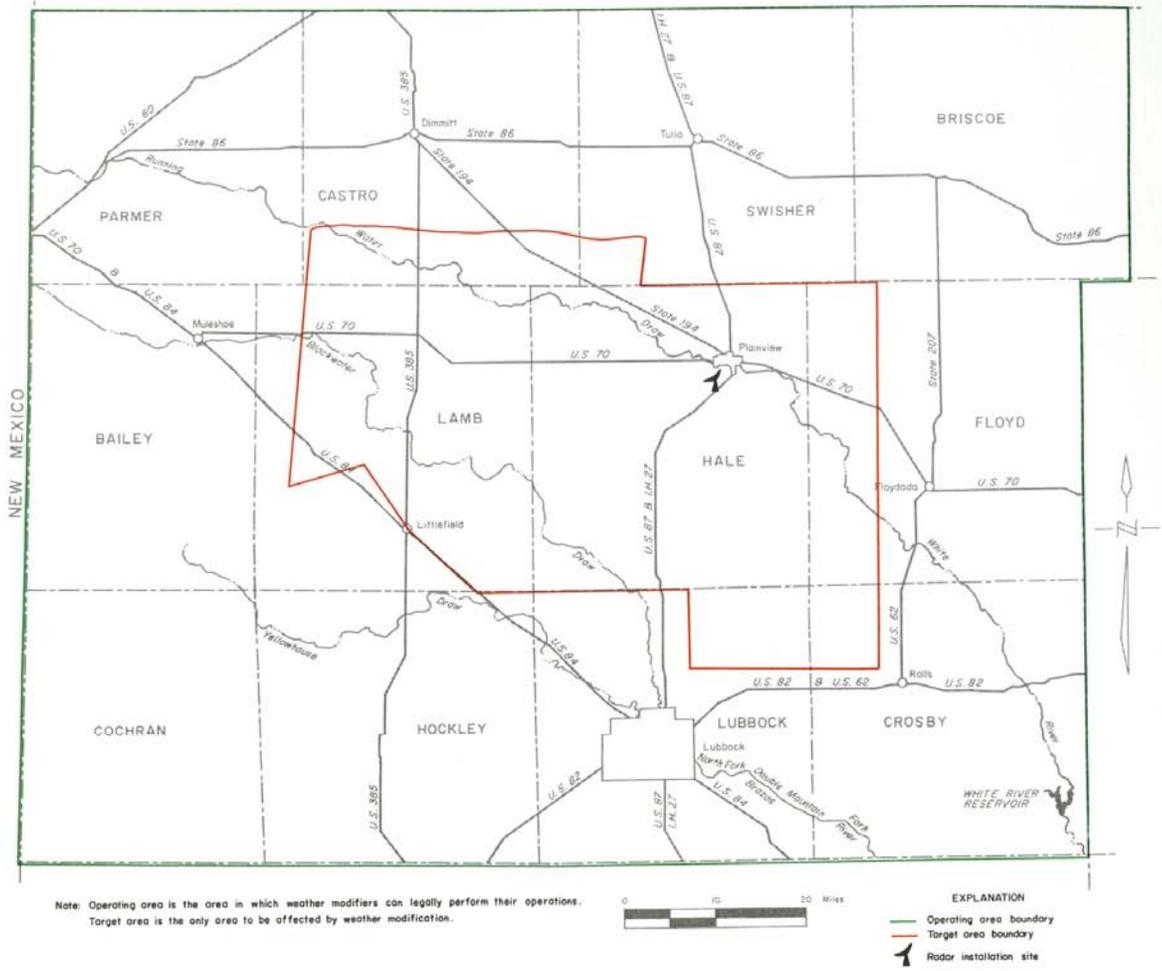


Weather Modification Projects Calendar Year 1971

Project 71-2-1.—Hail Suppression and Rainfall Enhancement

For the second season Atmospherics Incorporated pursued a hail suppression program on behalf of the Plains Weather Improvement Association. Rainfall enhancement was an added objective of the project for

1971. The target area was altered to include all or portions of Crosby, Floyd, Swisher, Hale, Lubbock, Lamb, and Castro Counties. Aerial seeding activity was guided by 3-cm radar, or visual observations whenever developing or approaching storms threatened the target area with hailfall. Seeding was again done by aircraft equipped with silver iodide pyrotechnic flares.



Operational Summary
May 10, 1971 - October 10, 1971

Number of Operational Days - 26
Total Number of Flights - 72
Total Seeding Material Used - 39,615 gm silver iodide
Total Number of Cells Seeded - 189

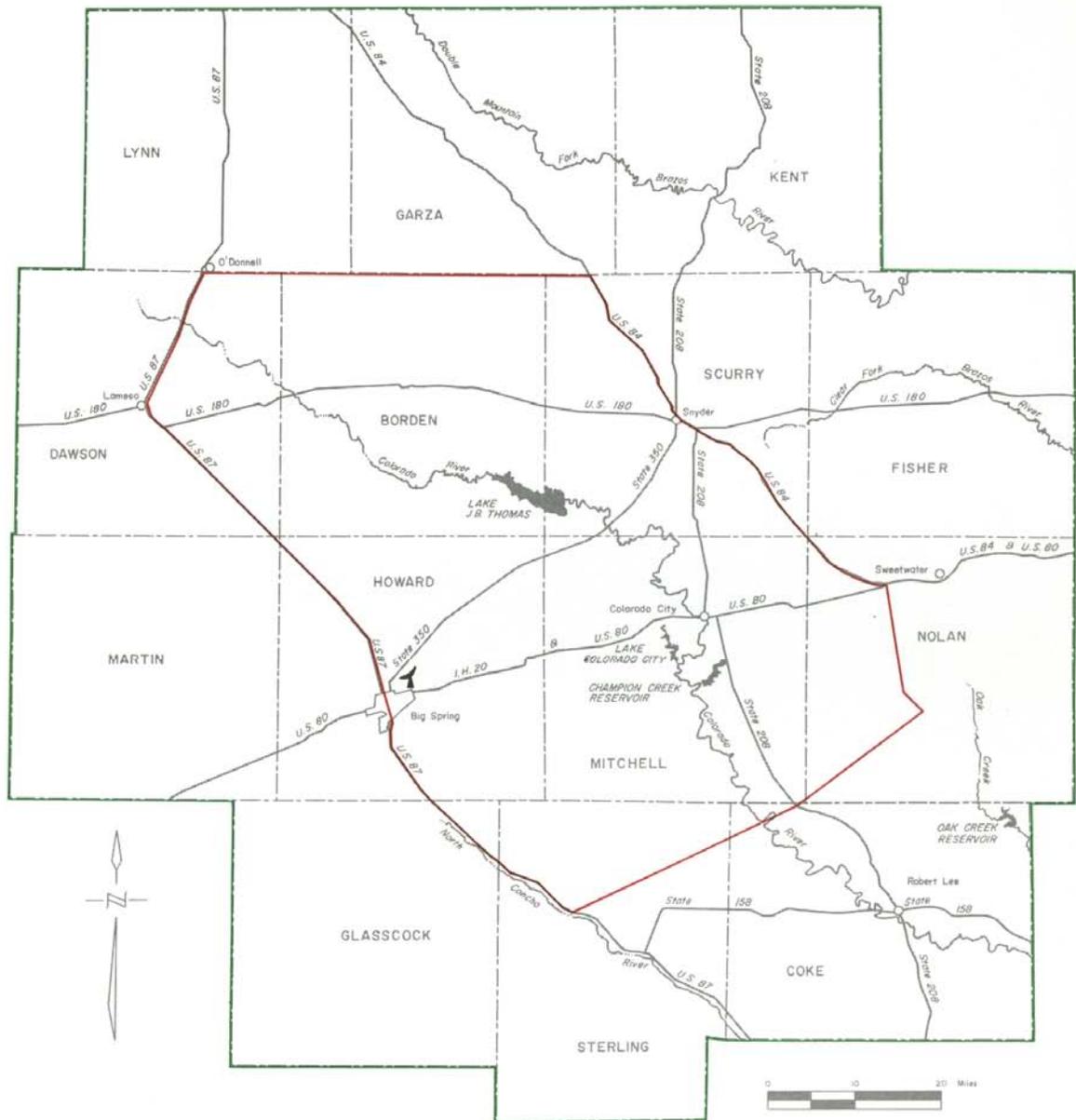
MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIAL USED	
May	11	17.2	8,750 gm	silver iodide
June	28	53.9	20,600 gm	silver iodide
July	4	4.4	755 gm	silver iodide
Aug.	27	34.6	9,150 gm	silver iodide
Sept.	0	0	none	
Oct.	2	2.6	360 gm	silver iodide

Project 71-2-2.—Colorado River Municipal Water District Rainfall Stimulation

Weather modification activities to stimulate rainfall on the Colorado River basin in Texas were initiated early in 1971. The Colorado River Municipal Water District of Big Spring, Texas, which supplies water to Big Spring, Snyder, Odessa, Midland, and other cities

and major industries in the area, awarded a contract for rainfall stimulation project to Atmospherics Incorporated. The 3,750-square-mile target area included all or parts of Dawson, Borden, Scurry, Martin, Howard, Mitchell, and Nolan Counties. The project employed the aerial application of silver iodide to suitable clouds and weather systems. Base of operations was at Big Spring where a ground-based 3-cm radar system provided guidance and surveillance functions for the operation.



Note: Operating area is the area in which weather modifiers can legally perform their operations.
Target area is the only area to be affected by weather modification.

EXPLANATION
 — Operating area boundary
 — Target area boundary
 ▲ Radar installation site

Operational Summary
April 15, 1971 - October 15, 1971

Number of Operational Days - 30
Total Number of Flights - 41
Total Seeding Material Used - 4,945 gm silver iodide
Total Number of Cells Seeded - 435

MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIAL USED	
April	5	6.1	540 gm	silver iodide
May	14	17.0	1,640 gm	silver iodide
June	9	8.7	1,110 gm	silver iodide
July	2	4.0	410 gm	silver iodide
Aug.	7	8.3	870 gm	silver iodide
Sept.	3	3.4	225 gm	silver iodide
Oct.	1	1.4	150 gm	silver iodide

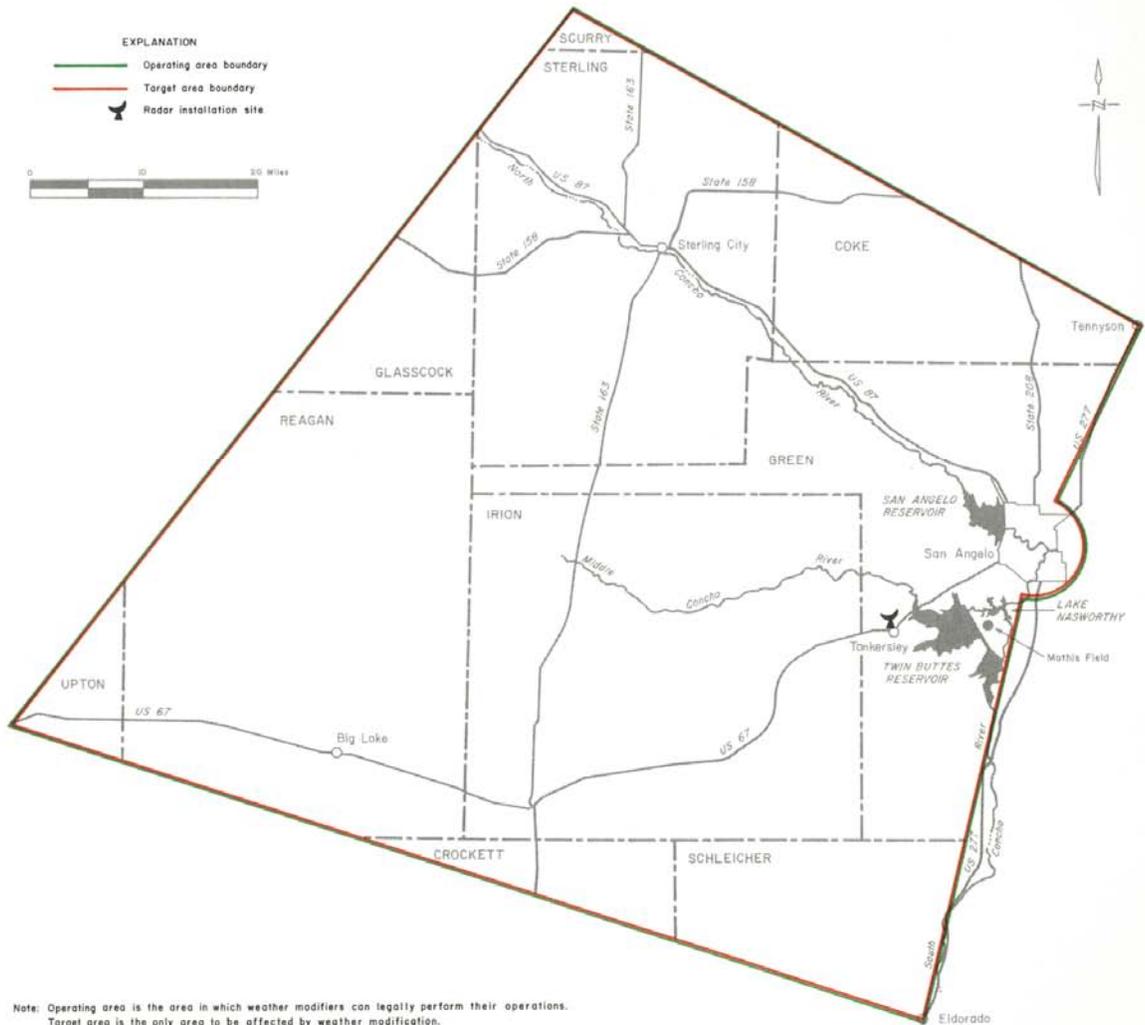
Project 71-4-1.—San Angelo Cumulus Research

Meteorology Research, Inc., of Altadena, California began the first year of a three-year subcontract to conduct weather modification research during the summer of 1971. This project was the result of a contract entered into by the Bureau of Reclamation and the Texas Water Development Board for purposes of developing practical procedures for precipitation management in Texas. The Water Development Board then subcontracted with Meteorology Research, Inc., to carry out the actual research and operational aspects of the project. In particular, experimental research was devoted to learning techniques for seeding warm cumulus clouds - those cumulus clouds which do not extend above the melting level (32°F) in the atmosphere, and as a result, do not respond to ice-phase

or silver iodide seeding. Another goal of the project was to increase runoff into San Angelo Lake, Twin Buttes Reservoir, and Lake Nasworthy, all in the target area near San Angelo.

The experimental research was conducted by means of aerial seeding using silver iodide and salt (NaCl). A specially instrumented airplane made cloud physics measurements. In addition, a seeding experiment using a ground generator to spray an ammonium nitrate-urea solution was conducted on three days during June. This experiment was conducted at the radar site near Tankersley.

The base of operations for the project was Mathis Field near San Angelo. The ground-based radar system at Tankersley provided the necessary guidance and tracking capabilities and made cloud physics measurements.



Operational Summary
May 3, 1971 - July 31, 1971

Number of Operational Days - 28
Total Number of Flights - 38
Total Seeding Material Used - 3,706 gm silver iodide,
4,595 lb. salt (sodium chloride)

MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	SEEDING HOURS	SEEDING MATERIAL USED
May	5	40	400 gm silver iodide, 710 lb salt
June	19	121	3,262 gm silver iodide, 2,450 lb salt
July	14	47	44 gm silver iodide, 1,435 lb salt

Note: Seeding operations using a ground generator were conducted on June 21, 26, and 28.

Project T-Drop—Texas Drought Relief Operation

Extreme drought conditions existing in Texas during the winter of 1970 and the spring of 1971 led to a request by Texas Governor Preston Smith for Federal assistance in a rainfall augmentation project. The result was a drought relief program sponsored by the Office of Emergency Preparedness under the scientific direction of the Bureau of Reclamation. The program, popularly known as Project T-Drop, was aimed at increasing rainfall over widespread areas of Texas by means of aerial silver iodide, salt, and ammonium nitrate-urea cloud seeding.

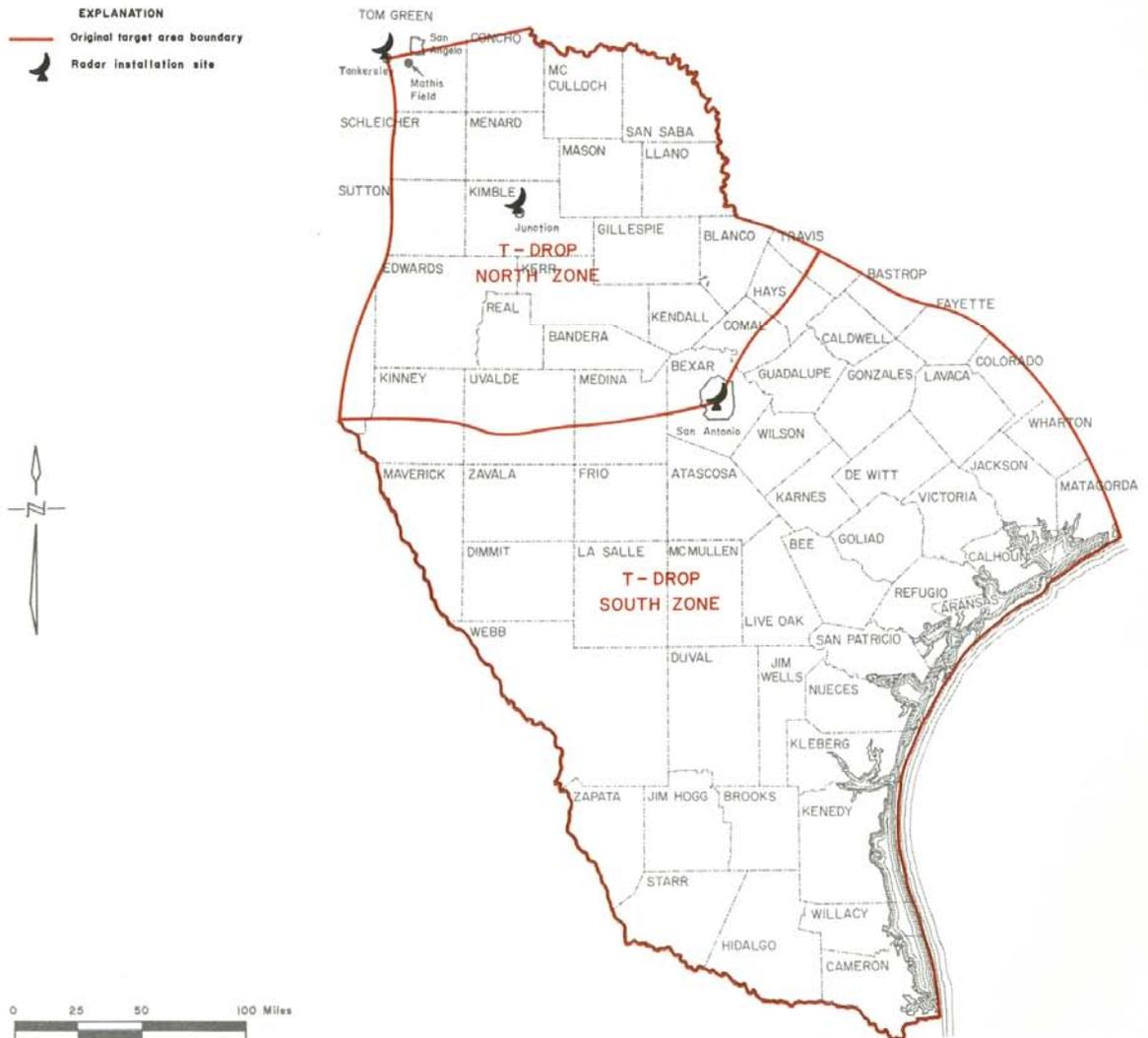
The overall target area of Project T-Drop was split into two sections - T-Drop North Zone and T-Drop South Zone. The operations in the North Zone were conducted using aircraft manned by personnel from the University of Washington and the University of Nevada. Meteorology Research, Inc., provided the scientific direction for this operation under contract with the Bureau of Reclamation. The base of operations for the North Zone was located at San Angelo with additional radar assistance coming from Junction.

In the South Zone the operations were conducted by the U.S. Air Force operating from Kelly Air Force Base in San Antonio, under the direction of Bureau of Reclamation scientists.

The Texas Water Development Board gave final approval of seeding operations and locations and also served as liaison with the local people.

The combined project area, which originally included 75,000 square miles in Central and South Texas, was eventually expanded due to a shortage of suitable clouds within the original target area. This enabled U.S. Air Force seeding missions to be conducted as far north as the Dallas-Fort Worth area and as far east as Toledo Bend Reservoir on the Texas-Louisiana boundary.

Being a Federally sponsored program, Project T-Drop was exempt from state weather modification license and permit requirements.



**T-Drop South Zone Operational Summary
June 6, 1971 - June 30, 1971**

Number of Operational Days - 24
Total Number of Flights - 35
Total Seeding Material Used - 66,775 gm silver iodide
Total Number of Cells Seeded - 250

MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIAL USED
June	35	157	66,775 gm silver iodide

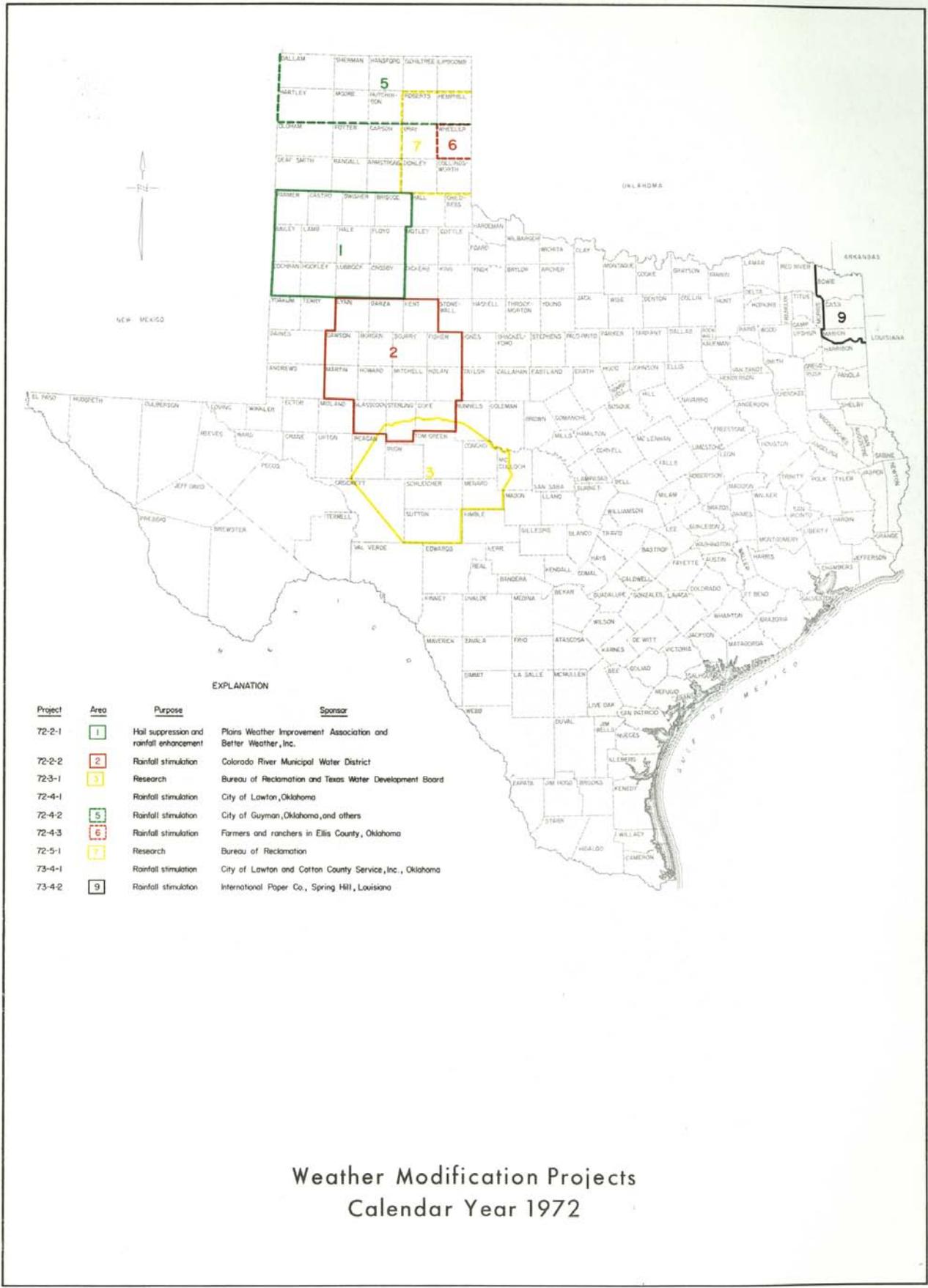
**T-DROP NORTH ZONE OPERATIONAL SUMMARY
June 4, 1971 - June 29, 1971**

Number of Operational Days - 25
Total Number of Flights - 24
Total Seeding Material Used - 13,810 gm silver iodide
951 gal ammonium nitrate-urea
800 lb salt (sodium chloride)

MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIAL USED
June	24	60.0	13,810 silver iodide 951 gal ammonium nitrate-urea 800 lb salt

WEATHER MODIFICATION PROJECTS
CALENDAR YEAR 1972



EXPLANATION

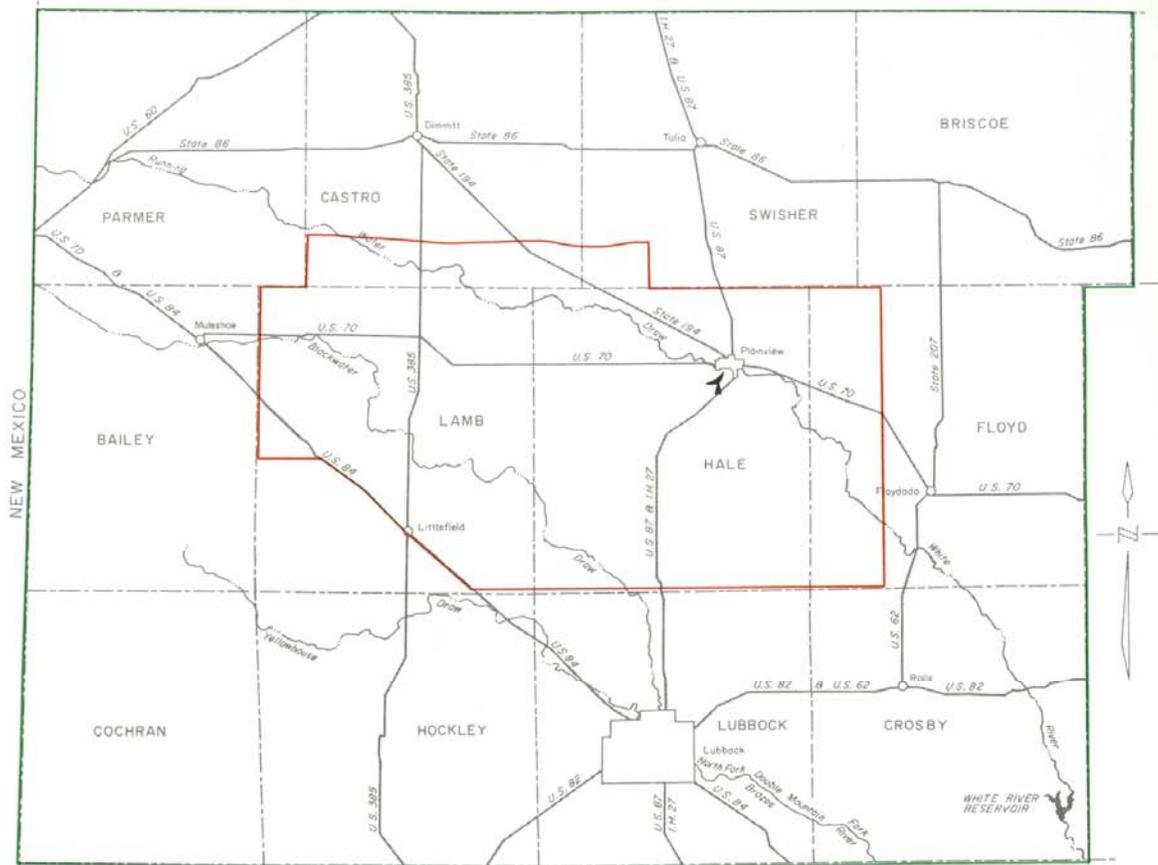
Project	Area	Purpose	Sponsor
72-2-1	1	Hail suppression and rainfall enhancement	Plains Weather Improvement Association and Better Weather, Inc.
72-2-2	2	Rainfall stimulation	Colorado River Municipal Water District
72-3-1	3	Research	Bureau of Reclamation and Texas Water Development Board
72-4-1		Rainfall stimulation	City of Lawton, Oklahoma
72-4-2	5	Rainfall stimulation	City of Guyman, Oklahoma, and others
72-4-3	6	Rainfall stimulation	Farmers and ranchers in Ellis County, Oklahoma
72-5-1	7	Research	Bureau of Reclamation
73-4-1		Rainfall stimulation	City of Lawton and Cotton County Service, Inc., Oklahoma
73-4-2	9	Rainfall stimulation	International Paper Co., Spring Hill, Louisiana

Weather Modification Projects
Calendar Year 1972

Project 72-2-1.—Hail Suppression and Rainfall Enhancement

Atmospherics Incorporated began the third summer of hail suppression and rainfall enhancement operations under the sponsorship of two groups of local businessmen, farmers, and ranchers—The Plains Weather Improvement Association of Plainview, and Better

Weather, Inc., of Littlefield. The operations were based at the Plainview Airport. The target area included all or portions of Floyd, Hale, Swisher, Lamb, and Castro Counties. Cloud-seeding operations were accomplished with aircraft which were guided by radar to any severe thunderstorms which threatened the target area with hail. Silver iodide in pyrotechnic flares was used as the seeding agent.



Note: Operating area is the area in which weather modifiers can legally perform their operations.
Target area is the only area to be affected by weather modification.



EXPLANATION
 — Operating area boundary
 — Target area boundary
 — Radar installation site

Operational Summary
May 10, 1972 - October 30, 1972

Number of Operational Days - 39
Total Number of Flights - 104
Total Seeding Material Used - 84,419 gm silver iodide
Total Number of Cells Seeded - 184

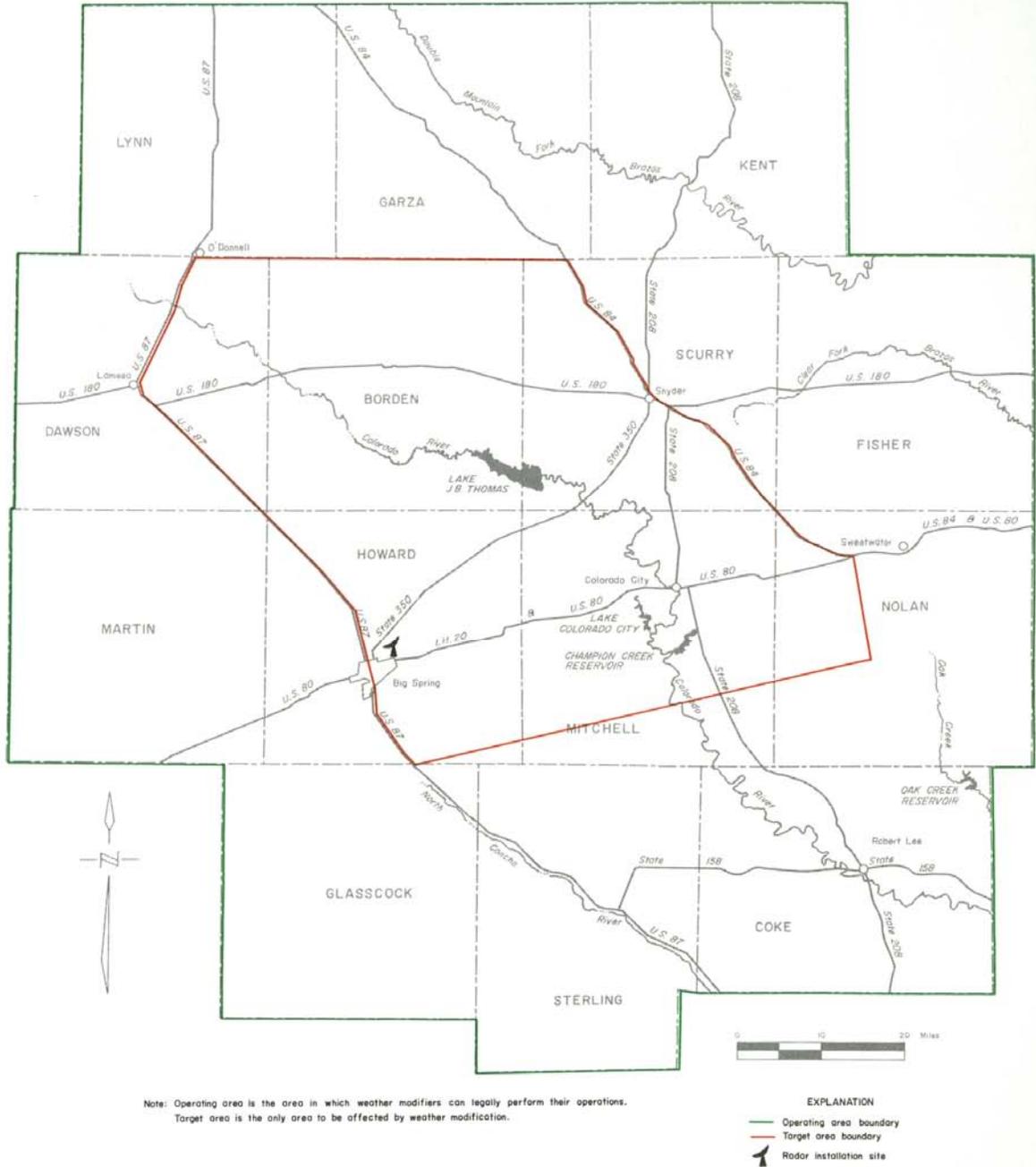
MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIALS USED	
May	25	52.4	22,775 gm	silver iodide
June	24	50.3	20,268 gm	silver iodide
July	24	46.5	18,749 gm	silver iodide
Aug.	26	44.8	18,574 gm	silver iodide
Sept.	5	10.6	4,053 gm	silver iodide
Oct.	0	0	none	

Project 72-2-2.—Colorado River Municipal Water District Rainfall Stimulation

The Colorado River Municipal Water District of Big Spring, Texas, contracted with Atmospherics Incorporated for the second summer of rainfall stimulation activities on the Colorado River basin in

Texas. The target area included all or portions of Dawson, Borden, Scurry, Nolan, Mitchell, Howard, Martin, Glasscock, Sterling, and Coke Counties. Cloud-seeding operations were accomplished by aircraft equipped with silver iodide pyrotechnic flares. The base of operations and 3-cm radar system were again located at Big Spring, Texas.



Operational Summary
April 15, 1972 - October 15, 1972

Number of Operational Days - 39
Total Number of Flights - 48
Total Seeding Material Used - 5,554 gm silver iodide

MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIAL USED
Apr.	6	7.9	722 gm silver iodide
May	7	8.9	756 gm silver iodide
June	10	12.8	1,040 gm silver iodide
July	9	10.7	756 gm silver iodide
Aug.	12	17.8	1,774 gm silver iodide
Sept.	4	4.7	506 gm silver iodide
Oct.	0	0	none

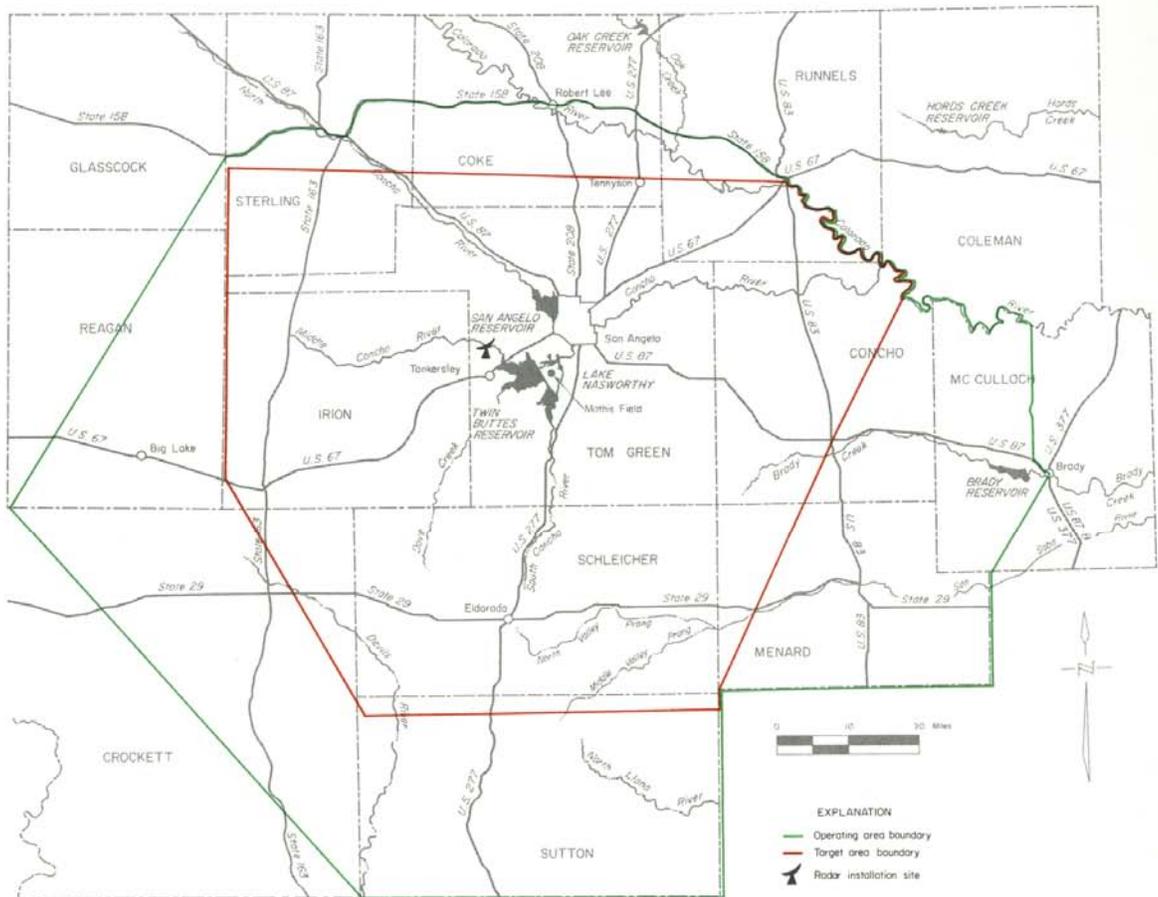
Project 72-3-1.—San Angelo Cumulus Research

Meteorology Research, Inc., conducted the second summer of operations under a three-year subcontract with the Texas Water Development Board to carry out weather modification and precipitation management research in the San Angelo area under sponsorship of the Bureau of Reclamation. In particular, the objectives of the project were to develop a technology for seeding warm cumulus clouds and to test techniques for seeding cold clouds in West Texas.

The experimental research was conducted by means of aerial seeding using salt and silver iodide. In

addition, cloud physics measurements were made using a specially instrumented cloud sampling aircraft. The randomized seeding program, designed for warm clouds during the first summer of operations, was again used. This program involves the random selection of suitable clouds for seeding, thereby producing both seeded and unseeded cloud cases for study.

The base of operations for the project was Mathis Field near San Angelo. The ground-based radar system near Tankersly was used for surveillance and tracking and for making cloud physics measurements.



Note: Operating area is the area in which weather modifiers can legally perform their operations.
Target area is the only area to be affected by weather modification.

Operational Summary
June 1, 1972 - August 6, 1972

Number of Operational Days - 18
Total Number of Flights - 18
Total Number of Cloud Cases - 29
Total Seeding Material Used - 12 gm silver iodide
2,071 lb salt (sodium chloride)

MONTHLY OPERATIONAL LOG

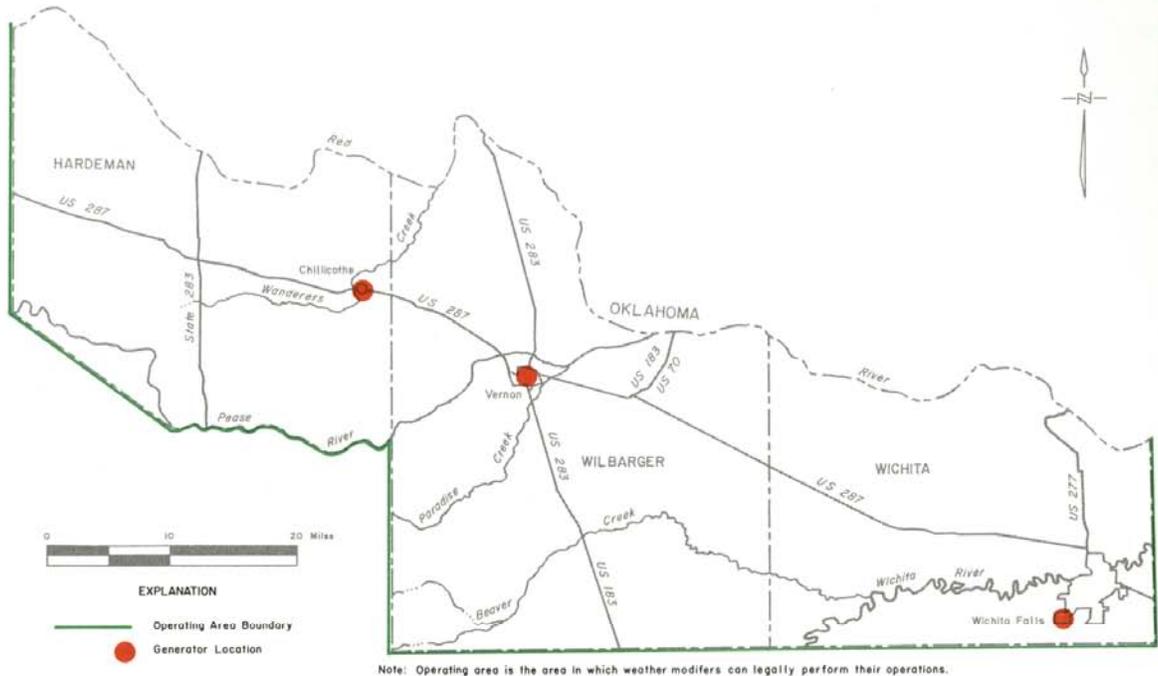
MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIAL USED
June	8	70.5	627 lb salt, 12 gm silver iodide
July	9	70.8	1,444 lb salt
Aug.	1	3.1	none

Project 72-4-1.—Oklahoma (Comanche County) Rainfall Stimulation

Efforts to increase rainfall and runoff in Comanche County, Oklahoma, began in late May of 1972. Under contract with the city of Lawton, Oklahoma, Irving P. Krick, Inc., began a program of rainfall stimulation using ground-based silver iodide generators. In Texas, this project included three silver iodide generators in the Texas counties of Hardeman, Wilbarger, and Wichita. All effects resulting from

generator operations were intended for areas in Oklahoma only.

The cloud-seeding operations involved dispensing silver iodide crystals at the rate of 0.5 grams per hour (per generator) for various periods of time. One of the ground-based generators was located at Chillicothe in Hardeman County, one at Vernon in Wilbarger County, and one at Wichita Falls in Wichita County. All three generators were operated by local residents under the direction of Irving P. Krick, Inc.



Operational Summary*
May 29, 1972 - December 31, 1972

Number of Operational Days - 35
Total Operational Hours (all generators) - 332
Total Seeding Material Used - 166.0 gm silver iodide

MONTHLY OPERATIONAL LOG

MONTH	NO. OF GENERATORS IN OPERATION	GENERATOR HOURS	SEEDING MATERIAL USED
May	0	0	none
June	0	0	none
July	0	0	none
Aug.	2	63.5	31.75 gm silver iodide
Sept.	3	136.5	68.25 gm silver iodide
Oct.	3	132	66.0 gm silver iodide
Nov.	0	0	none
Dec.	0	0	none

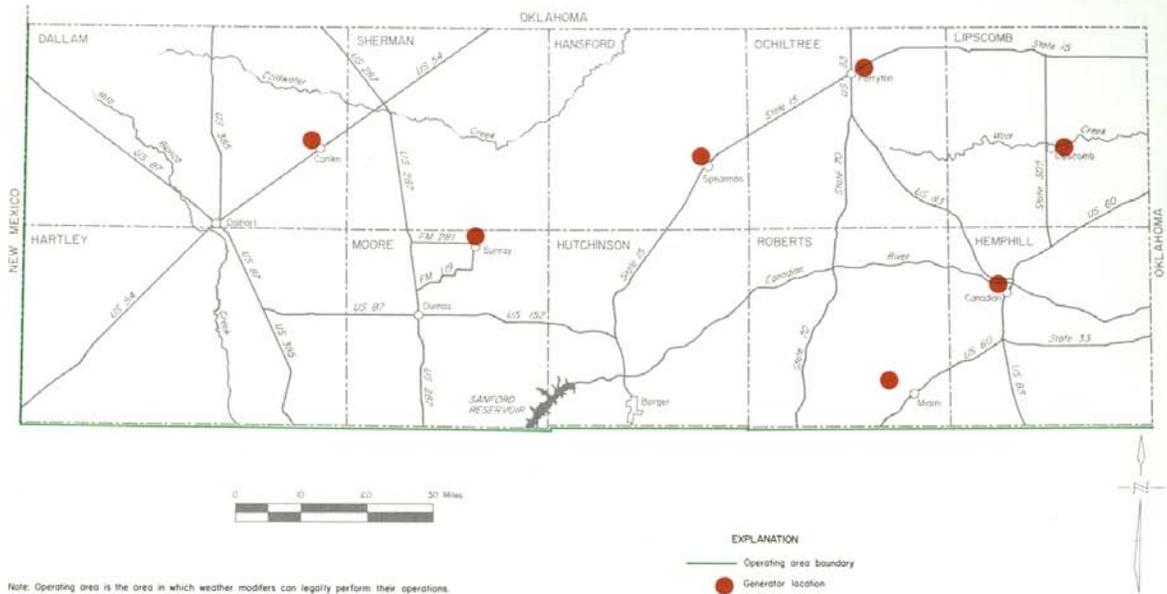
* Permit to operate expires April 15, 1973. Operational summary and log apply only to operations conducted in 1972.

**Project 72-4-2.—Oklahoma
(Guymon and Vicinity)
Rainfall Stimulation**

On behalf of the city of Guymon, Oklahoma, and farmers and ranchers in the Guymon vicinity, Irving P. Krick, Inc., began operations to stimulate rainfall for additional water supply in July 1972. The project employed ground-based silver iodide generators. In

Texas, the project involved the operation of seven ground-based generators. The effects of these generators were intended only for Oklahoma target areas.

Generators with 0.5 gm/hr output of silver iodide were located near the following Texas towns: Conlen, Sunray, Spearman, Perryton, Lipscomb, Canadian, and Miami. All generators in Texas were operated by local residents under the direction of Irving P. Krick, Inc.



**Operational Summary*
July 28, 1972 - December 31, 1972**

Number of Operational Days - 50
Total Operational Hours (all generators) - 1,085
Total Seeding Material Used - 542.5 gm silver iodide

MONTHLY OPERATIONAL LOG

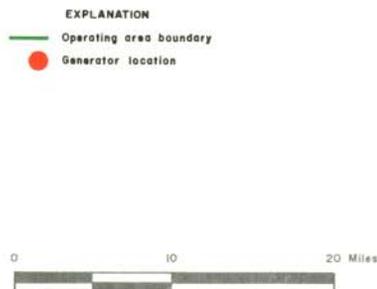
MONTH	NO. OF GENERATORS IN OPERATION	GENERATOR HOURS	SEEDING MATERIAL USED
July	1	9.	4.5 gm silver iodide
Aug.	7	432.5	216.25 gm silver iodide
Sept.	7	351.	175.5 gm silver iodide
Oct.	7	225.	112.75 gm silver iodide
Nov.	4	67.	33.50 gm silver iodide
Dec.	0	0.	none

* Permit to operate expires June 6, 1973. Operational summary and log apply only to operations conducted in 1972.

**Project 72-4-3.—Oklahoma
(Guymon and Vicinity)
Rainfall Stimulation**

Operations for Project 72-4-3 were conducted to provide additional seeding capability outside of Project 72-4-2 for the benefit of much of the same areas in

Oklahoma. A single silver iodide ground-based generator was located near the town of Wheeler in Wheeler County, Texas. The effects of this generator were intended only for target areas in Oklahoma. The generator was operated by local residents under the direction of Irving P. Krick, Inc. Generator output was 0.5 gm silver iodide per hour.



Note: Operating area is the area in which weather modifiers can legally perform their operations.



**Operational Summary
August 7, 1972 - December 31, 1972***

Number of Operational Days - 19
Total Operational Hours - 141.75
Total Seeding Material Used - 70.88 gm silver iodide

MONTHLY OPERATIONAL LOG

MONTH	NO. OF GENERATORS IN OPERATION	GENERATOR HOURS	SEEDING MATERIAL USED
Aug.	1	13.5	6.75 gm silver iodide
Sept.	1	77.25	38.63 gm silver iodide
Oct.	1	41.5	20.75 gm silver iodide
Nov.	1	9.5	4.75 gm silver iodide
Dec.	0	0	none

* Permit to operate expires September 24, 1973. Operational summary and log apply only to operations conducted in 1972.

Project 72-5-1.—Texas and Oklahoma Cloud Physics Research

Under the sponsorship of the Bureau of Reclamation, Weather Science, Inc., of Norman, Oklahoma, began operations to conduct cloud physics research and to stimulate additional rainfall over the watersheds above Lakes Altus, Ross, and Mountainview in Oklahoma.

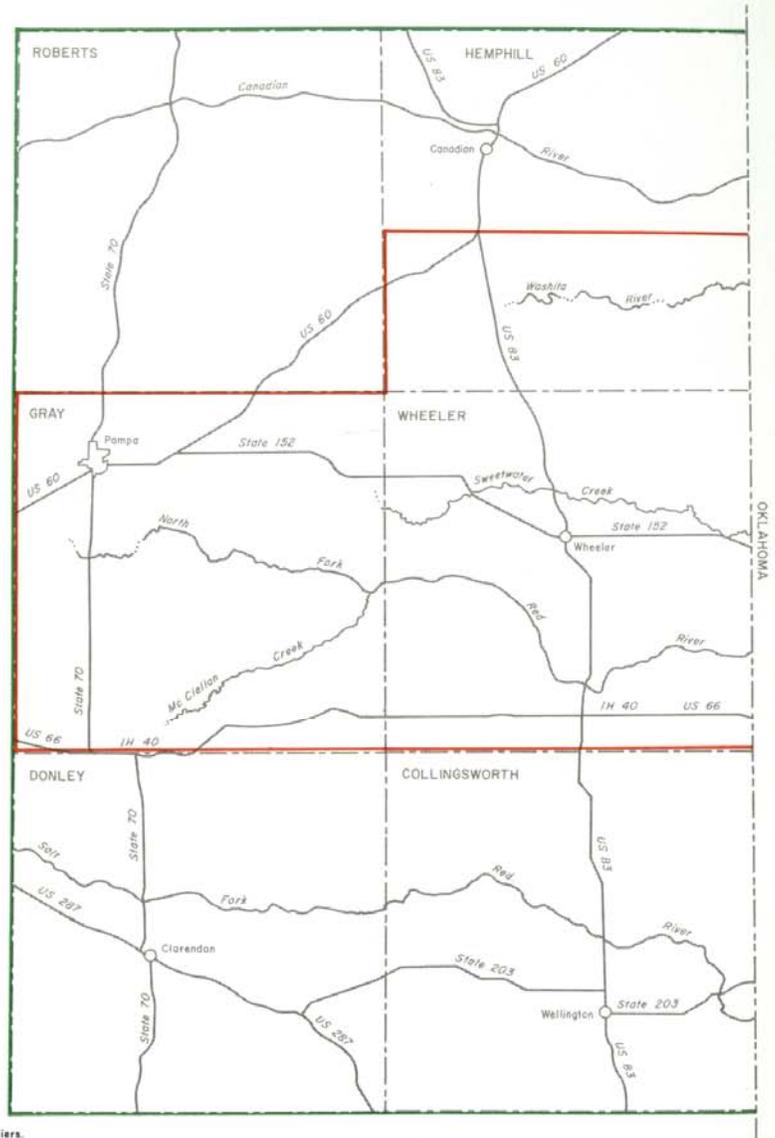
In Texas, the target area included Wheeler County, Gray County, and the southern half of Hemphill County.

Operations and research were conducted by means of specially equipped cloud-seeding aircraft using silver iodide and hygroscopic nuclei as seeding agents. Flight operations for the project were based at Mobile, Oklahoma. No operations involving hygroscopic seeding were conducted in Texas.

EXPLANATION
 Operating area boundary
 Target area boundary



Note: Operating area is the area in which weather modifiers can legally perform their operations.
 Target area is the only area to be affected by weather modifiers.



Operational Summary

Number of Operational Days - 2 (Texas portion only)
Total Number of Flights - 2
Total Number of Cloud Cells Seeded - 2
Total Seeding Material Used - 650.4 gm silver iodide

MONTHLY OPERATIONAL LOG

MONTH	NO. OF FLIGHTS	HOURS FLOWN	SEEDING MATERIAL USED
July	2	2.5	650.4 gm silver iodide

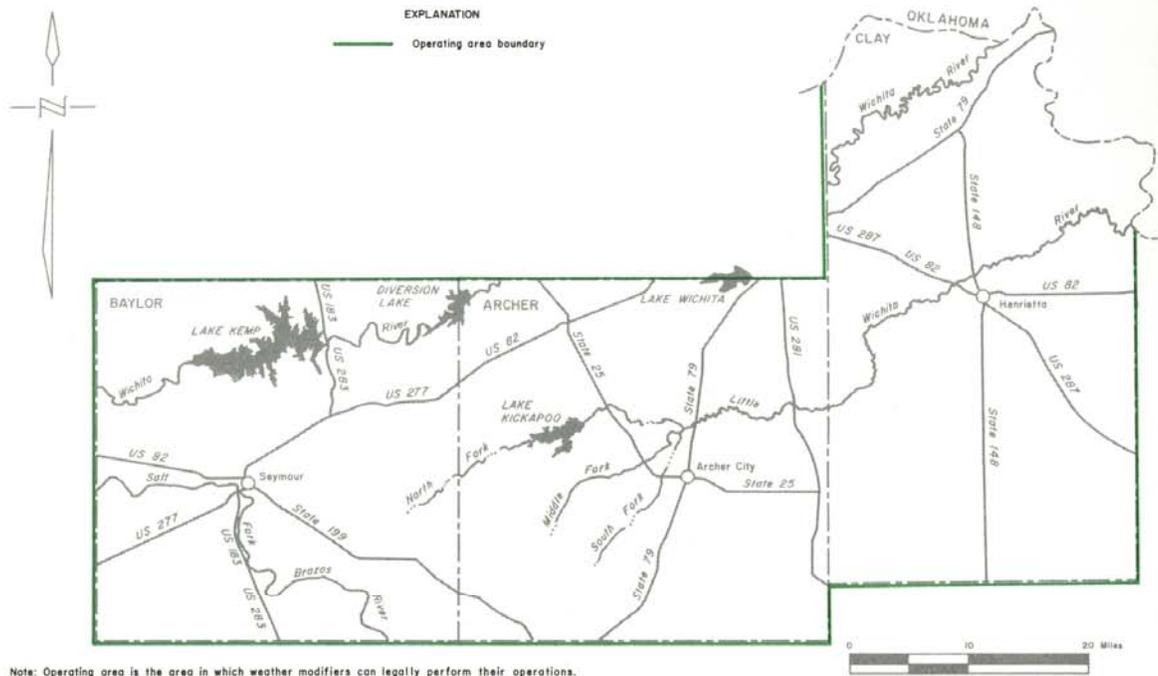
**Project 73-4-1.—Oklahoma
(Comanche and Cotton Counties)
Rainfall Stimulation**

Rainfall stimulation in this project for the benefit of farmers and ranchers in Comanche and Cotton Counties, Oklahoma, had not begun as of December 31, 1972, although the permit for the project was approved

September 25, 1972. However, another current project (72-4-1) of Irving P. Krick, Inc., was operated during 1972 for the benefit of Comanche County. Silver iodide ground-based generators are proposed to be located in the Texas counties of Baylor, Archer, and Clay. The effects of these generators are intended for Oklahoma target areas only.

**Operational Summary
September 25, 1972 - December 31, 1972**

No operations conducted during calendar year 1972.



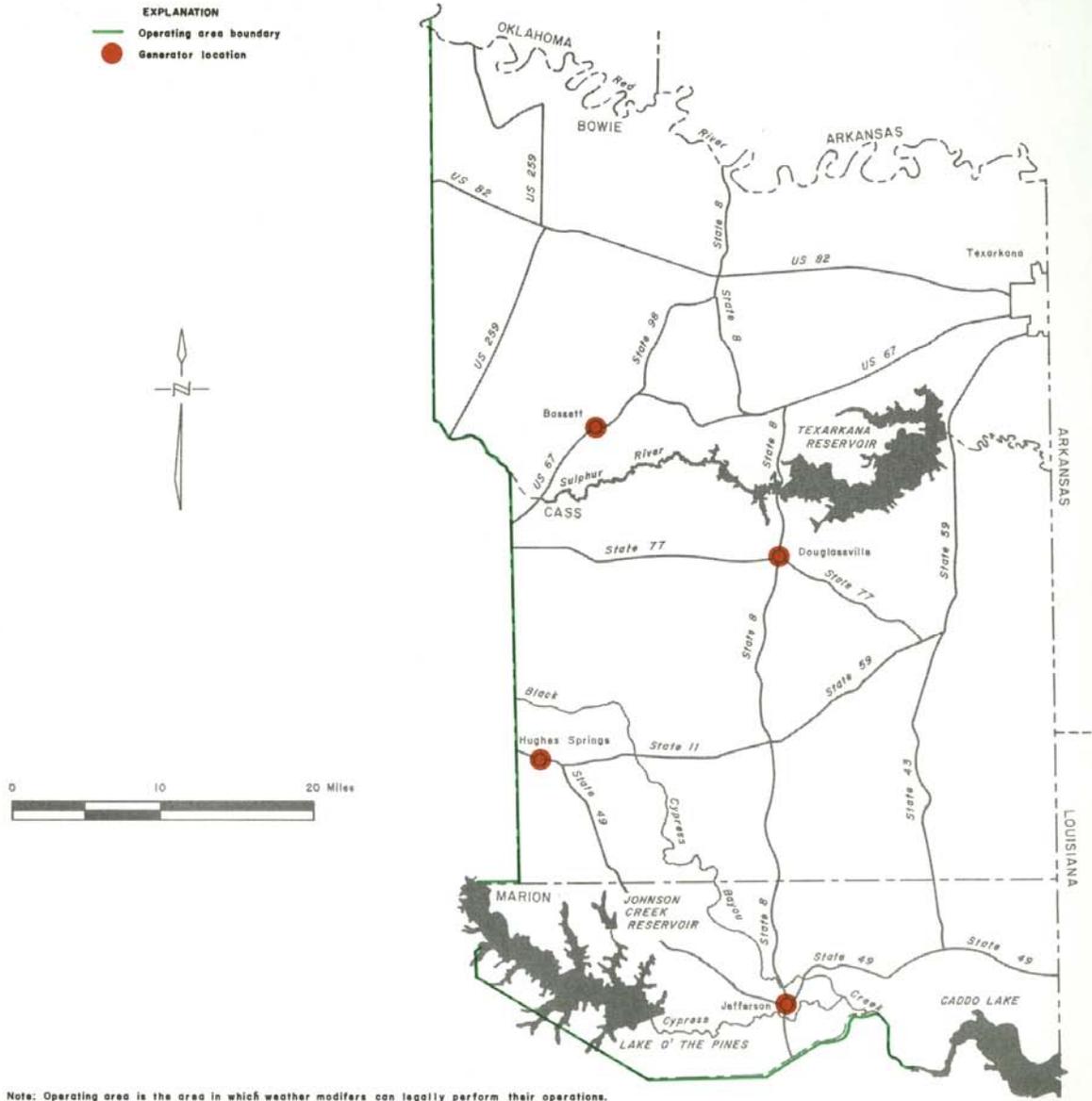
Note: Operating area is the area in which weather modifiers can legally perform their operations.

Project 73-4-2.—Arkansas Rainfall Stimulation

Efforts to enhance runoff on behalf of the International Paper Company of Springhill, Louisiana, began in October 1972. The project is intended to provide additional rainfall and increased runoff for the Company's paper mill operations in southwest Arkansas. To accomplish this, ground-based silver iodide generators, with 0.5 gm silver iodide per hour output, have been installed in extreme northeast Texas by Irving

P. Krick, Inc. The project in Texas involves only the installation and operation of ground-based generators. The effects of these generators are intended only for target areas in Arkansas.

Ground-based generators are located near the following Texas towns: Bassett, Douglassville, Hughes Springs, and Jefferson. All generators are operated by local residents under the direction of Irving P. Krick, Inc.



Operational Summary
September 25, 1972 - December 31, 1972*

Number of Operational Days - 12
Total Operational Hours (all generators) - 172.5
Total Seeding Material Used - 86.25 gm silver iodide

MONTHLY OPERATIONAL LOG

MONTH	NO. OF GENERATORS IN OPERATION	GENERATOR HOURS	SEEDING MATERIAL USED
Sept.	0	0	none
Oct.	3	119.5	59.75 gm silver iodide
Nov.	3	53	26.50 gm silver iodide
Dec.	0	0	none

* Permit to operate expires September 24, 1973. Operational summary and log apply only to operations conducted in 1972.