

# Annual Report of Alberta Severe Weather Management Society Hail Suppression Efforts

2022 Operations – June 1 through 15 September

Information prepared by Weather Modification LLC, dba Weather Modification International (WMI)  
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All cloud seeding flights were conducted in accordance with the scientific principles described in the *Notice of Intent to Engage in Weather Modification Activities* submitted to Environment Canada on May 10, 2022, within the limits of the operations area delineated therein.

Accordingly, some acronyms used in the following tables require explanations, provided below.

## **Missions by Type** (top left table)

*Total time* – the elapsed time from engine start to engine stop.

*Air time* – the elapsed time from takeoff to landing.

*SEED* – time flown on missions during which any seeding was conducted, regardless of amount.

*PATROL* – time flown in anticipation of encountering potential severe weather, when seeding did not occur.

*REPO* – (Reposition) time flown when aircraft were flown to other airports in anticipation of severe weather.

*PR* – flights made to the project operations centre for the purposes of the insurance industry-accredited lectures.

*DUAL* – flights flown for dual-mode seeding, that is, the combined use of ice-forming and drop-forming seeding agents.

*MX* – maintenance flights. Maintenance flights were to ensure functionality after repairs, and at the expense of WMI.

## **Aircraft Identifiers**

Hailstop #1, HS1 – tail number N904DK, based in Springbank

Hailstop #2, HS2 – tail number N6111V, based in Springbank

Hailstop #3, HS3 – tail number N127ZW, based in Red Deer

Hailstop #4, HS4 – tail number N522JP, based in Red Deer

Hailstop #5, HS5 – tail number N518TS, based in Springbank

## **Flare Usage** (by aircraft, top right table)

*BIP* – burn-in-place flare, contains 150g of ice-forming seeding agent

*EJ* – ejectable flare, contains 20g of ice-forming seeding agent

*TOTAL GRAMS* – the total mass of seeding agent released in each category, in grams.

## **Flight Time** (by aircraft, by month, found below the *Flare Usage* table)

Self-explanatory.

*TOTAL HOURS* – the total time flown by all five Hailstop aircraft in each month, given in hours and minutes.

## **Operations Summary** (the large table that comprises the remainder of the document)

*# Flights* – the total number of flights flown for project purposes (not maintenance)

*UTC DATE* – Universal Time Coordinates, or UTC, is used worldwide for all meteorological and aviation purposes. UTC is six hours ahead of Mountain Daylight Time (MDT), so to convert UTC to MDT, subtract six hours.

*HAILSTOP* – the aircraft flying the mission, e.g. HS2 = Hailstop 2, based in Springbank (see Aircraft Identifiers, above)

*OPS #* -- The flight number for each specific aircraft, used only for administrative purposes.

*ENGINES ON* – the UTC time engines were started for that mission.

*ENGINES OFF* -- the UTC time engines were shut down after that mission.

*TOTAL TIME* – the time the engines ran, in hours and minutes.

*MISSION TYPE* – see *Missions by Type*, above.

*EJ #* – the number of ice-forming EJ flares expended on the mission.

*BIP #* -- the number of ice-forming BIP flares expended on the mission.

*TOTAL TIME FOR DAY* – the total time accrued by all HS aircraft on each day.

*EJ* – the total number of EJ pyrotechnics (flares) used on each date.

*BIP* – the total number of BIP pyrotechnics (flares) used on each date.

*AGI SEED AMOUNT PER DAY* – the total mass of ice-forming seeding agent released on each date. This is the total of the amounts in the EJs and BIPs.

*# Storms* – the total number of storm complexes seeded on each date.

*At the bottom of the table, season totals are provided.*

UTC DATE	HAILSTOP	ENGINES ON (UTC)	ENGINES OFF (UTC)	TOTAL TIME (hh:mm)	MISSION TYPE	EJ (#)	BIP (#)	SEEDING MISSION DURATION	SEEDING AGENT PER DAY (Grams)	# Storms
06-Jun-22	HS2	18:35	22:23	3:48	SEED	8	0	3:48	160	1
08-Jun-22	HS4	20:36	23:50	3:14	PATROL	0	0	3:14	0	0
12-Jun-22	HS2	20:44	0:28	3:44	SEED	0	19		0	
12-Jun-22	HS5	22:31	1:10	2:39	SEED	0	4	6:23	3450	1
13-Jun-22	HS4	20:23	21:23	1:00	REPO	0	0			
14-Jun-22	HS3	19:26	20:04	0:38	REPO	0	0			
17-Jun-22	HS5	4:55	5:55	1:00	PATROL	0	0	1:00	0	0
18-Jun-22	HS2	7:19	9:21	2:02	PATROL	0	0	2:02	0	0
18-Jun-22	HS1	20:24	23:58	3:34	SEED	72	0		0	
18-Jun-22	HS4	20:48	23:42	2:54	SEED	0	1		0	
19-Jun-22	HS5	0:58	3:13	2:15	SEED	36	0		0	
19-Jun-22	HS1	1:22	3:18	1:56	SEED	0	3	10:39	2760	3
19-Jun-22	HS2	20:05	23:00	2:55	SEED	98	9		0	
19-Jun-22	HS3	20:27	22:55	2:28	SEED	0	1		0	
19-Jun-22	HS5	20:25	22:40	2:15	SEED	0	6	7:38	4360	2
22-Jun-22	HS3	18:19	19:49	1:30	SEED	0	11		0	
22-Jun-22	HS4	18:16	19:58	1:42	SEED	85	4		0	
22-Jun-22	HS5	19:52	23:23	3:31	SEED	0	12		0	
22-Jun-22	HS1	19:48	23:16	3:28	SEED	107	6		0	
22-Jun-22	HS3	22:31	23:57	1:26	SEED	0	4		0	
22-Jun-22	HS4	22:25	0:10	1:45	SEED	2	2	13:22	9730	3
23-Jun-22	HS2	17:25	18:49	1:24	PATROL	0	0		0	0
27-Jun-22	HS4	23:42	2:38	2:56	SEED	0	28		0	
28-Jun-22	HS3	0:16	2:45	2:29	SEED	228	10		0	
28-Jun-22	HS2	1:02	3:33	2:31	SEED	289	15		0	
28-Jun-22	HS1	1:38	4:56	3:18	SEED	61	21		0	
28-Jun-22	HS5	2:25	4:55	2:30	SEED	0	12	13:44	24460	3
28-Jun-22	HS2	22:15	1:48	3:33	SEED	250	0		0	
29-Jun-22	HS5	0:00	3:35	3:35	SEED	285	36		0	
29-Jun-22	HS4	0:24	1:14	0:50	SEED	0	1		0	
29-Jun-22	HS1	1:35	3:58	2:23	SEED	0	32	10:21	21050	3
29-Jun-22	HS2	15:28	16:35	1:07	PATROL	0	0		0	
29-Jun-22	HS1	17:39	20:54	3:15	SEED	125	0		0	
29-Jun-22	HS1	19:05	20:56	1:51	SEED	70	0	6:13	3900	2

01-Jul-22	HS5	19:47	23:05	3:18	SEED	27	0		0	
01-Jul-22	HS4	20:19	23:25	3:06	PATROL	0	0		0	
01-Jul-22	HS3	21:48	0:35	2:47	PATROL	0	0		0	
02-Jul-22	HS4	0:16	2:12	1:56	SEED	0	1	11:07	690	2
02-Jul-22	HS2	21:23	0:01	2:38	PATROL	0	0	2:38	0	0
05-Jul-22	HS1	20:02	23:40	3:38	SEED	0	9	3:38	1350	2
07-Jul-22	HS3	17:58	21:18	3:20	PATROL	0	0		0	
07-Jul-22	HS4	17:59	18:50	0:51	PATROL	0	0		0	
07-Jul-22	HS2	18:18	21:54	3:36	SEED	22	0		0	
07-Jul-22	HS4	20:05	22:31	2:26	SEED	167	0		0	
07-Jul-22	HS1	21:18	0:28	3:10	SEED	0	27		0	
07-Jul-22	HS5	21:24	0:28	3:04	SEED	289	8		0	
07-Jul-22	HS3	21:40	0:21	2:41	SEED	0	19		0	
07-Jul-22	HS4	23:00	1:09	2:09	SEED	53	0		0	
07-Jul-22	HS2	23:43	1:20	1:37	SEED	48	0	2:32	21030	3
08-Jul-22	HS3	20:33	22:04	1:31	SEED	207	0		0	
08-Jul-22	HS4	20:47	21:58	1:11	SEED	0	10		0	
09-Jul-22	HS3	0:59	2:02	1:03	PATROL	0	0		0	
09-Jul-22	HS4	0:53	1:57	1:04	PATROL	0	0	4:49	5640	1
09-Jul-22	HS3	22:02	0:43	2:41	SEED	187	12		0	
09-Jul-22	HS5	23:12	1:00	1:48	SEED	108	0	4:29	7700	2
16-Jul-22	HS3	21:14	0:08	2:54	SEED	221	17		0	
16-Jul-22	HS4	22:02	0:03	2:01	SEED	82	12		0	
16-Jul-22	HS2	22:43	2:04	3:21	SEED	138	13		0	
16-Jul-22	HS1	22:43	2:24	3:41	SEED	133	28		0	
17-Jul-22	HS5	0:37	4:15	3:38	SEED	181	29		0	
17-Jul-22	HS4	1:03	5:00	3:57	SEED	133	19		0	
17-Jul-22	HS3	1:20	3:48	2:28	SEED	0	25		0	
17-Jul-22	HS1	3:17	5:29	2:12	SEED	0	12	01:00:12	41010	8
18-Jul-22	HS3	19:03	20:30	1:27	PATROL	0	0	1:27	0	0
19-Jul-22	HS3	21:27	23:05	1:38	SEED	153	9		0	
19-Jul-22	HS4	21:47	23:07	1:20	SEED	0	13	2:58	6360	1
22-Jul-22	HS5	6:21	7:45	1:24	PATROL	0	0	1:24	0	
22-Jul-22	HS2	22:31	0:44	2:13	SEED	0	11		0	
23-Jul-22	HS5	2:25	2:50	0:25	REPO	0	0		0	
23-Jul-22	HS1	2:34	3:04	0:30	REPO	0	0	2:13	1650	1
24-Jul-22	HS2	23:52	0:13	0:21	REPO	0	0		0	
25-Jul-22	HS5	0:35	1:00	0:25	REPO	0	0		0	
25-Jul-22	HS1	0:42	1:05	0:23	REPO	0	0		0	
29-Jul-22	HS4	20:36	22:09	1:33	PATROL	0	0		0	
29-Jul-22	HS2	23:03	2:58	3:55	SEED	0	27		0	
29-Jul-22	HS4	23:26	2:35	3:09	SEED	0	36		0	
29-Jul-22	HS5	23:42	2:13	2:31	SEED	0	18		0	
29-Jul-22	HS1	23:46	2:00	2:14	SEED	0	21	13:22	15300	4
30-Jul-22	HS3	19:35	21:35	2:00	PATROL	0	0		0	
30-Jul-22	HS1	21:17	23:10	1:53	SEED	0	8		0	
30-Jul-22	HS5	21:13	23:01	1:48	SEED	40	4		0	
30-Jul-22	HS4	23:37	1:50	2:13	SEED	0	4		0	
31-Jul-22	HS2	0:31	2:06	1:35	PATROL	0	0	9:29	3200	2

01-Aug-22	HS3	0:00	1:22	1:22	SEED	43	0			
01-Aug-22	HS4	3:24	4:58	1:34	SEED	37	2	2:56	1900	2
01-Aug-22	HS3	20:28	23:03	2:35	SEED	204	0		0	
01-Aug-22	HS4	20:30	23:03	2:33	SEED	0	14		0	
01-Aug-22	HS1	21:41	0:47	3:06	SEED	0	27		0	
01-Aug-22	HS5	22:28	0:44	2:16	SEED	276	0		0	
01-Aug-22	HS4	23:26	2:49	3:23	SEED	0	46		0	
02-Aug-22	HS3	0:23	2:32	2:09	SEED	270	9		0	
02-Aug-22	HS2	0:53	3:25	2:32	SEED	255	9		0	
02-Aug-22	HS1	2:14	3:43	1:29	SEED	0	7		0	
02-Aug-22	HS5	2:32	3:52	1:20	SEED	28	2	21:23	37760	7
04-Aug-22	HS4	20:05	22:45	2:40	SEED	0	15		0	
04-Aug-22	HS1	20:52	23:31	2:39	SEED	40	5		0	
04-Aug-22	HS3	22:01	23:49	1:48	SEED	127	0		0	
05-Aug-22	HS4	0:55	1:40	0:45	REPO			7:07	6340	3
11-Aug-22	HS2	19:08	21:46	2:38	SEED	15	0		0	
11-Aug-22	HS4	19:18	20:59	1:41	PATROL	0	0		0	
11-Aug-22	HS5	19:38	20:15	0:37	PATROL	0	0	4:56	300	1
12-Aug-22	HS1	20:52	22:33	1:41	PATROL	0	0		0	
12-Aug-22	HS3	22:17	23:15	0:58	PATROL	0	0		0	
12-Aug-22	HS5	23:28	0:52	1:24	PATROL	0	0		0	
13-Aug-22	HS5	3:12	4:31	1:19	SEED	51	0		0	
13-Aug-22	HS2	3:18	4:40	1:22	SEED	0	2	6:44	1320	2
13-Aug-22	HS3	23:24	1:45	2:21	SEED	0	14		0	
14-Aug-22	HS4	0:15	1:54	1:39	SEED	0	13		0	
14-Aug-22	HS1	0:22	2:06	1:44	SEED	0	6	5:44	4950	1
17-Aug-22	HS3	0:07	1:51	1:44	SEED	0	8	1:44	1200	1
26-Aug-22	HS1	20:44	22:14	1:30	SEED	26	1	1:30	670	1
27-Aug-22	HS5	18:45	20:22	1:37	SEED	0	1		0	
27-Aug-22	HS5	21:46	22:22	0:36	REPO			1:37	150	1
				243:12		5277	810	240:23		63

No seeding missions were flown in the month of September, 2022.