13. CASE STUDY – 2 AUGUST 2018

A detailed review and summary of the most severe hail day of the 2018 season is provided below. The recapitulation reveals the sequence of events in dealing with the storm: when various aircraft were dispatched to respond to the developing threats, how the storms evolved and where they moved, and when seeding began and ended.

WEATHER SYNOPSIS AND FORECAST FOR 2 AUGUST 2018

On the morning of August 2nd, the project forecaster predicted a Convective Day Category (CDC) of +4, indicating a risk of golf ball-sized hail over the southern and western sectors of the project area. Severe thunderstorms were forecast to develop along the foothills in the early afternoon, move eastward, and rapidly intensify.

A weak upper-level jet streak was present over far-southern Alberta (Fig. 44 and Fig. 45), and an upper-level trough was slowly spreading eastward into the region.

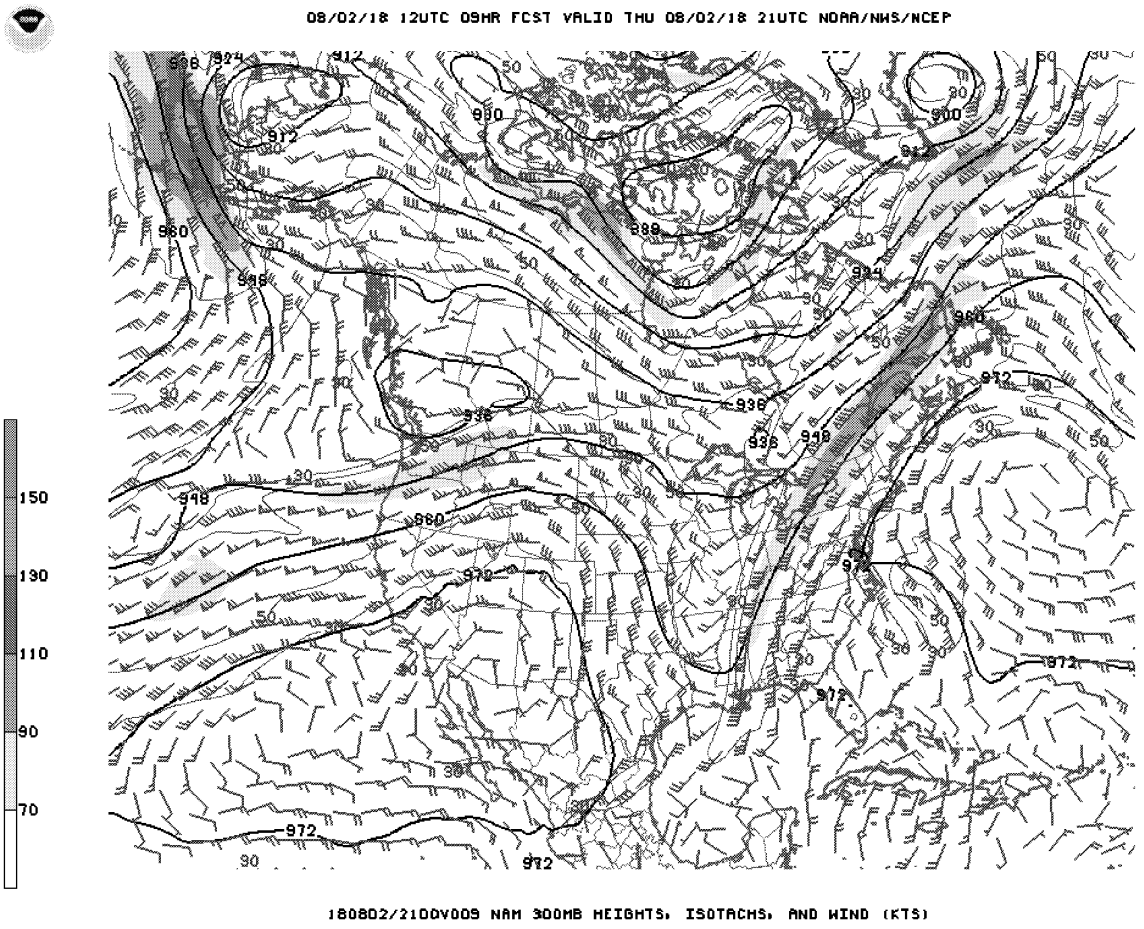

Fig. 44. The jet stream-level (300mb, about 30,000 ft) prognostic chart of winds and heights for 3pm MDT on 2 August 2018 indicated the presence of a modest jet streak (blue shading) over southern Alberta.

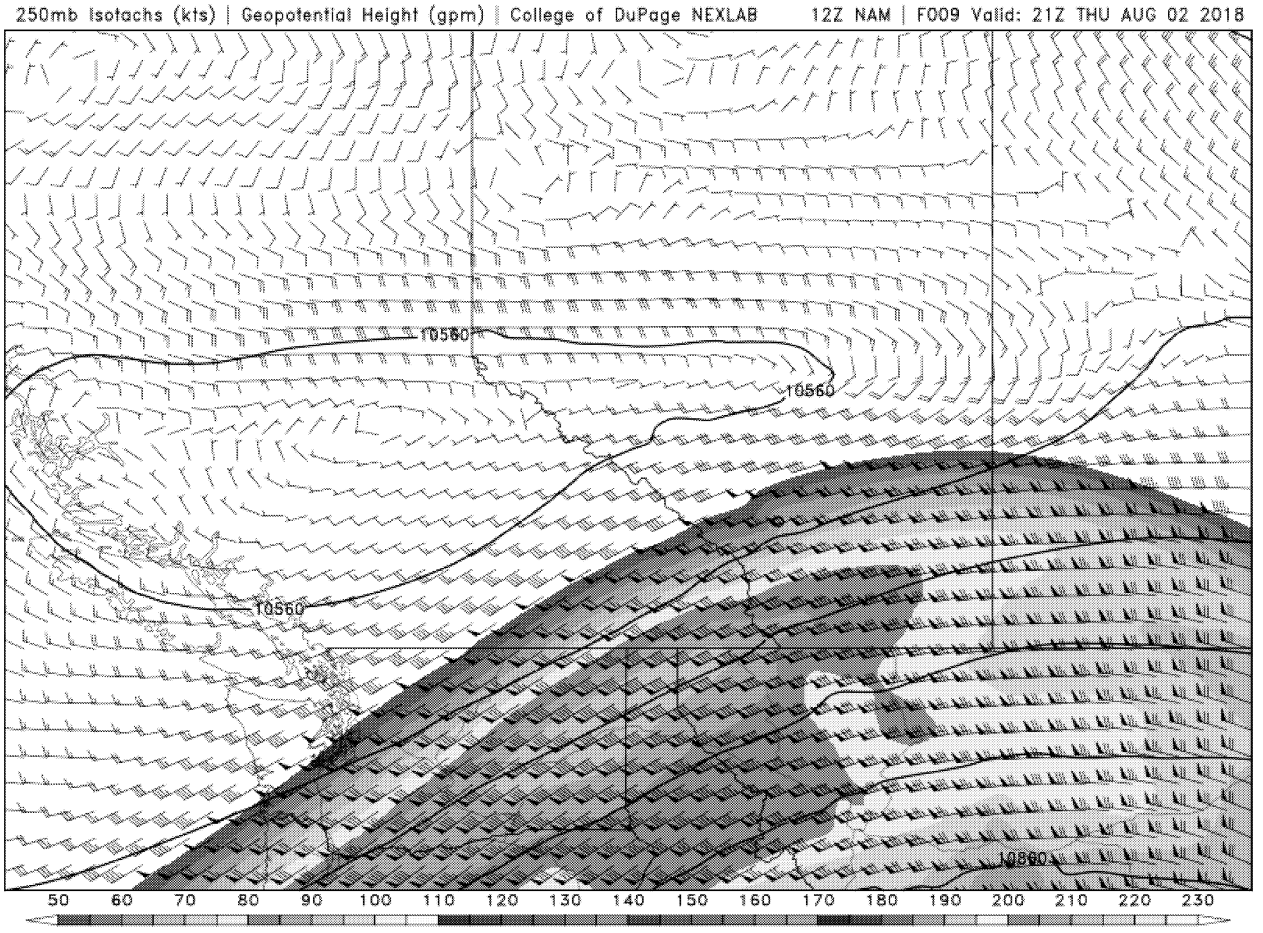

Fig. 45. The jet stream winds at the 250 mb level (approximately 35,000 ft) are shown, as predicted for 3 pm MDT on 2 August 2018. This more detailed view of the upper jet (compare Fig. 44) showed a 95 knot (175 kilometers per hour) jet streak pushing into southern Alberta, which enhanced the wind shear for the southern project regions.

Slightly ahead of the upper-level trough, modest mid-level vorticity (atmospheric spin) was expected to move through the region during the afternoon hours, triggering and/or enhancing convection (Fig. 46).

Low-level moisture was substantial, with dew point temperatures expected to rise to 13°C in portions of the project area. At the surface, rapid heating was anticipated early in the day, and afternoon temperatures were forecast to climb to 25°C in Calgary.

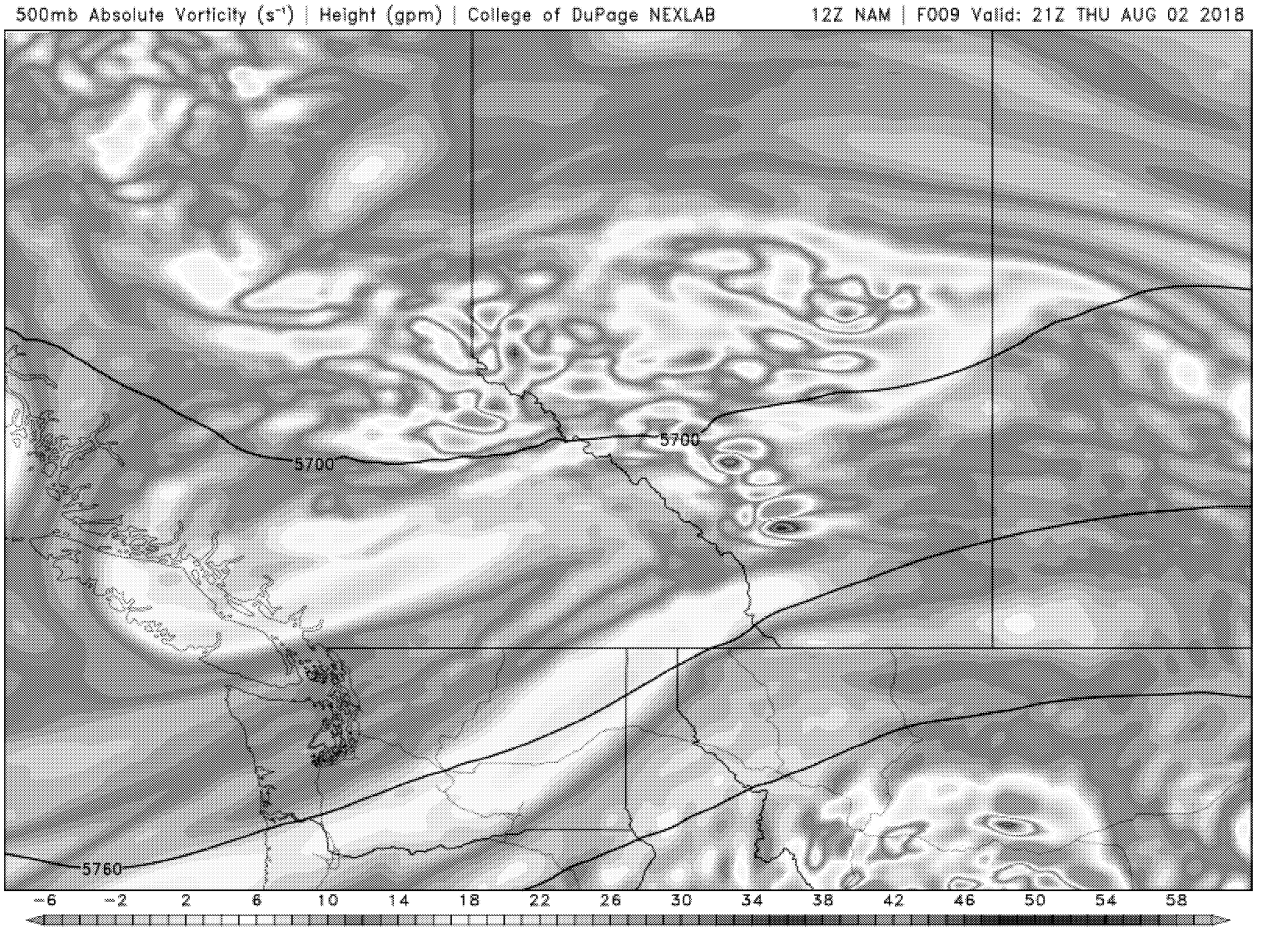

Fig. 46. The mid-level (500 mb, ~18,000 ft) heights (m, lines) and vorticity (colors) predicted for 3pm MDT for August 2nd 2018 are shown. Westerly wind flow and weak positive vorticity advection was thus expected early in the forecast period.

Southeasterly surface winds were forecast in the western project region, with a surface trough developing along the foothills. Upslope flow was forecast to help initiate early afternoon convection along the western project boundary. Slight mid-level cooling would also contribute to the instability, and convective available potential energy (CAPE) values would be quite high, reaching near 1700 J/Kg by midafternoon (Fig. 47). The Lifted Index was expected to reach -7.0°C which is highly unstable for Alberta. A significant capping inversion was not anticipated, meaning convection would likely initiate early in the afternoon and be able to move through the entire project region without inhibition.

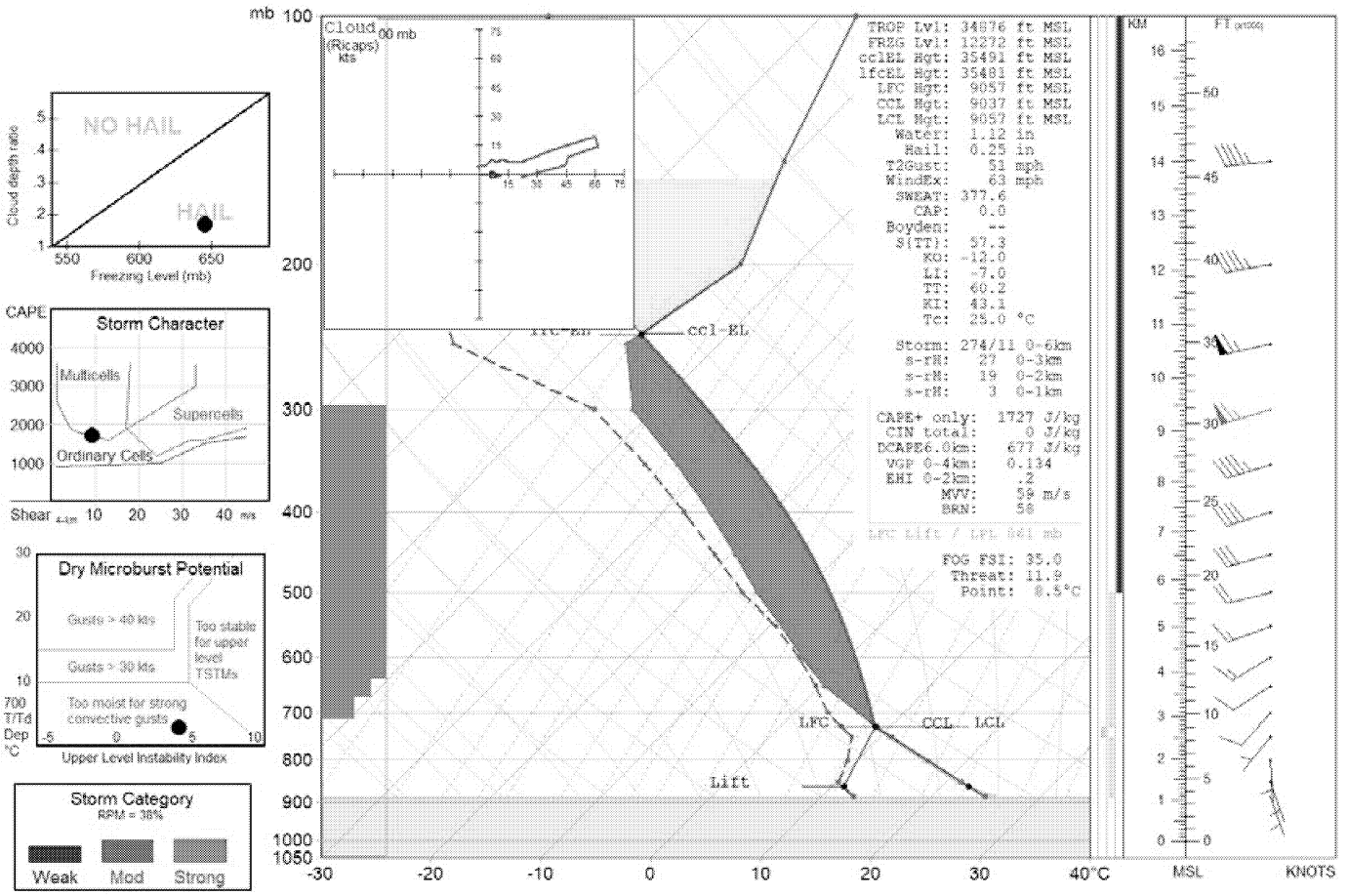

Fig. 47. The atmospheric vertical profiles of temperature, moisture, and winds are shown, as predicted for 3pm MDT on August 2nd, 2018.

Fig. 48. A severe hailstorm rolls into southwest Calgary on August 2nd, 2018. (Photograph courtesy of Calgary storm chaser, Beth Allan.)

Low-level charts (850 mb) indicated a ridge of moist, warm air present over southeastern Alberta and Saskatchewan. Moisture advection was weak, but significant low-level moisture was expected to already be in place by early afternoon. The 0-6 km bulk shear was moderate for the lower levels. However, overall wind shear was significant in the deeper layer, particularly in the southern project region nearest the upper jet streak. Directional shear was also present, with southeast winds likely at the surface, veering to strong westerlies in the mid-levels. The forecast storm mode was for discrete severe cells transitioning to less-severe linear storms as they pushed eastward.

The presence of the stronger shear in the southern project region along with the likelihood of more discrete convection nearer the mountains meant the area of most concern for large damaging hail was in the south and west. The Hailcast model indicated the possibility of 2.9 cm diameter hail over Calgary and 2.7 cm hail over Red Deer.

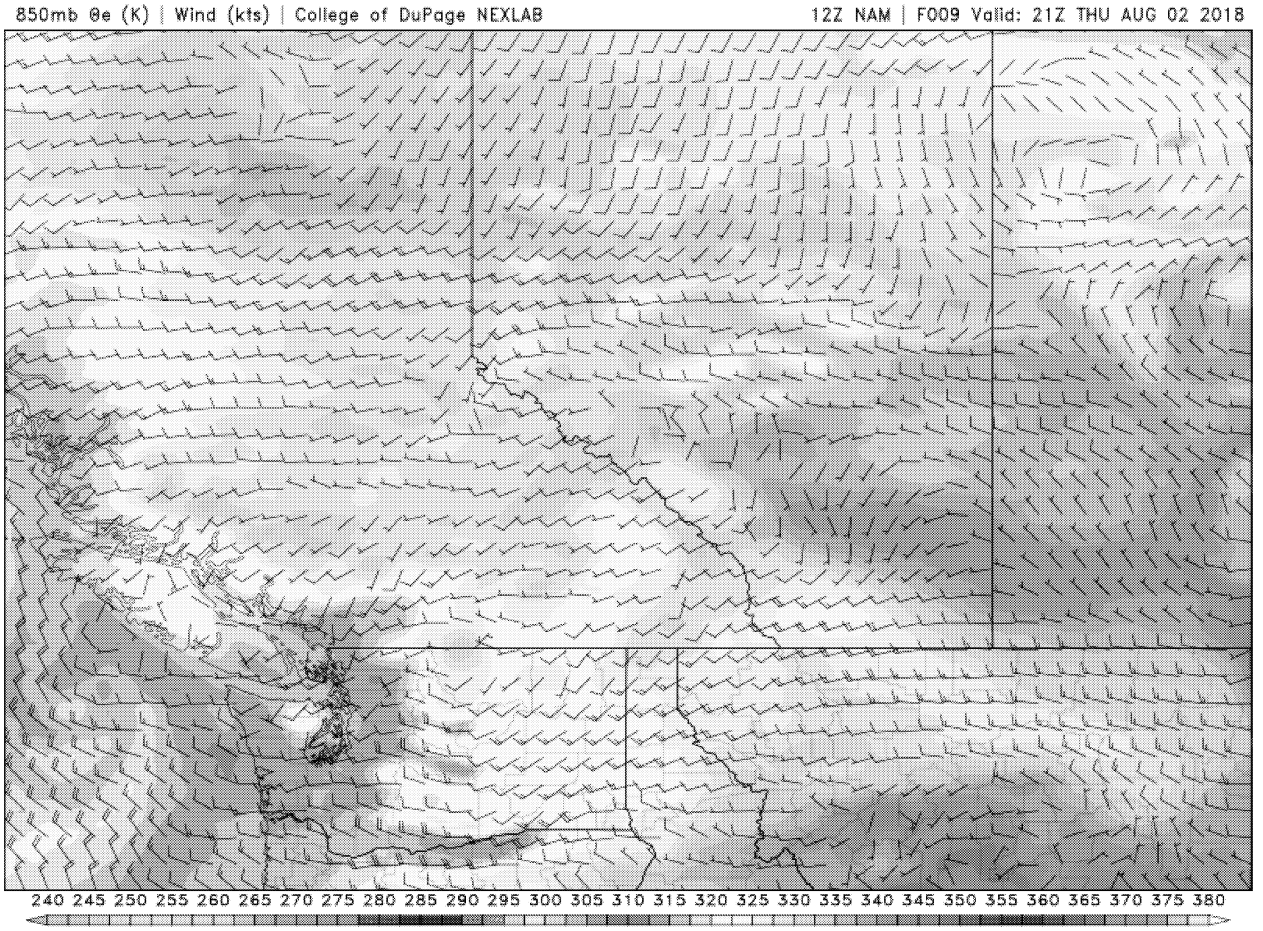

Fig. 49. The low-level (850 mb, ~5,000 ft) equivalent potential temperature (Theta E) chart for 3pm MDT on 2 August 2018 predicted warm moist air over much of the project region. Weak moisture advection was evident, though winds were relatively light in this layer. "Theta E" reflects both the air temperature and the moisture content, and so indicates the presence of both instability (warm low levels) and storm fuel (uncondensed humidity).

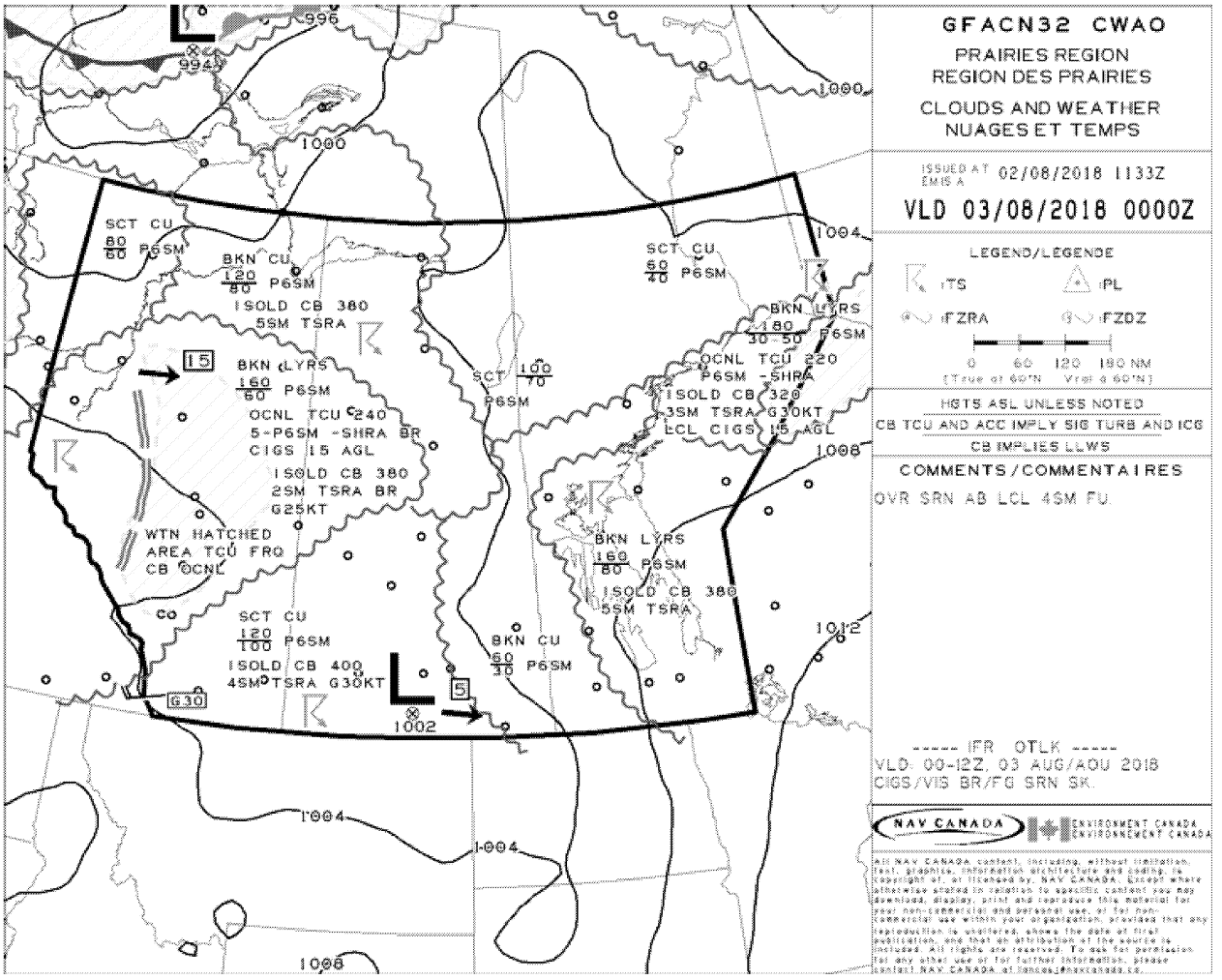

Fig. 50. The surface forecast for 6pm MDT on 2 August 2018 showed minimal surface features over the region other than the developing lee trough and a low pressure center over southern Saskatchewan.

All crew members were placed on airport standby immediately following the daily 11:00 MDT weather briefing and remained at their airports in anticipation of the severe weather forecast to develop in the early afternoon. At 12:13 MDT a weak cell over the foothills due west of Calgary began to show signs of organization and growth. Given that severe storms were expected, the location and motion of this storm posed a substantial threat to Calgary. Multiple aircraft were launched in rapid succession. At 12:16 MDT, Hailstop 1 and Hailstop 2 were launched from Springbank for top and base seeding respectively (Fig. 51).

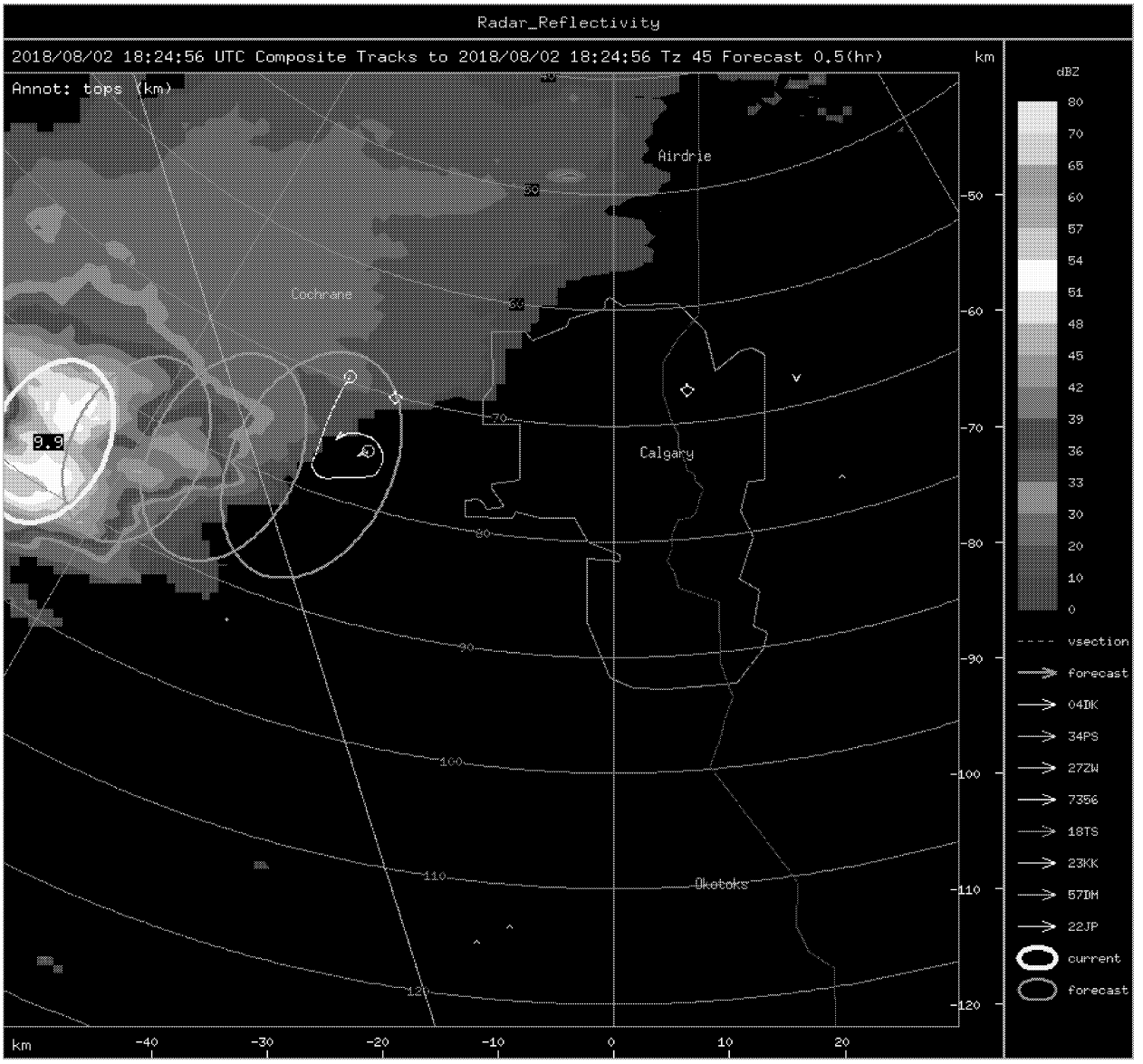

Fig. 51. The Olds-Didsbury radar display at 18:24Z (12:24 MDT) showing the cell that would be the most threatening cell of the day developing over the foothills west of Calgary. Hailstop 1 (white track) and Hailstop 2 (orange track) have both departed Springbank, and are enroute to seed the cell.

At 12:26 MDT (18:26Z) Hailstop 5 was launched from Springbank for base seeding. Hailstop 5, a C90 King Air, is often used for top seeding duties. When warranted, the larger C90 aircraft can be utilized as base seeders with burn-in-place flares at cloud base along with the smaller Cessna 340s. During this point in the storm's evolution, the severe cell was tracking toward Springbank, and Hailstop 5 was launched before the cell could reach the airport trapping the plane on the ground and rendering it unusable for operations. At 12:35 MDT, Hailstop 3 was launched from Red Deer as reinforcement for the initial top seeder. During severe storms over Calgary, backup top seeders are sometimes launched well before they are needed and asked to fly a holding pattern near the area where they will be taking over for another aircraft. In theory, the aircraft could be launched with only just enough time to reach the storm at the exact time they are needed. However, having them available early eliminates gaps in seeding coverage due to unforeseen delays or timing errors. Hailstop 2 began base seeding at 12:34 MDT (Fig.

52) along the southeast side of the cell where a significant shelf cloud was observed with strong inflow. Wing tip generators were utilized along with continuous burn-in-place flares.

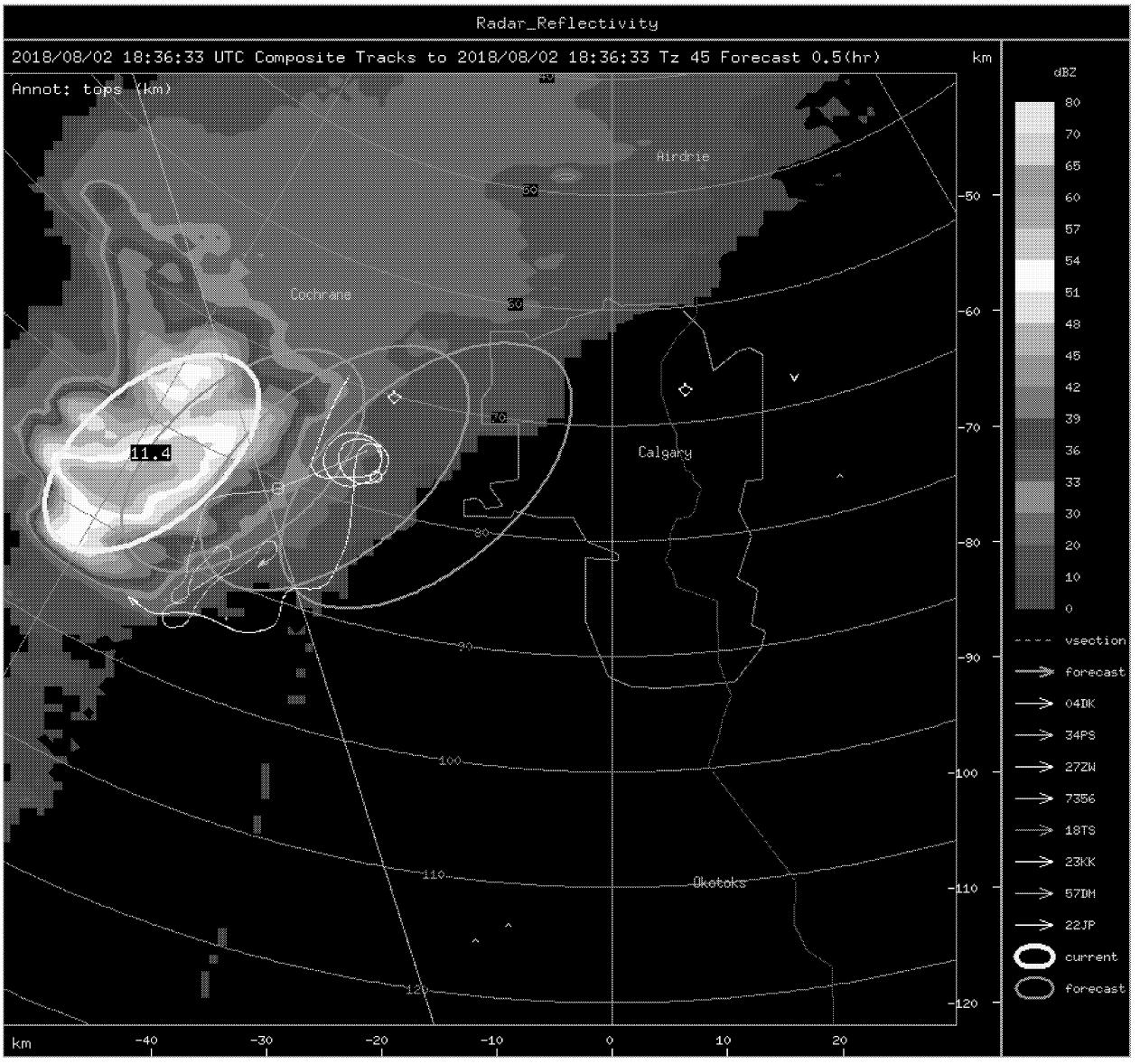

Fig. 52. The Olds-Didsbury radar display at 18:36Z (12:36 MDT) showing the most damaging cell of the day approximately thirty to forty minutes upwind of Calgary (based on the storm movement at the time). Seeding has begun, and the third aircraft from Springbank (Hailstop 5), was also on the way, having been launched at 18:26Z (12:26Z). Hailstsop 3 from Red Deer (blue track, not yet in view) was also launched at this time as reinforcement for top-seeding.

After circling and climbing to top seeding altitude just south of Springbank, Hailstop 1 shifted southward to the flanking line of the storm. Upon arrival, they found abundant visual targets with heavy amounts of supercooled liquid water. They began top seeding at 12:40 MDT (18:40Z, Fig. 53). As seeding began, Hailstop 1 was informed that a backup top seeding aircraft had already been launched from Red Deer to replace them and that seeding rates should be aggressive. Heavy doses of ejectable flares were utilized along with nearly continuous burn-in-place flares at cloud top.

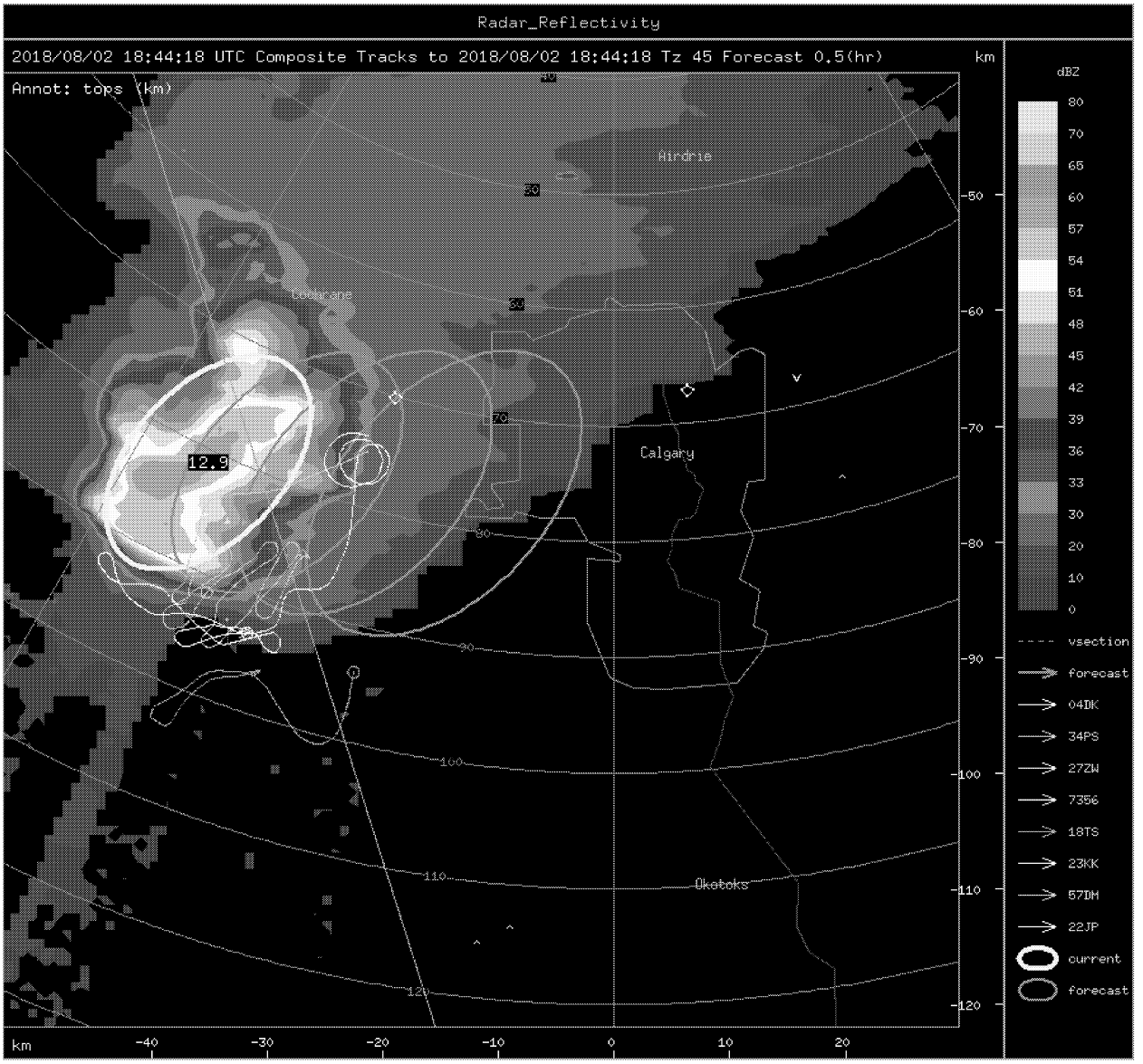

Fig. 53. The Olds-Didsbury radar display at 18:44Z (12:44 MDT) showing a severe (12.9 km tall) TITAN cell approaching Calgary. Seeding is well underway at both cloud top and base, while a second base seeding aircraft (Hailstop 5, pink track) is joining the action.

Hailstop 5 began base seeding at 12:51 MDT. At this point in the day's activity, the storm was approximately fifty minutes from reaching the Calgary city limits and was being seeded heavily by three aircraft. At 12:54 MDT the last available aircraft, Hailstop 4, was launched to the Calgary cell (Fig. 54). Radar signatures indicated the storm was beginning to turn right and exhibiting supercell characteristics. Hailstop 1 expended its entire load of ejectable flares at cloud top before the storm entered Calgary.

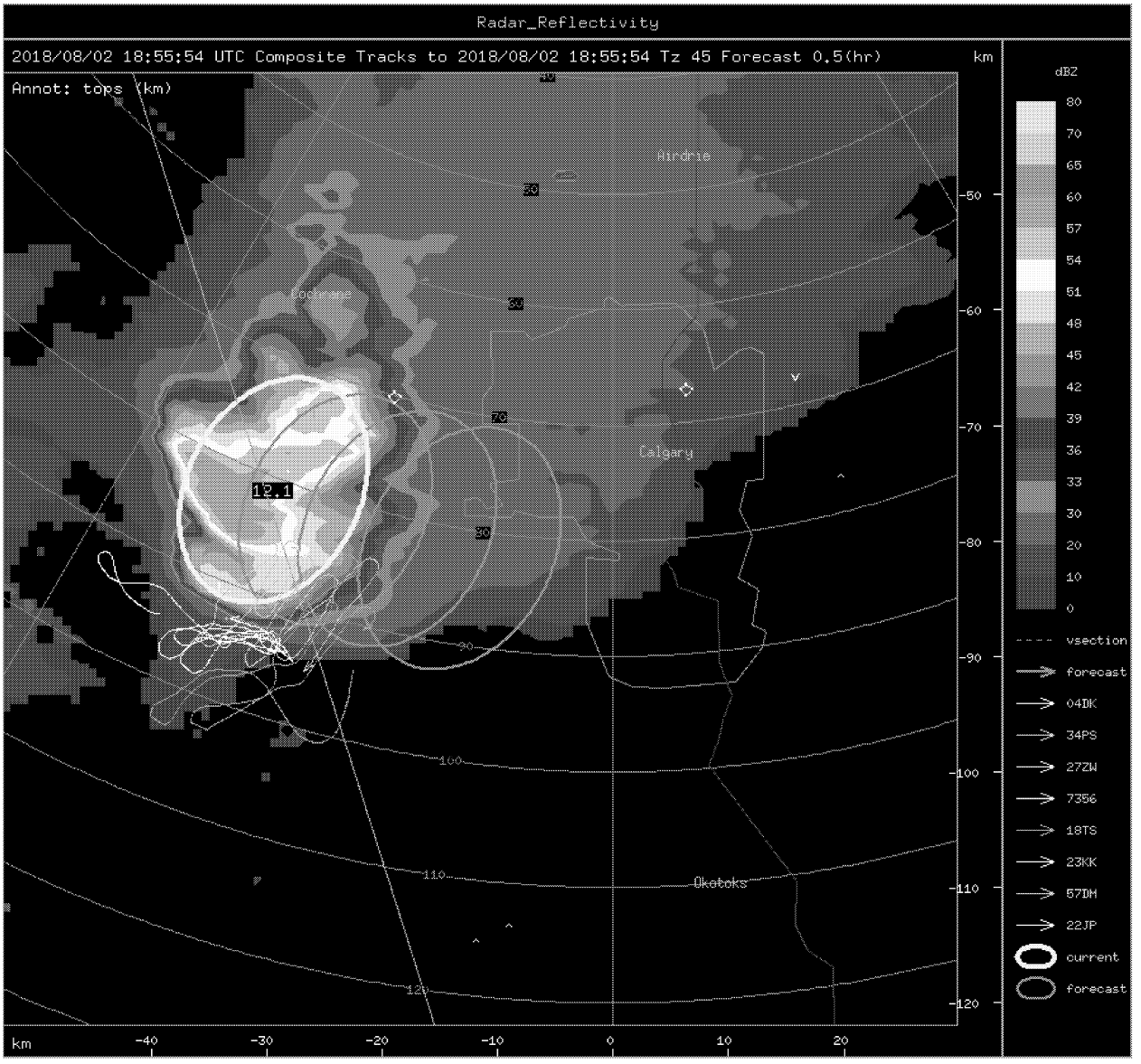

Fig. 54. The Olds-Didsbury radar display at 18:55Z (12:55 MDT) showing a large 12.1 km cell approaching Calgary. Cell movement has slowed slightly and storm motion has turned to the right, likely indicating a more organized updraft. The storm is still approximately 30 minutes upwind of Calgary at the slower speed. All Springbank aircraft continue seeding with Hailstop 1 at top and Hailstop 2 and Hailstop 5 at cloud base. Hailstop 3 (blue track, but not yet in view) and Hailstop 4 (green track, but not yet in view) had been launched at this time, meaning all five aircraft were either seeding or on the way to the storm.

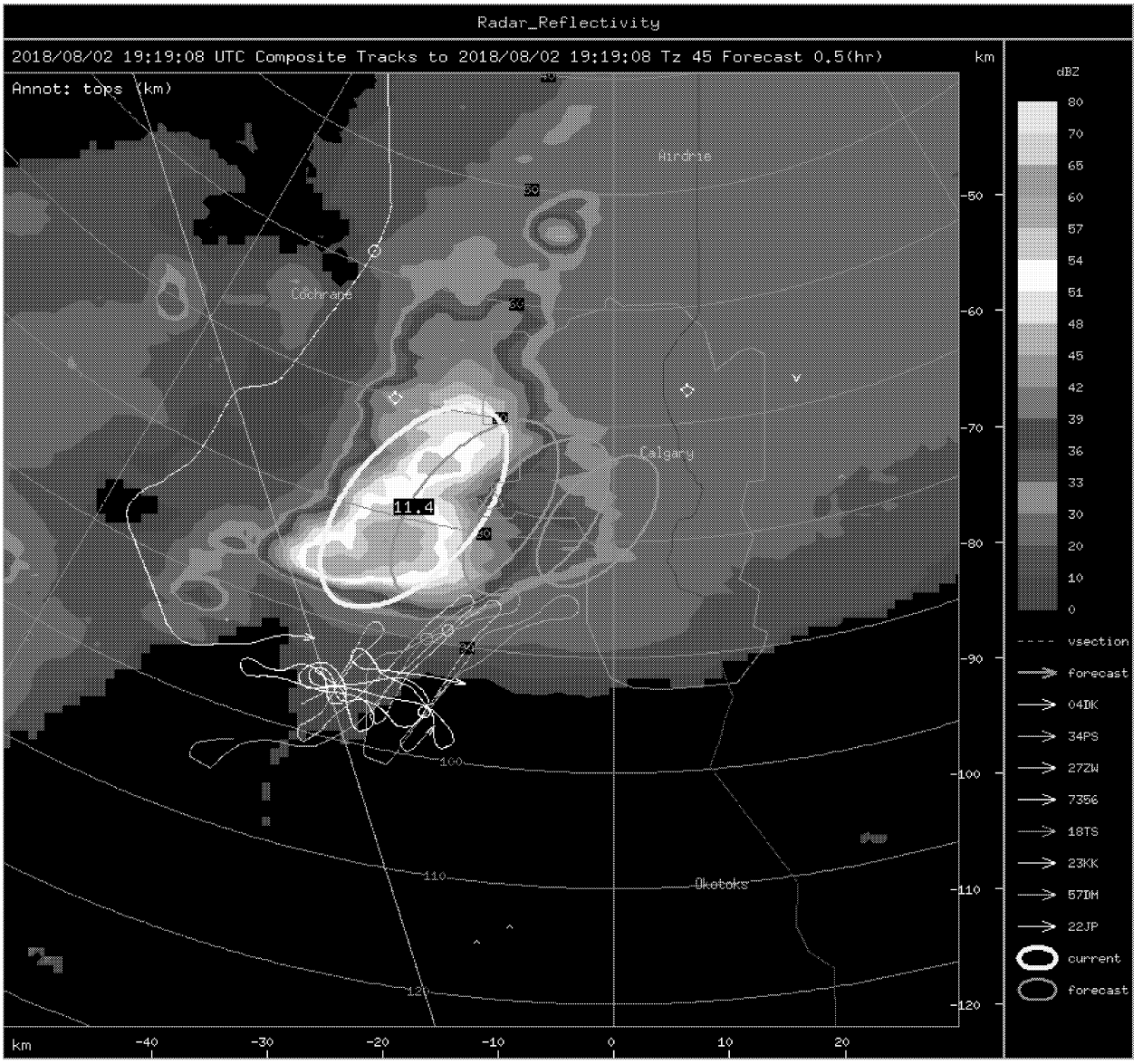

Fig. 55. The Olds-Didsbury radar display at 19:19Z (13:19 MDT) showing the severe cell continuing to slow. The severe storm core was shrinking slightly. Hailstop 3 (blue track) arrived from the north as reinforcement at cloud top, and navigated around embedded showers on the west side of the main storm to reach the flanking line. The first top seeder (Hailstop 1, white track) had fired the last of their load of ejectable flares and was seeding with burn-in-place flares and descending to lower altitudes in preparation for departure from the area. By vacating the top-seeding altitude as Hailstop 3 arrived, Hailstop 3 could access that airspace without delay, facilitating continuous seeding.

At 13:31 MDT, Hailstop 3 arrived at the storm from the west and took over for Hailstop 1 at cloud top utilizing aggressive seeding rates. Hailstop 1 was directed to immediately land for a "quick turn" and prepare for another flight as soon as possible, if needed. Since there was significant convection near the Springbank Airport, Hailstop 1 was not able to return to their normal base of operations and instead headed for the Olds-Didsbury Airport to immediately fuel and re-flare while the storm continued to be seeded by three aircraft. Small supplies of flares are kept on hand at the radar facility at the Olds-Didsbury Airport for such situations. Hailstop 2 and Hailstop 5 continued to base seed along the shelf cloud on the southeast side of the storm.

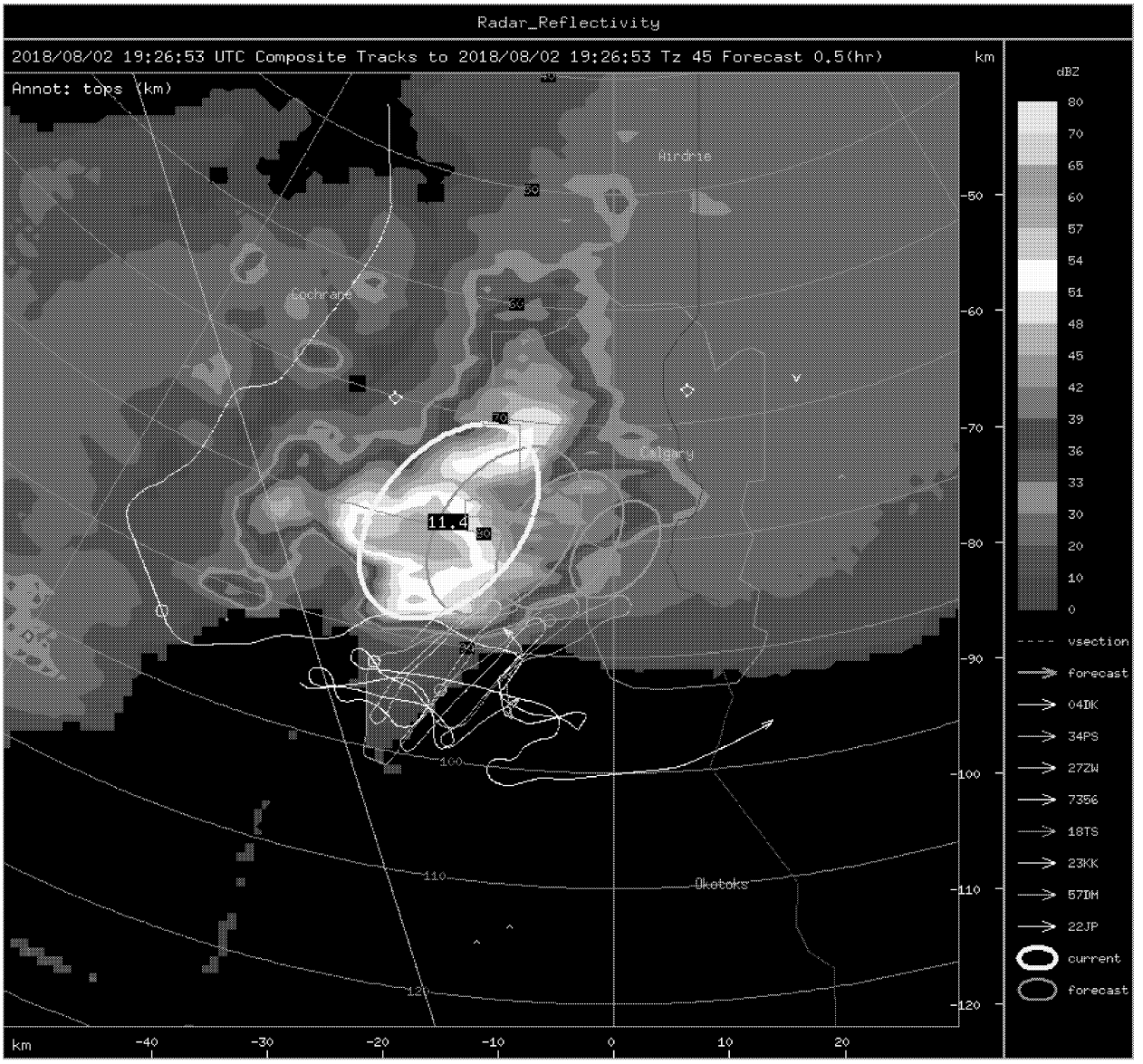

Fig. 56. The Olds-Didsbury radar display at 19:26Z (13:26 MDT) as the core of the storm approaches western Calgary. Hailstop 3 (blue track) had taken over top seeding as Hailstop 1 (white track) headed for the Olds-Didsbury Airport for fuel and flares (The Springbank Airport was experiencing the storm.) Hailstop 4 was airborne and headed toward the storm as reinforcement for the base seeding aircraft, but not yet in range.

At 13:38 MDT, the core of the storm began moving into the Calgary city limits.

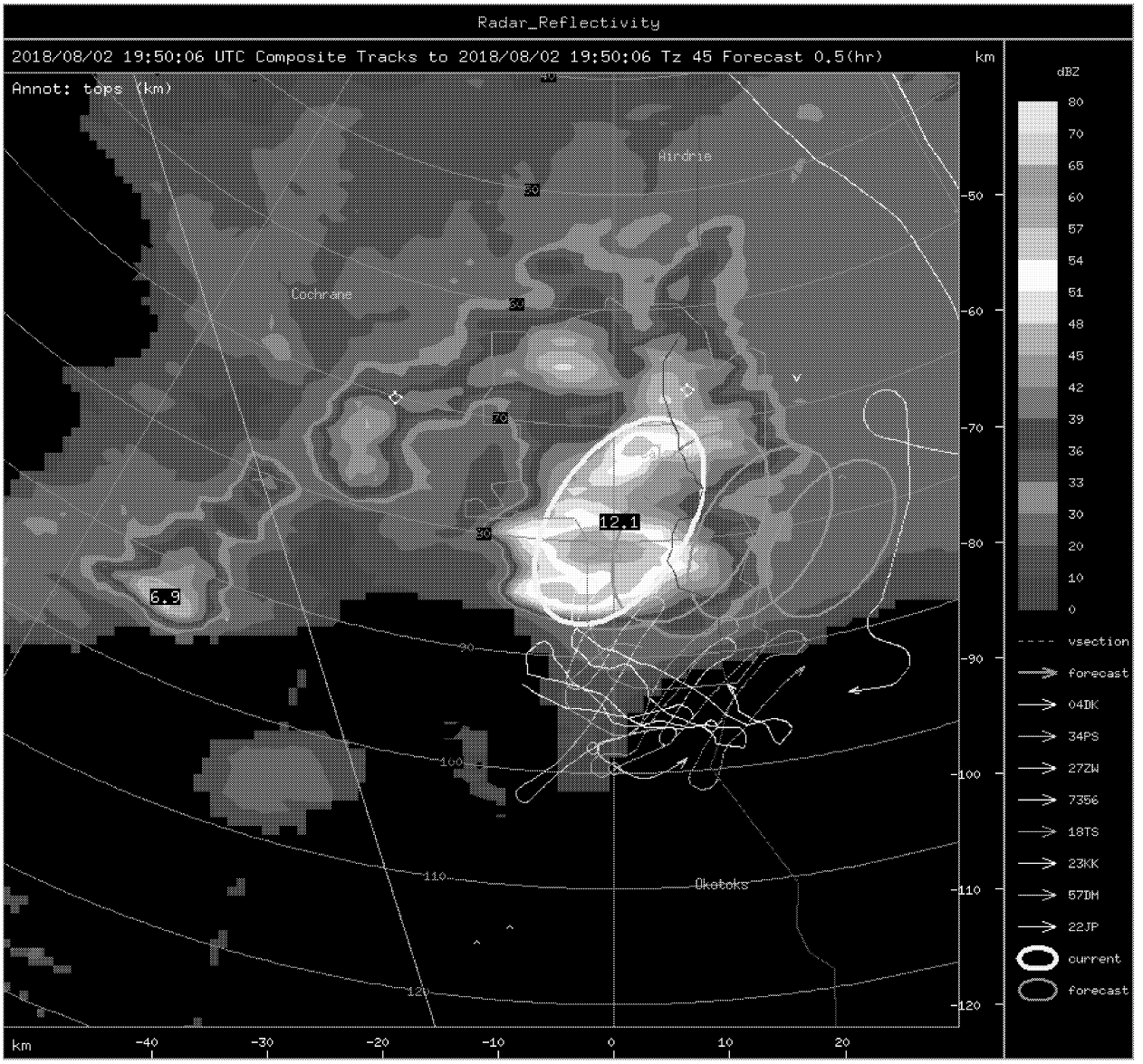

Fig. 57. The Olds-Didsbury radar display at 19:50Z (13:50 MDT) as a 12.1 km tall severe storm moved into southwestern Calgary. Hailstop 3 seeded from cloud top while Hailstop 2 and Hailstop 5 base-seeded. Hailstop 4 (green track) had arrived on the scene and was approaching from the east to join base seeding activities.

Hailstop 4 began base seeding over Calgary at 14:01 MDT. As the storm pushed eastward through the southern portion of the city, four aircraft continued seeding. Three base seeders were able to maintain excellent inflow along a multilevel inflow shelf while maintaining slight vertical separation in the tight airspace. The top seeder, Hailstop 3, continued seeding along the flanking line with ejectable and burn-in-lace flares.

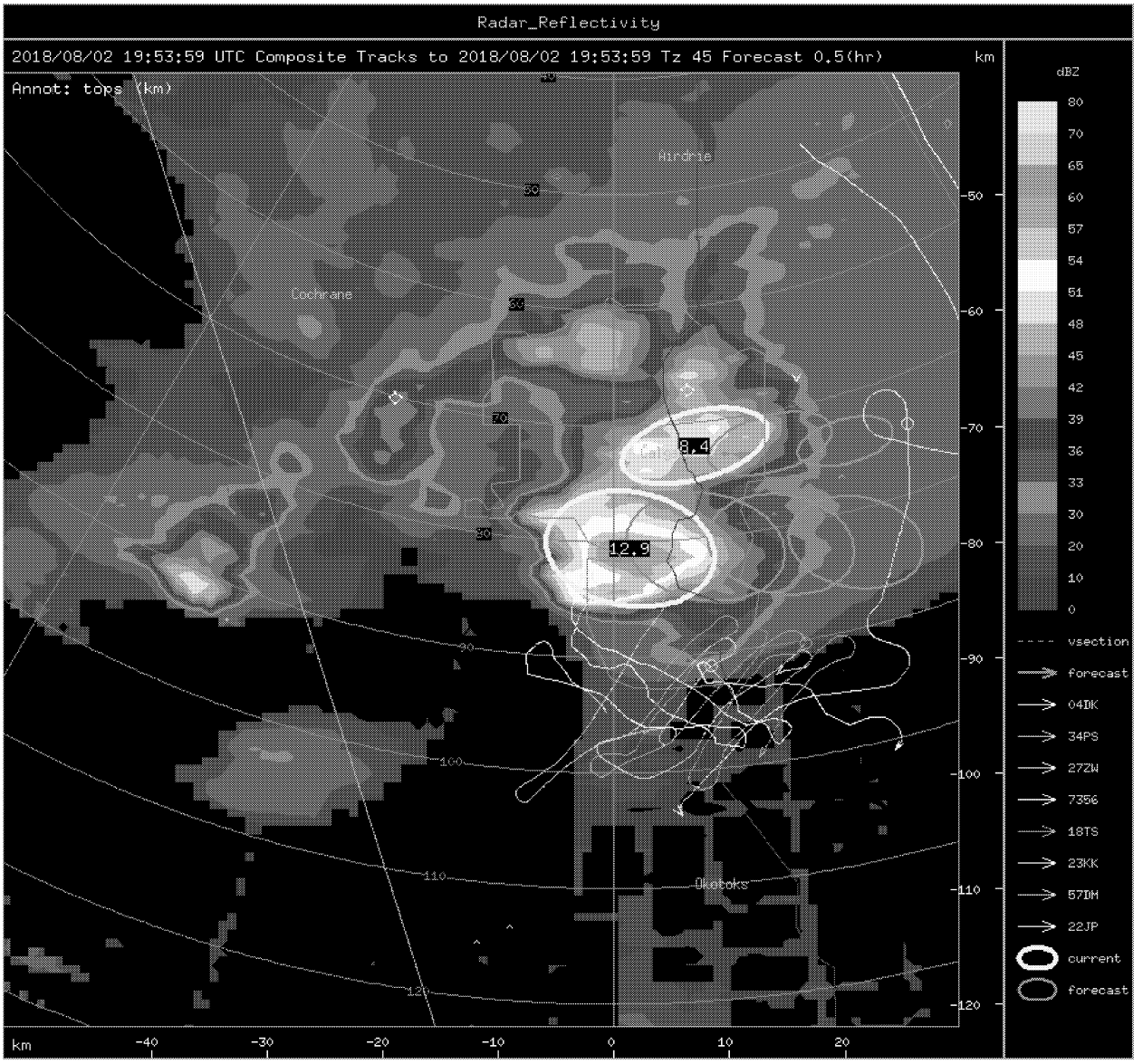

Fig. 58. The Olds-Didsbury radar display at 19:53Z (13:53 MDT) shows the severe storm, now 12.9 km tall, now fully within the city limits of Calgary. Four Hailstop aircraft continued to seed.

The team of four aircraft maintained their positions relative to the storm as it pushed through the city with 12.9 km cell top heights. Once the storm had moved beyond the Calgary city limits, it showed some early potential to hit Strathmore, so several aircraft remained with the cell for this reason. By 20:25 MDT, two aircraft were directed to return to base as they were low on chemical following the aggressive seeding for Calgary. The two remaining aircraft were directed to return to base five minutes later as the storm trajectory and intensity had changed and the storm was no longer deemed a significant hail threat to Strathmore. Hailstop 4 was diverted from landing for a short time to briefly seed and patrol a new cell southwest of Calgary, but this storm did not develop into a major hailstorm.

During the rest of the afternoon, all five aircraft would each fly one additional mission for various other weaker storms near Sundre, Bentley, Lacombe, and Calgary. Additional seeding occurred, though not nearly as aggressively as for the Calgary cell. None of these subsequent storms appeared to become severe hail threats as most of the late day convection was embedded and more linear with weaker updrafts.

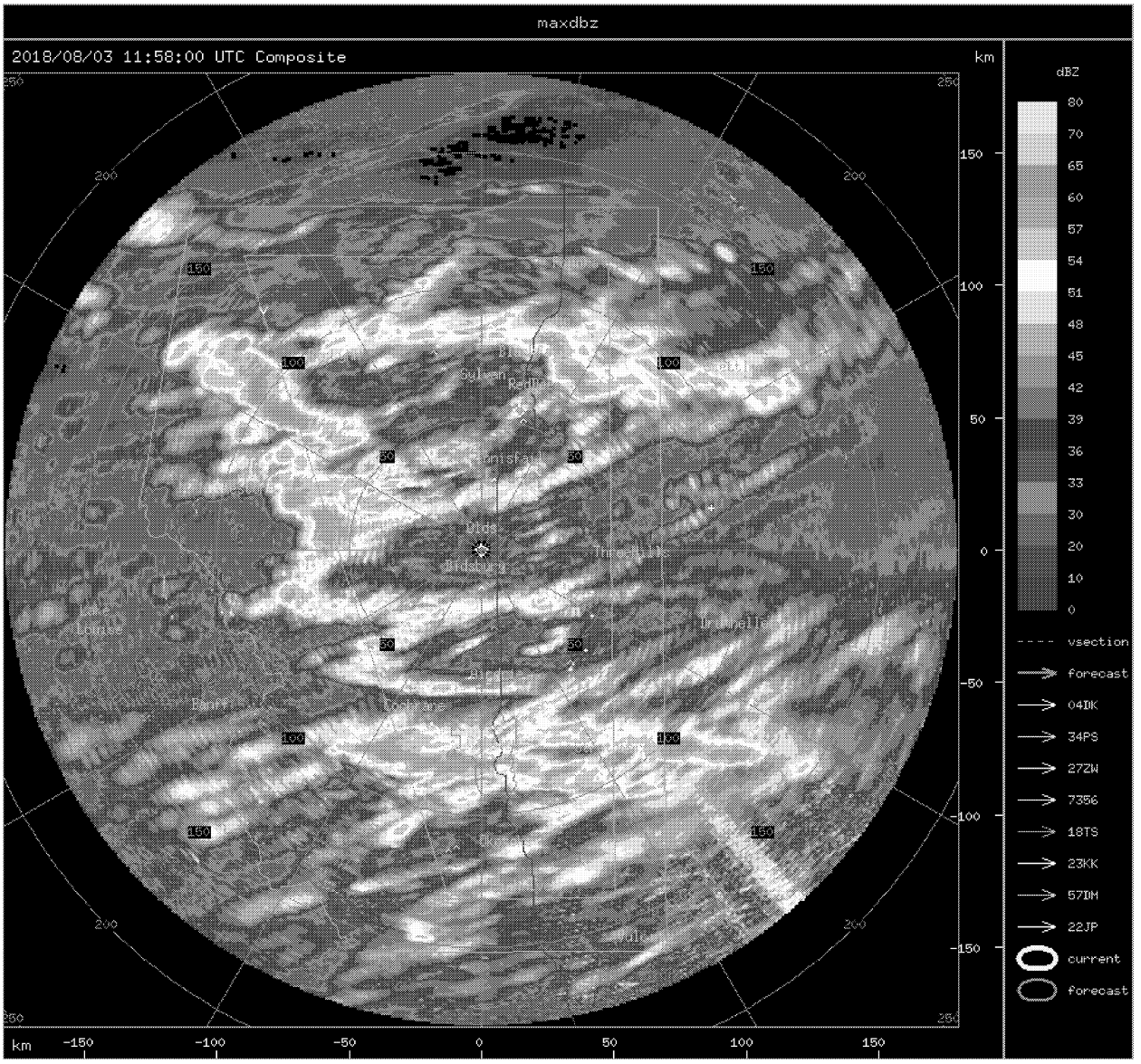

Fig. 59. The composite maximum radar reflectivity plot for the entire storm day of 2 August 2018. The entire day's storm activity is shown with numerous cells initiating along the foothills and progressing eastward into the project area. Bright orange shades indicate the most intense radar returns, and thus the most potential for damaging hail. The diameter of the core of intense radar reflectivity west of Calgary shrunk significantly as the cell moved through the city. The smaller diameter of the high intensity reflectivity core is broadly correlated with the aggressive seeding upwind of and over Calgary.

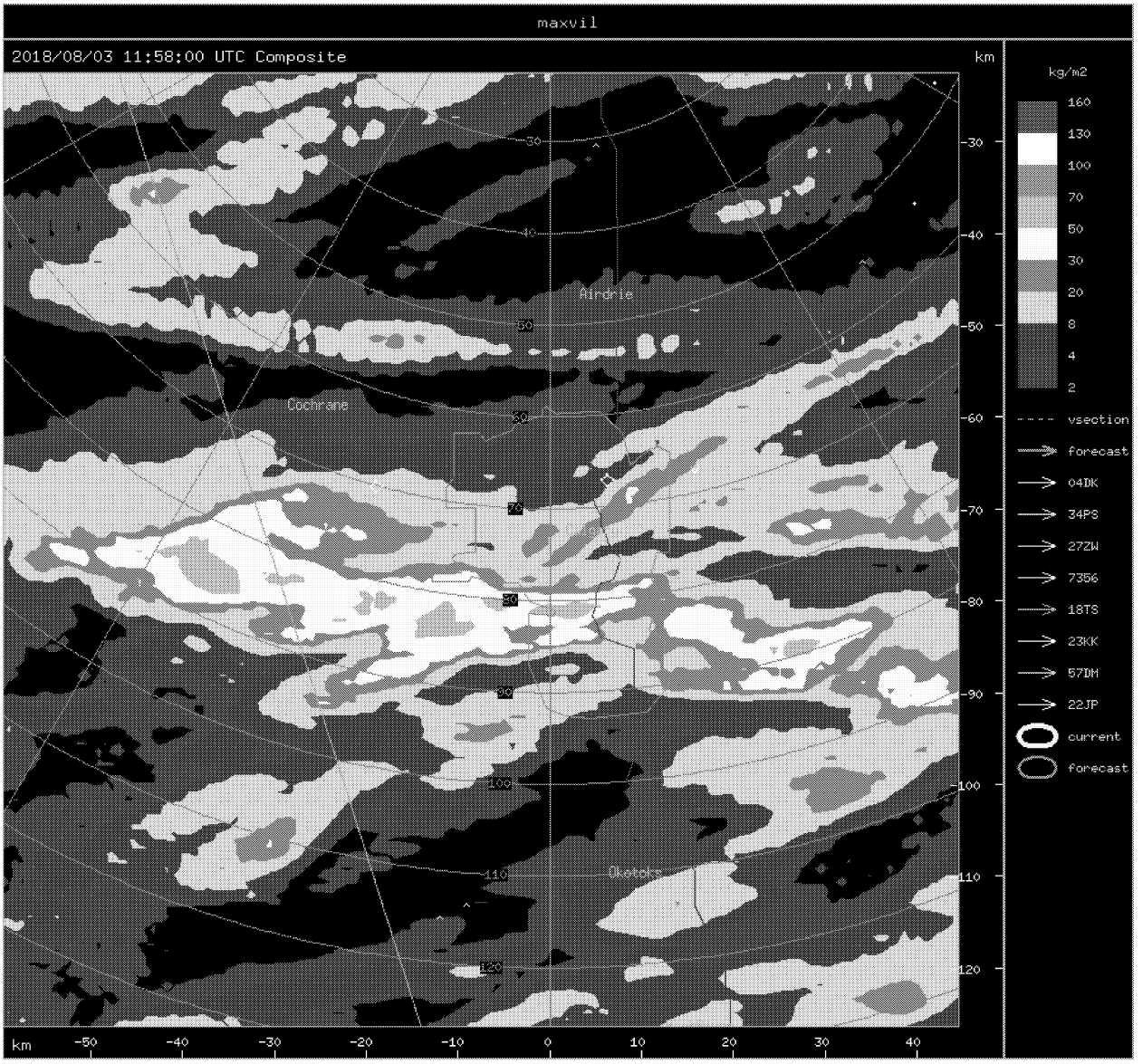

Fig. 60. The maximum vertically-integrated liquid (VIL) measured by the radar is shown for the entire storm day of 2 August 2018. VIL is well-correlated with hail size. Yellow and orange shades indicate the swaths of most damaging hail. Note the width of the max VIL swath (hail damage path) shrunk considerably from the time that it developed over the foothills to when it entered Calgary.

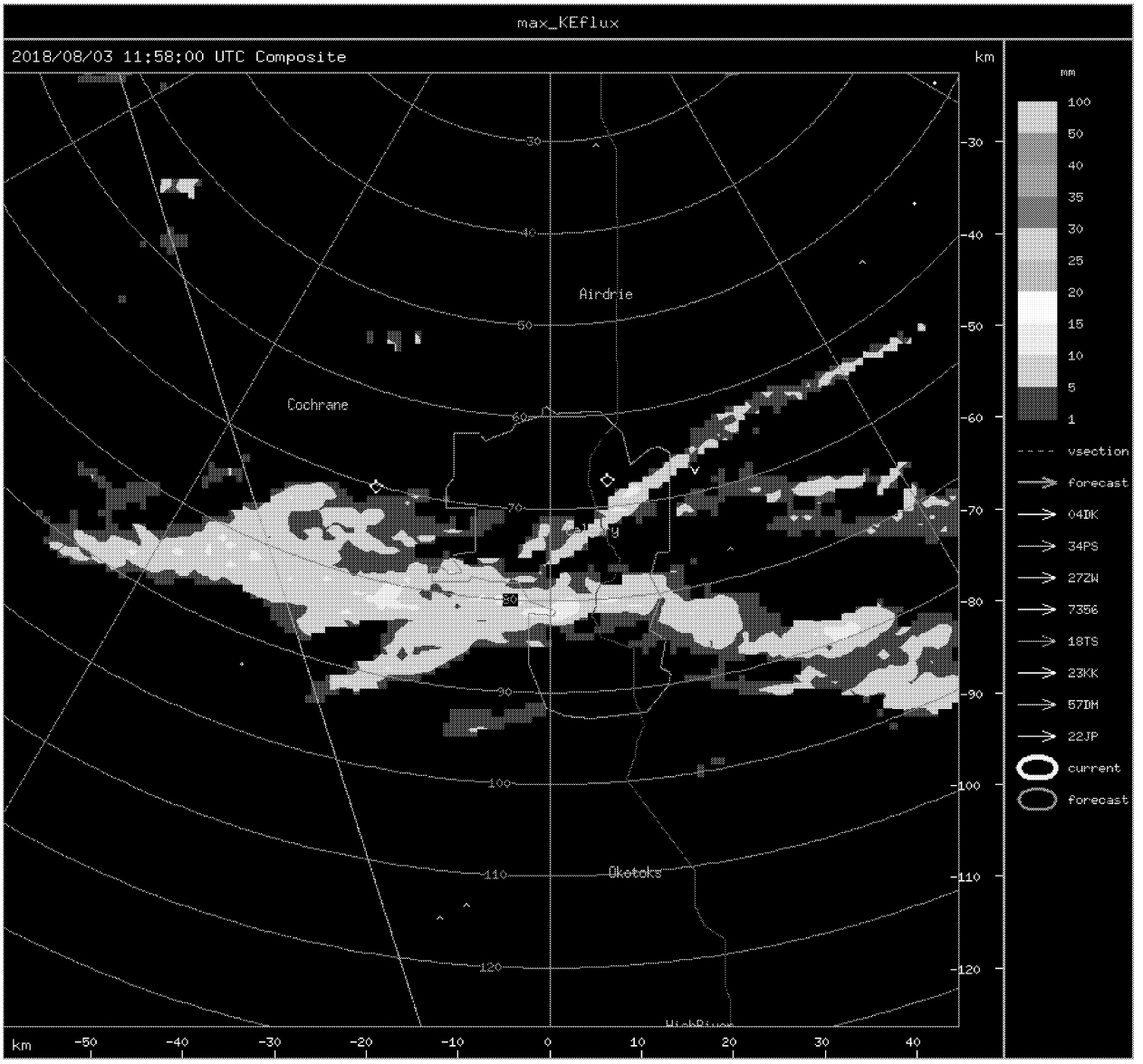

Fig. 61. The maximum kinetic energy flux calculated by the radar TITAN software is shown for the entire storm day of 2 August 2018. This parameter is also used to estimate the damage path for hailstorms. Similar to the maxVIL map in Fig. 60, the width of the damage path appears to have shrunk considerably as the storm pushed through the city from west to east. Assuming this decrease in diameter of the damage path can be attributed to seeding and not natural variability, the presence of the much larger diameter hail swath upwind of Calgary would indicate that the hail damage could have covered a much larger portion of the city without seeding.

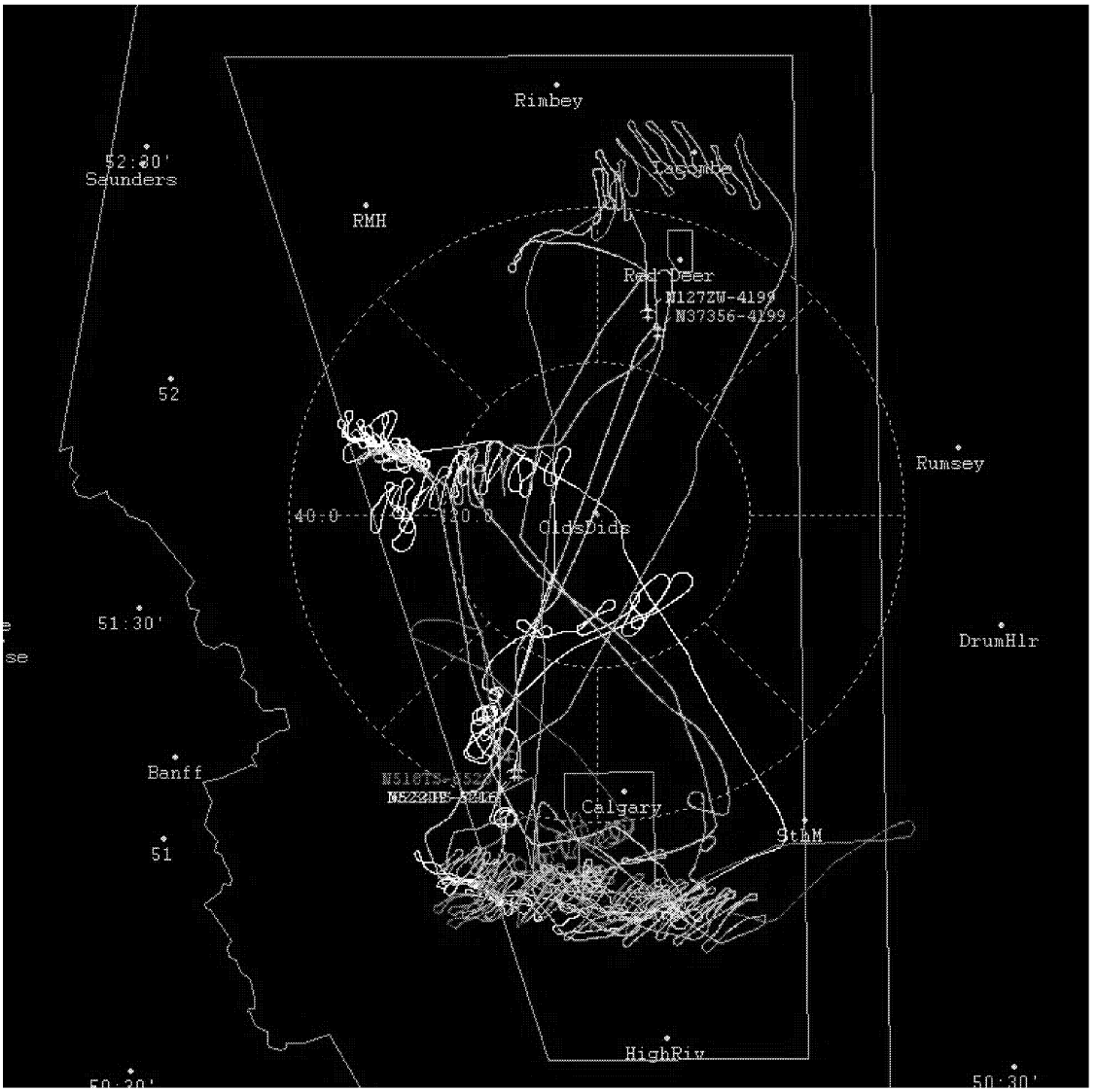

Fig. 62. *AirLink* GPS aircraft seeding tracks for the entire storm day of 2 August 2018. Track colors are as follows: Hailstop 1, white; Hailstop 2, orange; Hailstop 3, light blue; Hailstop 4, green; and Hailstop 5, pink. The WMI *AirLink* aircraft tracks show that the storm that moved through Calgary was very well seeded by all five aircraft. Seeding began before the cell had moved inside the official project boundary. Other minor storms were also seeded near Sundre, Bentley and Lacombe on this day.

CONCLUSIONS

Larger than golf ball size hail was reported west and southeast of Calgary. Within the city limits, golf ball size hail was reported. However, damage was spotty and localized to neighborhoods in the southern third of the city. The observed convective day category was +5. There were no other hail reports this day from any of the later afternoon seeded storms over Sundre, Calgary, or Lacombe. All five aircraft flew two seeding missions, and all five aircraft seeded for the most severe storm of the day over Calgary. Seeding began early for the Calgary cell, approximately fifty minutes before reaching the city. Seeding rates were very heavy and appropriate for the severity of the storm. Continuous seeding coverage was maintained throughout the most critical portions of the storm track. Position of the seeding aircraft relative to the storm was appropriate for proper targeting, and all equipment functioned properly.

At total of 42.5 kg of silver iodide seeding material was utilized during 10 seeding flights. A total of 732 ejectable 20 gram flares were utilized along with 129 burn-in-place 150 gram flares. Wing tip generators were utilized for a combined total of 475 minutes total generator time. There were six seeded storms throughout the course of the day including cells over Calgary, Sundre, Bentley, and Lacombe. During the first five flights of the day for the severe Calgary cell, the vast majority of the day's seeding occurred including 538 ejectable flares, 101 burn-in-place flares, and 310 burner minutes.

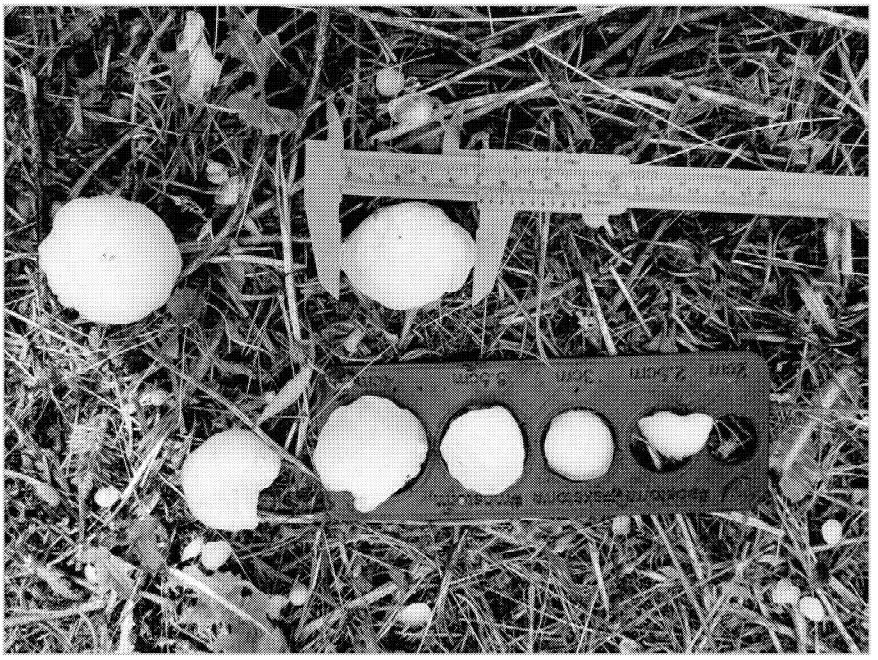

Fig. 63. A 5 cm diameter hailstone was the largest reported for the day southeast of Calgary near 104 St SE and Highway 22X. (Photograph by Darren Howard, used by permission).

14. CLIMATIC PERSPECTIVES

The 2018 season saw storm severity close to normal compared with previous seasons. Convective available potential energy (CAPE) was 481 J/kg on average during the summer which was only 58 J/kg lower than the average. Since CAPE values within the project area can range from 0 to 3000 J/kg during a usual summer, instability was near normal. The diurnal change in instability was typical in that most of the severe storms occurred during the afternoon and evening hours. Severe storm activity rapidly diminished after sunset due to loss of surface heating from the sun.

Temperatures for the summer averaged around 21.7°C, very close to the seasonal normal of 21.8°C. The average dew point temperature was 7.8°C for the season. This compares with an average dew point temperature of 8.8°C during project's history (1996-2018). Lower-than-normal dew points mean thunderstorms will have a tougher time intensifying into severe thunderstorms. One degree won't make a big difference, but is significant.

In terms of precipitation, the summer started out with slightly above-normal precipitation. This lasted through mid-July. Precipitation was then close to normal from mid-July through the early half of August. The latter half of August into September then experienced drier-than-normal conditions across the area. August and September saw thick smoke over the region, limiting visibilities and reducing surface heating across the protected area. The smoke was caused primarily by persistent fires in British Columbia.

The daily and accumulated rainfall for from January 2018 through December 2018 is shown in Fig. 64. Calgary was above normal until the second week of August, when the ridge built and convection largely ended for the season.

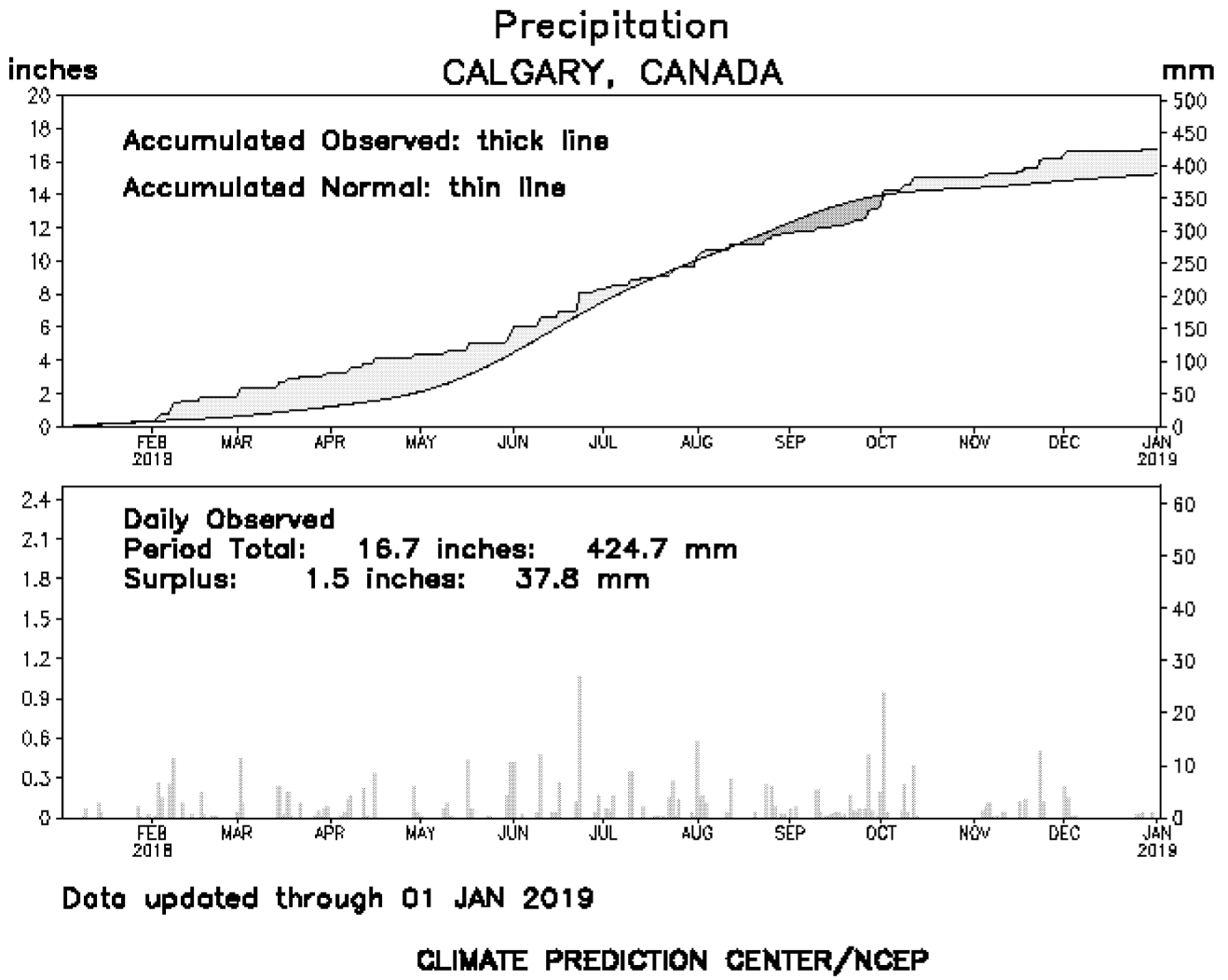

Fig. 64. Calgary precipitation, daily and cumulative, for calendar year 2018. (Data and plot from the National Center for Environmental Prediction, NOAA.) Precipitation data for Red Deer, Penhold, Lacombe and Blackfalds are unavailable, and so an analogous graphic for the northern portion of the project area is unavailable.

14.1 EL NIÑO/SOUTHERN OSCILLATION (ENSO) DISCUSSION

The links between sea surface temperatures in the equatorial Pacific Ocean and the weather and climate of Alberta are not clearly defined. However, there has been a slightly positive correlation between hot, dry summers and El Niño (warm ocean) conditions; and cool, wet, stormy summers with La Niña (cool ocean) conditions.

ENSO-neutral continued during May, as indicated by mostly average sea surface temperatures (SSTs) across the central and eastern equatorial Pacific. The weekly Niño indices were between +0.2°C and 0.0°C, except for the Niño-1+2 index, which remained negative (-0.5°C). Positive subsurface temperature anomalies (averaged across 180°-100°W) increased over the past month, as another downwelling equatorial oceanic Kelvin wave reinforced the already above-average subsurface temperatures. Convection remained suppressed near the Date Line and was slightly enhanced over Indonesia. Low-level and upper-level winds were near average across the equatorial Pacific Ocean. Overall, oceanic and atmospheric conditions reflected ENSO-neutral.

ENSO-neutral continued during July, as indicated by near-average sea surface temperatures (SSTs) across the central and eastern equatorial Pacific at the end of the month. The weekly Niño indices were 0.0°C for the Niño-3 index, +0.1°C for the Niño-3.4 and Niño1+2 indices, and +0.4°C for the Niño-4 index. Positive subsurface temperature anomalies (averaged across 180°-100°W) continued over the month, and the volume of anomalous warmth extended to the surface in the eastern part of the basin. Convection remained suppressed near the Date Line and over western Indonesia. Low-level winds were near average across most of the equatorial Pacific Ocean, while upper-level wind anomalies were westerly over the eastern Pacific and near the International Date Line. Overall, the oceanic and atmospheric conditions reflected ENSO-neutral.

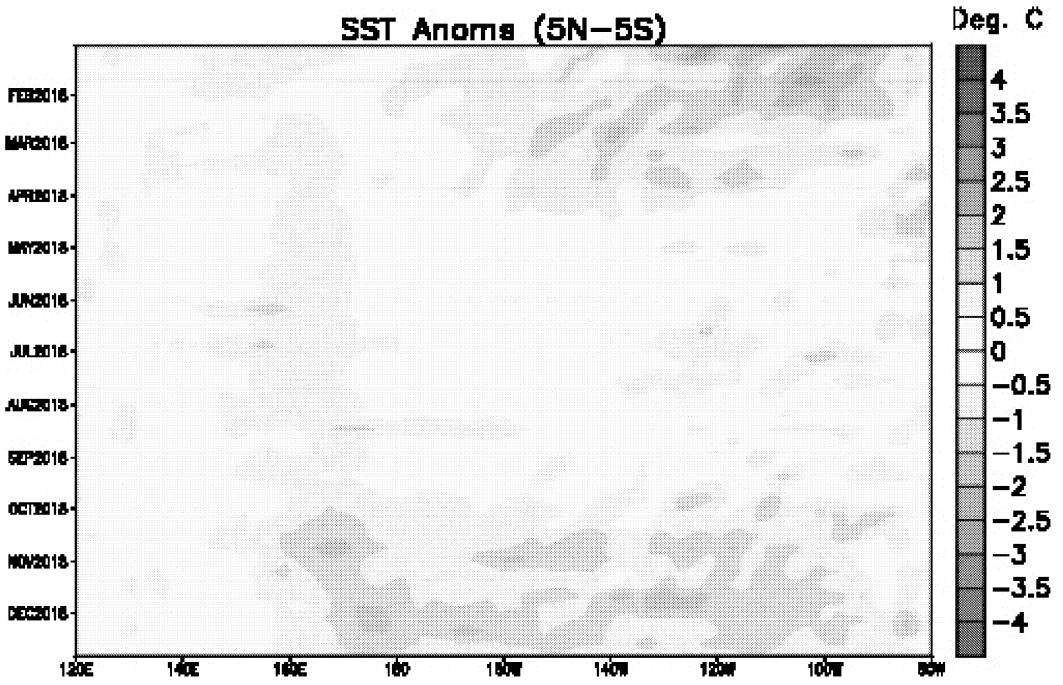

Fig. 65. Sea Surface Temperature (SST) anomalies by date and longitude, for latitudes 5°N through 5°S. (Graphic from NCEP.) As the discussions and graph all indicate, conditions were essentially ENSO-neutral through the project period.

ENSO-neutral continued during September, but with increasingly more widespread regions of above-average sea surface temperatures (SSTs) across the equatorial Pacific Ocean. Over the last month, all four Niño index values increased, with the latest weekly values in each region near +0.7°C. Positive subsurface temperature anomalies (averaged across 180°-100°W) also increased during the last month, due to the expansion and strengthening of above-average temperatures at depth across the equatorial Pacific. Convection was increasingly suppressed over Indonesia and around the Date Line. Low-level westerly wind anomalies were evident over the western and east-central Pacific, with some of the strongest anomalies occurring over the eastern Pacific during the past week. Upper-level wind anomalies were easterly over the east-central Pacific. Overall, the oceanic and atmospheric conditions reflected ENSO-neutral, but began to trend towards a developing El Niño.

15. CONCLUSIONS

The 2018 field program ran smoothly. All storms worthy of treatment according to the current operational guidelines were seeded in a timely way. The most significant storm day of the season was August 2nd, when all five aircraft seeded, and all flew multiple missions. Strong storms developed in the southern portion of the protected area, striking Calgary during the early afternoon. Additional strong storms blossomed over much of the project area during the afternoon and evening, threatening the more northern cities. A detailed storm summary of this day is included.

Overall, the personnel, aircraft, and radar performed well and there were no interruptions of service. A lightning strike to an engine on Hailstop 1 on July 10th resulted in that aircraft being grounded while the engine was inspected, but a replacement aircraft of the same type was on station and ready for action on July 12th. No seeding opportunities were missed.

The storm frequency was near normal; the season ranked ninth in terms of seeding activity. Having the fifth aircraft available allowed the project Lead Meteorologist to increase aircraft coverage when long-lived storms moved through or near a succession of municipalities, and to seed earlier at sustained, effective rates when severe storms threatened high priority cities and towns. Overall, it was a good year.

Bruce Boe, Vice President – Meteorology
Jody Fischer, Director of Flight Operations
Brian Kindrat, Project Manager
Daniel Gilbert, Chief Meteorologist, Alberta Lead Meteorologist
Bradley Waller, Field Meteorologist
Adam Brainard, Field Meteorologist/Numerical Modeler

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APPENDICES

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APPENDIX A – ORGANIZATION CHART

ALBERTA HAIL SUPPRESSION PROJECT 2018
DAILY SUMMARY REPORTS

Date	Weather	Activities Summary
June 1, Friday	A mid and upper level trough was expected to slide northeastward across AB during the time of peak heating. A few weak lobes of PVA looked to move eastward across the region. This PVA was expected to occur along a lee trough. Upslope flow appeared to persist through the early evening. Starting mid-evening, the winds were expected to switch to westerly which would allow dew-points to quickly drop from west to east across the area. Area model soundings indicated just enough instability would be present from late afternoon through early evening to produce isolated areas of pea size hail. Stratiform rain showers fell over the entire region in the morning. These showers then ended in the early afternoon. The cloud cover diminished from the west to east in the afternoon which allowed surface heating to occur. Starting around 23Z a cluster of thunderstorms initiated to the west of Cremona over the foothills. Storm (#1) moved off the foothills to the northwest of Cochrane at 00Z (06/02). This storm then moved southeastward into Calgary in the evening. Later in the evening, a thunderstorm formed west of Rocky MH. This thunderstorm pushed southeastward toward the Caroline area at the time of sunset. Radar data indicated grape size hail may have fallen to the west of Caroline. The thunderstorm was long lived and eventually moved across most of the project area during the early nighttime hours. Pea size hail observed 10 miles NE of Cochrane. Max cell top: 8.4km, 60.3 max dBz, 35.1 max VIL Tmax YC = 16.0C and 10.7mm of rain. Tmax QF = 13.9C and no rain data. Tmax Radar = 14.2C and 9.9mm of rain.	HS2 flew a maintenance flight. The aircraft became airborne at 1814Z and landed at 1845Z. HS1 was launched at 0012Z (06/02) to a TITAN cell moving southeastward into the project area north of Cochrane. They were airborne at 0033Z (06/02). At 0038Z (06/02) HS1 began patrolling for Cochrane. The aircraft began top seeding storm #1 for Calgary at 0108Z (06/02). Then at 0111Z (06/02) they stopped seeding and started patrolling the Calgary area. The aircraft resumed seeding storm #1 for Calgary at 0137Z (06/02). HS1 stopped seeding and started patrolling Calgary at 0150Z (06/02). At 0156Z (06/02) the crew RTB and landed at 0205Z (06/02). Flight Summary HS2: 1805Z-1848Z; no seeding; maintenance flight. HS1: 0025Z-0207Z (06/02); 11 EJ; patrol Cochrane; #1 Calgary.
June 2, Saturday	Jet energy looked to lift to the north of the area as a subtle shortwave ridge of high pressure built over AB. Subsidence associated with the ridge appeared to warm temperatures at the mid and low levels of the atmosphere. This was expected to cause tropospheric stabilization. The low levels and surface looked to see downsloping winds throughout the period. These winds appeared to aid in keeping dew-points low. Higher dew-points were expected to be possible over the far northeastern part of the area. Area modified model soundings suggested anywhere from 10 to 200J/kg of CAPE would be present from mid-afternoon through around 8PM in the evening. Dry air was expected above 12kft MSL. Weak, isolated thunderstorms slid east-southeastward across the far northern part of the protected area during the afternoon hours. The rest of the project area saw fair weather	No aircraft operations.

	cumulus clouds in the afternoon and evening. Max cell top: 6.9 km, 54.2 max dBz, 15.0 max VIL Tmax YC = 21.1C and no rain. Tmax QF = 20.2C and no rain data. Tmax Radar = 21.0C and no rain.	
June 3, Sunday	An upper level ridge was projected to give way to a vigorous shortwave trough and jet streak ejecting northeast from Washington state. Robust PVA was predicted to provide sufficient lift for elevated convection from the late evening into the overnight hours. Linear fast moving thunderstorms were expected, potentially producing small to moderate hail. Activity was projected to depart by 9Z (06/04). A modest cap was forecast to keep any daytime activity a minimal convective concern. Chinook clouds were observed much of the day across most of the project area. A leading wave of elevated showers moved northeast from Sundre to Lacombe between 23Z and 1Z (06/04). A second wave approached the southwest project area between 2 and 3Z (06/04), but did not evolve into a convective threat. It dissipated near Cochrane around 0330Z. A third broken wave of showers and thundershowers approached the entire western project boundary shortly before 5Z (06/04). It dissipated as it moved into the project, and did not produce lightning inside the project boundary. Several more bands of elevated showers arrived in the project area in the late overnight hours, but all activity remained weak. No TITAN cells or lightning were observed through the period. No TITAN cells, 45.3 max dBz, 4.2 max VIL Tmax YC = 23.9C and no rain. Tmax QF = 22.8C and no rain data. Tmax Lacombe = 22.8C and no rain. Tmax Radar = 22.1C and no rain.	HS4 was launched at 0210Z (06/04) for a wave of convection swiftly moving northeast toward the southwestern project area. They were airborne at 0232Z (06/04). At 0309Z (06/04) HS4 started patrolling for Calgary. They then repositioned to the Sundre area at 0349Z (06/04). They started patrolling Sundre at 0412Z (06/04). The aircraft RTB at 0432Z (06/04) and landed at 0449Z (06/04). HS1 was launched at 0225Z (06/04) for a wave of fast moving convection approaching the southwest buffer. They were airborne at 0243Z (06/04). At 0301Z (06/04) HS1 began patrolling the Calgary area. They RTB at 0508Z (06/04) and landed at 0519Z (06/04). HS5 was launched to patrol the Calgary area at 0507Z (06/04). The aircraft became airborne at 0527Z (06/04). At 0533Z (06/04) they started patrolling the Cochrane area. The aircraft RTB at 0548Z (06/04) and landed at 0556Z (06/04). Flight Summary HS4: 0221Z-0454Z (06/04); no seeding; patrol Calgary, patrol Sundre. HS1: 0234Z-0522Z (06/04); no seeding; patrol Calgary. HS5: 0516Z-0558Z (06/04); no seeding; patrol Cochrane.
June 4, Monday	An upper level trough was forecast to move across the project area Monday, with mid-level temperatures falling sharply through late evening. Morning cloud cover was observed breaking up before briefing, and insolation was predicted to quickly give rise to air mass thunderstorms across much of the project area. Equilibrium levels were projected to be around 8km, so only modest (up to grape size) hail threats were anticipated. Activity was expected to dissipate after dusk, with clearing skies overnight. Weak morning showers parted followed by scattered sunshine and rapid destabilization. Convective thundershowers began to develop midday, with most activity remaining disorganized. Convection slowly intensified through the day, with a few convective cells becoming small hail threats in the northwest project area. Pea size hail was reported in Rocky Mountain House just before 0Z (06/05). Radar indicated up to grape size hail may have fallen approximately 20 miles northwest of Rocky	HS4 was launched at 1953Z for a broken line of thunderstorms near Sundre. They were airborne at 2012Z. HS4 began to patrol between Innisfail and Red Deer at 2020Z. They repositioned to a second area of convection west of Red Deer near Sylvan at 2047Z, and began patrolling that activity for Red Deer at 2055Z. HS4 repositioned to slightly stronger convection near Caroline at 2106Z. They began patrolling this for Caroline at 2115Z. HS4 RTB at 2149Z, and landed at 2201Z. HS2 was launched at 2012Z for a developing cell southwest of Calgary. They were airborne at 2031Z and immediately began to patrol Calgary. Convection remained weak, so they RTB at 2045Z. HS2 landed at 2055Z. HS3 was launched at 2218Z for a developing

	Mountain House. Convection shifted south in the evening, but remained north of a dry line situated near Airdrie. All activity weakened after sunset, and exited the eastern buffer at 0530Z (06/05). No significant weather occurred overnight. Pea size hail was reported in Rocky Mountain House. Max cell top: 8.4km, 58.2 max dBz, 30.2 max VIL Tmax YC = 20.0C and 0.6mm of rain. Tmax QF = 19.0C and no rain data. Tmax Lacombe = 18.9C and 2.6mm of rain. Tmax Radar = 18.3C and 7.9mm of rain.	thunderstorm northwest of Rocky MH. They were airborne at 2241Z. HS3 began patrolling Sylvan at 2247Z. At 2331Z they repositioned to new development around Rocky MH. HS3 began patrolling Rocky MH at 2338Z. They repositioned east toward Sylvan at 0006Z (06/05), and began patrolling the area at 0010Z (06/05). HS3 RTB at 0018Z (06/05). They landed at 0024Z (06/05). Flight Summary HS4: 2005Z-2203Z; no seeding; patrol Red Deer, patrol Caroline. HS2: 2020Z-2058Z; no seeding; patrol Calgary. HS3: 2231Z (06/04)-0028Z (06/05); no seeding; patrol Sylvan, Rocky MH.
June 5, Tuesday	The upper level jet was forecast to move overhead Tuesday night as an upper level ridge built across western Canada. Mid-level PVA was modeled to move across the project area mid-afternoon. Surface flow was forecast to be generally light and variable, but slightly upslope through the afternoon. Scattered convective showers and thundershowers were anticipated from mid-afternoon into the evening. This activity was forecast to remain weak and not a hail concern due to limited surface moisture and upper troposphere stability. Scattered light rain showers moved northeast in the northern project area between 12 and 14Z. Fair conditions were then observed until a wave of clouds and virga developed and moved across the project area between 22Z and 2Z (06/06). No significant weather occurred overnight. The strongest reflectivity observed occurred during the morning activity. No TITAN cells, 32.4 max dBz, 0.7 max VIL Tmax YC = 20.0C and no rain. Tmax QF = 18.7C and no rain data. Tmax Lacombe = 18.5C and no rain. Tmax Radar = 19.0C and no rain.	No aircraft operations.
June 6, Wednesday	An upper level ridge was projected to amplify across Alberta. No mid or upper level convective triggers were anticipated. Dry downslope flow was forecast in the low levels, with low dew points near 0C predicted through the daytime hours. No significant weather was forecast throughout the forecast period. Mostly clear and dry conditions were observed throughout the period. No meteorological echoes. Tmax YC = 23.4C and no rain. Tmax QF = 23.5C and no rain data. Tmax Lacombe = 23.3C and no rain. Tmax Radar = 23.7C and no rain.	No aircraft operations.

June 7, Thursday	The axis of an upper level ridge was modeled to pivot northeast away from the project area Thursday afternoon. No significant mid or upper level convective triggers were forecast. Low level flow was expected to turn southeast, transporting considerable moisture back into the region. Upslope flow was projected to foster convection, particularly near the northwest project area, with some cells capable of producing small hail by evening. Activity was forecast to weaken after dusk with the loss of surface heating. Mostly clear but hazy conditions were observed from Thursday morning well into the afternoon. Orographic convection, strongest to the northwest, was observed beginning around 22Z, with a few cells producing rain and lightning in the project area west of Rocky MH. No activity became strong enough to become a hail concern. Rain showers continued well into the overnight hours in the northwest project area, finally exiting to the north around 10Z (06/08). No TITAN cells, 49.5 max dBz, 7.3 max VIL Tmax YC = 26.3C and no rain. Tmax QF = 26.7C and no rain data. Tmax Lacombe = 27.2C and no rain. Tmax Radar = 25.4C and no rain.	No aircraft operations.
June 8, Friday	A powerful upper level trough was observed slowly moving east into B.C. while broad upper level ridging continued across the Canadian Prairies. A strong meridional upper level jet straddled these two features, but was expected to remain west of the project area through the forecast period. In the low levels, dry westerly downslope air was expected to turn southerly as a surface trough pulled away from eastern Alberta. High temperatures were forecast to top out in the upper 20s, with dew points remaining dry in the low to single digits. Light upslope flow, best in the northwest, was predicted to initiate mild orographic convection, but no thunderstorms or hail threats were foreseen. No significant weather was anticipated overnight. Weak convective rain showers moved north near Rimbey early Friday morning, followed by mostly clear conditions the rest of the day. A broad wave of clouds and embedded rain showers moved into the west and southwest project area just before 12Z (06/09) Saturday morning. No TITAN cells, 41.3 max dBz, 2.8 max VIL Tmax YC = 27.6C and no rain. Tmax QF = 27.3C and no rain data. Tmax Lacombe = 26.8C and no rain. Tmax Radar = 26.9C and no rain.	No aircraft operations.
June 9, Saturday	A strong 120kt upper level jet was projected to develop across Alberta as a deep upper level trough approached the region. Strong PVA was anticipated, along with strong speed shear and very fast cell motions. South-southeast low level flow was	HS5 was launched at 2034Z for convection moving north in the far southeast project area. They were airborne at 2048Z. HS5 began top seeding storm #1 Strathmore at 2102Z. HS5 stopped seeding at RTB at

	modeled to bring considerable moisture into the project area, with instability climbing to near 1000 J/kg by the afternoon. Scattered strong thunderstorms were forecast, with the strongest activity favoring areas with the best insolation. Another wave of rain and potential thundershowers were expected overnight, but instability was not expected to be sufficient to warrant any hail concerns. A wave of clouds and rain showers spread north-northeast across the entire project area Saturday morning, with convective thundershowers building on the backside between 16 and 19Z. Partly cloudy skies were then observed until 20Z, when a strong cluster of thunderstorms moved north from near Lethbridge toward the southeast project area. A new cell, seeded storm #1, developed on the northwest flank of this convection near Vulcan, and quickly intensified into a moderate hail threat. It moved north very quickly, threatening the protected cities of Strathmore, Irricana, Beiseker, Acme, Linden, Red Deer, Blackfalds, Lacombe, and finally Ponoka. The storm was seeded until it dissipated in the far northern project area. A second smaller cell developed west of Vulcan around 2230Z. It was patrolled for Strathmore as it became a small hail threat in the far southern project area, but it dissipated before it threatened any protected city. Widespread disorganized thundershowers developed across the northern project area around 0Z (06/10), weakening and exiting the project area to the north around 4Z (06/10). Quiet conditions were then observed until 7Z (06/10), when widespread clouds and rain showers gradually developed from south to north across much of the project area. This activity continued through the remainder of the night into Sunday morning. Up to quarter size hail in Irricana. Dime size hail north of Beiseker. Pea size hail in Lacombe. Max cell top: 10.6km, 63.3 max dBz, 61.5 max VIL Tmax YC = 26.0C and 0.8mm of rain. Tmax QF = 26.4C and no rain data. Tmax Lacombe = 25.6C and 0.4mm of rain. Tmax Radar = 25.3C and 0.5mm of rain.	2202Z. They landed at 2217Z. HS2 was launched at 2036Z for convection in the far southeast project area. They were airborne at 2052Z. HS2 began base seeding storm #1 Strathmore at 2105Z. HS2 stopped seeding at 2218Z and repositioned to new development in the southern buffer. HS2 began to patrol Strathmore at 2254Z. They RTB at 2311Z, and landed at 2326Z. HS4 was launched at 2119Z for developing convection in the southern project area. They were airborne at 2139Z. HS4 began base seeding for storm #1 Red Deer at 2200Z. They stopped seeding but continued to patrol Red Deer at 2234Z. HS4 resumed seeding storm #1 Red Deer at 2254Z. They stopped seeding and RTB at 2325Z, and landed at 2339Z. HS1 was launched at 2122Z for a strong thunderstorm moving north through the eastern project area. They were airborne at 2138Z. HS1 began to patrol Red Deer at 2213Z. They were repositioned to new convective development in the southern buffer at 2229Z. HS1 began patrolling Strathmore at 2309Z. They RTB at 2314Z and landed at 2330Z. HS3 was launched at 2149Z for a thunderstorm tracking toward Red Deer. They were airborne at 2216Z. HS3 began patrolling Red Deer at 2234Z. They began top seeding storm #1 Red Deer at 2301Z. HS3 stopped seeding but continued to patrol Blackfalds at 2309Z. They RTB at 2317Z and landed at 2330Z. Flight Summary HS5: 2041Z-2220Z; 124 EJ, 9 BIP; #1 Strathmore to Acme. HS2: 2044Z-2329Z; 146 min wing-tip generators, 8 BIP; #1 Strathmore to Red Deer, patrol Strathmore. HS4: 2129Z-2342Z; 132 min wing-tip generators, 2 BIP; #1 Red Deer to Ponoka. HS1: 2130Z-2332Z; no seeding; patrol Red Deer, patrol Strathmore. HS3: 2200Z-2334Z; 11 EJ, 0 BIP; #1 Red Deer, patrol Blackfalds.
June 10, Sunday	A negatively tilted trough was in place over BC. The trough was predicted to intensify into a closed low as it slid over AB in the afternoon. PVA was expected to be plentiful throughout the period. At the low levels and surface, lee cyclogenesis was forecast to occur near Drumheller. Surface heating and instability appeared to be greatest over the southeast quadrant of the project area, particularly to the SE of Calgary at the time of peak heating. Bulk speed shear values (~30kts) also looked to favor longer-lived thunderstorms to the SE of Calgary.	No aircraft operations.

	Stratiform rain showers along with areas of embedded convection occurred over the region through the afternoon hours. From the Calgary area and to the south, enough sunshine occurred for isolated thunderstorms. Radar data indicated grape size may have fallen over a small area to the southwest of Calgary. Scattered, stratiform rain showers then continued to fall over the project area throughout the rest of the period. Pea size hail observed in High River and Okotoks. Max cell top: 9.1km, 56.8 max dBz, 36.7 max VIL Tmax YC = 13.2C and 12.0mm of rain. Tmax QF = 11.4C and no rain data. Tmax Lacombe = 12.1C and 18.3mm of rain. Tmax Radar = 10.9C and 14.2mm of rain.	
June 11, Monday	A closed low was centered to the northeast of Edmonton and was expected to track northeastward into northern SK. PVA was forecast to weaken in the afternoon as the low pushed into SK. 500mb temperatures appeared to warm slightly which would likely prevent any deep convection from developing. Downslope low level and surface winds were predicted throughout the period. These downslope winds looked to keep dew-points low across the entire region. Thunderstorm trigger mechanisms were expected to be weak during the day and overnight. The modified model soundings for the afternoon showed anywhere from 10 to 130J/kg of CAPE. Bulk speed shear values looked to be very weak, only around 5kts. Light and scattered, stratiform rain showers fell over the region in the morning. In the afternoon, cloud cover gradually thinned from west to east. The late afternoon and evening then saw fair weather cumulus clouds over the eastern part of the project area. Altocumulus, altostratus, and cirrus clouds were observed overnight. No TITAN cells, 36.7 max dBz, 0.4 max VIL Tmax YC = 17.2C and no rain. Tmax QF = 17.7C and no rain data. Tmax Lacombe = 17.6C and 3.0mm of rain. Tmax Radar = 17.1C and no rain.	No aircraft operations.
June 12, Tuesday	A shortwave ridge of high pressure was centered over western BC in the morning. The transitory ridge was forecast to briefly build over the southern half of AB through early evening before quickly flattening and weakening. A couple waves of PVA were expected to slide eastward across AB. The first one looked to move through around midnight local time. The second wave appeared to move through at roughly the time of sunrise the next day. 500mb and low level warming was predicted to create a moderately strong cap which would remain in place through at least the time of dusk. The troposphere was predicted to be slightly unstable in the afternoon. The	No aircraft operations.

	atmosphere then looked to be mostly stable overnight. Altocumulus, altostratus, and cirrus clouds flowed over the region through the evening. During the nighttime, stratus clouds thickened over the project area. Virga was observed near Calgary late in period. The virga matched the weak echo returns that showed up on radar. No TITAN cells, 30.3 max dBz, 0.1 max VIL Tmax YC = 20.0C and no rain. Tmax QF = 20.2C and no rain data. Tmax Lacombe = 21.3C and no rain. Tmax Radar = 20.0C and no rain.	
June 13, Wednesday	A trough was predicted to slide eastward along the BC/Washington border. The trough was expected to provide a constant supply of PVA to the region. Low level and surface winds were forecast to switch to easterly over the northern part of the region in the late afternoon as lee cyclogenesis occurred near Sundre. A cold front associated with the low was predicted to drop southward across the entire project area during the late evening and overnight hours. Dew-points looked to rise across the area. Instability across the region in the afternoon and evening was forecast to range from 200 to 600J/kg with approximately 30kts of bulk speed shear. Overnight, enough instability appeared to linger over the area for elevated nocturnal thunderstorms. In the afternoon, scattered cumulus congestus clouds formed over the region. By the early evening, a cluster of TITAN cells formed to the southwest of Innisfail and moved east-northeastward across the region. Isolated thunderstorms continued to form over the region into the nighttime hours. Max cell top: 7.6km, 57.5 max dBz, 17.6 max VIL Tmax YC = 22.1C and no rain. Tmax QF = 21.1C and no rain data. Tmax Lacombe = 20.4C and no rain. Tmax Radar = 21.3C and no rain.	No aircraft operations.
June 14, Thursday	A mid and upper level low pressure system was centered over Waterton Lakes National Park in the morning. Several lobes of PVA were expected to rotate counter-clockwise around the low as it pushed eastward across the far southern part of AB in the afternoon. PVA looked to weaken in the early evening. Dew-points were expected to stay high enough in the afternoon to allow for thunderstorm development. Lee cyclogenesis was forecast to occur over the SE part of the region. Area modified model soundings showed anywhere from 400 to 600J/kg of CAPE during the afternoon with weak shear. The tropopause was predicted to be fairly low which would limit thunderstorm growth to below 10km or 33kft MSL throughout the period. Stratiform rain showers with areas of embedded convection were observed over the area in the morning. Scattered	No aircraft operations.

	embedded thunderstorms then formed in the afternoon and evening. These storms were short-lived and were a minimal hail threat. Radar data suggested pea size hail may have fallen over a small area to the east of Penhold. Max cell top: 6.9km, 57.2 max dBz, 21.2 max VIL Tmax YC = 12.1C and 0.8mm of rain. Tmax QF = 17.3C and no rain data. Tmax Lacombe = 19.5C and no rain. Tmax Radar = 12.2C and 14.5mm of rain.	
June 15, Friday	A deepening low pressure system over BC was expected to become cutoff from the upper level jet stream late in the period. PVA was forecast to make its way into the area from the south in the afternoon and evening. Low level and surface wind directions were predicted to favor upslope flow throughout the period. Area modified model soundings for the afternoon and evening showed instability ranging from 400 to 800J/kg. Bulk speed shear values were expected to be too low for long-lived thunderstorms. The tropopause was forecast to remain low, near 30kft MSL. Altocumulus castellanus clouds were observed near Sundre in the early morning. Starting at roughly 16Z, towering cumulus clouds began forming near Sundre. These clouds intensified into low-topped thunderstorms. In the early afternoon, towering cumulus clouds formed over most of the area. Storm #1 formed over northwestern Calgary at approximately 20Z. This cluster of convective storm cells slowly pushed eastward across the city. The rest of the afternoon saw numerous short-lived thunderstorms form over the entire protected area. Storm #2 formed directly over Innisfail during the late afternoon hours. A gradual downward trend in the thunderstorm activity occurred during the evening hours. Pea size hail was observed in northwest Calgary. At 2255Z pea size hail fell at the Olds-Didsbury airport for around 5 minutes. Max cell top: 8.4km, 59.6 max dBz, 27.7 max VIL Tmax YC = 17.9C and 0.8mm of rain. Tmax QF = 19.6C and no rain data. Tmax Lacombe = 19.2C and no rain. Tmax Radar = 18.4C and 7.9mm of rain.	HS3 was launched at 1710Z to a slow moving storm near Sundre. The flight became airborne at 1730Z. At 1745Z they began patrolling from Sundre to Cochrane. HS3 started patrolling the Calgary area at 1917Z. At 2016Z the aircraft started top seeding storm #1 for Calgary. HS3 was then running low on fuel, so they stopped seeding and RTB at 2031Z. The aircraft landed at 2048Z. HS1 was launched to a storm over Calgary at 2032Z. They became airborne at 2047Z. At 2055Z the aircraft started patrolling Calgary. They repositioned to the Red Deer area at 2111Z for patrol. HS1 began patrolling Red Deer at 2135Z. The aircraft started top seeding storm #2 for Innisfail at 2238Z. Then at 2247Z, HS1 stopped seeding and RTB. They landed at 2310Z. Flight Summary HS3: 1717Z-2053Z; 34 EJ, 0 BIP; patrol Sundre to Cochrane, #1 Calgary. HS1: 2039Z-2312Z; 10 EJ, 0 BIP; patrol Calgary, patrol Red Deer, #2 Innisfail.
June 16, Saturday	A closed mid and upper level low pressure system was centered over Idaho. This cutoff low was expected to be quasi-stationary. The low was forecast to cause moderate upslope flow. The wind flow looked to create suitable conditions for moisture pooling across the project area throughout the daytime. Area modified model soundings appeared very similar to what was observed the previous day across the region. Instability looked to range from 300 to 700J/kg of CAPE through early evening. Bulk speed shear values looked to remain very low. The tropopause was expected to be near 35kft MSL, but	HS1 was launched to convection moving into the Calgary area from the northeast at 0028Z (06/17). They were airborne at 0042Z (06/17). At 0105Z (06/17) the aircraft started top seeding storm #1 for Calgary and Okotoks. They stopped seeding and started patrolling Okotoks at 0114Z (06/17). The flight then RTB at 0117Z (06/17). They landed at 0133Z (06/17). Flight Summary

	the modified model soundings suggested storms would struggle to grow larger than 30kft or 9km MSL. Towering cumulus clouds began to grow near Rocky MH and Red Deer late in the morning. Scattered thunderstorms then formed from Sundre to Three Hills in the early afternoon. This activity slowly shifted southward during the rest of the afternoon. Scattered air mass thunderstorms initiated over the project area in the late afternoon and early evening. Storm #1 formed near Three Hills at 22Z and tracked southwestward through the Calgary and Okotoks area. No significant weather was observed overnight. Pea size hail was reported in Calgary and Airdrie. Max cell top: 7.6km, 58.6 max dBz, 30.3 max VIL Tmax YC = 16.4C and 6.6mm of rain. Tmax QF = 20.0C and no rain data. Tmax Lacombe = 20.7C and no rain. Tmax Radar = 18.6C and 10.4mm of rain.	HS1: 0038Z-0135Z (06/17); 1 EJ, 2 BIP; #1 Calgary to Okotoks.
June 17, Sunday	The axis of a deep upper level trough was projected to remain stationary across far southern Alberta. Immediately north of this feature, a ridge was modeled to spread into the project area, creating a hostile convective environment by mid-afternoon. No significant convective triggers were anticipated. Clear conditions were forecast overnight. Towering cumulus were observed across the project area from mid to late morning, but most remained too weak to produce precipitation or be observed by radar. Weak reflectivity was seen southeast of Vulcan around 17Z, but this dissipated by early afternoon. No lightning was detected. Conditions cleared through the afternoon with no significant weather the rest of the period. No TITAN cells, 23.4 max dBz, 0.2 max VIL Tmax YC = 21.6C and no rain. Tmax QF = 22.5C and no rain data. Tmax Lacombe = 23.2C and no rain. Tmax Radar = 20.9C and no rain.	No aircraft operations.
June 18, Monday	An upper level trough axis was projected to straddle the project area, separating northeast flow to the north from southwest flow to the south. Broad mid-level ridging continued to extend into central Alberta from the west, providing subsidence and a hostile convective environment. The only forecast weather concerns were clouds and possible light showers in the very southern project area, closest to the influence of a cutoff low drifting east-northeast into Montana. Partly cloudy skies were observed across much of the project area Monday with no observed precipitation. Thicker stratiform clouds and weak radar reflectivity was observed between 23Z and 1Z (06/19) in the far southern project area and buffer. No	No aircraft operations.

	significant weather occurred overnight. No TITAN cells, 28.4 max dBz, 0.4 max VIL Tmax YC = 21.4C and no rain. Tmax QF = 24.3C and no rain data. Tmax Lacombe = 25.2C and no rain. Tmax Radar = 22.3C and no rain.	
June 19, Tuesday	A broad upper level ridge was modeled to move east across north central Alberta. Subsidence associated with the ridge was forecast to create a substantial cap, and no significant convective trigger mechanisms were anticipated. No significant weather was predicted through the forecast period. Tranquil conditions were observed all day and night. The only meteorological echoes observed occurred in the southeast buffer around 15Z. No TITAN cells, 16.3 max dBz, 0.0 max VIL Tmax YC = 25.3C and no rain. Tmax QF = 25.5C and no rain data. Tmax Lacombe = 26.3C and no rain. Tmax Radar = 23.9C and no rain.	No aircraft operations.
June 20, Wednesday	A broad upper level ridge was modeled to begin accelerating east across the Canadian Prairies. A robust cap was projected to remain in place throughout the forecast period. Upslope low-level flow was expected to generate orographic convection, but westward cell motion was forecast to keep that activity away from the project area. No convective triggers were anticipated overnight. Mostly clear and warm conditions were experienced across the project area. Orographic showers and thunderstorms developed, but they remained west of the project area. No significant weather occurred overnight. No meteorological echoes. Tmax YC = 27.2C and no rain. Tmax QF = 26.6C and no rain data. Tmax Lacombe = 27.3C and no rain. Tmax Radar = 25.7C and no rain.	HS4 performed a maintenance flight. They were airborne at 1736Z and landed at 1744Z. HS2 performed a maintenance flight. They were airborne at 1743Z and landed at 1807Z. Flight Summary HS4: 1720Z-1751Z; no seeding; maintenance flight. HS2: 1730Z-1810Z; no seeding; maintenance flight.
June 21, Thursday	Morning upper air analysis showed slack mid and upper level flow with a broad ridge well to the east and a small shortwave trough in B.C. Warm moist southeast flow was projected to foster unstable conditions across the project, with almost no cap predicted in afternoon model soundings. Orographic convection was anticipated, but given weak disorganized cell motions, air mass thunderstorms initiating in the project area was perceived as a greater threat. Flash flooding was a forecast concern due to the slow moving convection. Convection was modeled to ebb overnight, though scattered weaker thundershowers were expected to continue.	Radar tour #1 was conducted at the Olds-Didsbury airport with 15 people in attendance. HS1 flew a PR flight. They were airborne from YBW at 1757Z and landed at EA3 at 1813Z. HS1 was launched at 0017Z (06/22) for developing convection over Turner Valley. They were airborne from EA3 at 0029Z (06/22). HS1 began to patrol from Cochrane to Olds at 0046Z (06/22). They repositioned to convection near Red Deer at 0115Z

	Mostly clear and mild conditions were observed Thursday morning, with orographic convection developing and intensifying by midday. This activity remained west of the project area through much of the afternoon, but breached the northwest project area boundary around 23Z. Air mass convection began developing in the eastern project area and buffer around 0Z (06/22), including a cluster of cells forming in and around Red Deer. This area of thunderstorms, storm #1, grew haphazardly around Red Deer between 0Z and 0130Z (06/22) before dissipating. Cell motion was nearly stationary. Radar indicated up to grape size hail may have fallen in the city. Thunderstorms continued to develop in the northeast project area and buffer until 3Z (06/22). Rain and weaker thundershowers persisted until 10Z (06/22). Pea size hail reported in Red Deer. Max cell top: 10.6km, 60.7 max dBz, 43.1 max VIL Tmax YC = 26.5C and no rain. Tmax QF = 27.1C and no rain data. Tmax Lacombe = 28.2C and no rain. Tmax Radar = 25.3C and no rain.	(06/22). HS1 started top seeding storm #1 Innisfail to Red Deer at 0131Z (06/22). HS1 stopped seeding and repositioned toward Acme at 0156Z (06/22). HS1 began patrolling Acme at 0209Z (06/22). HS1 RTB at 0237Z (06/22) and landed in YBW at 0254Z (06/22). HS2 was launched at 0019Z (06/22) for developing convection over Turner Valley. They were airborne at 0035Z (06/22). HS2 began to patrol from Cochrane to Olds at 0052Z (06/22). They repositioned to developing convection in Red Deer at 0057Z (06/22). HS2 began base seeding storm #1 Red Deer at 0112Z (06/22). At 0121Z (06/22), the left wing tip generator failed, but seeding continued. HS2 stopped seeding and RTB at 0147Z (06/22). They landed at 0215Z (06/22). HS4 was launched at 0022Z (06/22) for developing convection near Red Deer. They were airborne at 0046Z (06/22). HS4 began base seeding storm #1 Red Deer at 0055Z (06/22). They stopped seeding and began patrolling Lacombe at 0157Z (06/22). HS4 RTB at 0204Z (06/22) and landed at 0223Z (06/22). HS2 performed a maintenance flight. They were airborne at 0418Z (06/22) and landed at 0427Z (06/22). Flight Summary HS1: 1747Z-1817Z; no seeding; PR flight; takeoff YBW, land EA3. HS1: 0025Z-0256Z (06/22); 75 EJ, 4 BIP; #1 Innisfail to Red Deer, patrol Cochrane to Olds, patrol Acme; takeoff EA3, land YBW. HS2: 0029Z-0218Z (06/22); 35 min wing-tip generators, 5 BIP; #1 Red Deer, patrol Cochrane to Olds. HS4: 0031Z-0227Z (06/22); 90 min wing-tip generators, 9 BIP; #1 Red Deer, patrol Lacombe. HS2: 0412Z-0430Z (06/22); no seeding; maintenance flight.
June 22, Friday	A negatively tilted shortwave trough was modeled to move from southeastern B.C. into far southern Alberta during the forecast period. Mid-level flow was forecast to be weak with cell motions pivoting from west to north to northeast by Saturday morning. Instability was anticipated to be significant given moderate to high surface moisture and insolation. Early convective initiation was predicted with scattered thunderstorms persisting through the afternoon into the evening. Additional thunderstorms were expected overnight, arriving from the east-northeast due to the cyclonic flow of low pressure to the south. Partly cloudy skies Friday morning quickly yielded to TCU and	HS2 was launched at 1728Z for developing convection northwest of Cochrane. They were airborne at 1738Z, and began patrolling Cochrane at 1744Z. HS2 started base seeding storm #1 Cochrane at 1803Z. They stopped seeding and RTB at 2030Z, and landed at 2040Z. HS5 was launched at 1802Z for convection developed near Cochrane. They were airborne at 1811Z. HS5 started top seeding storm #1 Calgary at 1825Z. HS5 stopped seeding and descended to shed ice at 2022Z. They began base seeding storm #1 for Strathmore at 2047Z. HS5 stopped seeding and RTB

	weak convection in the northwest project area from 15 to 17Z. Stronger convection developed along the western project boundary west of Cochrane around 1730Z, expanding slowly east and south across the southern half of the project area. One cluster of disorganized and pulsing storms, storm #1, was seeded as it tracked from near Cochrane, through Calgary, and exited the project near Strathmore. Radar indicated small areas of up to grape size hail may have fallen in Calgary. Widespread rain and embedded thundershowers filled in behind storm #1, with precipitation continuing across much of the southern project area from 20Z through 1Z (06/23). Elsewhere in the project area, scattered thunderstorms began developing around Red Deer between 18 and 19Z, with activity spreading across the northeast project area through the afternoon. All activity was slow moving and disorganized, though the strongest storms of the day occurred with this activity near Pine Lake and in the eastern project buffer. No protected cities were affected. Another area of showers and thunderstorms developed in the northwest and central project area between 23Z and 3Z (06/23). This activity warranted patrol as it approached a variety of protected cities, but no cells ultimately became appreciable hail threats. Rain and occasional embedded thundershowers continued moving slowly south-southwest out of the northern project area for the remainder of the night. Scattered areas of rain showers also developed across the southern project area after 6Z (06/23), becoming more widespread with embedded weak thundershowers after 9Z (06/23). Pea size hail reported in Calgary. Minor local flooding in Calgary. Max cell top: 10.6km, 61.0 max dBz, 61.3 max VIL Tmax YC = 24.5C and 3.2mm of rain. Tmax QF = 24.4C and no rain data. Tmax Lacombe = 25.1C and 0.6mm of rain. Tmax Radar = 21.9C and a trace of rain.	at 2139Z, and landed at 2207Z. HS3 was launched at 1912Z for convection developing near Sylvan. They were airborne at 1932Z. HS3 began to patrol Strathmore at 2005Z. HS3 started top seeding storm #1 Strathmore at 2031Z. They stopped seeding but continued to patrol Strathmore at 2123Z. HS3 RTB at 2139Z and landed at 2203Z. HS4 was launched at 1950Z for convection developing around Red Deer. They were airborne at 2006Z. HS4 began patrolling Red Deer at 2013Z. They RTB at 2037Z and landed at 2048Z. HS2 was launched at 2245Z for TCU developing in the northwest project area. They were airborne at 2302Z. HS2 began patrolling Sundre at 2319Z. They repositioned to an area with converging outflow boundaries near Carstairs at 2344Z. HS2 RTB at 0040Z (06/23) and landed at 0052Z (06/23). HS3 was launched at 0055Z (06/23) for convection developing across the northwest project area. They were airborne at 0113Z (06/23). HS3 began patrolling Olds to Eckville at 0126Z (06/23). HS3 RTB at 0144Z (06/23) and landed at 0153Z (06/23). Flight Summary HS2: 1734Z-2042Z; 294 min wing-tip generators, 22 BIP; #1 Cochrane to Chestermere. HS5: 1806Z-2211Z; 163 EJ, 27 BIP; #1 Calgary to Strathmore. HS3: 1922Z-2209Z; 57 EJ, 7 BIP; #1 Strathmore, patrol Strathmore. HS4: 1955Z-2053Z; no seeding; patrol Red Deer. HS2: 2256Z (06/22)-0055Z (06/23); no seeding; patrol Sundre, patrol Carstairs. HS3: 0107Z-0200Z (06/23); no seeding; patrol Olds to Eckville.
June 23, Saturday	Light mid and upper level flow was forecast for a third consecutive day with a broad weak ridge stretching across central Canada. Considerable surface moisture was observed Saturday morning, aided by widespread rain that was ongoing since Friday night. Cloud cover from this extensive rain mass was expected to be the crux of convective intensity with a second anticipated round of convection Saturday afternoon. Nonetheless, scattered slow moving convective cells were forecast for the afternoon and evening with a small to moderate hail threat. Instability was modeled to ebb after dusk, with no appreciable convective triggers foreseen overnight. Widespread rain and embedded thunderstorms were spread across all but the northwest project area Saturday morning. No hail threats occurred with this activity. The precipitation began to dissipate around 19Z, coincident with new weak convective	HS4 was launched at 2148Z for convection developing in the northern project area. They were airborne at 2205Z. HS4 began patrolling from Red Deer to Innisfail at 2213Z. They started base seeding storm #1 Innisfail at 2242Z. HS4 stopped seeding at 2303Z and repositioned to new growth near Sylvan. They began patrolling Sylvan at 2314Z. HS4 repositioned back to stronger convection near Innisfail at 2322Z. They began patrolling Innisfail at 2332Z. HS4 repositioned to Lacombe for new convection at 2334Z, and began patrolling Lacombe at 2345Z. HS4 RTB at 0015Z (06/24) and landed at 0026Z (06/24). HS1 was launched at 2154Z for convection moving west toward the southeast project area. They were

	growth in the northwest project area. Convective growth throughout the day was short-lived and disorganized, though pulses of radar indicated pea and grape size hail occurred in the strongest cells. By 22Z, convection in the northern project warranted patrol as it approached protected cities, as well as an additional area of convection sliding in from the northeast near Strathmore. The eastern convection did not intensify into a hail threat initially, while in the north, the first seeded storm of the day (storm #1) strengthened and was seeded as it approached Innisfail around 2245Z. Seeding was halted as the storm pulsed down and moved south along the QE2. Seeding resumed when new growth posed a threat to Crossfield at 2344Z. Storm #2 developed directly north-northwest of Sylvan at 23Z, and was seeded briefly before it moved across town and dissipated. Storm #3 developed over Calgary just after 0Z (06/24). It briefly pulsed into a minor (pea size) hail threat according to radar, and was seeded until it dissipated into rain showers. No hail was reported from Calgary or from any other location. Convection across the project area showed a general weakening trend between 0030Z and 1Z (06/24), though a few final convective cells became low-end hail threats north of Red Deer between 1Z and 3Z (06/24). All remaining convection began to dissipate after 3Z (06/24), with skies clearing and patchy fog developing overnight. Max cell top: 8.4km, 60.8 max dBz, 40.5 max VIL Tmax YC = 20.9C and 27.0mm of rain. Tmax QF = 22.0C and no rain data. Tmax Lacombe = 22.8C and 17.0mm of rain. Tmax Radar = 20.3C and 25.1mm of rain.	airborne at 2208Z. HS1 began patrolling Strathmore at 2222Z. They repositioned to a developing storm near Innisfail at 2245Z. HS1 began top seeding storm #2 Sylvan at 2309Z. They stopped seeding and began patrolling Sylvan at 2317Z. HS1 repositioned toward Didsbury at 2320Z. They began patrolling Didsbury at 2336Z. HS1 began seeding storm #1 Crossfield at 2344Z. They stopped seeding and began patrolling Crossfield to Airdrie at 2348Z. At 0030Z (06/24), they extended their patrol south to Chestermere. HS1 started seeding storm #3 Calgary at 0045Z (06/24). They stopped seeding and RTB at 0055Z (06/24). HS1 landed at 0106Z (06/24). Flight Summary HS4: 2157Z (06/23)-0032Z (06/24); 34 min wing-tip generators, 3 BIP; #1 Innisfail, patrol Innisfail to Red Deer, patrol Sylvan, patrol Lacombe. HS1: 2158Z (06/23)-0110Z (06/24); 45 EJ, 2 BIP; #2 Sylvan, #1 Crossfield, #3 Calgary, patrol Strathmore, patrol Didsbury, patrol Crossfield to Chestermere.
June 24, Sunday	AB was predicted to see a gradual transition to southwest flow as a large scale low pressure system began to move eastward over the coast of BC. 500mb temperatures were expected to warm by roughly 2C during the daytime. PVA looked to be weak throughout the period. The low level and surface wind flow was forecast to be southerly to southeasterly. The wind flow was expected to favor weak upslope flow along parts of the foothills. Area modified model soundings indicated instability would range from weak to moderate (i.e. upwards of 800J/kg of CAPE) across the region during the daytime. Bulk speed shear values were expected to be insignificant. Convection initiated along the entire length of the foothills during the early afternoon. The low level winds were strong enough over the northern part of the area to push a couple of weak convective cells into the protected area near Caroline and Rocky MH. This convection rapidly decreased in intensity as it slid across the western project area boundary. The rest of the project area mainly saw mostly clear skies throughout the period. No TITAN cells, 42.7 max dBz, 2.6 max VIL Tmax YC = 25.4C and no rain. Tmax QF = 25.1C and no rain data.	No aircraft operations.

	Tmax Lacombe = 25.8C and no rain. Tmax Radar = 23.9C and no rain.	
June 25, Monday	The upper level low was centered over BC in the morning. A shortwave trough with moderate PVA, 70kt upper level jet streak, and cold front were predicted to push northeastward across AB in the early afternoon. Model soundings indicated a moderately strong cap would be in place during the afternoon hours over most of the project area. The cap appeared to extend from 7 to 13kft MSL. The cap was forecast to be weaker over the far eastern part of the protected area. Instability and shear appeared sufficient enough for severe thunderstorms. In the morning a cold front quickly moved northeastward across the mountains and foothills triggering off thunderstorms. Starting around 1630Z this front moved into the area. The convection was initially elevated as it moved across the area. At approximately 2100Z a line of convection initiated between Calgary and Three Hills. In the late afternoon this convection eventually strengthened into several TITAN cells which tracked northeastward across the far eastern part of the project area. Radar data indicated grape size hail may have fallen northwest of Three Hills. During the nighttime hours elevated thunderstorms formed north of Strathmore. Max cell top: 11.4km, 60.5 max dBz, 44.1 max VIL Tmax YC = 26.8C and no rain. Tmax QF = 26.9C and no rain data. Tmax Lacombe = 27.5C and no rain. Tmax Radar = 26.2C and no rain.	HS2 flew a maintenance flight. The aircraft became airborne at 1735Z and landed at 1748Z. HS3 was launched at 1720Z to patrol Red Deer as a fast moving cold front approached the area. The flight became airborne at 1742Z and started patrolling for Red Deer, Lacombe, and Ponoka. At 1850Z HS3 RTB and landed at 1857Z. HS4 was launched to patrol the Lacombe area at 1730Z. They were airborne at 1750Z and began patrolling for Red Deer, Lacombe, and Ponoka. HS4 RTB at 1850Z and landed at 1903Z. HS2 flew a second maintenance flight. The aircraft became airborne at 2037Z and landed at 2047Z. HS5 was launched at 2210Z to a rapidly intensifying storm near Linden and Acme. The flight was airborne at 2224Z. The aircraft started patrolling the Linden area at 2241Z. At 2257Z they RTB and landed at 2314Z. Flight Summary HS2: 1725Z-1750Z; no seeding; maintenance flight. HS3: 1730Z-1905Z; no seeding; patrol Red Deer, Lacombe, and Ponoka. HS4: 1740Z-1909Z; no seeding; patrol Red Deer, Lacombe, and Ponoka. HS2: 2031Z-2049Z; no seeding; maintenance flight. HS5: 2216Z-2316Z; no seeding; patrol Linden and Acme.
June 26, Tuesday	A closed mid and upper level low was expected to move northeastward across northern AB. 500mb warming was predicted to limit deep convective growth in the afternoon, evening, and overnight. A few shortwave troughs looked to rotate counter-clockwise around the low providing waves of PVA throughout the period. Given the downslope wind flow (i.e. chinook) at the low levels combined with low dew-points, thunderstorm development appeared unlikely during the day and night. Enough instability looked to exist early in the period for isolated convective rain showers across the region. The CAPE layer was forecast to extend above the -20C level which meant a few lightning strikes could not be ruled out for the Red Deer area and to the north. Isolated convective rain showers were observed near Ponoka during the late morning and early afternoon hours. The atmosphere then gradually stabilized during the late afternoon. Stratocumulus, altocumulus, and cirrus clouds then flowed over the area the rest of the period. No TITAN cells, 42.2 max dBz, 2.7 max VIL	No aircraft operations.

	Tmax YC = 19.7C and a trace of rain. Tmax QF = 19.9C and no rain data. Tmax Lacombe = 20.0C and no rain. Tmax Radar = 19.1C and no rain.	
June 27, Wednesday	The right entrance region of an upper level jet streak was forecast to be centered over the southern part of the project area throughout the period. The best chance for mid-level PVA was expected to be in the evening and overnight. Low level and surface winds were predicted to initially be downslope, but the wind flow appeared to become easterly early in the evening as a weak lee cyclone developed to the south of the protected area. Surface dew-points looked to start rising across the area in the evening. Instability was expected to be minimal. Fair weather cumulus clouds were observed across the entire region throughout the daytime hours. Scattered cirrus and altocumulus clouds formed over the area during the day and night. Overnight, the cloud cover thickened over the far southern part of the region, near Vulcan, and weak echo returns were observed on radar. No TITAN cells, 20.3 max dBz, 0.2 max VIL Tmax YC = 23.7C and no rain. Tmax QF = 21.9C and no rain data. Tmax Lacombe = 22.3C and no rain. Tmax Radar = 22.4C and no rain.	No aircraft operations.
June 28, Thursday	The upper level jet stream was expected to shift east of the area in the late afternoon. A trough was forecast to slide eastward into southern AB in the evening and overnight. The trough looked to provide the PVA off and on throughout the period. Upslope wind flow was expected to be strongest over the southern half of the protected area. Most of the foothills appeared to see suitable moisture pooling due to the consistent upslope flow. The troposphere was predicted to contain 100 to 300J/kg of CAPE along with 20 kts of bulk speed shear. Convection began forming over the Limestone Mountain area, northwest of Sundre, in the early afternoon. This convection became weaker as it entered into the project area at approximately 22Z. In the late afternoon, rather benign convective growth was observed along a mesoscale boundary extending from Sundre across the protected area over to Pine Lake. Starting around 23Z more convection initiated to the west of Cremona. A few short-lived thunderstorms then tracked into the project area near Cremona and Cochrane before slowly dissipating. Scattered convective rain showers fell over the southern half of the project area during the evening and overnight hours. Max cell top: 5.4km, 55.5 max dBz, 11.9 max VIL Tmax YC = 19.2C and 1.0mm of rain. Tmax QF = 18.5C and no rain data.	Radar tour #2 was conducted at the Olds-Didsbury airport with 19 people in attendance. HS2 flew a PR flight. They were airborne from YBW at 1736Z and landed at EA3 at 1753Z. HS2 flew a PR return flight. They were airborne from EA3 at 0113Z (06/29) and landed at YBW at 0132Z (06/29). Flight Summary HS2: 1726Z-1756Z; no seeding; PR flight; takeoff YBW, land EA3. HS2: 0108Z-0134Z (06/29); no seeding; PR flight; takeoff EA3, land YBW.

	Tmax Lacombe = 19.4C and no rain. Tmax Radar = 17.8C and 0.5mm of rain.	
June 29, Friday	A low pressure system was forecast to be centered over northern AB with a trough axis extending southward all the way to California. A lobe of PVA looked to push eastward across the northern part of the area at around the time of peak heating. Weak upslope conditions were expected in the afternoon, but downslope wind flow looked to become dominant beginning in the evening. A north-south orientated cold front was predicted to push eastward across the area in the afternoon. Area modified models soundings indicated the troposphere would contain anywhere from 400 to 600J/kg of CAPE. Given the low bulk speed shear values of 5 to 15kts, thunderstorms were expected to be short-lived. Cell and storm motions were predicted to be slow. Towering cumulus clouds started forming across the area in the morning. TITAN cells then developed southwest of Sundre at 1730Z. More convective growth then occurred farther south along the foothills. This line of thunderstorms (storms #1 and #2) then slid eastward across the project area through the cities of Airdrie and Calgary. Radar data indicated grape size hail may have fallen over a small area to the west of Calgary. Convective rain showers continued to fall over the region into evening hours. At the time of sunset, the convective rain showers and cloud cover quickly diminished, and mostly clear skies were seen across the region overnight. Pea size hail was reported in Calgary. Max cell top: 8.4km, 58.2 max dBz, 30.1 max VIL Tmax YC = 19.0C and 4.2mm of rain. Tmax QF = 20.7C and no rain data. Tmax Lacombe = 21.7C and 3.7mm rain. Tmax Radar = 19.1C and a trace of rain.	HS2 was launched to patrol Airdrie and Calgary at 1920Z. The aircraft became airborne at 1944Z. The flight started patrolling from Calgary to Airdrie at 1949Z. At 2031Z HS2 started base seeding storm #1 for Calgary. The flight stopped seeding and began patrolling Calgary at 2050Z. They RTB at 2120Z and landed at 2127Z. HS1 was launched at 1924Z to patrol the Calgary area. The flight was airborne at 1943Z. They began patrolling Calgary at 1952Z. At 2209Z HS1 started top seeding storm #2 for Calgary. They stopped seeding at 2218Z and started patrolling Calgary. HS1 RTB at 2222Z and landed at 2237Z. Flight Summary HS2: 1934Z-2131Z; 40 min wing-tip generators, 0 BIP; patrol Calgary to Airdrie, #1 Calgary. HS1: 1935Z-2239Z; 14 EJ, 2 BIP; #2 Calgary.
June 30, Saturday	The upper level jet stream looked to be positioned over southern AB which was forecast to provide jet PVA at the time of peak heating. A couple of shortwave troughs were expected to push eastward across the area in the afternoon and evening. At the low levels, a lee trough appeared to form during the mid-afternoon and was expected to track eastward. Low level and surface dew-points looked to increase over the northern half of the project area during the daytime. A moderate amount of instability was forecast to exist over the entire region during the daytime. Higher instability was expected over the northern half of the project area. Bulk speed shear values looked to be around 15kts, so the thunderstorms were predicted to be of the short-lived and pulse variety. Tower cumulus clouds started developing near Rocky MH at 1700Z. Over the next couple of hours widespread convection occurred over the northwest quadrant of the protected area. Storm #1 initiated near Eckville and grew into a line of thunderstorms which tracked eastward through Blackfalds, Red	HS5 was launched at 1954Z to patrol growing convection west of Calgary. The flight was airborne at 2007Z and started patrolling Calgary. HS5 repositioned to the northwest of Olds at 2050Z. At 2110Z they started patrolling for Innisfail. They RTB at 2133Z and landed at 2147Z. HS4 was launched to patrol the Sylvan Lake area at 1955Z. The aircraft became airborne at 2012Z and began patrolling Sylvan. At 2032Z they started base seeding storm #1 from Blackfalds to Red Deer. HS4 extended their line of seeding to the south end of the thunderstorm to seed for Innisfail at 2110Z. At 2130Z the aircraft stopped seeding and began patrolling for Innisfail. They RTB at 2133Z and landed at 2151Z. HS5 was launched at 2310Z to a storm growing to the north of Caroline. The flight became airborne at

	Deer, and Innisfail. Storm #2 formed at 2200Z north of Caroline and moved toward Bowden before dissipating. The next storm (#3) formed near Cremona at approximately 2300Z and then pushed eastward through Crossfield and Linden. The thunderstorm activity then slowly weakened during the evening. Scattered, light convective rain showers continued to fall over the northern and eastern parts of the region overnight. Max cell top: 9.9km, 60.6 max dBz, 43.3 max VIL Tmax YC = 22.1C and no rain. Tmax QF = 21.6C and no rain data. Tmax Lacombe = 21.2C and 1.6mm of rain. Tmax Radar = 19.6C and 1.0mm of rain.	2319Z. At 2342Z the aircraft started top seeding storm #2 for Bowden and Innisfail. HS5 stopped seeding and RTB at 0009Z (07/01). The flight landed at 0027Z (07/01). HS4 was launched to a long-lived storm moving toward Innisfail and Bowden at 2327Z. The aircraft was airborne at 2341Z. At 2350Z HS4 started base seeding storm #2 for Bowden and Innisfail. At 2359Z HS4 continued seeding enroute as they repositioned further south to Crossfield. The aircraft began seeding storm #3 for Linden at 0010Z (07/01). They then stopped seeding and RTB at 0019Z (07/01). HS4 landed at 0104Z (07/01). Flight Summary HS5: 2000Z-2150Z; no seeding; patrol Calgary, patrol Innisfail. HS4: 2001Z-2158Z; 116 min wing-tip generators, 0 BIP; patrol Sylvan, #1 Blackfalds, Red Deer, and Innisfail. HS5: 2314Z (06/30)-0030Z (07/01); 12 EJ, 5 BIP; #2 Bowden and Innisfail. HS4: 2335Z (06/30)-0110Z (07/01); 58 min wing-tip generators, 0 BIP; #2 Bowden and Innisfail, #3 Linden.
July 1, Sunday	A shortwave trough was expected to slide southeastward across AB during the early afternoon hours. Additional PVA was forecast to occur throughout the period as a closed mid and upper level low dug southeastward toward southern BC from the Alaskan panhandle. Downslope winds at the low levels and surface were expected to keep dew-points lower across the entire area, although the northeast quadrant of the protected area looked to see the best chance for higher dew-points. Area modified model soundings showed bulk speed shear values would be sufficient for long-lived thunderstorms. Instability was predicted to be highest during the early afternoon. The atmosphere then looked to stabilize as a quasi-linear dry line pushed eastward across the project area during the afternoon hours. At 1800Z a low top supercell (storm #1) initiated to the southwest of Rocky MH and moved southeastward toward Sundre, Olds, Didsbury, and Carstairs. This storm eventually tracked southeastward across the entire project area, moving through the towns of Linden and Acme. Storm #2 formed northwest of Sylvan Lake and pushed east-southeastward through Red Deer. Another thunderstorm (storm #3) then grew near Airdrie and pushed east-southeastward toward Strathmore. This storm became more organized as it moved into the eastern buffer zone north of Strathmore. In the late afternoon another wave of thunderstorms pushed eastward across the area. Storm #4 initiated near Limestone Mountain but dissipated before reaching Sundre. Storm #5 grew directly over Red Deer before moving southeastward	HS4 was launched at 1829Z to a low top supercellular thunderstorm south of Rocky MH. The aircraft was airborne at 1840Z. They started base seeding storm #1 for Sundre at 1853Z. At 2027Z they extended their line toward Cremona. HS4 stopped seeding and RTB at 2101Z. They landed at 2125Z. HS3 was launched to a long-lived TITAN cell near Caroline at 1838Z. The flight became airborne out of YQF at 1902Z. At 1920Z HS3 started top seeding storm #1 for Olds. They stopped seeding and were redirected to new convective cellular growth northeast of Calgary at 2013Z. At 2017Z HS3 started patrolling 10 miles northwest of Strathmore. They then began patrolling for Calgary at 2034Z. The aircraft started seeding storm #1 for Linden and Acme at 2113Z. HS3 stopped seeding in order to descend to shed ice at 2122Z. At 2128Z the aircraft RTB, and they landed in EA3 at 2149Z. HS2 was launched at 1857Z to patrol growing convection near Innisfail. They became airborne at 1915Z. At 1930Z HS2 began patrolling Olds. The aircraft repositioned at 1935Z to the Sylvan area. At 1947Z the aircraft started base seeding storm #2 for Red Deer. HS2 stopped seeding and started patrolling Red Deer at 1958Z. At 2011Z the flight repositioned to near the town of Linden. They started seeding storm #3 for Strathmore at 2036Z.

	toward Pine Lake. The next significant storm (#6) of the day developed west of Rimbey and pushed east-southeastward through Lacombe. Then at 0230Z (07/02) a third wave of convection started to approach the northern buffer zone. Storm #7 moved southeastward toward Bentley during the late evening. Convective rain showers continued to fall over the area throughout the nighttime. Golf ball size hail reported at the Didsbury Golf Club in the western part of Didsbury. Toonie size hail reported in eastern Didsbury. Pea size hail measured at the Olds-Didsbury airport at 2025Z. Pea size hail observed in Airdrie. Max cell top: 10.6km, 60.9 max dBz, 50.0 max VIL Tmax YC = 21.0C and no rain. Tmax QF = 18.3C and no rain data. Tmax Lacombe = 19.9C and 11.6mm of rain. Tmax Radar = 17.2C and 7.6mm of rain.	At 2048Z the aircraft continued seeding as they repositioned to the west of Linden. They began seeding storm #1 for Linden and Acme at 2058Z. The aircraft then stopped seeding and RTB at 2144Z. They landed at 2156Z. HS3 was launched to a TITAN cell west of Sylvan at 2228Z. The aircraft was airborne out of EA3 at 2233Z. At 2250Z they started patrolling for Caroline. HS3 RTB at 2256Z and landed in YQF at 2307Z. HS2 was launched at 2240Z to a developing storm west of Sylvan. They became airborne at 2253Z. HS2 began base seeding storm #4 for Sundre at 2314Z. At 2321Z they stopped seeding and started patrolling the same area for Sundre. HS2 RTB at 2342Z and landed at 0000Z (07/02). HS1 was launched west of Sylvan Lake at 2241Z. The flight was airborne at 2255Z. At 2320Z HS1 started patrolling for Sylvan and Red Deer. They started top seeding storm #5 for Red Deer at 0004Z (07/02). At 0016Z (07/02) HS1 stopped seeding and repositioned to a growing TITAN cell west of Lacombe. They dropped down to the base seeding altitude while enroute to the growing storm. The aircraft started base seeding storm #6 for Lacombe at 0021Z (07/02). At 0055Z (07/02) they stopped seeding and RTB. The flight landed at 0133Z (07/02). HS5 was launched at 0312Z (07/02) to a long-lived and tall thunderstorm north of Rocky MH. They became airborne at 0325Z (07/02). At 0356Z (07/02) the aircraft started top seeding storm #7 for Bentley. HS5 started patrolling the Sylvan area at 0432Z (07/02). At 0447Z (07/02) the aircraft RTB and landed at 0512Z (07/02). HS2 was launched to a storm north of Rocky MH at 0318Z (07/02). The aircraft was airborne at 0330Z (07/02). At 0401Z (07/02) the flight started base seeding storm #7 for Bentley. HS2 stopped seeding and RTB At 0428Z (07/02). The aircraft landed at 0500Z (07/02). Flight Summary HS4: 1833Z-2129Z; 256 min wing-tip generators, 14 BIP; #1 Sundre, Olds, Didsbury, and Carstairs. HS3: 1849Z-2153Z; 239 EJ, 11 BIP; #1 Olds, patrol Strathmore, patrol Calgary, #1 Linden and Acme; takeoff YQF, land EA3. HS2: 1907Z-2200Z; 158 min wing-tip generators, 11 BIP; patrol Olds, #2 Red Deer, #3 Strathmore, #1 Linden and Acme. HS3: 2225Z-2313Z; no seeding; patrol Caroline; takeoff EA3, land YQF. HS2: 2247Z (07/01)-0003Z (07/02); 14 min wing-tip

		generators, 0 BIP; #4 Sundre. HS1: 2248Z (07/01)-0136Z (07/02); 34 EJ, 7 BIP; patrol Sylvan and Red Deer; #5 Red Deer, #6 Lacombe. HS5: 0320Z-0515Z (07/02); 9 EJ, 0 BIP; #7 Bentley, patrol Sylvan. HS2: 0324Z-0504Z (07/02); 54 min wing-tip generators, 0 BIP; #7 Bentley.
July 2, Monday	The upper level jet stream was predicted to sag southward into Montana as a closed low pressure system continued to dig southeastward over BC. The low looked to be centered over southern AB by late afternoon providing ample PVA to the region throughout the period. Outflow boundaries were expected to be the focus for convective development. A cold front was forecast to slide southeastward across the region during the afternoon. CAPE values looked to be around 500J/kg with around 10kts of bulk speed shear. Tropopause was forecast to remain low, around 30kft MSL or 9.5km. Towering cumulus clouds and air mass thunderstorms formed over the entire region in the afternoon. A few of these thunderstorms grew large enough to produce pea size hail. In the evening, convective rain showers continued across the area. Overnight, stratiform rain showers primarily fell along the western half of the project area overnight. Pea size hail observed in High River. At 2005Z ice pellets occurred at the Olds-Didsbury airport. Max cell top: 8.4km, 57.1 max dBz, 23.4 max VIL Tmax YC = 16.0C and 1.6mm of rain. Tmax QF = 16.8C and no rain data. Tmax Lacombe = 16.2C and 6.7mm of rain. Tmax Radar = 15.8C and 9.9mm of rain.	HS1 was launched at 2213Z to patrol over Calgary. They became airborne at 2225Z. The aircraft started top seeding storm #1 for Airdrie and Calgary at 2233Z. At 2305Z the flight stopped seeding and was redirected to Turner Valley for patrol. HS1 started patrolling Turner Valley at 2317Z. At 2328Z they RTB and landed at 2338Z. Flight Summary HS1: 2218Z-2340Z; 0 EJ, 7 BIP; #1 Airdrie to Calgary, patrol Turner Valley.
July 3, Tuesday	The positively tilted axis of an upper level trough stretched across southern Alberta, with most of the project area in light northeasterly upper level flow. Mid-level winds were also light, with only marginal synoptic PVA expected. Thick morning clouds were observed Tuesday morning, and were expected to gradually break up in the afternoon. Sunshine following the stratus dissipation was predicted to quickly lead to air-mass convection due to low convective temperatures. Shear was projected to be low, with mostly disorganized convection forecast. The greatest threat was expected in the north and east, where the best insolation and moisture were modeled to be. Convective intensity was forecast to wane after dusk, with rain showers continuing into the overnight hours. Morning rain and low stratus gradually dissipated midday Tuesday, with pockets of clearing and shallow convection beginning near Innisfail around 20Z. All convective cells were short lived, but gradually intensified as conditions warmed throughout the afternoon. By 22Z, a broken line of thunderstorms had formed between Rimbey and Three Hills,	HS1 flew a maintenance flight. They were airborne from YBW at 1508Z and landed in YQF at 1533Z. HS1 was launched at 2313Z for convection developing over Red Deer. They were airborne from YQF at 2331Z. HS1 started top seeding storm #1 Red Deer at 2356Z. They stopped seeding but continued to patrol Red Deer at 0008Z (07/04). HS1 RTB to Springbank at 0017Z (07/04) and landed at YBW at 0040Z (07/04). Flight Summary HS1: 1501Z-1538Z; no seeding; maintenance flight; takeoff YBW, land YQF. HS1: 2326Z (07/03)-0042Z (07/04); 19 EJ, 0 BIP; #1 Red Deer; takeoff YQF, land YBW.

	with cells moving south but activity propagating northeast, presumably following the outflow boundary of the initial convection. At 23Z, cells in this broken line began to develop near Red Deer, with one cell threatening the city with radar indicated pea size hail. These cells, storm #1, were seeded as they moved into Red Deer until they dissipated over the city. Convective activity continued across the north and east project area through the evening hours, with the strongest area of storms producing radar indicated grape size hail south of Three Hills around 1Z (07/04). Convection weakened quickly around dusk, though rain showers continued to move south across the central and eastern half of the project area the rest of the night. Max cell top: 8.4km, 60.0 max dBz, 32.0 max VIL Tmax YC = 15.7C and 0.8mm of rain. Tmax QF = 17.1C and no rain data. Tmax Lacombe = 19.4C and 10.4mm of rain. Tmax Radar = 14.7C and 1.8mm of rain.	
July 4, Wednesday	The upper level jet was modeled to lift north across the project area as an upper level ridge amplified across Alberta. No significant synoptic convective trigger mechanisms were forecast. Low morning stratus was projected to mix out midday Wednesday, followed by insolation and fast developing convective cumulus clouds. This convection was predicted to remain capped by the developing mid-level ridge, and not become deep enough to produce lightning or hail. All convective activity was expected to dissipate after dusk, with clearing skies overnight. Clouds and scattered rain showers moved south in the central and western project area from dawn until around 15Z. The low stratus began to mix out between 16 and 17Z, followed by widespread towering cumulus producing capped convective rain showers across the central and western project area. This activity continued throughout the afternoon, gradually diminishing into the evening. Skies cleared across the region by dusk, with no significant weather overnight. No TITAN cells, 55.2 max dBz, 10.1 max VIL Tmax YC = 19.7C and 4.2mm of rain. Tmax QF = 19.2C and no rain data. Tmax Lacombe = 20.5C and no rain. Tmax Radar = 18.8C and 6.9mm of rain.	No aircraft operations.
July 5, Thursday	A strong mid and upper level ridge was observed across southern Alberta and Saskatchewan. Warm moist southerly flow was anticipated throughout the period. A cap was modeled to create strong convective inhibition around 700mb, though considerable elevated instability was forecast above the cap. No significant synoptic-scale convective triggers were forecast, and upslope flow was not predicted to exceed the negative buoyancy of the cap.	HS4 flew a maintenance flight. They were airborne at 1743Z and landed at 1751Z. Flight Summary HS4: 1728Z-1755Z; maintenance flight; no seeding.

	Chinook clouds were observed near Sundre Thursday morning, followed by mostly clear skies the rest of the day. Altocumulus clouds with virga began to move across the far northwest project area beginning at 4Z (07/06), with one stronger cell producing light rain in this area around 7Z (07/06). Lightning was not observed. No TITAN cells, 41.8 max dBz, 3.4 max VIL Tmax YC = 25.9C and no rain. Tmax QF = C and no rain data. Tmax Lacombe = 25.1C and no rain. Tmax Radar = 24.1C and no rain.	
July 6, Friday	A jet streak was projected to move northeast into the project area Friday afternoon as a trough progressed across B.C. Several waves of weak PVA were anticipated, with the first potentially initiating convection around 20-21Z. A lee trough and dry line were forecast to serve as a focal point for the day's strongest convection, with moisture pooling and enhanced shear expected along and north of the boundary. High based, low precipitation supercells were advertised given the significant instability and strong shear anticipated. Strong to severe convective activity was predicted to continue into the evening, with scattered weaker showers and thunderstorms overnight. Mostly clear and warm conditions were observed from Friday morning into the afternoon. A dry line was very evident both by observations and as a fine line on radar, and served as the focal point for the first convective initiation southeast of Airdrie at 2130Z. This cell cycled rapidly in intensity as it moved toward Acme and Linden, but did not become a sustained, powerful supercell until it exited the project area near Three Hills. It was seeded (storm #1) as it showed signs of back-building toward Calgary, and later for Acme. Near the same time as storm #1's evolution, additional convection began to intensify in the northwest project area. Storm #2 was a cell in this cluster of convection and was seeding as it tracked toward Rocky MH. It weakened before arriving, and did not produce radar-indicated hail in the city. Storm #3 was another quickly pulsing storm south of storm #2. It was seeded briefly for Caroline before it dissipated. Storm #4 was yet another cell in this same region of convection, but formed on the southern flank of this activity and showed signs of organization. It was seeded from Eckville to Ponoka as it tracked east-northeast across the far northern project area. Back in the southern project area, new fast-developing convection was visually observed growing near the dry line southwest of Crossfield. It was seeded (storm #5) for Crossfield, but never developed into an appreciable hail threat. At 0130Z (07/07), a cluster of convection south of Limestone Mountain rapidly organized into a supercellular structure and moved east-northeast toward Sundre. This cell, storm #6, was seeded as it approached Sundre and continued across the project area through Bowden. It gradually became less organized and more multicellular as it progressed east, evolving into a broken line of thunderstorms that stretched from	HS4 flew a reposition flight. They were airborne from YQF at 1956Z, and landed at EA3 at 2015Z. HS4 flew a maintenance flight. They were airborne from EA3 at 2100Z and landed back at EA3 at 2107Z. HS4 was launched at 2119Z for a storm developing southeast of Airdrie. They were airborne from EA3 at 2130Z. HS4 began base seeding storm #1 Acme at 2155Z. They stopped seeding and repositioned to Cochrane at 2233Z. HS4 RTB to YBW at 2238Z, and landed at 2254Z. HS5 was launched at 2136Z for convection developing southeast of Airdrie. They were airborne at 2152Z. HS5 began top seeding storm #1 Calgary at 2210Z. HS5 stopped seeding and began patrolling Calgary at 2240Z. HS5 began seeding storm #5 Crossfield at 2343Z. They stopped seeding and began patrolling Airdrie at 0012Z (07/07). HS5 RTB at 0029Z (07/07) and landed at 0037Z (07/07). HS2 was launched at 2139Z for convection developing southeast of Airdrie. They were airborne at 2154Z. HS2 began patrolling Rocky MH at 2220Z. They began base seeding storm #2 Rocky MH at 2225Z. HS2 repositioned toward Sundre at 2242Z, leaving the generators on in-transit. They began seeding storm #3 Caroline at 2254Z. HS2 stopped seeding and began patrolling Sundre at 2304Z. They began seeding storm #4 Eckville at 2331Z. They stopped seeding and RTB at 0049Z (07/07). HS2 landed at 0124Z (07/07). HS3 was launched at 2337Z for intensifying convection south of Rocky MH. They were airborne at 2356Z. HS3 began top seeding storm #4 Eckville at 0010Z (07/07). They stopped seeding and began patrolling Bentley at 0056Z (07/07). HS3 RTB at 0059Z (07/07), and landed at 0109Z (07/07). HS4 was launched at 2340Z for fast growing convection northeast of Cochrane. They were

	Bowden to Ponoka by the time it reached the QE2. Radar indicated up to grape size hail may have fallen near Sundre, but no other protected cities were affected by hail throughout the day. A new wave of showers and weaker thunderstorms developed from Sundre to Ponoka between 4Z and 9Z (07/07), as well as a short-lived line of thundershowers from near Crossfield to Stettler around 8Z (07/07). Pea size hail reported near Leslieville and in Sundre. Max cell top: 11.4km, 62.1 max dBz, 65.5 max VIL Tmax YC = 33.2C and no rain. Tmax QF = 28.9C and no rain data. Tmax Lacombe = 29.3C and 4.2mm of rain. Tmax Radar = 27.2C and no rain.	airborne from YBW at 2355Z. HS4 began patrolling Crossfield at 0013Z (07/07). They repositioned to stronger convection near Eckville at 0016Z (07/07). HS4 began base seeding storm #4 Ponoka at 0043Z (07/07). They stopped seeding and repositioned to Sundre at 0126Z (07/07). HS4 began seeding storm #6 Sundre at 0155Z (07/07). At 0320Z (07/07) the flight stopped seeding and RTB. They landed in EA3 at 0331Z (07/07). HS1 was launched at 0018Z (07/07) to patrol the Cochrane area. They were airborne at 0033Z (07/07). HS1 started patrolling Cochrane at 0037Z (07/07). They repositioned further northwest toward Sundre at 0117Z (07/07). HS1 began top seeding storm #6 Sundre at 0141Z (07/07). They stopped seeding and RTB at 0238Z (07/07), and landed at 0251Z (07/07). HS5 was launched at 0153Z (07/07) for a supercell moving east toward Sundre. They were airborne at 0203Z (07/07). HS5 began top seeding storm #6 Sundre at 0232Z (07/07). At 0318Z (07/07) the aircraft stopped seeding and RTB. HS5 landed at 0335Z (07/07). HS2 was launched at 0153Z (07/07) for a supercell moving east toward Sundre. They were airborne at 0228Z (07/07). HS2 began base seeding storm #6 Sundre at 0244Z (07/07). At 0329Z (07/07) the aircraft stopped seeding and RTB. They landed at 0357Z (07/07). HS3 was launched at 0246Z (07/07) for a strong thunderstorm near Sundre. They were airborne at 0300Z (07/07). At 0319Z (07/07) HS3 began patrolling the Olds area. At 0354Z (07/07) the flight RTB and landed at 0405Z (07/07). HS4 flew a reposition flight. They were airborne out of EA3 at 0425Z (07/07) and landed in YQF at 0439Z (07/07). Flight Summary HS4: 1943Z-2020Z; no seeding; reposition flight; takeoff YQF, land EA3. HS4: 2054Z-2109Z; no seeding; maintenance flight; takeoff EA3, land EA3. HS4: 2123Z-2258Z; 76 min wing-tip generators, 0 BIP; #1 Acme. HS5: 2145Z-0039Z; 56 EJ, 9 BIP; #1 Calgary, #5 Crossfield. HS2: 2145Z (07/06)-0127Z (07/07); 234 min wing-tip generators, 13 BIP; #2 Rocky MH, #3 Caroline, #4 Eckville to Bentley, patrol Sundre. HS3: 2347Z (07/06)-0114Z (07/07); 98 EJ, 8 BIP; #4 Eckville, patrol Bentley.

		HS4: 2349Z (07/06)-0334Z (07/07); 258 min wing-tip generators, 17 BIP; #4 Ponoka, # 6 Sundre to Bowden, patrol Crossfield; takeoff YBW, land EA3. HS1: 0029Z-0253Z (07/07); 301 EJ, 12 BIP; #6 Sundre. HS5: 0159Z-0338Z (07/07); 96 EJ, 8 BIP; #6 Sundre to Bowden. HS2: 0222Z-0400Z (07/07); 90 min wing-tip generators, 7 BIP; #6 Sundre to Bowden. HS3: 0252Z-0410Z (07/07); no seeding; patrol Olds. HS4: 0419Z-0448Z (07/07); no seeding; reposition flight; takeoff EA3, land YQF.
July 7, Saturday	The upper level jet was projected to remain across far southern Alberta while an upper level trough moved east well north of the project area. Mid-level temperatures were predicted to warm, with no significant synoptic trigger mechanisms. Moisture was notably lower than Friday, with the highest moisture remaining in the north and east. Afternoon convection was anticipated, though it was forecast to be tempered by the limited moisture. Additional convection was predicted overnight, particularly in the far northern project where synoptic forcing was strongest. Altocumulus early Saturday morning grew into towering cumulus by mid-morning, with cells intensifying as they tracked east from the radar toward Rumsey. This activity dropped radar indicated pea size hail immediately (1 mile) outside of the eastern buffer around 1730Z. Drier air then moved across the project area with brisk west-northwest flow, though diurnal instability fostered weak air-mass convection in the northern project area beginning at 22Z. This activity became elevated and continued in the northern buffer until 6Z (07/08). All afternoon and evening convection remained weak and did not pose a hail threat. Dime size hail reported in Stettler. Pea size hail reported in Wetaskiwin. Max cell top: 9.1km, 54.3 max dBz, 19.6 max VIL Tmax YC = 25.1C and no rain. Tmax QF = 24.3C and no rain data. Tmax Lacombe = 23.5C and 0.6mm of rain. Tmax Radar = 23.6C and no rain.	No aircraft operations.
July 8, Sunday	A weak mid and upper level ridge was forecast to build over the project area while the upper level jet moved back across the region. Southeasterly low-level flow was projected to bring higher moisture into the project area, and upslope flow was forecast to trigger orographic convection that would move into the project area from the afternoon into the evening. An additional subtle wave of PVA was predicted to instigate late evening convection capable of small to moderate hail in the northern project area. Instability was expected to pivot north out of the project area after midnight.	HS4 was launched at 0004Z (07/09) for quickly organizing convection northwest of Rocky MH. They were airborne at 0020Z (07/09). HS4 began to patrol Rocky MH at 0040Z (07/09). They repositioned to convection threatening Caroline at 0049Z (07/09). They began to patrol Caroline at 0100Z (07/09). HS4 repositioned back to the stronger convection north of Rocky MH at 0110Z (07/09). They began base seeding storm #1 Eckville at 0120Z (07/09). At 0319Z (07/09) the aircraft stopped seeding and RTB. The flight landed at 0349Z (07/09).

	Partly cloudy and mild conditions were observed from Sunday morning through midafternoon. At 2230Z, orographic convection began to get taller, and one cell was able to sustain itself away from the foothills by 2315Z. This cell, storm #1, became organized and briefly appeared to be a threat for Rocky MH. It ultimately passed north of town, but continued to track east across the northern project area threatening the cities of Eckville, Bentley, and Lacombe. It was seeded for these three cities until it weakened and crossed the QE2 at 0330Z (07/09). Storm #1 produced radar-indicated grape size hail north of Rocky MH. Elsewhere, a second cell formed east of Limestone Mountain at 2345Z and moved into the project northwest of Sundre. This storm, storm #2, was seeded as it approached the QE2 and threatened the cities of Innisfail and Penhold. It weakened considerably around 0315Z (07/09), and did not produce radar indicated hail in any protected city. Another convective cell intensified near Rocky MH at 0320Z (07/09), but dissipated before becoming a hail threat. Weaker, less organized convection developed near Bowden at 5Z (07/09) and gradually moved northeast. This activity departed the project near Ponoka at 9Z (07/09), followed by mostly clear skies. Max cell top: 8.4km, 61.2 max dBz, 43.3 max VIL Tmax YC = 25.1C and no rain. Tmax QF = 22.6C and no rain data. Tmax Lacombe = 22.9C and 5.2mm of rain. Tmax Radar = 21.8C and a trace of rain.	HS2 was launched at 0110Z (07/09) for an organized thunderstorm north of Rocky MH. They were airborne at 0125Z (07/09). HS2 began base seeding storm #1 Bentley at 0156Z (07/09). They repositioned toward storm #2 west of Innisfail at 0235Z (07/09), leaving wing-tip generators on in-transit. HS2 began seeding storm #2 Innisfail at 0244Z (07/09). At 0322Z (07/09) the aircraft stopped seeding and RTB. The flight landed at 0350Z (07/09). HS1 was launched at 0113Z (07/09) for convection near Caroline. They were airborne at 0125Z (07/09). HS1 began to patrol Sundre at 0146Z (07/09). They repositioned to stronger convection west of Innisfail at 0216Z (07/09). HS1 began top seeding storm #2 Innisfail at 0224Z (07/09). At 0323Z (07/09) the flight stopped seeding and RTB. They landed at 0340Z (07/09). HS3 was launched at 0200Z (07/09) for an organized cell heading for Lacombe. They were airborne at 0225Z (07/09). HS3 began patrolling Blackfalds at 0237Z (07/09). They began top seeding storm #1 Lacombe at 0246Z (07/09). At 0313Z (07/09) stopped seeding and repositioned to Rocky MH for patrol. HS3 began patrolling Rocky MH at 0329Z (07/09). They RTB at 0332Z (07/09) and landed at 0346Z (07/09). Flight Summary HS4: 0011Z-0355Z (07/09); 238 min wing-tip generators, 9 BIP; #1 Eckville to Lacombe, patrol Rocky MH, patrol Caroline. HS2: 0118Z-0352Z (07/09); 174 min wing-tip generators, 5 BIP; #1 Bentley, #2 Innisfail and Penhold. HS1: 0119Z-0342Z (07/09); 55 EJ, 0 BIP; #2 Innisfail and Penhold, patrol Sundre. HS3: 0207Z-0352Z (07/09); 21 EJ, 0 BIP; #1 Lacombe, patrol Blackfalds, patrol Rocky MH.
July 9, Monday	Modest mid and upper level ridging was projected to warm and stabilize the upper troposphere, with very little instability anticipated throughout the period. Low-level flow was expected to return to the southeast, becoming upslope along the foothills in the afternoon. However, given the substantial capping, only limited orographic convective growth was anticipated, and this activity was not forecast to pose a threat to the project area. No significant convective triggers were expected overnight, though clouds and showers were advertised to encroach from the southwest toward dawn in advance of a fast moving trough arriving Tuesday. Elevated instability Monday morning lead to towering cumulus clouds near the radar and points east. This activity moved east	No aircraft operations.

	of the project area by 15Z. Mostly clear and warmer than average temperatures were experienced across the project area the remainder of the day. Weak convection was evident moving from the foothills into the northwest project area around 22Z, but no lightning or hail threats were observed. Upper level clouds began moving northeast into the project area overnight, with weak elevated echoes observed by dawn Tuesday. No TITAN cells, 26.3 max dBz, 0.1 max VIL Tmax YC = 28.2C and no rain. Tmax QF = 25.4C and no rain data. Tmax Lacombe = NA and no rain data. Tmax Radar = 25.7C and no rain.	
July 10, Tuesday	A mid and upper level trough was positioned over southeast BC and was expected to slide eastward over the far southern part of AB during the period. Intensification of the trough was expected which would lead to strong PVA over the region through at least the early evening. Southeast low level moisture advection was forecast to aid with increasing dew-points at the surface and low levels. At the surface, a lee cyclone was predicted to form east of Strathmore in the afternoon. Model soundings indicated atmospheric instability would be highest over areas experiencing the most surface heating. Speed shear was forecast to be strongest during the early afternoon and was expected to gradually weaken the rest of the day. In the late morning convection began forming over the southern half of the project area. Storm #1 formed southwest of Calgary and quickly moved northeastward across the city in the late morning. Storm #2 moved through Strathmore at roughly 1800Z. A second storm (#3) then pushed northeastward along the eastern periphery of Calgary in the early afternoon. The cloud cover then cleared over the most of the project area during the late afternoon as a dry slot moved over the region. At 2330Z a line of convection formed north of Calgary. This line extended from north of Cochrane to Strathmore. Within this line of convection, storm #4 grew between Airdrie and Calgary. This storm moved southeastward into Calgary before dissipating. At the same time, numerous thunderstorms formed along the entire length of the foothills. These storms pushed into the project area in the early evening. Storm #5 grew west of Caroline and move toward the Sundre before dissipating. Storm #6 initiated west of Cremona and approached Calgary as it diminished in intensity. The seventh storm of the day formed southwest of Rimbey and pushed southeastward toward the Sylvan area. Max cell top: 12.9km, 61.0 max dBz, 41.5 max VIL Tmax YC = 21.6C and 8.9mm of rain. Tmax QF = 21.9C and no rain data. Tmax Lacombe = NA and no rain data.	HS1 was launched to patrol High River at 1633Z. The flight became airborne at 1649Z. At 1658Z the aircraft started top seeding storm #1 for Calgary. At 1713Z they stopped seeding and were redirected to a storm near Strathmore. HS1 started seeding storm #2 for Strathmore at 1716Z. At 1720Z they repositioned south of Turner Valley. Then at 1730Z the aircraft started seeding storm #3 for Calgary. The aircraft stopped seeding and descended to shed ice at 1808Z. At 1820Z they repositioned to High River. The crew started patrolling High River at 1835Z. The aircraft RTB at 1856Z and landed at 1912Z. The aircraft was struck by lightning during this flight. HS5 was launched to a TITAN cell forming west of Turner Valley at 2121Z. The aircraft was airborne at 2135Z. HS5 started patrolling for Calgary at 2145Z. At 2229Z they RTB and landed at 2240Z. HS3 was launched at 2349Z to a line of growing convection north of Cochrane. At 0018Z (07/11) the flight became airborne. HS3 started top seeding storm #4 at 0033Z (07/11) from Airdrie to Calgary. At 0042Z (07/11) they stopped seeding and started patrolling the Calgary area. HS3 was then redirected to a growing storm north of Cochrane at 0109Z (07/11). At 0116Z (07/11) the aircraft started seeding storm #6 for Calgary. They then stopped seeding and started patrolling the Airdrie area at 0119Z (07/11). The aircraft repositioned to Olds for patrol at 0135Z (07/11). At 0147Z (07/11) the aircraft was redirected to Innisfail to patrol this area. At 0200Z (07/11) they repositioned to the Sylvan area for patrol, and the flight started patrolling Sylvan at 0206Z (07/11). At 0208Z (07/11) the flight RTB and landed at 0213Z (07/11). HS2 was launched to a growing storm north of Calgary at 0016Z (07/11). The flight was airborne at 0030Z (07/11). At 0035Z (07/11) HS2 began base

	Tmax Radar = 19.8C and 10.4mm of rain.	seeding storm #4 for Calgary. The aircraft stopped seeding at 0044Z (07/11) and started patrolling the Calgary area. At 0050Z (07/11) HS2 was redirected to Caroline. HS2 began seeding storm #5 for Sundre at 0111Z (07/11). The flight continued seeding enroute as they repositioned to the Sylvan area at 0140Z (07/11). At 0147Z (07/11) HS2 started seeding storm #7 for Sylvan. They then stopped seeding and RTB at 0158Z (07/11). The flight landed at 0230Z (07/11). HS4 flew a maintenance flight. The flight became airborne at 0130Z (07/11) and landed at 0137Z (07/11). HS1 flew a maintenance flight. The aircraft was airborne out of YBW at 0257Z (07/11) and landed in YQF at 0324Z (07/11). Flight Summary HS1: 1640Z-1916Z; 20 EJ, 14 BIP; #1 Calgary, #2 Strathmore, #3 Calgary, patrol High River. HS5: 2130Z-2243Z; no seeding; patrol Calgary. HS3: 0004Z-0219Z (07/11); 12 EJ, 3 BIP; #4 Airdrie to Calgary, #6 Calgary, patrol Airdrie, patrol Olds, patrol Innisfail, patrol Sylvan. HS2: 0023Z-0232Z (07/11); 232 min wing-tip generators, 0 BIP; #4 Calgary, #5 Sundre, #7 Sylvan. HS4: 0123Z-0145Z (07/11); no seeding; maintenance flight. HS1: 0247Z-0328Z (07/11); no seeding; maintenance flight; takeoff YBW, land YQF.
July 11, Wednesday	A small scale and short-lived ridge of high pressure was forecast to build over southern AB through the early evening. None the less, a couple of weak shortwave troughs looked to ride through the flow of the ridge. The first was predicted to slide eastward across the area in the afternoon. Another wave then looked to move through during the overnight hours. Weak upslope wind flow was expected. Atmospheric instability appeared to increase to around 125J/kg during the time of peak heating. Forecast model soundings showed very dry air above 15kft MSL which suggested convection would struggle to become tall. Bulk speed shear values looked to be around 15kts. In the early morning isolated stratiform rain showers and virga were observed from Sundre southward through Calgary. Fair weather cumulus clouds then formed over most of the region in the afternoon. In the early evening a few tower cumulus clouds were observed along the foothills near Bragg Creek. Overnight, scattered convective rain showers were observed on radar between Olds and the town of Acme. No TITAN cells, 48.3 max dBz, 3.5 max VIL Tmax YC = 25.1C and no rain.	HS4 flew a maintenance flight. The flight was airborne at 1733Z and landed at 1742Z. Flight Summary HS4: 1724Z-1750Z; no seeding; maintenance flight.

	Tmax QF = 24.9C and no rain data. Tmax Lacombe = NA and no rain data. Tmax Radar = 24.2C and no rain.	
July 12, Thursday	The mid and upper levels of the troposphere were predicted to see zonal flow throughout the period. A couple minor waves of PVA were forecast to slide eastward across the area during the daytime, but overall, PVA looked to be strongest during the nighttime hours. Upslope wind flow appeared to be stronger over the NW part of the area. At the surface, a lee trough was predicted to form in the evening and was expected to slide eastward during the nighttime hours. Area modified model soundings indicated speed shear values would be high, approximately 40kts. This combined with a moderately unstable troposphere was expected to lead to the potential for medium size hail from the evening into the nighttime hours. The atmosphere remained capped throughout the day, and thunderstorm trigger mechanisms turned out to be more benign than expected. Fair weather cumulus clouds formed over the area in the afternoon and evening. Scattered cirrus and altocumulus clouds were seen flowing over the region throughout the period. No TITAN cells, 24.6 max dBz, 0.1 max VIL Tmax YC = 27.3C and no rain. Tmax QF = 24.8C and no rain data. Tmax Lacombe = NA and no rain data. Tmax Radar = 24.0C and no rain.	Due to mechanical issues with HS1 related to a lightning strike which occurred on July 10th, a replacement aircraft was flown in from Fargo. Beginning on July 12th, HS1 switched from N904DK to N522JP. There were no missed operations due to this issue.
July 13, Friday	A 110 knot jet streak was expected to nose its way into central AB starting in the mid-afternoon. PVA associated with the left-exit region of the jet streak was forecast to enhance rising motions in the atmosphere. A trough was expected to move eastward across the area in the evening and overnight providing an ample amount of PVA. The primary triggers for thunderstorms were predicted to be frontogenesis and lee cyclogenesis that would intensify near Drayton Valley. A strong cold front was expected to slide southeastward across the entire project area from mid-afternoon through the evening hours. Model output data suggested parts of the far northern part of the area had the potential to see over 60kts of bulk speed shear. The project area was forecast to be very unstable with parts of the northern area seeing over 1,500J/kg of CAPE. Starting at approximately 2000Z the first convective cell of the day initiated along the foothills to the northwest of Rocky MH. This first wave of convection became more organized as it moved eastward across the northern buffer zone. Storm #1 initiated along the leading edge of this wave of convection and moved toward Ponoka during the late afternoon. Storm #2 formed to the northwest of Rocky MH and tracked southeastward through Eckville and Lacombe. At 2300Z a cluster of convective cells developed over Limestone Mountain and tracked eastward through Caroline. Along the eastern edge of the convective cells, Storm #3 became organized and moved	HS2 flew a reposition flight. They were airborne out of YBW at 2052Z and landed in Rocky MH at 2128Z. HS4 was launched to a long-lived storm northwest of Bentley at 2235Z. The aircraft was airborne out of YQF at 2250Z. They started base seeding storm #1 for Ponoka at 2304Z. HS4 then continued seeding as they repositioned to another storm (#2) north of Eckville at 2335Z. At 2341Z the flight began seeding storm #2 for Lacombe. HS4 stopped seeding at 0022Z (07/14) and repositioned to Sundre. At 0035Z (07/14) the crew started patrolling the Sundre area. They started seeding storm #3 for Bowden at 0051Z (07/14). At 0112Z (07/14) HS4 continued seeding as they extended their line to the southwest. The aircraft began seeding storm #4 for Olds at 0118Z (07/14). At 0141Z (07/14) they stopped seeding and RTB. The flight landed in YBW at 0157Z (07/14). HS3 was launched at 2241Z to an organized storm north of Bentley. The flight became airborne at 2310Z. At 2322Z HS3 started top seeding storm #1 for Ponoka. The flight then stopped seeding and repositioned to another storm to the southwest at 2333Z. At 2344Z the aircraft started seeding storm #2 for Lacombe. At 0023Z (07/14) the crew stopped

	through Bowden during the early evening hours. Another storm (#4) then intensified NW of Sundre and tracked through Olds during the evening. Greater than golf ball size hail reported near Bowden, north of Ponoka, and in the eastern buffer zone, just south of the town of Tees. Pea to nickel size hail observed in Lacombe and Olds. Ping Pong size hail was reported near Eckville. Max cell top: 12.9km, 64.8 max dBz, 103.2 max VIL Tmax YC = 31.7C and a trace of rain. Tmax QF = 26.3C and no rain data. Tmax Lacombe = 26.0C and no rain data. Tmax Radar = 26.2C and no rain.	seeding and RTB. They landed at 0030Z (07/14). HS2 was launched to the north of Rocky MH at 2245Z. The aircraft became airborne out of Rocky MH at 2255Z. At 2306Z HS2 started base seeding storm #2 for Eckville. They continued seeding the storm as it approached Lacombe. At 0020Z (07/14) the flight stopped seeding and RTB. The aircraft landed in YBW at 0044Z (07/14). HS5 was launched at 2329Z to a TITAN cell moving toward Lacombe. The aircraft became airborne at 2345Z. They began patrolling the Sundre area at 0014Z (07/14). At 0043Z (07/14) HS5 started top seeding storm #3 for Bowden. At 0130Z (07/14) they stopped seeding and RTB. The aircraft landed at 0151Z (07/14). HS1 was launched to patrol the Cochrane area at 0055Z (07/14). The flight was airborne at 0109Z (07/14). HS1 started top seeding storm #4 for Olds at 0129Z (07/14). At 0150Z (07/14) the aircraft stopped seeding and started patrolling the Didsbury area. At 0200Z (07/14) they repositioned to the south to Cochrane. HS1 began patrolling the Cochrane area at 0215Z (07/14). The flight RTB at 0235Z (07/14) and landed at 0245Z (07/14). HS2 was launched at 0112Z (07/14) to long-lived strong storm tracking eastward toward Olds. The aircraft was airborne at 0125Z (07/14). The flight started base seeding storm #4 for Olds at 0143Z (07/14). At 0149Z (07/14) they stopped seeding and began patrolling the Didsbury area. Then at 0153Z (07/14) HS2 repositioned to Sundre. They started patrolling the Sundre area at 0200Z (07/14). At 0210Z (07/14) the aircraft was redirected to the Cochrane area. At 0214Z (07/14) the flight RTB before starting patrol for Cochrane. They landed at 0240Z (07/14). HS4 flew a reposition flight. They were airborne out of YBW at 0316Z (07/14) and landed in YQF at 0350Z (07/14). Flight Summary HS2: 2048Z-2130Z; no seeding; reposition flight; takeoff YBW, land Rocky MH. HS4: 2244Z (07/13)-0201Z (07/14); 252 min wing-tip generators, 16 BIP; #1 Ponoka, #2 Lacombe, patrol Sundre, #3 Bowden, #4 Olds; takeoff YQF, land YBW. HS3: 2255Z (07/13)-0035Z (07/14); 229 EJ, 11 BIP; #1 Ponoka, #2 Lacombe. HS2: 2248Z (07/13)-0045Z (07/14); 148 min wing-tip generators, 11 BIP; #2 Eckville to Lacombe; takeoff Rocky MH, land YBW. HS5: 2340Z (07/13)-0153Z (07/14); 156 EJ, 9 BIP;

		patrol Sundre, #3 Bowden. HS1: 0100Z-0247Z (07/14); 96 EJ, 5 BIP; #4 Olds, patrols Didsbury, patrol Cochrane. HS2: 0117Z-0246Z (07/14); 12 min wing-tip generators, 0 BIP; #4 Olds, patrol Didsbury, patrol Sundre. HS4: 0308Z-0355Z (07/14); no seeding; reposition flight; takeoff YBW, land YQF.
July 14, Saturday	An upper level trough was centered along the AB/SK border. This trough was expected to continue sliding eastward during the day as the area transitioned into northwest flow at the mid-levels. A ridge of high pressure was forecast to build over BC and would begin to move into AB late in the period. PVA was predicted to be weak. Additionally, low level and surface dew-points were expected to remain relatively dry. A strong cap was predicted to be in place. Modified model soundings showed only enough instability for towering cumulus clouds. None the less, very dry air above 13kft MSL was forecast to be entrained within any growing updrafts, so towering cumulus clouds looked unlikely throughout the period. Stratiform rain showers fell over the southern half of the area during the early morning hours. The cloud cover then cleared from the north to south. Mostly clear skies were seen the rest of the period. No TITAN cells, 46.5 max dBz, 2.9 max VIL Tmax YC = 21.2C and 2.2mm of rain. Tmax QF = 19.6C and no rain data. Tmax Lacombe = 19.3C and 4.3mm of rain. Tmax Radar = 19.0C and 5.6mm of rain.	No aircraft operations.
July 15, Sunday	An upper level ridge was modeled to spread east across Western Canada. Mid-level temperatures were projected to gradually warm, forming a significant convective cap through the forecast period. No appreciable convective triggers were forecast aside from diurnal upslope flow. Mostly clear skies were observed throughout the forecast period. No meteorological echoes. Tmax YC = 26.7C and no rain. Tmax QF = 24.8C and no rain data. Tmax Lacombe = 25.3C and no rain. Tmax Radar = 23.9C and no rain.	No aircraft operations.
July 16, Monday	The axis of a sizeable upper level ridge was projected to move east across Alberta Monday. Exceptionally warm mid-level temperatures were forecast beneath the ridge. Instability was expected to be very limited, with a considerable cap predicted to stymie convection throughout the forecast period. Clear skies and warmer than average temperatures were	No aircraft operations.

	experienced across the project area. Heat warnings were issued across much of the region. No meteorological echoes. Tmax YC = 30.4C and no rain. Tmax QF = 29.1C and no rain data. Tmax Lacombe = 29.5C and no rain. Tmax Radar = 28.2C and no rain.	
July 17, Tuesday	The axis of an upper level ridge was forecast to continue moving east out of Alberta as a subtle shortwave trough approached the region. Mid-level cooling associated with this transition, combined with substantial daytime heating and seasonable moisture, was predicted to foster significant instability under a convective cap by late afternoon. High elevated instability was modeled to continue through the overnight hours. Mostly clear skies were observed from Tuesday morning through the late afternoon. Towering cumulus clouds with virga began moving northeast across the northern project area around 2Z (07/18), with weak thunderstorms developing between Sylvan and Rimbey after 530Z (07/18). This activity continued to strengthen into a small to moderate hail threat at is approached the QE2, briefly producing radar indicated grape size hail between Lacombe and Ponoka. These thunderstorms exited the northeast buffer at 0920Z (07/18). At 10Z (07/18), two additional areas of elevated convection developed in the project area. One area near Strathmore produced rain but no significant thunderstorms in the southeast project area, while the second intensified rapidly shortly after 11Z (07/18) between Rocky MH and Olds. The latter developed into a line of tall and powerful elevated thunderstorms Wednesday morning. Max cell top: 12.1km, 59.1 max dBz, 49.3 max VIL Tmax YC = 31.3C and no rain. Tmax QF = 30.2C and no rain data. Tmax Lacombe = 30.4C and no rain. Tmax Radar = 28.4C and no rain.	HS2 flew a maintenance flight. They were airborne from YBW at 1535Z and landed in YQF at 1604Z. HS2 flew a return maintenance flight. They were airborne from YQF at 0310Z (07/18) and landed in YBW at 0335Z (07/18). Flight Summary HS2: 1525Z-1610Z; no seeding; maintenance flight; takeoff YBW, land YQF. HS2: 0250Z-0339Z (07/18); no seeding; maintenance flight; takeoff YQF, land YBW.
July 18, Wednesday	The project area lay between the subtropical jet well to the south and the polar jet which stretched zonally across the northern Prairies. Mid-level vorticity advection was weak, but a subtle wave was modeled to move into the project area in the early afternoon. Afternoon instability was projected to be extremely high, with CAPE exceeding 2,000 J/kg in model soundings. Shear, conversely, was much less significant, with only about 20kts of speed shear anticipated. Strong but disorganized convection was predicted, beginning in the foothills and spreading east across the project. Instability was not predicted to return overnight in areas that saw afternoon convection. A wave of convection that initiated in the late overnight hours	HS1 was launched at 1130Z to rapidly intensify line of tall thunderstorms north of Sundre. At 1146Z the aircraft became airborne. The flight started top seeding storm #1 for Innisfail at 1202Z. At 1305Z HS1 stopped seeding and repositioned to new convective growth Calgary. HS1 began patrolling Calgary at 1318Z. HS1 RTB at 1355Z, and landed at 1407Z. HS3 was launched to a line of thunderstorms west of Innisfail at 1155Z. They were airborne at 1226Z. They started base seeding storm #1 for Sylvan at 1234Z. At 1305Z HS3 stopped seeding and repositioned to a growing storm over Calgary. HS3

	Tuesday continued to move east across the project area. It intensified rapidly between 11 and 12Z Wednesday morning, organizing into a line of thunderstorms (storm #1) between Sundre and Rocky MH. This line was seeded ahead of Sylvan, Innisfail, and Red Deer until it crossed the QE2 and weakened around 13Z. Nickel size hail was reported from the southern-most cell in the line in Olds Wednesday morning. Additional weaker convection developed between Calgary and Torrington between 13 and 15Z, but this did not intensify into a hail threat. Skies cleared later Wednesday morning, followed by orographic convection initiating around 18z. This activity became stronger and more widespread into the early afternoon, but was initially slow to move off the foothills. At 2145Z convection developed along a line between Airdrie and Cochrane. This line was seeded (storm #2) in the event it continued to develop into Calgary. Storm #2 weakened by 22Z, at which time a strong thunderstorm was moving southeast into the project area northwest of Sundre. This cell, storm #3, produced the highest VIL of the day, and was seeded until it became embedded with rain showers and dissipated. Attention then turned to the northeast edge of the anvil, where a cell rapidly intensified near the Red Deer airport around 2235Z. This storm (#4) was seeded for Penhold until it moved away from the city. Storm #5 was a cluster of strong convection that moved southeast off the foothills toward Cremona, Cochrane, and Calgary. It was seeded as it moved across these cities, but remained disorganized and only produced radar-indicated pea size hail in Cochrane. Storm #6 developed just to the south and west of storm #5 around 0030Z (07/19), and was seeded for Turner Valley and Black Diamond until it dissipated at 0115Z (07/19). Storm #7 intensified on the eastern flank of the convection near Strathmore at 0040Z (07/19), and was seeded until it passed through the city and exited into the buffer. Rain and thundershowers continued to exit the southeast project area until around 3Z (07/19. An area of elevated weak convection moved east-southeast into the far northwest project area at 4Z (07/19), but activity remained weak until around 7Z (07/19) when convection intensified rapidly in the northern buffer northwest of Ponoka. This storm, storm #8, was seeded for Ponoka until it dissipated around 0830Z (07/19). Scattered weak convection continued across the project area into Thursday morning, but no further hail threats were observed. Nickel size hail measured in Olds at 1215Z. Max cell top: 13.6km, 61.4 max dBz, 84.5 max VIL Tmax YC = 24.7C and 0.3mm of rain. Tmax QF = 25.8C and no rain data. Tmax Lacombe = 26.5C and 0.8mm of rain. Tmax Radar = 23.8C and no rain.	began patrolling Calgary at 1318Z. HS3 RTB at 1355Z and landed at 1415Z. HS4 was launched at 1230Z to a long line of thunderstorms approaching Sylvan. The aircraft became airborne at 1247Z and began patrolling Red Deer. There were no convective threats after the flight became airborne, so they RTB at 1254Z. HS4 landed at 1258Z. HS5 was launched at 1910Z for convection developing along the foothills west of Bragg Creek. They were airborne at 1925Z. HS5 began patrolling Bragg Creek at 1935Z. HS5 descended to base seeding altitude and continued to patrol Bragg Creek at 2004Z. They repositioned toward new convection near Cochrane at 2018Z. HS5 began patrolling Cochrane at 2030Z. They RTB at 2121Z, and landed at 2130Z. HS1 was launched at 2102Z to replace HS5 patrolling convection moving into the western project area. They were airborne at 2119Z, and began patrolling Cochrane at 2128Z. HS1 began base seeding storm #2 Calgary at 2142Z but immediately began climbing to top seeding altitude, and were seeding during this transition. They began top seeding storm #2 Calgary at 2153Z. HS1 stopped seeding and began patrolling Airdrie at 2213Z. They repositioned west toward Cochrane at 2243Z. HS1 began patrolling Cochrane at 2301Z, and descended back to base seeding altitude. They began base seeding storm #5 Cremona at 2312Z. HS1 stopped seeding and repositioned to developing convection northwest of Strathmore at 0039Z (07/19). They began base seeding storm #7 Strathmore at 0045Z (07/19). HS1 stopped seeding and RTB at 0105Z (07/19). They landed at 0147Z (07/19). HS4 was launched at 2144Z for strong convection moving into the project area northwest of Sundre. They were airborne at 2158Z. HS4 began base seeding storm #3 Sundre at 2217Z. They repositioned toward the Red Deer airport at 2233Z, leaving wing-tip generators on in-transit. HS4 started seeding storm #4 Penhold at 2243Z. They stopped seeding and repositioned further north to Red Deer at 2306Z. HS4 RTB at 2315Z and landed at 2322Z. HS2 was launched at 2144Z for developing convection northwest of Calgary. They were airborne at 2203Z. HS2 began to patrol Cochrane at 2208Z. They RTB at 2216Z, and landed at 2221Z. HS2 was relaunched at 2313Z for strong convection moving southeast toward Calgary. They were

		airborne at 2324Z. HS2 began base seeding storm #5 Cochrane at 2331Z. They extended their track to the southwest at 0035Z (07/19) and began seeding storm #6 Turner Valley at 0042Z (07/19). HS2 stopped seeding but continued to patrol Turner Valley and Black Diamond at 0129Z (07/19). They RTB at 0134Z (07/19) and landed at 0152Z (07/19). HS5 was launched for 2328Z for a strong thunderstorm west of Cochrane. They were airborne at 2341Z. HS5 began base seeding storm #5 Cochrane at 2347Z. They extended their track southwest and began seeding a new area of convective growth, storm #6, for Turner Valley and Black Diamond at 0040Z (07/19). They stopped seeding but continued to patrol Turner Valley and Black Diamond at 0117Z (07/19). HS5 RTB at 0134Z (07/19) and landed at 0149Z (07/19). HS4 was launched at 0732Z (07/19) to nocturnal elevated thunderstorms approaching Ponoka from the northwest. The flight was airborne at 0745Z (07/19). The aircraft began base seeding storm #8 for Ponoka at 0800Z (07/19). At 0822Z (07/19) they stopped seeding and started patrolling for Ponoka. HS4 RTB at 0829Z (07/19) and they landed at 0840Z (07/19). Flight Summary HS1: 1142Z-1410Z; 15 EJ, 16 BIP; #1 Innisfail to Red Deer, patrol Calgary. HS3: 1220Z-1420Z; 0 EJ, 7 BIP; #1 Sylvan to Red Deer, patrol Calgary. HS4: 1242Z-1304Z; no seeding; patrol Red Deer. HS5: 1918Z-2132Z; no seeding; patrol Bragg Creek, patrol Cochrane. HS1: 2111Z (07/18)-0149Z (07/19); 29 EJ, 35 BIP; #2 Calgary, #5 Cremona to Calgary, #7 Strathmore, patrol Cochrane, patrol Airdrie. HS4: 2150Z-2327Z; 98 min wing-tip generators, 3 BIP; #3 Sundre, #4 Penhold, patrol Red Deer. HS2: 2154Z-2225Z; no seeding; patrol Cochrane. HS2: 2319Z (07/18)-0155Z (07/19); 236 min wing-tip generators, 11 BIP; #5 Cochrane to Calgary, #6 Turner Valley and Black Diamond. HS5: 2335Z (07/18)-0155Z (07/19); 0 EJ, 19 BIP; #5 Cochrane to Calgary, #6 Turner Valley and Black Diamond. HS4: 0737Z-0845Z (07/19); 44 min wing-tip generators, 2 BIP; #8 Ponoka.
July 19, Thursday	A powerful upper level trough was observed moving southeast in northwestern B.C. while a small shortwave ridge quickly departed Alberta into Saskatchewan. Mid and upper level flow was forecast to continue to be light, with only weak shear and subtle PVA anticipated. Low level upslope flow was likely, with orographic convection initiating by early afternoon. Linear	HS5 was launched at 2125Z for a line of convection moving toward the western project area. They were airborne at 2140Z. HS5 began to patrol Bragg Creek at 2152Z. They RTB at 2329Z, and landed at 2340Z. HS2 was launched at 2129Z for a line of convection

	convection was likely with convection predicted to slowly spread across much of the project area throughout the afternoon. Very high instability was modeled to wane after dusk, with no significant hail threats expected overnight. Quiet and mostly clear conditions Thursday morning yielded to widespread orographic convection by midday. This activity did not push off the foothills until around 21Z, when a broken line of convention approached the entire western project boundary. By 22Z the southern half of the line weakened considerably, but activity in the northern half of the project area contained stronger embedded convective cells. The first seeded storm of the day (#1) developed embedded in the anvil with other convection northwest of Sundre around 22Z. It was seeded as it approached Caroline until it weakened near the city around 2230Z. Around that time, a new line of convection began to develop on the eastern fringe of the existing anvil near the Olds-Didsbury airport. This line intensified and expanded as it moved north-northeast along the QE2, and was seeded (storm #2) from Olds to Ponoka. Radar indicated up to grape size hail may have occurred in Penhold from this storm. The line exited into the northern buffer east of Ponoka at 1Z (07/20). Additional showers and thunderstorms moved northeast across the central project area from roughly Sundre to Rumsey from 2Z to 9Z (07/20). Max cell top: 12.1km, 60.1 max dBz, 49.8 max VIL Tmax YC = 25.9C and 0.4mm of rain. Tmax QF = 25.4C and no rain data. Tmax Lacombe = 25.9C and 2.1mm of rain. Tmax Radar = 23.4C and 2.0mm of rain.	entering the western project area. They were airborne at 2142Z. HS2 began patrolling Sundre at 2155Z. They began base seeding storm #1 Caroline at 2221Z. HS2 repositioned to stronger convection west of Didsbury at 2233Z, leaving the wing-tip generators on in-transit. They began seeding storm #2 for Olds at 2241Z. HS2 stopped seeding and RTB at 0024Z (07/20). They landed at 0055Z (07/20). HS4 was launched at 2253Z for convection moving north near the Olds-Didsbury airport. They were airborne at 2310Z. HS4 began base seeding storm #2 Bowden at 2321Z. They stopped seeding and RTB at 0052Z (07/20), and landed at 0110Z (07/20). HS3 was launched at 2253Z for a developing line of convection near Olds. They were airborne at 2322Z. HS3 began top seeding storm #2 Red Deer at 2337Z. At 0014Z (07/20) they descended to shed ice, and began base seeding storm #2 Red Deer at 0024Z (07/20). HS3 stopped seeding and RTB at 0038Z (07/20). They landed at 0046Z (07/20). Flight Summary HS5: 2124Z-2341Z; no seeding; patrol Bragg Creek. HS2: 2135Z (07/19)-0100Z (07/20); 246 min wing-tip generators, 12 BIP; #1 Caroline, #2 Olds to Red Deer, patrol Sundre. HS4: 2300Z (07/19)-0114Z (07/20); 182 min wing-tip generators, 12 BIP; #2 Bowden to Ponoka. HS3: 2312Z (07/19)-0053Z (07/20); 80 EJ, 14 BIP; #2 Red Deer to Lacombe.
July 20, Friday	A large, deep upper level low was modeled to move slowly east toward western Alberta Friday. The left exit region of a jet streak south of the low was projected to move into the northern project area in the afternoon. Strong mid-level PVA was also expected as the trough advanced toward the project area. A downslope enhanced dry line was forecast to mix northeast into the central project area, with extremely high instability and strong shear along and north of this feature. Supercell development was predicted, quickly evolving into a squall line given nearly unidirectional mid and upper level winds. A cold front was forecast to move southeast across the project area by late afternoon, bringing cooler more stable air that would end the convective threat by dusk. Dense morning fog was observed across much of the project area Friday morning, and was extremely slow to mix out from Sundre to around Rocky MH. This suppressed anticipated surface-based instability significantly through the early afternoon. By 20Z, a leading wave of thunderstorms moved off of the foothills north of Limestone mountain into the northwest project area. Convection that moved into the aforementioned area of fog and low stratus near Rocky MH weakened significantly, while cells further north intensified dramatically. The strongest cell of the day developed with this activity in the	HS2 was launched at 1844Z for convection developing near Limestone Mountain. They were airborne at 1900Z. HS2 began to patrol from Sundre to Rocky MH at 1919Z. They repositioned toward the Olds-Didsbury airport at 2040Z, and RTB there at 2052Z. HS2 landed at the Olds-Didsbury airport at 2102Z. HS4 was launched at 2059Z for convection developing west of Sundre. They were airborne at 2127Z. HS4 began patrolling Sundre at 2141Z. HS4 RTB at 2211Z, and landed at 2222Z. HS3 was launched at 2116Z for convection developing along a line near Sundre. They were airborne at 2138Z. HS3 began patrolling Sylvan at 2145Z. They RTB at 2253Z and landed at 2307Z. HS2 was launched at 2224Z to return to Springbank. They were airborne from EA3 at 2237Z and landed in YBW at 2255Z. Flight Summary HS2: 1850Z-2104Z; no seeding; patrol Sundre to

	northern buffer, where it produced radar indicated walnut sized hail. A broken line of thunderstorms developed behind this first wave of convection from near Rocky MH to Caroline at 22Z, briefly intensifying into a small to moderate hail threat in Rimbey at 0Z (07/21). Radar indicated up to grape size hail may have fallen in Rimbey. This convection exited the northern buffer at 1Z (07/21), followed by mostly clear skies. Widely scattered elevated showers fell across the northern half of the project area between 6Z and 11Z (07/21), but no hail threats occurred. Pea size hail reported in Rimbey. Max cell top: 12.1km, 64.5 max dBz, 98.0 max VIL Tmax YC = 29.5C and no rain. Tmax QF = 23.3C and no rain data. Tmax Lacombe = 25.9C and no rain. Tmax Radar = 21.6C and no rain.	Rocky MH. HS4: 2111Z-2230Z; no seeding; patrol Sundre. HS3: 2126Z-2316Z; no seeding; patrol Sylvan to Lacombe. HS2: 2232Z-2300Z; no seeding; reposition flight; takeoff EA3, land YBW.
July 21, Saturday	A large, deep upper level low was expected to move slowly east-northeast across central Alberta Saturday. Strong vorticity maximums were expected to foster periods of PVA and NVA through the forecast period. Much cooler air aloft fostered a relatively low convective temperature, with insolation forecast to yield afternoon air-mass convection across the project area. A cold front was expected to move across the region in the mid-afternoon, acting as a focus for afternoon convection. Cooler and cloudier conditions were anticipated behind the front, with weaker scattered showers forecast for the remainder of the period. Mostly clear skies Saturday morning quickly became dotted with convective cumulus midday. A line of cells was evident along the cold front in the northwest by 19Z, with a few more discrete storms forming ahead of the line in the early afternoon. Storms continued to develop to the south as the line advanced east, with a few cells, including storm #1, developing over Calgary around 2030Z. This activity was seeded until it exited Calgary. The cold front continued to advance south and east through the afternoon, with weaker rain showers continuing behind it the remainder of the day. Scattered rain showers occurred in the central and northern project area overnight. Max cell top: 8.4km, 59.2 max dBz, 27.0 max VIL Tmax YC = 24.2C and 0.4mm of rain. Tmax QF = 19.9C and no rain data. Tmax Lacombe = 21.5C and no rain. Tmax Radar = 22.3C and 0.3mm of rain.	HS4 was launched at 1952Z for a broken line of convection approaching Red Deer. They were airborne at 2003Z. HS4 started patrolling Red Deer at 2007Z. They RTB at 2046Z, and landed at 2057Z. HS5 was launched at 2005Z for convection developing near Calgary. They were airborne at 2015Z. HS5 started base seeding storm #1 Calgary at 2023Z. They stopped seeding at 2054Z and began patrolling Springbank. HS5 RTB at 2058Z, and landed at 2108Z. Flight Summary HS4: 1954Z-2103Z; no seeding; patrol Red Deer. HS5: 2008Z-2110Z; 0 EJ, 7 BIP; storm #1 Calgary, patrol Springbank.
July 22, Sunday	A large scale low pressure system was forecast to be centered over northern SK. This feature combined with a high amplitude ridge, positioned over the Yukon territory, looked to cause AB to see NW flow. The low level and surface winds were expected to switch to the northeast later in the afternoon which would	No aircraft operations.

	favor upslope conditions. The area was expected to see a moderately unstable atmosphere in the afternoon and evening with anywhere from 100 to 200J/kg of CAPE. Bulk speed shear values looked to be approximately 20kts. Convective temperatures were forecast to be low enough across the area for air mass thunderstorms. Isolated convective rain showers fell in the northern buffer zone near Rimbey during the late afternoon. Stratiform rain showers overspread the northern area overnight as a cold front dropped southeastward across the area. Areas of embedded convection were observed on radar within the precipitation shield. Max cell top: 5.4km, 51.6 max dBz, 8.7 max VIL Tmax YC = 22.8C and a trace of rain. Tmax QF = 21.8C and no rain data. Tmax Lacombe = 21.4C and no rain. Tmax Radar = 20.1C and 0.3mm of rain.	
July 23, Monday	The mean mid and upper level wind flow was predicted to remain from the northwest as a trough slowly crept southeastward across AB. PVA appeared to be likely throughout the period as the trough approached the area from the northwest. The low levels and surface were expected to see persistent upslope flow throughout the period. Upslope flow was forecast to be strongest over the southern half of the project area at the time of peak heating. Area modified model soundings indicated instability would be higher over the southern part of the project area where more surface heating would be experienced through the daytime. Bulk speed shear values were predicted to range from 30 to 40 kts which would be sufficient for long-lived thunderstorms with potentially severe hail. Stratiform rain showers fell over the far northern part of the area during the morning hours. Thunderstorms started forming near Limestone Mountain at 1730Z. The thunderstorm activity propagated southward along the foothills during the afternoon hours. Storm #1 developed between the town of Banff and Cochrane at 1945Z. This storm was long-lived and tracked southeastward across southern Calgary. The thunderstorm continued to move southeastward across the southeast part of the area during the early evening hours. Another wave of convection pushed southeastward across the project area during the evening hours producing convective rain showers. Overnight, the rain showers slowly became more stratiform in nature. Greater than toonie size hail reported by CTV news in southwest Calgary. Max cell top: 10.6km, 61.4 max dBz, 61.5 max VIL Tmax YC = 22.4C and 3.8mm of rain. Tmax QF = 18.1C and no rain data.	HS1 was launched to the west of Cochrane at 2057Z. The flight became airborne at 2112Z. The aircraft started top seeding storm #1 for Calgary at 2124Z. At 2219Z the flight stopped seeding and descended to shed ice. HS1 resumed top seeding the same storm at 2234Z. At 2317Z they stopped seeding and RTB. The flight landed at 2330Z. HS2 was launched at 2116Z to a TITAN cell over the foothills approaching Calgary. The aircraft was airborne at 2128Z. They started base seeding storm #1 for Calgary at 2135Z. At 2229Z HS2 was restricted by air traffic control from flying any farther east. At 2308Z the aircraft extended their seeding line farther to the south toward Okotoks. HS2 stopped seeding and RTB at 2319Z. They landed at 2330Z. HS5 was launched to a thunderstorm along the foothills west of Calgary at 2134Z. They became airborne at 2143Z. At 2146Z the flight started base seeding storm #1 for Calgary. At 2229Z air traffic control restricted HS5 from flying any further east. They extended their line farther south toward Okotoks at 2308Z. At 2315Z the aircraft stopped seeding and began climbing to the top seeding altitude. At 2335Z the flight began patrolling High River. They RTB at 2340Z and landed at 0000Z (07/24). HS4 was launched at 2230Z to a long-lived thunderstorm moving southeastward toward Strathmore. The flight was airborne at 2243Z. At 2314Z the aircraft began patrolling the Strathmore area. HS4 repositioned to Okotoks at 2320Z. At 2335Z they started patrolling the High River area. At 2340Z the aircraft RTB and landed at 0023Z (07/24).

	Tmax Lacombe = 17.2C and 1.3mm of rain. Tmax Radar = 18.3C and 3.6mm of rain.	Flight Summary HS1: 2104Z-2333Z; 193 EJ, 19 BIP; #1 Calgary. HS2: 2121Z-2335Z; 208 min wing-tip generators, 22 BIP; #1 Calgary. HS5: 2140Z (07/23)-0002Z (07/24); 0 EJ, 29 BIP; #1 Calgary, patrol High River. HS4: 2234Z (07/23)-0027Z (07/24); no seeding; patrol Strathmore and High River.
July 24, Tuesday	The upper level jet stream was predicted to be positioned along the international border. A mid-level trough was forecast to slide southeastward through the northwest flow providing ample PVA to the region through late afternoon. Mid-level forcing appeared to shift east of the area in the evening spelling an end to the thunderstorm activity. The low levels and surface were expected to see consistent upslope flow throughout the daytime hours which would allow moisture pooling along the foothills. Instability appeared to be highest during the afternoon hours, with anywhere from 300 to 700J/kg of CAPE. Bulk speed shear values (i.e. ~45kts) looked to be sufficient for long-lived and severe thunderstorms. Thunderstorm severity was expected to be largely dependent upon surface heating. The first long-lived thunderstorm of the day formed over Kananaskis Country shortly after 1800Z. This storm gradually intensified as it tracked southeastward into the far southeastern part of the project area. This thunderstorm was not a threat to any population centers. Radar data indicated walnut size hail may have fallen to the southwest of High River. At roughly 1915Z a storm initiated near the town of Banff. This storm also slowly gained in strength as it tracked southeastward toward Turner Valley. The thunderstorm dissipated before reaching Turner Valley and Black Diamond. The convective activity then started to wane across the entire area in the early evening. No significant weather occurred overnight. Max cell top: 11.4km, 65.5 max dBz, 84.9 max VIL Tmax YC = 15.6C and 7.2mm of rain. Tmax QF = 18.0C and no rain data. Tmax Lacombe = 18.1C and 2.0mm of rain. Tmax Radar = 16.6C and no rain.	HS5 was launched to a tall convective storm approaching Turner Valley at 2109Z. The aircraft became airborne at 2116Z. At 2132Z the flight started patrolling for Turner Valley. They RTB at 2201Z and landed at 2216Z. Flight Summary HS5: 2112Z-2219Z; no seeding; patrol Turner Valley.
July 25, Wednesday	AB was forecast to remain in northwest flow at the mid and upper levels of the troposphere. In the evening, a shortwave trough was expected to slide southeastward across the region. The shortwave was predicted to provide weak PVA. Upslope wind flow looked to allow for moisture pooling along the foothills. A weak low level jet appeared to form during the overnight hours which would allow an 850mb theta-e ridge to remain in place overnight. Modified model soundings were suggesting anywhere from 400 to 600J/kg of CAPE would be present from the time of peak heating into the nighttime hours. Bulk speed shear values were expected to be around 25kts.	No aircraft operations.

	Speed shear looked to be just enough for long-lived thunderstorms with medium size hail. Overnight, instability was expected to persist, although PVA appeared to be weak. Thunderstorms initiated along the Rocky mountains starting around 0000Z (07/26). The storms back built and propagated south-southeastward along the mountains and foothills. Starting around 0400Z (07/26), these thunderstorm began to push into the western protected area. The storms became elevated, increased in speed, and tracked southeastward across the entire southern portion of the project area during the nighttime hours. Radar data suggested pea size hail may have fallen between Okotoks and High River during the overnight hours. Max cell top: 9.1km, 56.7 max dBz, 28.6 max VIL Tmax YC = 22.6C and 0.4mm of rain. Tmax QF = 22.1C and no rain data. Tmax Lacombe = 21.8C and no rain. Tmax Radar = 20.9C and 0.3mm of rain.	
July 26, Thursday	Upper level jet energy was expected over the southern part of the area. A broad positively tilted trough was forecast to be positioned over AB throughout the period. Strong PVA looked to occur from late afternoon into the evening hours. The low levels and surface appeared to see upslope flow. A lee cyclone was predicted to develop over the southeast part of the region in the late afternoon. Atmospheric instability (i.e. ~1,300J/kg) was expected to be more than adequate for severe thunderstorms, and speed shear values (~30kts) looked to be strong enough for long-lived thunderstorms. Convective temperatures appeared to be low enough to allow for air mass thunderstorms formation around 2000Z. What's more, thunderstorms were expected to initiate along the foothills starting around 2000Z. The thunderstorms activity was forecast to wane during the early nighttime hours. Convection initiate along the foothills near Limestone Mountain and west of Caroline at roughly 1900Z. This convection become more widespread and pushed southeastward toward Sundre. Storm #1 initiated directly over Cochrane and attempted to push into Calgary before quickly dissipating. Starting around 2000Z, TITAN cells developed in the northern buffer zone. Storm #2 grew near Sylvan and pushed toward the Red Deer area. Storm #3 formed west of Sundre and tracked through Cremona and Airdrie. Storm #4 developed along the foothills southwest of Cremona. This thunderstorm intensified as it tracked southeastward through Cochrane and Calgary. Radar data indicated grape sized hail may have fallen over eastern Calgary. Then at 0000Z (07/27) the convection morphed into a line of thunderstorms which extended from Turner Valley to Drumheller. This line of storms slid southeastward across the remainder of the southern part of the project area. Convective activity diminished in the wake of this line of thunderstorms during the late evening hours, and no significant weather was observed overnight.	HS2 was launched at 2021Z to a cluster of convective storm cells developing west of Sundre. The flight became airborne at 2035Z and started patrolling the Cochrane area. HS2 started base seeding storm #1 for Calgary at 2048Z. At 2100Z they stopped seeding and began patrolling the Calgary area. The aircraft repositioned to the Cremona area at 2107Z. At 2120Z they started seeding storm #3 for Cremona. At this same time, the right wing-tip generator did not start, so they were only able to use the left wing-tip generator for seeding. At 2300Z HS2 continued seeding as they repositioned to new convective growth threatening Strathmore. At 2310Z the crew began seeding storm #5 for Strathmore. They then became low on fuel, so the flight stopped seeding and RTB at 2331Z. HS2 landed at 2355Z. HS4 was launched to patrol Sylvan at 2023Z. The aircraft was airborne at 2038Z and started patrolling from Sylvan to Lacombe. At 2054Z the aircraft started base seeding storm #2 for Red Deer. The left wing-tip generator was not working properly, so the crew turned off the left burner at 2104Z. HS4 stopped seeding and started patrolling for Red Deer at 2120Z. Then at 2123Z the aircraft RTB. They landed at 2134Z. HS5 was launched at 2120Z to patrol the Cochrane area. The flight was airborne at 2134Z and started patrolling Cochrane. At 2211Z they started top seeding storm #4 for Cochrane. At 2300Z HS5 continued seeding as they repositioned to new convective cells forming over southeastern Calgary. At 2330Z the aircraft was iced up, so they continued

	Pea size hail reported in eastern Calgary. Max cell top: 10.6km, 61.5 max dBz, 65.4 max VIL Tmax YC = 24.5C and 3.4mm of rain. Tmax QF = 25.0C and no rain data. Tmax Lacombe = 24.6C and 0.2mm of rain. Tmax Radar = 23.7C and 0.3mm of rain.	to seeding as they descended to the base seeding altitude. At 2337Z the aircraft was restricted by air traffic control from conducting base seeding for Okotoks and Calgary. As a result, they stopped seeding and RTB at 2337Z. The flight landed at 2356Z. HS1 was launched to a TITAN cell approaching Cochrane at 2205Z. At 2215Z the aircraft became airborne. HS1 started base seeding storm #4 for Cochrane at 2223Z. At 2300Z HS1 continued seeding as they repositioned to new convective growth forming over southeastern Calgary. The aircraft then stopped seeding and began climbing to the top seeding altitude at 2330Z. At 2341Z HS1 started top seeding storm #4 for Okotoks. At 2348Z the flight was restricted by air traffic control from using ejectable flares due to aircraft traffic passing below their flight path. They continued seeding with burn-in-place flares during this time. Then at 2350Z the crew was able to resume seeding with ejectable flares. HS1 stopped seeding and RTB at 0024Z (07/27). They landed at 0047Z (07/27). HS4 flew a maintenance flight. The aircraft was airborne at 2220Z and landed at 2227Z. HS2 flew a maintenance flight. The flight was airborne at 0141Z (07/27) and landed at 0144Z (07/27). Flight Summary HS2: 2026Z-2356Z; 155 min wing-tip generators, 11 BIP; patrol Cochrane, #1 Calgary, #3 Cremona to Airdrie, #5 Strathmore. HS4: 2030Z-2139Z; 36 min wing-tip generators, 0 BIP; patrol Sylvan to Lacombe, #2 Red Deer. HS5: 2127Z-2359Z; 218 EJ, 15 BIP; #4 Cochrane to Calgary. HS1: 2211Z (07/26)-0049Z (07/27); 25 EJ, 18 BIP; #4 Cochrane, Calgary, Okotoks, and High River. HS4: 2214Z-2231Z; no seeding; maintenance flight. HS2: 0137Z-0148Z (07/27); no seeding; maintenance flight.
July 27, Friday	AB was expected to continue seeing northwest flow at the mid and upper levels of the troposphere. A shortwave trough looked to slide southeastward across the area in the afternoon providing weak PVA. The diurnal mountain plains circulation was forecast to setup up. This was expected to allow for upslope conditions to develop in the early afternoon and last through the time of sunset. CAPE values were predicted to range from 200 to 600J/kg across the region during the daytime. Bulk speed shear values were expected to be 10kts, so convection looked to be short-lived. Modified model soundings indicated very dry air would exist above 11kft MSL.	No aircraft operations.

	In the early afternoon convection developed along the foothills west of Sundre and Cochrane. Air mass convection also formed over the northeast quadrant of the region. Throughout the afternoon hours the convection was short-lived and produced mostly rain showers. Thunderstorms were observed over southeastern Calgary, near Three Hills, and along the entire length of the foothills to the south of Caroline. Radar data suggested pea size hail may have fallen over southeastern Calgary. Max cell top: 7.6km, 56.6 max dBz, 23.5 max VIL Tmax YC = 22.8C and no rain. Tmax QF = 24.5C and no rain data. Tmax Lacombe = 24.7C and no rain. Tmax Radar = 24.7C and no rain.	
July 28, Saturday	A mid and upper level ridge of high pressure was expected to build over the southern half of AB throughout the period. 500mb heights looked to slowly rise, and mid-level temperatures were forecast to steadily warm. Low level moisture pooling looked to be most likely along the southern foothills in the late afternoon and early evening. Mid-level PVA was possible through around 0000Z (07/29). Modified model soundings for the region showed anywhere from 200 to 600J/kg of CAPE along with 10kts of bulk speed shear. Overall, the thermodynamic picture for the area looked very similar to the previous day. Isolated convective rain showers fell between Red Deer and Three Hills during the late afternoon hours. The rest of the project area saw fair weather cumulus clouds in the afternoon and evening. Mostly clear skies were observed during the overnight hours. No TITAN cells, 47.1 max dBz, 4.8 max VIL Tmax YC = 26.1C and no rain. Tmax QF = 26.5C and no rain data. Tmax Lacombe = 27.0C and no rain. Tmax Radar = 25.0C and no rain.	No aircraft operations.
July 29, Sunday	A broad upper level ridge was modeled to spread into Alberta while a shortwave trough moved southeast out of the Northwest Territories. Stable conditions were projected due to mid-level subsidence under the ridge. No significant weather was forecast throughout the period. Mostly clear and above average temperatures were observed across the region. An area of clouds with low reflectivity moved into the northwest buffer between 7-8Z (07/30), otherwise no meteorological echoes occurred. No TITAN cells, 23.4 max dBz, 0.3 max VIL Tmax YC = 28.5C and no rain. Tmax QF = 28.7C and no rain data.	No aircraft operations.

	Tmax Lacombe = 29.7C and no rain. Tmax Radar = 27.5C and no rain.	
July 30, Monday	A broad ridge was modeled to shrink south in southern Alberta while a shortwave trough moved southeast near Cold Lake. Very warm and unstable conditions were predicted in the afternoon, with upslope orographic convection supplemented by PVA and a cold front moving south in the late evening. High convective bases and limited shear were expected to limit hail size, but modest to low-end severe hail was anticipated in the strongest cells. Showers and thunderstorms were expected to continue into the early overnight hours until the cold front cleared the project area. Clear skies Monday morning gave rise to orographic convection midday. This activity began moving into the western project area west of Cremona around 20Z, quickly intensifying into a significant hail threat as it moved southeast toward Cochrane. Storm #1 formed on the southeastern extent of this convection just before 21Z and showed occasional signs of organization as it moved across Cochrane, over the Springbank airport, and through southern Calgary. It was seeded until it exited Calgary around 2330Z. Additional convection developed south of storm #1 northwest of High River, was seeded (storm #2) until it passed High River at 0020Z (07/31). Further north, additional orographic convection coalesced into a powerful squall line that raced east across the central project area. Convection developed on the northeast flank of the squall line over Red Deer just after 1Z (07/31) and was seeded (storm #3) until it moved away from the city. A broad area of convection moved south into the northern project area from 2Z to 4Z (07/31) but did not become a hail threat to a protected city. Rain showers continued in a broken line from Cochrane to Strathmore, finally exiting the project area around 9Z (07/31). Loonie size hail observed at the Springbank airport. Nickel size hail reported in Cochrane. Pea to marble size hail reported in Calgary. Max cell top: 13.6km, 61.6 max dBz, 78.7 max VIL Tmax YC = 32.1C and 0.8mm of rain. Tmax QF = 31.0C and no rain data. Tmax Lacombe = 29.2C and 20.3mm of rain. Tmax Radar = 30.3C and 17.3mm of rain.	HS5 was launched at 2036Z for convection developing northwest of Cochrane. They were airborne at 2050Z and immediately began patrolling Cochrane. HS5 began top seeding storm #1 Cochrane at 2119Z. They stopped seeding and RTB at 2334Z and landed at 2344Z. HS2 was launched at 2040Z for convection developing northwest of Cochrane. They were airborne at 2053Z and immediately began patrolling Cochrane. HS2 began base seeding storm #1 Cochrane at 2104Z. They stopped seeding and RTB at 2330Z. HS2 landed at 2341Z. HS1 was launched at 2129Z for convection moving toward Springbank. They were airborne at 2143Z. HS1 began base seeding storm #1 Calgary at 2149Z. They stopped seeding and RTB at 2331Z and landed at 2350Z. HS4 was launched at 2220Z for convection threatening Calgary. They were airborne at 2237Z. HS4 began base seeding storm #1 Calgary at 2312Z. They repositioned to new convection near High River at 2335Z, leaving wing-tip generators on in-transit. HS4 began seeding storm #2 High River at 2342Z. They stopped seeding and repositioned toward a line of convection approaching Didsbury at 0020Z (07/31) and continued north to Red Deer at 0049Z (07/31). HS4 began seeding storm #3 Red Deer at 0112Z (07/31). They stopped seeding and RTB at 0135Z (07/31) and landed at 0145Z (07/31). HS3 was launched at 2231Z for convection northwest of Sundre. They were airborne at 2310Z. HS3 began patrolling Cochrane at 2334Z. They RTB at 2353Z and landed at 0014Z (07/31). Flight Summary HS5: 2045Z-2346Z; 280 EJ, 22 BIP; #1 Cochrane to Calgary. HS2: 2046Z-2344Z; 302 min wing-tip generators, 16 BIP; #1 Cochrane to Calgary. HS1: 2137Z-2352Z; 0 EJ, 27 BIP; #1 Calgary. HS4: 2228Z (07/30)-0149Z (07/31); 138 min wing-tip generators, 17 BIP; #1 Calgary, #2 High River, #3 Red Deer. HS3: 2259Z (07/30)-0023Z (07/31); no seeding; patrol Cochrane.
July 31, Tuesday	An upper level ridge with embedded pockets of PVA was predicted to progress toward Alberta Tuesday. High low level moisture was observed across the project area, though a strong 700mb cap was also noted in model soundings. Shear was	HS5 was launched at 2309Z for convection moving into the southwest project area. They were airborne at 2320Z. HS5 began patrolling Turner Valley and Black Diamond at 2334Z. They RTB at 2357Z and

	stronger than Monday, with directional and speed shear anticipated. Orographic convection was predicted but was forecast to remain largely along the foothills until late in the day. The chance for modest to strong elevated convection overnight was cautioned, with high elevated instability and PVA forcing expected. A wave of elevated convection near Sundre moved southeast across the project area late Tuesday morning into the early afternoon. Orographic convection began developing west of Cochrane around 20Z, but while some cells were very intense, all significant activity remained west of the project boundary. This convection exited the southwest buffer around 0Z (08/01). A second wave of strong convection moved southeast toward the northwest project area at 2Z (08/01). This convection became much less organized as it approached but produced the highest reflectivity and VIL values observed throughout the period near Caroline. It dissipated completely near Red Deer at 7Z (08/01). Another wave of elevated showers and thunderstorms developed across the western project area at 8Z (08/01), but no hail threats were observed as it progressed across the project area. Lightning, however, was observed with this activity. Max cell top: 10.6km, 57.8 max dBz, 19.3 max VIL Tmax YC = 26.0C and 0.4mm of rain. Tmax QF = 26.3C and no rain data. Tmax Lacombe = 26.1C and no rain. Tmax Radar = 24.2C and 0.3mm of rain.	landed at 0014Z (08/01). Flight Summary HS5: 2316Z (07/31)-0016Z (08/01); no seeding; patrol Turner Valley and Black Diamond.
August 01, Wednesday	The axis of an upper level ridge was projected to pivot east into Saskatchewan while a shortwave trough moved slowly onshore near Vancouver. The left exit region of a jet streak was modeled to move into the central project area in the afternoon. A convective cap was anticipated to foster clear skies into the afternoon hours, with extreme instability building underneath the cap. The cap was forecast to break by peak heating, with explosive convective growth expected from that time through the afternoon and evening hours. High elevated instability was predicted to continue overnight, though NVA was modeled to mitigate convective opportunities around and after midnight. Morning rain showers in the central project area exited to the east around 1330Z. Mostly clear skies were then experienced until orographic convection began developing around 1930Z. This activity quickly moved into the western project area, with one cell organizing into a supercell south of Cremona. This storm was seeded (storm #1) as it tracked right of the mean flow toward Airdrie until it moved across the city. A second storm, seeded storm #2, organized southwest of Cochrane around the same time as storm #1. It was seeded for Cochrane and Calgary until it exited the city around 2240Z. Another cell formed immediately south of the track of storm #2 south of Cochrane around 23Z and was seeded (storm #3) is it approached Calgary. It ultimately passed north of the city and	HS1 was launched at 1945Z for convection west of Calgary. They were airborne at 2012Z. HS1 began top seeding storm #1 Airdrie at 2028Z. They descended but continued base seeding storm #1 Airdrie at 2134Z. HS1 stopped seeding and RTB at 2208Z. They landed at 2220Z. HS2 was launched at 1942Z for convection west of Calgary. They were airborne at 2019Z. HS2 began base seeding storm #1 Airdrie at 2034Z. They repositioned south to a new cell forming southwest of Cochrane at 2101Z, leaving wing-tip generators on in-transit. HS2 began seeding storm #2 Calgary at 2107Z. They stopped seeding and RTB at 2240Z and landed at 2247Z. HS4 was launched at 2006Z for convection west of Calgary. They were airborne at 2023Z. HS4 began base seeding storm #1 Airdrie at 2047Z. They repositioned southwest to a storm entering Calgary at 2205Z, leaving wing-tip generators on in-transit, and began seeding storm #2 Calgary at 2212Z. HS4 stopped seeding and RTB at 2242Z, and landed at 2309Z. HS5 was launched at 2011Z for convection west of

	did not produce hail in a protected city. Storm #4 developed in an embedded cluster of convection in southeast Calgary around 2315Z. It was seeded as it tracked northeast toward Chestermere, then it organized and turned east-southeast and was seeded for Strathmore before it exited the project area around 0030Z (08/02). Back in the central project area, another extremely powerful supercell moved into the project area west of Cremona around 2330Z. This storm (#5) was seeded for Crossfield, Carstairs, Linden and Acme as it tracked east. New strong but embedded convection intensified in a broken line between Springbank and the foothills west of Turner Valley around 0130Z (08/02). This activity was seeded briefly for Calgary (storm #6) until it raced east across the city. Scattered showers and thunderstorms continued across the project area through the night, though the only hail threats occurred in the far southeast project area and did not threaten any protected cities. Ping pong ball size hail reported southwest of Dogpound near Bottrel at 2051Z. 3.5cm hail measured in Dogpound at 0Z. Pea to grape size hail reported in northwest Calgary. Pea size hail reported in southeast Calgary. Pea size hail reported in Airdrie. Max cell top: 14.4km, 63.8 max dBz, 85.9 max VIL Tmax YC = 29.5C and 14.5mm of rain. Tmax QF = 28.4C and no rain data. Tmax Lacombe = 28.3C and 1.1mm of rain. Tmax Radar = 27.0C and 0.3mm of rain.	Calgary. They were airborne at 2022Z. HS5 began patrolling Airdrie at 2034Z. They repositioned to a storm southwest of Cochrane at 2056Z. HS5 began top seeding storm #2 Calgary at 2108Z. HS5 stopped seeding and repositioned away from the storm at 2214Z, descending to base seeding altitude in-transit. HS5 began base seeding storm #2 Strathmore at 2239Z. HS5 stopped seeding and repositioned west to new growth west of Calgary at 2251Z. They began base seeding storm #3 Calgary at 2301Z. HS5 stopped seeding and RTB at 2340Z. They landed at 2357Z. HS3 was launched at 2110Z for convection west of Calgary. They were airborne at 2132Z. HS3 began patrolling Calgary at 2200Z. They began top seeding storm #2 Calgary at 2217Z. HS3 stopped seeding and RTB at 2253Z and landed at 2319Z. HS1 was relaunched at 2257Z for new convection developing west of Springbank. They were airborne at 2307Z. HS1 began top seeding storm #4 Chestermere at 2336Z. They stopped seeding and RTB at 0030Z (08/02). HS1 landed at 0047Z (08/02). HS2 was relaunched at 2342Z for strong convection near Cremona. They were airborne at 2354Z. HS2 began base seeding storm #5 Carstairs and Crossfield at 0001Z (08/02). HS2 had a right burner failure at 0040Z (08/02) but continued seeding with the left burner and BIPs. They stopped seeding and RTB at 0049Z (08/02) and landed at 0105Z (08/02). HS5 performed a maintenance flight. They were airborne at 0144Z (08/02) and landed at 0200Z (08/02). HS1 was launched at 0131Z (08/02) for fast-moving convection west of Okotoks. They were airborne at 0146Z (08/02). HS1 began base seeding storm #6 Calgary at 0201Z (08/02). They stopped seeding and began patrolling Calgary at 0205Z (08/02). HS1 RTB at 0212Z (08/02) and landed at 0224Z (08/02). HS2 was launched at 0139Z (08/02) for fast-moving convection west of Okotoks. They were airborne at 0155Z (08/02). HS2 began patrolling Turner Valley and Black Diamond at 0210Z (08/02). They RTB at 0213Z (08/02) and landed at 0221Z (08/02). Flight Summary HS1: 2005Z-2222Z; 293 EJ, 31 BIP; #1 Airdrie. HS2: 2010Z-2251Z; 252 min wing-tip generators, 20 BIP; #1 Airdrie, #2 Calgary. HS4: 2012Z-2314Z; 230 min wing-tip generators, 23 BIP; #1 Airdrie, #2 Calgary. HS5: 2014Z-2359Z; 304 EJ, 32 BIP; #2 Calgary to

		Strathmore, #3 Calgary, patrol Airdrie. HS3: 2121Z-2322Z; 176 EJ, 13 BIP; #2 Calgary. HS1: 2303Z (08/01)-0050Z (08/02); 223 EJ, 13 BIP; #4 Chestermere to Strathmore. HS2: 2348Z (08/01)-0108Z (08/02); 87 min wing-tip generators, 10 BIP; #5 Carstairs and Crossfield to Linden and Acme. HS5: 0138Z-0202Z (08/02); no seeding; maintenance flight. HS1: 0139Z-0225Z (08/02); 0 EJ, 1 BIP; #6 Calgary. HS2: 0151Z-0224Z (08/02); no seeding; patrol Turner Valley and Black Diamond.
August 02, Thursday	The upper level jet was modeled to remain over southern Alberta Thursday while a trough slowly spread east toward the project area. Mid-level PVA was anticipated in advance of the trough. Light surface flow was observed Thursday morning and was forecast to turn upslope in the afternoon. Moisture remained seasonally high and combined with strong insolation and slowly cooling temperatures aloft, extremely high instability was predicted. Shear was also concerning, especially in the southern half of the project area, closest to the upper level jet. Orographic convection was anticipated early Thursday afternoon, with the potential for severe hail with more discrete convection particularly in the southern and western project areas. Activity was forecast to turn more linear through the afternoon and evening, with activity eventually exiting the project area in the late evening. No significant convective triggers were expected after midnight. Elevated thundershowers moved across the far southern project area between 12Z and 13Z, and between Cremona and Three Hills from 14Z and 18Z. A third wave of convection approached the project area southwest of Cochrane at 18Z, intensifying rapidly on the foothills. The convection consolidated into a supercell by 1830Z and tracked east directly toward Calgary. It was seeded (storm #1) until it was clear it would pass south of Strathmore around 2030Z. A second cell intensified southwest of Calgary around 2045Z and was seeded until it dissipated in far southern Calgary. Additional convection began to move into the west and northwest project area around 22Z. One cell, storm #3, posed a threat to Sundre, and was seeded until it weakened at 2317Z. Back in the south, a new convective cell intensified southwest of Calgary at 2245Z and was seeded until it moved across town around 2330Z. At the same time, a squall line organized and intensified west of Sundre, and was seeded (storm #5) for Sundre until it weakened around 0Z (08/03). Another area of strong convection west of Lacombe was seeded (storm #6) as it approached the QE2 from around 0Z to 1Z (08/03). Widespread embedded thunderstorms continued across much of the project area from 1Z to 3Z (08/03). This weakened into more widely scattered rain showers by 4Z (08/03), though scattered elevated thunderstorms continued in the far southern project area until about 7Z (08/03). Skies then cleared the remainder of the night, with patchy fog developing across the project area.	HS2 was launched at 1816Z for convection southwest of Cochrane. They were airborne at 1830Z. HS2 started base seeding storm #1 Calgary at 1834Z. They stopped seeding and RTB at 2025Z. HS2 landed at 2039Z. HS1 was launched at 1816Z for convection developing southwest of Cochrane. They were airborne at 1828Z. HS1 began top seeding storm #1 Calgary at 1840Z. They stopped seeding and RTB to the Olds-Didsbury airport at 1934Z. HS1 landed in EA3 at 2000Z. HS5 was launched at 1826Z for convection southwest of Cochrane. They were airborne at 1842Z. HS5 started base seeding storm #1 Calgary at 1851Z. They climbed to top seeding altitude at 2009Z and began top seeding storm #1 Strathmore at 2029Z. HS5 RTB at 2030Z and landed at 2040Z. HS3 was launched at 1835Z for convection southwest of Cochrane. They were airborne at 1855Z. HS3 started top seeding storm #1 Calgary at 1931Z. They RTB at 2019Z and landed at 2048Z. HS4 was launched at 1854Z for a strong thunderstorm moving toward Calgary. They were airborne at 1913Z. HS4 began base seeding storm #1 Calgary at 2001Z. They stopped seeding at 2030Z and repositioned west to a new cell developing in far southwest Calgary. They began seeding storm #2 Calgary at 2046Z. HS4 stopped seeding and RTB to Springbank at 2101Z. They landed in YBW at 2115Z. HS1 was relaunched at 2141Z for new convection developing near Sundre. They were airborne from the Olds-Didsbury airport at 2151Z. HS1 began top seeding storm #3 Sundre at 2209Z. They stopped seeding but continued patrolling Sundre at 2234Z. HS1 resumed top seeding storm #3 Sundre at 2254Z. At 2317Z they stopped seeding and repositioned to a line of new convection forming along the western project boundary. HS1 began base seeding storm #5 Sundre at 2330Z. They

	Max cell top: 12.9km, 61.4 max dBz, 66.6 max VIL Greater than golf ball size hail measured at the intersection of Hwy 22X and 104th street, southeast of Calgary. Golf ball size hail reported in southern Calgary. Tmax YC = 22.8C and 3.8mm of rain. Tmax QF = 25.0C and no rain data. Tmax Lacombe = 25.3C and 9.3mm of rain. Tmax Radar = 22.3C and a trace of rain.	stopped seeding but continued patrolling Sundre at 0003Z (08/03). HS1 repositioned southwest toward Cremona at 0025Z (08/03). They began patrolling Cremona at 0036Z (08/03). HS1 repositioned to new convection developing northwest of Cochrane at 0128Z (08/03) and began patrolling Cochrane at 0135Z (08/03). HS1 RTB at 0158Z (08/03) and landed in YBW at 0205Z (08/03). HS4 was relaunched at 2152Z for new convection near Calgary. They were airborne from YBW at 2207Z. HS4 began patrolling Sundre at 2226Z. They repositioned south to new convection south of Springbank at 2234Z. HS4 began base seeding storm #4 Calgary at 2300Z. They stopped seeding and repositioned to Olds at 2328Z. HS4 began seeding storm #5 Sundre at 2352Z. They stopped seeding and RTB at 0012Z (08/03). HS4 landed in YQF at 0023Z (08/03). HS5 was relaunched at 2234Z for strong convection developing southwest of Calgary. They were airborne at 2243Z. HS5 began top seeding storm #4 Calgary at 2252Z. They stopped seeding and repositioned northwest of Cochrane at 2333Z. HS5 began patrolling Cremona at 2347Z. They RTB at 2356Z and landed at 0005Z (08/03). HS2 was relaunched at 2312Z for a developing line of convection across the western project area. They were airborne at 2324Z. HS2 began base seeding storm #6 Bentley at 2353Z. One wing-tip generator was inoperable for the duration of the seeding. They stopped seeding and RTB at 0102Z (08/03). HS2 landed at 0132Z (08/03). HS3 was relaunched at 2322Z for a broken line of strong convection in the northwest project area. They were airborne at 2343Z. HS3 began base seeding storm #6 Bentley at 2350Z. They stopped seeding and RTB at 0012Z (08/03) and landed at 0019Z (08/03). Flight Summary HS2: 1822Z-2043Z; 222 min wing-tip generators, 24 BIP; #1 Calgary to Strathmore. HS1: 1823Z-2001Z; 248 EJ, 24 BIP; #1 Calgary; takeoff YBW, land EA3. HS5: 1839Z-2043Z; 1 EJ, 38 BIP; #1 Calgary and Strathmore. HS3: 1844Z-2054Z; 289 EJ, 10 BIP; #1 Calgary. HS4: 1903Z-2118Z; 88 min wing-tip generators, 5 BIP; #1 Calgary to Strathmore, #2 Calgary; takeoff YQF, land YBW. HS1: 2148Z (08/02)-0209Z (08/03); 133 EJ, 8 BIP; #3 Sundre, #5 Sundre, patrol Cremona, patrol Cochrane; takeoff EA3, land YBW.

		HS4: 2159Z (08/02)-0027Z (08/03); 96 min wing-tip generators, 1 BIP; #4 Calgary, #5 Sundre, patrol Sundre; takeoff YBW, land YQF. HS5: 2238Z (08/02)-0008Z (08/03); 61 EJ, 8 BIP; #4 Calgary, patrol Cremona. HS2: 2318Z (08/02)-0134Z (08/03); 69 min wing-tip generator, 6 BIP; #6 Bentley to Lacombe. HS3: 2336Z (08/02)-0024Z (08/03); 0 EJ, 5 BIP; #6 Bentley.
August 03, Friday	An upper level low was projected to move east from central Alberta into Saskatchewan Friday. PVA dropping south behind the low was forecast to help instigate convection in the project area in the afternoon. Broad northwest flow was expected in the low levels throughout the forecast period. Instability was much lower than recent days, with CAPE around 500 J/kg expected. Shear was minimal in both speed and direction. Unorganized air-mass convection was forecast across the project area, fading into weak rain showers when surface heating was lost in the evening. Scattered convection initiated across the western project area between 19Z and 20Z, spreading east throughout the afternoon. A few taller cells produced radar-indicated pea size hail near High River, Sundre, and Three Hills, but no significant hail threats were observed. A second wave of convection moved southeast from the northern buffer at 23Z, with one cell on the leading edge of this activity intensifying into a modest hail threat north of Three Hills around 2Z (08/04). This activity did not threaten a protected city, and the wave weakened into non-threatening rain showers after dusk. Scattered rain showers continued in the southern project area until 9Z (08/04). Max cell top: 10.6km, 60.0 max dBz, 34.3 max VIL Tmax YC = 24.6C and 4.2mm of rain. Tmax QF = 23.8C and no rain data. Tmax Lacombe = 22.3C and no rain. Tmax Radar = 22.9C and 0.3mm of rain.	HS1 was launched at 1929Z for convection west of Okotoks. They were airborne at 1955Z. HS1 began patrolling Calgary at 2003Z. They RTB at 2147Z and landed at 2200Z. Flight Summary HS1: 1944Z-2202Z; no seeding; patrol Calgary.
August 04, Saturday	A subtle upper level high pressure system was modeled to settle south over central Alberta while a cutoff low remained nearly stationary over the eastern Pacific. Light and disorderly mid-level flow was forecast to keep mid-level vorticity advection minimal through the period. A cold front was observed progressing south through the project area Saturday morning, with widespread rain showers along and behind it. Partial clearing was anticipated behind this feature later in the afternoon, with the opportunity for air-mass convection quickly following. All convective activity was expected to subside after surface heating was lost in the evening. A broad area of rain showers moved south across the project area from Saturday morning throughout the afternoon. Skies began to clear in the far northern project area and buffer around 23Z, and a few short-lived thunderstorms developed in this area until weakening around 2Z (08/05). Lightning was	No aircraft operations.

	observed with this convection, but no radar-indicated hail fell. Light rain showers continued in the southern and eastern project areas overnight, with stronger embedded convection developing near Drumheller after 9Z (08/05). Max cell top: 6.9km, 56.7 max dBz, 16.8 max VIL Tmax YC = 17.4C and 2.8mm of rain. Tmax QF = 19.2C and no rain data. Tmax Lacombe = 18.3C and 8.1mm of rain. Tmax Radar = 17.5C and 3.3mm of rain.	
August 5, Sunday	Split mid and upper level flow was expected over the area as a deep cut off low remained stationary over the eastern Pacific. Subtle 500mb warming and height rises were predicted throughout the period. The low level and surface winds were expected to favor upslope conditions from the mid-afternoon through the time of sunset. Surface heating appeared to be the primary trigger mechanism for thunderstorms along the foothills. Convective temperatures looked to be reached across the western part of area at the time of peak heating. CAPE values were forecast to approach 600J/kg, but no speed shear was expected. Stratiform rain showers fell near Strathmore in the morning. Beginning at approximately 1830Z isolated convection formed along the foothills. Then at 2000Z an isolated convective cell slid southeastward across the western boundary and into the protected area. Rain showers were observed on radar to the northwest of Cochrane from this convection. At 2200Z convective rain showers occurred to the northwest of Sundre. In the early evening, the skies cleared across the entire region. No significant weather was observed overnight. No TITAN cells, 52.9 max dBz, 9.3 max VIL Tmax YC = 23.7C and a trace of rain. Tmax QF = 24.6C and no rain data. Tmax Lacombe = 24.6C and no rain. Tmax Radar = 24.0C and no rain.	No aircraft operations.
August 6, Monday	A deep and large scale low pressure system was predicted to remain parked over the eastern Pacific. A shortwave trough was expected to move southeastward across the area in the late afternoon and evening providing moderate PVA. A ridge of high pressure looked to build over the western provinces following the shortwave trough. The low levels and surface were forecast to see downslope wind flow throughout the period. Area modified model soundings for Calgary and close to the foothills indicated upwards of 350J/kg of CAPE would exist in the troposphere at the time of peak heating. Bulk speed shear values were expected to be around 10kts. Dry air was forecast to be entrained into any growing updrafts at altitudes of 16kft MSL and higher. The convective temperature looked to be reached for a short time around the time of peak heating. Scattered cumulus clouds formed over the western half of the project area in the afternoon. At the time of peak heating a	No aircraft operations.

	wave of more widespread cumulus cloud cover was first seen near Sundre. This wave of increased cloud cover slowly shifted southeastward in the evening. Towering cumulus clouds were observed near the Calgary area at 0400Z (08/07). No TITAN cells, 23.9 max dBz, 0.1 max VIL Tmax YC = 28.9C and no rain. Tmax QF = 29.4C and no rain data. Tmax Lacombe = 28.1C and no rain. Tmax Radar = 27.5C and no rain.	
August 7, Tuesday	A large scale, cut off low pressure system was expected to remain quasi-stationary over the eastern Pacific throughout the day and night. Over AB, a broad ridge of high pressure was forecast to build. Rising 500mb temperatures and heights along with a strong cap looked inhibit the development of convection. Downslope wind flow was expected at the low levels and surface. Modified model soundings showed a mostly stable atmosphere. Since the troposphere appeared to be mostly stable, speed shear was not expected to be a factor. A band of stratiform cloud cover moved southeastward across the area during the early morning hours. Smoke then began to spread across the region in the late morning. This smoke gradually thickened throughout the day and nighttime hours. No TITAN cells, 20.6 max dBz, 0.1 max VIL Tmax YC = 28.8C and no rain. Tmax QF = 27.9C and no rain data. Tmax Lacombe = 26.9C and no rain. Tmax Radar = 27.7C and no rain.	No aircraft operations.
August 8, Wednesday	The deep upper level low over the eastern Pacific appeared to remain stationary. The broad scale ridge over the western part of North America was expected to continue building throughout the day and night. Furthermore, 500mb temperatures and heights were predicted to rise. Weak upslope conditions were expected over the northwestern part of the region, although this wind flow did not appear to be strong enough to overcome the strong low level cap. Area modified model soundings showed a loaded gun situation in place across the project area during the time of peak heating, although the existence of a strong cap at the low levels was expected to curtail thunderstorm initiation. Mostly clear skies were observed during the day and night. Smoke continued to flow over the region from fires located in southern BC and the state of Washington. Heat warnings were issued by Environment Canada for the entire region. No meteorological echoes. Tmax YC = 29.9C and no rain. Tmax QF = 30.5C and no rain data. Tmax Lacombe = 30.4C and no rain.	No aircraft operations.

	Tmax Radar = 28.8C and no rain.	
August 9, Thursday	The mid and upper level low pressure system over the eastern Pacific was forecast to begin slowly tracking northeastward toward Vancouver. None the less, the ridge in place over AB was predicted to continue building throughout the period. Downslope wind flow was expected to persist which would likely cause dew-points to remain relatively low compared to the hot temperatures. Area modified model soundings showed a mostly stable air mass in place over the protected area. Model data indicated a very strong cap would exist which will inhibit the development of convection throughout the period. Minimal cloud cover occurred across the entire area which allowed for temperatures to warm to record highs. Smoke continued to flow into the region from several fires in BC and Washington. The smoke was especially thick near the Sundre area in the evening due to a large out of control fire in the mountains to the west of the town. No meteorological echoes. Tmax YC = 34.0C and no rain. Tmax QF = 34.6C and no rain data. Tmax Lacombe = 34.3C and no rain. Tmax Radar = 33.1C and no rain.	Radar tour #3 was conducted at the Olds-Didsbury airport with 27 people in attendance. HS3 flew a PR flight. They were airborne from YQF at 1640Z and landed at EA3 at 1651Z. Flight Summary HS3: 1615Z-1653Z; no seeding; PR flight; takeoff YQF, land EA3.
August 10, Friday	The axis of the ridge was forecast to shift eastward into SK as the closed low over the eastern Pacific continued to move northeastward toward Vancouver. A lee cyclone appeared to form near Drayton Valley at the time of peak heating. As the lee cyclone moved eastward it looked to cause a cold front to quickly drop southward across the entire area during the nighttime hours. All the model soundings for the region indicated a strong cap would remain in place throughout the period, although a moderate amount of instability was expected to be present in the mid and upper levels of the atmosphere. Cloud bases appeared to be extremely high. The cloud bases were predicted to be higher than 15kft MSL. The cities of Calgary and Red Deer set all-time record highs for temperature. The previous record for Calgary was 36.1C which was set in 1919. Calgary reached a high temperature of 36.5C at roughly 5PM local time. Day time high temperatures were also broken for other areas in the AB. Thick smoke continued to flow into the region from numerous fires in AB, BC, and Washington. In the evening, scattered and elevated convection developed over the protected area. Overnight, scattered convective rain showers were observed over the northern half of the region and near Strathmore. At the very end of the period, weak and elevated thunderstorms were observed to the west and north of Rocky MH. Radar indicated convective rain showers occurred with these thunderstorms. Max cell top: 8.4km, 52.6 max dBz, 10.0 max VIL Tmax YC = 36.5C and no rain.	HS3 flew a PR flight. They were airborne from EA3 at 1516Z and landed at YQF at 1530Z. Flight Summary HS3: 1506Z-1533Z; no seeding; PR flight; takeoff EA3, land YQF.

	Tmax QF = 36.3C and no rain data. Tmax Lacombe = 36.5C and no rain. Tmax Radar = 34.7C and no rain.	
August 11, Saturday	Jet PVA was predicted to increase across AB. A closed low was centered just off the coast of Vancouver Island. The low was forecast to weaken into a trough as it approached AB during the period. PVA was probable throughout the daytime and nighttime hours. The low level and surface wind flow appeared to favor upslope conditions through the evening hours. Area modified model soundings showed a strong low level cap in place across the area. The forcing from the approaching low looked to be strong enough to still initiate elevated thunderstorms during the daytime. Upper level jet energy was predicted to provide strong enough speed shear values for long-lived thunderstorms with potential for small size hail. Cloud bases were expected to be very high, approximately 17.4kft MSL. Weak thunderstorms occurred to the west and north of Rocky MH during the early morning hours. At 2000Z a tall storm grew near Lake Louise. The fast moving, elevated strong storm moved northeastward toward Rocky MH. The TITAN cell began diminishing at 2115Z near Limestone Mountain. This storm was part of a band of thunderstorms that dissipated as they attempted to push into the project area near Rocky MH at 2230Z. At around 2345Z an elevated and tall storm formed along the mountains southwest of High River. This storm maintained its intensity as it quickly tracked northeastward toward Calgary. As the TITAN cell moved into the project area, the thunderstorm rapidly dissipated. The last thunderstorm activity of the period occurred at roughly 0530Z (08/12) when a cluster of tall and fast moving TITAN cells tracked northeastward across the far southeastern part of the project area. Radar data indicated grape size hail may have fallen near the town of Vulcan. Max cell top: 11.4km, 57.0 max dBz, 31.4 max VIL Tmax YC = 26.2C and 0.8mm of rain. Tmax QF = 23.8C and no rain data. Tmax Lacombe = 22.4C and 1.8mm of rain. Tmax Radar = 23.1C and a trace of rain.	HS5 was launched to a tall storm moving quickly toward Calgary at 0018Z (08/12). The flight became airborne at 0027Z (08/12) and began patrolling Calgary. At 0035Z (08/12) HS5 RTB. The aircraft landed at 0043Z (08/12). Flight Summary HS5: 0022Z-0045Z (08/12); no seeding; patrol Calgary.
August 12, Sunday	A cutoff low located over central Alberta was modeled to rejoin the upper level flow today as it exited the region to the east. Mid-level PVA was forecast to continue instigating rain and convection in the afternoon, with NVA following by evening. Low morning stratus was expected to mix out in the southern project area, with the strongest convection anticipated in this area. No significant weather was expected overnight with gradually clearing skies. A wave of showers and embedded thunderstorms approached the project area Sunday morning, with more discrete thundershowers forming ahead of the line in the northwest project area around 14Z. The wave of convection weakened as	HS1 was launched at 2103Z for a strong thunderstorm north of Cochrane. They were airborne at 2119Z. HS1 began top seeding storm #1 Calgary at 2133Z. They stopped seeding but continued patrolling Calgary at 2228Z. HS1 RTB at 2238Z, and landed at 2251Z. HS2 was launched at 2103Z for a strong thunderstorm north of Cochrane. They were airborne at 2118Z. HS2 began base seeding storm #1 Calgary at 2128Z. They stopped seeding and RTB at 2228Z, and landed at 2238Z.

	it crossed the western project boundary around 1630Z, and dissipated by 18Z. A new discrete thunderstorm developed along the foothills west of Cremona around 20Z, and showed signs of organization as it moved southeast toward Calgary. It was seeded (storm #1) for Calgary until it moved across town and dissipated. Radar indicated up to grape size hail may have fallen in the city, though only pea size hail was reported. Broken stratus clouds persisted in the project area through the evening, eventually lifting but giving way to areas of dense fog late Sunday night. 1.0cm size hail reported at Hwy 22 & Big Hill Springs Rd. Pea size hail reported in Calgary. Max cell top: 9.9km, 60.5 max dBz, 38.9 max VIL Tmax YC = 19.2C and 7.4mm of rain. Tmax QF = 15.8C and no rain data. Tmax Lacombe = 13.7C and 0.8mm of rain. Tmax Radar = 15.9C and no rain.	Flight Summary HS1: 2106Z-2254Z; 97 EJ, 13 BIP; #1 Calgary, patrol Calgary. HS2: 2110Z-2240Z; 120 min wing-tip generators, 6 BIP; #1 Calgary.
August 13, Monday	The jet stream was observed well north of the project area in northern Alberta while a ridge overspread the region from the west. Negative vorticity advection and subsidence were expected to create conditions hostile to convective growth throughout the forecast period. A surface high pressure circulation was forecast to pass east in southern Alberta, with south to southeast flow expected by the afternoon. No significant weather was anticipated. Fog and low stratus mixed out of the boundary layer by late morning, with fair weather cumulus observed in the afternoon. High cirrus clouds spread into the area from the north overnight. No significant weather occurred. No meteorological echoes. Tmax YC = 20.9C and no rain. Tmax QF = 21.6C and no rain data. Tmax Lacombe = 21.5C and no rain. Tmax Radar = 20.3C and no rain.	No aircraft operations.
August 14, Tuesday	A strong but progressive ridge was modeled to move east across southwestern Canada Tuesday. No PVA or synoptic scale convective triggers were anticipated. Downslope southwesterly surface flow, combined with extremely warm mid-level temperatures, was forecast to yield above average temperatures through the period. No significant weather was expected. Clear skies became overlain with smoke Tuesday afternoon, becoming very thick and restricting visibility overnight. No meteorological echoes were detected by radar, and no precipitation was observed. No meteorological echoes.	No aircraft operations.

	Tmax YC = 29.1C and no rain. Tmax QF = 29.8C and no rain data. Tmax Lacombe = 29.4C and no rain. Tmax Radar = 28.9C and no rain.	
August 15, Wednesday	A shortwave trough was modeled to move east across northern Alberta while zonal flow developed across the project area. PVA was anticipated to favor areas north of the project area in central Alberta. Low level flow was projected to turn easterly in the afternoon, though limited moisture and poor instability was forecast to limit orographic convection's severity. Thick smoke was also a forecast concern, with low visibility observed across the region Wednesday morning. A weak LLJ was modeled to develop overnight and support a continued threat of elevated convection, though this activity was not expected to become a hail threat. Smokey but clear skies were observed throughout the day. No significant convection occurred throughout the day. Isolated convective showers developed southwest of Sylvan and north of Three Hills between 5z and 8z (08/16), but remained weak. Lightning was not observed with this activity. No TITAN cells, 41.6 max dBz, 2.3 max VIL Tmax YC = 25.0C and no rain. Tmax QF = 26.2C and no rain data. Tmax Lacombe = 24.7C and no rain. Tmax Radar = 24.5C and no rain.	No aircraft operations.
August 16, Thursday	Zonal flow was projected to continue Thursday with smoke continuing to stream into the project area from abundant fires in British Columbia. The jet stream was predicted to remain well north of the area. No significant PVA was modeled to occur. Low level flow was forecast to turn upslope in the afternoon, with modest instability around 500 J/kg modeled to manifest in orographic convection. A stronger cap inside the project area was predicted to cause this activity to weaken quickly upon entering the project area. Instability was expected to fade to near zero overnight. Unusually warm and exceptionally smoky conditions were observed Thursday. Visibility was in the IFR category (1-3 SM) much of the day at all airports, with periods of LIFR to near zero visibility reported. Air quality was rated as hazardous at all reporting stations, and special air quality statements were issued across the region. No significant weather occurred in the project area throughout the forecast period. No meteorological echoes. Tmax YC = 28.3C and no rain. Tmax QF = 28.8C and no rain data. Tmax Lacombe = 28.7C and no rain. Tmax Radar = 27.1C and no rain.	Radar tour #4 was conducted at the Olds-Didsbury airport with 20 individuals in attendance. HS4 flew a PR flight. They were airborne from YQF at 1733Z and landed in EA3 at 1752Z. HS4 flew a return PR flight. They were airborne from EA3 at 2241Z and landed in YQF at 2307Z. Flight Summary HS4: 1720Z-1755Z; no seeding; PR flight; takeoff YQF, land EA3. HS4: 2235Z-2311Z; no seeding; PR flight; takeoff EA3, land YQF.
August 17,	Zonal mid and upper level flow was modeled to continue	No aircraft operations.

Friday	another day while a shortwave trough began to move southeast across northern B.C. No significant vorticity advection was anticipated. Smoke-tempered instability was projected to foster another conditional opportunity for orographic convection with mesoscale upslope flow. A greater convective risk was forecasted with a cold front expected to drop south across the project area from the evening into the overnight hours. No significant weather occurred from Friday morning through most of the evening. Thick smoke continued to plague the region, with periods of at or near IFR visibility continuing. A broken line of thunderstorms began to approach from the northwest around 3Z (08/18), but dissipated and largely stayed north of the project area. A second wave of weak thundershowers developed in the far northern project area and northern buffer from around 8Z to 10Z (08/18), but no hail threats were observed. A few lightning strikes were noted with this activity in the northern buffer around 9Z (08/18). Thick smoke continued across the project area into the morning hours Saturday. No TITAN cells, 47.3 max dBz, 5.7 max VIL Tmax YC = 28.0C and no rain. Tmax QF = 28.1C and no rain data. Tmax Lacombe = 29.0C and no rain. Tmax Radar = 26.5C and no rain.	
August 18, Saturday	The upper level jet was modeled to sit across central Alberta as a shortwave trough quickly exited to the northeast. Moderate PVA from this shortwave was projected to become NVA behind the vorticity maximum in the afternoon, with considerable mid-level subsidence predicted in model soundings. This environment was forecast to be very convectively hostile, and no significant convective activity was anticipated. Stable conditions were expected to persist into Sunday. Mostly clear but smoky conditions were observed throughout the day. Some improvement in visibility occurred in the afternoon, particularly in the far north, with visibility improving to the MVFR (3-5 SM) range in many areas. No significant weather occurred overnight. No meteorological echoes. Tmax YC = 19.1C and no rain. Tmax QF = 18.0C and no rain data. Tmax Lacombe = 19.4C and no rain. Tmax Radar = 16.9C and no rain.	No aircraft operations.
August 19, Sunday	The upper level jet stream was expected to dip southward over southern AB as a trough slid southeastward across the area. The positively tilted axis of the trough looked to move across the area during the overnight hours. Moderate PVA was forecast to occur in the evening and overnight. Upslope conditions were predicted from the afternoon through the end	No aircraft operations.

	of the period. Area modified model soundings suggested the atmosphere would contain a hint of instability from the time of peak heating through the nighttime hours. Instability was expected to be insufficient for thunderstorms development, although CAPE values of around 25J/kg appeared to be enough for embedded convective rain showers. Moderately thick smoke along with minimal cloud cover was observed across the region through the late afternoon. Stratiform rain showers began to fall near Caroline at 0200Z (08/20). The stratiform rains showers with embedded convection eventually overspread most of the area during the nighttime hours. The bands of precipitation slowly shifted southward across the area during the overnight hours. No TITAN cells, 51.7 max dBz, 4.0 max VIL Tmax YC = 19.3C and no rain. Tmax QF = 21.4C and no rain data. Tmax Lacombe = 21.9C and no rain. Tmax Radar = 19.6C and 0.5mm of rain.	
August 20, Monday	The mid and upper level trough axis was centered over southeastern AB in the morning. This weather disturbance was predicted to move to the southeast into Montana. The afternoon hours looked to see rising 500mb heights and temperatures as a ridge of high pressure built into AB from BC. Mid-level PVA was forecast to diminish in the early afternoon. NVA was expected from late afternoon into the evening hours. Low level and surface upslope flow was expected to persist through this evening. Model soundings for the southern half of the protected area indicated 50 to 210J/kg of CAPE would be present through the early afternoon hours. The troposphere was expected to begin stabilizing in late afternoon due to increasing subsidence in the mid-levels. Light and scattered, stratiform rain showers continued to fall over the southern half of the project area in the early morning. These showers first started to fall over the region the previous day. Radar data indicated areas of embedded convection within the stratiform rain showers. In the mid-morning the showers quickly shifted south of the protected area. The rest of the period saw mostly clear skies. No TITAN cells, 39.9 max dBz, 0.9 max VIL Tmax YC = 19.5C and 0.8mm of rain. Tmax QF = 21.9C and no rain data. Tmax Lacombe = 22.3C and 0.5mm of rain. Tmax Radar = 19.9C and 0.8mm of rain.	No aircraft operations.
August 21, Tuesday	A mid and upper level ridge of high pressure was forecast to continue building over AB throughout the day and night. A trough looked to stay centered over the Gulf of Alaska. 500mb temperatures were predicted to warm, and 500mb heights looked to rise throughout today and tonight. A stable air mass was expected to remain in place across the region throughout	No aircraft operations.

	the period. Mostly clear skies were observed throughout the day and night. Smoke concentrations slowly increased during the day, especially along the foothills. No significant weather occurred. No meteorological echoes. Tmax YC = 26.3C and no rain. Tmax QF = 26.6C and no rain data. Tmax Lacombe = 27.0C and no rain. Tmax Radar = 25.6C and no rain.	
August 22, Wednesday	The mid and upper level ridge of high pressure was predicted to flatten as a trough began to slide eastward over BC. 500mb temperatures were forecast to stay roughly the same. The 00Z (08/23) modified model sounding for CYYC indicated roughly 150J/kg of CAPE would be present at the mid-levels and upper levels of the troposphere. A very strong low level cap was expected to inhibit any convective development throughout the period. Mostly clear skies were observed across the area throughout the period. At 2000Z, CYQF weather observations showed a thick plume of smoke moved southward into the northern area. The thick smoke eventually slid southward across the entire area during the early evening, and the smoke remained in place across the region throughout the overnight hours. No significant weather occurred. No meteorological echoes. Tmax YC = 31.4C and no rain. Tmax QF = 30.3C and no rain data. Tmax Lacombe = 29.5C and no rain. Tmax Radar = 30.1C and no rain.	Radar tour #5 was conducted at the Olds-Didsbury airport with 23 people in attendance. HS4 flew a PR flight. They were airborne from YQF at 1747Z and landed at EA3 at 1804Z. Flight Summary HS4: 1739Z-1806Z; no seeding; PR flight; takeoff YQF, land EA3.
August 23, Thursday	A weak 55 knot upper level jet streak looked to be centered over the region in the evening. The axis of the mid and upper level trough was centered over BC early in the period and was expected to continue moving eastward. PVA was forecast to begin increasing at approximately the time of peak heating as the leading edge of the trough began to move into AB. The low levels and surface were expected to see a lee cyclone form northwest of Rocky Mountain House in the afternoon. A cold front was predicted to develop to the west of the lee cyclone and looked to drop southward across the region during the nighttime hours. Area modified model soundings at the time of peak heating through the early nighttime hours showed a moderate amount of instability along with bulk speed shear values of 40kts. Mostly clear skies were observed through the early evening. During the same time, thick smoke continued to flow into the area from several fires in BC. Isolate, light convective rain showers fell to the west of Lacombe and Ponoka in the late evening. Overnight, radar data showed moderate convective	No aircraft operations.

	rain showers fell near Rocky MH and to the west of Caroline. A few lightning strikes occurred in the same vicinity as the convective rain showers. Max cell top: 6.9km, 51.2 max dBz, 9.8 max VIL Tmax YC = 27.9C and no rain. Tmax QF = 27.7C and no rain data. Tmax Lacombe = 29.5C and no rain. Tmax Radar = 27.1C and no rain.	
August 24, Friday	The upper level jet stream was predicted to shift to the southeast of the area. At the mid-levels, the trough axis was expected to provide moderate PVA to the region as it slid eastward during the early afternoon. Subtle 500mb height rises looked to occur in the evening. The wind flow at the low levels and surface was forecast to be from the northwest to north which would allow for upslope conditions across the entire area in the afternoon. A cold front was expected to continue pushing southeast across the area. Modified model soundings indicated the troposphere would be slightly unstable during the afternoon hours with anywhere from 10 to 100J/kg of CAPE. Bulk speed shear values looked to be weak, around 15kts. A band of stratiform rain showers with embedded convection and a couple of thunderstorms slid southeastward across the region in the late morning and early afternoon. Lightning was observed near CYYC at approximately 1700Z. In the evening, the convective activity and cloud cover diminished across the entire area. No significant weather was observed overnight. No TITAN cells, 50.6 max dBz, 5.1 max VIL Tmax YC = 12.0C and 6.4mm of rain. Tmax QF = 12.9C and no rain data. Tmax Lacombe = 11.9C and 3.0mm of rain. Tmax Radar = 10.6C and 4.6mm of rain.	No aircraft operations.
August 25, Saturday	The upper level jet stream was forecast to stay primarily focused over BC as AB stayed in a troughing weather pattern. A shortwave trough was expected to slide eastward across the area starting in the mid-afternoon. Low level and surface wind flow looked to stay downslope through the nighttime hours. The downslope wind flow was expected to aid in keeping dew-points lower across the entire area. The modified model soundings for the entire region showed a moderately unstable air mass in place from mid-afternoon through around the time of sunset. CAPE values appeared to range from 80 to 200J/kg across the area, and bulk speed shear values looked to be approximately 20kts. In the late afternoon, convective rain showers formed along the northern foothills. This convection grew into a few scattered thunderstorms that attempted to push into the project area during the early evening. One thunderstorm managed to survive long enough to move into the project area near Sundre in the early evening. Scattered convective rain	HS4 flew a return PR flight. The return PR flight was delayed until Saturday due to widespread thick smoke from numerous forest fires in BC. They were airborne from EA3 at 1919Z and landed at YQF at 1930Z. Flight Summary HS4: 1909Z-1934Z; no seeding; PR flight; takeoff EA3, land YQF.

	showers continued to fall over the region into the early nighttime hours. No TITAN cells, 49.3 max dBz, 5.8 max VIL Tmax YC = 19.4C and no rain. Tmax QF = 20.1C and no rain data. Tmax Lacombe = NA and no rain data. Tmax Radar = 19.9C and a trace of rain.	
August 26, Sunday	An upper level trough was modeled to remain across Alberta Sunday while a jet streak moved south across B.C. Modest mid-level PVA was anticipated in the evening and overnight hours, and a surface cold front was expected to move southeast across the project area in the afternoon. Midday insolation was forecast to trigger convection along and ahead of the front in the afternoon, but limited instability and modest shear was predicted to keep the hail threat minimal. Stratiform rain showers were forecast behind the front from the late afternoon into the overnight hours. Light morning rain showers moved east from Red Deer to Ponoka early Sunday morning, followed partly cloudy but hazy skies. A broken line of convection initiated ahead of a cold front in the northern project area around 18Z, spreading south and east across the project area throughout the afternoon. Most convective cells were short lived and embedded, though lightning was detected in the taller storms. No hail threats were detected by radar, though ice pellets to pea size hail was observed in Bowden late in the afternoon. Convection dissipated into widespread stratiform rain showers by Sunday evening, and rain continued across much of the project area into the overnight hours. Max cell top: 7.6km, 57.3 max dBz, 18.4 max VIL Pea size hail reported in Bowden. Tmax YC = 20.3C and 5.8mm of rain. Tmax QF = 18.6C and no rain data. Tmax Lacombe = 17.9 C and 3.1mm of rain. Tmax Radar = 18.8C and 8.6mm of rain.	No aircraft operations.
August 27, Monday	The upper level jet was predicted to move into Alberta as a ridge over the Pacific Northwest spread east and flattened. Modest PVA was modeled to ride overtop this ridge and affect the project area overnight. Cool and blustery northwest flow was observed Monday morning, and was forecast to slacken and pivot south as high pressure slid east across north central Alberta. Low and mid-level stratus clouds were expected to mix out in the afternoon due to subsidence associated with NVA. Fair weather cumulus clouds were then anticipated for the remainder of the afternoon, with a severe cap throttling any deeper convection. Stratiform rain showers were expected to return late overnight into the morning hours Tuesday. Drizzle and light rain showers gradually abated Monday	No aircraft operations.

	morning as low stratus clouds rose and morphed into stratocumulus Monday afternoon. Mostly clear skies were observed by the early evening. A leading wave of cirrus approached from the northwest around dusk followed by progressively lowering cloud layers. Light stratiform rain returned to the northern project area and buffer between 0930Z and 12Z (08/28). No TITAN cells, 43.0 max dBz, 2.6 max VIL Tmax YC = 13.3C and 2.0mm of rain. Tmax QF = 13.4C and no rain data. Tmax Lacombe = 13.2C and 0.9mm of rain. Tmax Radar = 12.7C and 1.0mm of rain.	
August 28, Tuesday	An upper level ridge in the northwest U.S. was modeled to flatten as a shortwave trough progressed quickly east onshore from the Gulf of Alaska. Upper air analyses showed the jet remaining over the project area Tuesday morning, lift from a decaying jet streak was predicted to be minimal. Several weak disturbances with vorticity were projected to move through the mid-level flow, with NVA anticipated in the early afternoon followed by a wave of PVA near peak heating. Instability was limited but shear was considerable, with low-topped but discrete convective cells the predominant forecasted threat. No significant convection was prognosticated overnight. Rain showers spread southeast across the northern and eastern quadrants of the of the project area before dissipating in the late morning. Discrete convective cells began developing in the central and northeast project area in the late afternoon and continued until around 6Z (08/29). All activity remained weak, and no lightning or hail threats were observed. Clouds with stratiform showers moved into the far northwest project area and buffer shortly before dawn Wednesday. No TITAN cells, 47.3 max dBz, 3.1 max VIL Tmax YC = 20.5C and no rain. Tmax QF = 21.1C and no rain data. Tmax Lacombe = 20.5C and 1.6mm of rain. Tmax Radar = 19.2C and 1.3mm of rain.	No aircraft operations.
August 29, Wednesday	A shortwave trough was projected to move quickly into Alberta Wednesday. Enhanced shear and strong PVA were anticipated with this feature. Chinook clouds dominated the project area Wednesday morning, and were predicted to continue to inhibit surface heating and destabilization. A brief period of clearing was forecasted ahead of the PVA, but hail threats were expected to be limited. All significant convection was predicted to exit the area by the early overnight hours as the vorticity maximum departed. Chinook clouds and widespread haze was observed from Wednesday morning through much of the afternoon. Areas of virga began falling out of the mid-level cloud in the afternoon, occasionally making it to the surface as light rain in the	A PR tour was conducted at the Olds-Didsbury airport with 20 people in attendance. HS5 conducted a PR flight. They were airborne from YBW at 1726Z and landed in EA3 at 1742Z. HS5 flew a return PR flight. They were airborne from EA3 at 2224Z and landed at 2238Z. Flight Summary HS5: 1718Z-1745Z; no seeding; PR flight; takeoff YBW, land EA3. HS5: 2220Z-2241Z; no seeding; PR flight; takeoff EA3, land YBW.

	northern half of the project area. At 2130Z a discrete cell formed on the back edge of the chinook arch and intensified in the northwest buffer region. It entered the project area northwest of Rocky MH at 23Z with an appreciable grape size radar-indicated hail threat, but was not a danger to any protected cities. It very gradually weakened as it continued west-southwest in the northern project area, and dissipated into a rain shower west of Bentley at 1Z (08/30). Widespread convective showers and weak thunderstorms continued across the northern half of the project area for much of the night, though activity became much more isolated after 11Z (08/30). Max cell top: 9.1km, 64.8 max dBz, 66.5 max VIL Tmax YC = 20.7C and 0.6mm of rain. Tmax QF = 22.5C and no rain data. Tmax Lacombe = 19.7C and 0.9mm of rain. Tmax Radar = 19.4C and no rain.	
August 30, Thursday	Alberta remained under the influence of a large scale upper level trough Thursday. A shortwave trough was modeled to progress through the flow and bring considerable PVA to project area in the late afternoon and evening. Westerly low and mid-level flow was forecast to foster a lee trough in the project area, with drier and more stable air anticipated in the southern and western quadrants of the project area. CAPE at or around 500 J/kg was expected with better moisture to the north and east of this boundary, and the day's most significant convection predicted in this area. Convection was predicted to depart the project area in the early overnight hours, with clearing after midnight. Weak rain showers moved southeast across the central project area early Thursday morning, dissipating by 14Z. Mostly clear skies were then observed until about 20Z, when convection began developing across the eastern project area near Three Hills. This activity did not become a hail threat and quickly exited into the eastern buffer. Extensive mid-level cloud cover began to develop in the northwest project area after 21Z, with a convective cell forming on the southern flank of the cloud shield near Sundre at 2230Z. This thunderstorm was disorganized, and did not become a hail threat to any protected city as it moved east and crossed the QE2 between Olds and Bowden. A new loosely organized wave of convection moved southeast into the far northwestern project area shortly after 0Z (08/31). This activity was multicellular, with brief periods of intensification with thunderstorms capable of pea to grape size hail. This area of thunderstorms tracked across much of the northern project area from 0Z to 4Z (08/31), but weakened considerably around dusk. Scattered convective rain showers persisted in the central and southern project area into the overnight hours, though skies began to clear around 8Z (08/31). Max cell top: 9.9km, 58.9 max dBz, 30.8 max VIL Pea size hail reported in Rocky MH and Innisfail.	No aircraft operations.

	Tmax YC = 20.7C and 0.6mm of rain. Tmax QF = 19.2C and no rain data. Tmax Lacombe = 18.3C and 5.7mm of rain. Tmax Radar = 18.8C and 6.6mm of rain.	
August 31, Friday	The upper level jet was projected to move into southern Alberta Friday night as a shortwave trough moved into the region. Substantial PVA was expected with this transition, but not until the overnight hours. Dry west to southwest low-level flow was observed Friday morning, and was forecast to continue through the afternoon. A strong cap in the mid-troposphere was predicted to inhibit all diurnal convective opportunities. Elevated instability was only expected to be around 100 J/kg overnight, and embedded convective rain showers was the only hazard anticipated. Partly cloudy skies were observed through much of the day. Thicker mid and upper level clouds moved in from the northwest toward evening, with rain showers beginning in the northwest corner of the project area around 8Z (09/01). This activity spread quickly southeast behind a cold front, with moderate to heavy rain and gusty winds experienced. All convection remained shallow, and neither lightning nor TITAN cells were observed. Rain showers continued to develop as far south as Calgary by 12Z (09/01) and continued to expand Saturday morning. No TITAN cells, 48.8 max dBz, 5.1 max VIL Tmax YC = 20.3C and no rain. Tmax QF = 21.9C and no rain data. Tmax Lacombe = 20.8C and no rain. Tmax Radar = 20.8C and no rain.	No aircraft operations.
September 1, Saturday	The upper level jet was expected to remain across southern Alberta Saturday as a weak shortwave ridge moved east across B.C. NVA and mid-level subsidence was projected to form a strong convective cap near 500mb Saturday afternoon. Weak diurnal instability was anticipated, but no towering cumulus was forecast to break the cap. All convective activity was predicted to subside as surface heating was lost in the evening, with no significant weather overnight. Widespread embedded convective rain showers moved southeast across the project area Saturday morning. Gusty northwest winds and ice pellets were observed in the strongest convection, but no lightning or hail threats were detected. Morning activity exited the southeast project area around 15Z, though isolated convection continued until 17Z. Mostly clear skies were then observed until 19Z, when slightly stronger discrete convection developed in the far southwest project area. Several other convective cells developed further north throughout the afternoon, including in Calgary and near Sundre, but neither lightning nor TITAN cells were detected throughout the day. Rain showers become more embedded but expanded across the central project area Saturday evening, ultimately dissipating around 9Z (09/02).	No aircraft operations.

	No TITAN cells, 52.8 max dBz, 6.8 max VIL Ice pellets in Olds at 1305Z. Ice pellets also reported in Calgary around 2345Z. Tmax YC = 16.7C and 1.6mm of rain. Tmax QF = 16.9C and no rain data. Tmax Lacombe = 16.2C and no rain data. Tmax Radar = 16.9C and no rain.	
September 2, Sunday	Upper level jet energy was expected to continue flowing over the region throughout the period. At the mid-levels, a trough was forecast to move eastward over BC which would allow for increasing amounts of PVA. PVA looked to continue over the region through the nighttime hours. A lee trough was expected to form in the evening. The lee trough was predicted to slide eastward during the overnight hours. Behind the lee trough, a cold front looked to drop southeastward across the area during the nighttime hours. The area modified model soundings showed only a slight amount of tropospheric instability from the time of peak heating through overnight hours. A strong low level cap appeared to be in place throughout the daytime. Speed shear values were expected to be too high relative to the low amount of instability. Cumulus, altocumulus, cirrus, and cirrocumulus clouds were seen over the region during the daytime. Shortly after 0600Z (09/03) stratiform rain showers began to fall near Rocky MH. The rain showers slowly overspread the rest of the northern part of the project area during the remainder of the period. No TITAN cells, 39.3 max dBz, 1.1 max VIL Tmax YC = 20.7C and no rain. Tmax QF = 19.1C and no rain data. Tmax Lacombe = 18.1C and no rain. Tmax Radar = 19.9C and no rain.	No aircraft operations.
September 3, Monday	The main core of the upper level jet stream was forecast shift to the southeast. This appeared to cause jet PVA to diminish in the afternoon. The mid and upper level trough was centered directly over AB, and PVA was expected to decrease late in the afternoon as the trough axis shifted eastward into SK. Cold air advection from the north was predicted to continue through the overnight hours. The modified model soundings for the region indicated a slightly unstable post frontal air mass would be in place in the afternoon with bulk speed around 15kts. Stratiform rain showers fell over the region in the morning as a cold front slid southeastward across the region. In the early afternoon, the precipitation shield shifted southeast of the area. In the mid and late afternoon, radar data showed scattered convective rain showers fell over the entire project area. The cloud cover then diminished briefly in the evening before another wave of scattered stratiform rain showers pushed eastward through the region during the overnight	No aircraft operations.

	hours. No TITAN cells, 48.7 max dBz, 3.3 max VIL Tmax YC = 15.5C and 2.1mm of rain. Tmax QF = 14.8C and no rain data. Tmax Lacombe = 14.8C and 4.9mm of rain. Tmax Radar = 14.2C and 2.8mm of rain.	
September 4, Tuesday	The upper level jet stream was expected to stay positioned over the region throughout the period. At the mid and upper levels of the troposphere, a ridge of high pressure was forecast to gradually build over AB. 500mb heights and temperatures looked to rise, and no PVA was expected. Weak upslope conditions appeared to occur through the evening, but a strengthening low level cap was predicted to prevent any deep convection from occurring. Modified model soundings suggested the troposphere would be mostly stable throughout the daytime and nighttime. Furthermore, the model soundings indicated very dry air would occur above 9kft MSL. Light, scattered stratiform rain showers were observed on radar during the early morning hours. A stratus and stratocumulus layer of clouds then blanketed the region into the early afternoon. In the midafternoon, the cloud cover became more broken before diminishing in the evening. Mostly clear skies were observed overnight. No TITAN cells, 42.9 max dBz, 1.5 max VIL Tmax YC = 14.3C and no rain. Tmax QF = 15.1C and no rain data. Tmax Lacombe = 15.2C and no rain. Tmax Radar = 13.9C and no rain.	No aircraft operations.
September 5, Wednesday	The main core of the upper level jet stream looked to stay north of the area. At the mid-levels, the ridge of high pressure was expected to continue slowly building over AB. A few minor waves of PVA were forecast to pass over the area during the day and night. These waves of PVA looked to produce increased cloud cover across the area. The low levels of the troposphere were predicted to see a hardy cap which would inhibit deep convection from occurring. What's more, a stable air mass was expected to be present across central AB. Scattered altocumulus and cirrus clouds were observed over the region throughout the period. No significant weather occurred. No TITAN cells, 15.6 max dBz, 0 max VIL Tmax YC = 20.9C and no rain. Tmax QF = 21.2C and no rain data. Tmax Lacombe = 21.4C and no rain. Tmax Radar = 20.4C and no rain.	No aircraft operations.
September 6,	Upper level jet energy appeared to begin moving over the	Radar tour #7 was conducted at the Olds-Didsbury

Thursday	region during the nighttime hours. The ridge of high pressure looked to stay in place through the evening. The ridge axis was then forecast to shift eastward towards the SK border during the nighttime hours. A few insignificant waves of PVA were predicted to quickly push northeastward across AB during the period. These waves appeared to mainly produce increased cloud cover across the area. The low levels and surface looked to see a lee trough form during the overnight hours. The air mass across the region was forecast to be slightly unstable. Instability was expected to exist between 15 and 20kft MSL. Mostly clear skies were observed over the entire area in the morning and afternoon. In the evening a band of moderately thick stratiform cloud cover slid northeastward across the northern half of the protected area. Shortly after dusk, convection rain showers fell to the northeast of Calgary. Isolated, weak convective rain showers were also seen on radar in the northeast quadrant of the project area during the overnight hours. No lightning was observed inside the project area from this convection. No TITAN cells, 50.3 max dBz, 6.8 max VIL Tmax YC = 25.1C and no rain. Tmax QF = 23.0C and no rain data. Tmax Lacombe = 22.3C and no rain. Tmax Radar = 22.8C and no rain.	airport with 21 people in attendance. HS3 flew a PR flight. They were airborne from YQF at 1800Z and landed at EA3 at 1820Z. HS3 then flew a return PR flight. They were airborne from EA3 at 2249Z and landed at YQF at 2300Z. Flight Summary HS3: 1747Z-1824Z; no seeding; PR flight; takeoff YQF, land EA3. HS3: 2240Z-2305Z; no seeding; PR flight; takeoff EA3, land YQF.
September 7, Friday	An upper level jet was forecast to be centered over the region. AB looked to transition to southwest flow at the mid and upper levels as a trough approached the BC coast. Moderately strong PVA was expected from the time of peak heating through the end of the period. A lee trough was predicted to develop in the afternoon and looked to extend from roughly Caroline through Strathmore. The lee trough looked have a potentially tight dew-point gradient. Therefore, a dry line was expected to be co-located along with the lee trough. Area modified model soundings suggested a loaded gun situation would be in place to the northeast of the lee trough. A chinook arch cloud formed during the morning hours. This large cloud extended from the town of Hinton down through Cochrane. The large cloud dissipated at around 2000Z, and cumulus clouds began forming over the northwest part of the region. The evening hours then saw increasing cloud cover. During the late overnight hours a band of light stratiform rain showers started to move off the foothills and into the western part of the protected area. No TITAN cells, 32.3 max dBz, 0.5 max VIL Tmax YC = 27.8C and no rain. Tmax QF = 26.9C and no rain data. Tmax Lacombe = 26.6C and no rain. Tmax Radar = 26.5C and no rain.	HS5 flew a maintenance flight. They were airborne at 1735Z and landed at 1741Z. HS2 flew a maintenance flight. The aircraft was airborne at 1751Z and landed at 1759Z. HS1 flew a maintenance flight. The flight was airborne at 1816Z and landed at 1820Z. Flight Summary HS5: 1727Z-1743Z; no seeding; maintenance flight. HS2: 1740Z-1802Z; no seeding; maintenance flight. HS1: 1805Z-1821Z; no seeding; maintenance flight.
September 8,	Jet energy looked to mainly stay south of the area. A shortwave	HS3 flew a maintenance flight. The aircraft was

Saturday	trough was forecast to continue sliding northeastward across AB. This shortwave appeared to provide moderately strong PVA through the mid-afternoon. Another shortwave trough looked to push eastward across southern AB during the early nighttime hours. The low levels were projected to see subtle cold air advection from the northwest. The troposphere looked to be moderately unstable with area CAPE values ranging from 200 to 1000J/kg. Bulk speed shear values were expected to range from around 15kts in the north to 25kts in the south. Stratiform rain showers fell over the northern half of the protected area through the early afternoon. In the late afternoon and early evening, weak embedded thunderstorms formed to the northwest and north of Rocky MH. This convection dissipated shortly after dusk. Overnight, a second wave of weak embedded thunderstorms slid east-northeastward across the southern part of the project area. Max cell top: 6.1km, 49.2 max dBz, 8.5 max VIL Tmax YC = 22.4C and no rain. Tmax QF = 20.9C and no rain data. Tmax Lacombe = 20.7C and no rain. Tmax Radar = 20.3C and no rain.	airborne at 1736Z and landed at 1800Z. Flight Summary HS3: 1724Z-1807Z; no seeding; maintenance flight.
September 9, Sunday	An upper level jet streak was predicted to weaken as it moved ahead of a shortwave ridge in southeast B.C. This ridge was modeled to move across the project area in the evening, with NVA and warming mid-level temperatures anticipated. Northwest low-level flow as observed Sunday morning, and this was forecast to turn northeast in the afternoon. Widespread upslope flow and orographic cloudiness was expected, though convective opportunities were predicted to be very meager given minimal instability. More widespread stratiform showers were expected overnight due to PVA on the backside of the shortwave ridge. Convective rain showers moved east between Calgary and Strathmore early Sunday morning, dissipating by 13Z. Mostly cloudy skies persisted through much of the day. A few weak orographic showers developed northwest of Cochrane, but no lightning or hail threats were observed. More widespread clouds and stratiform rain showers moved into the northern half of the project area around 8Z (09/10) and continued into Monday morning. No TITAN cells, 44.7 max dBz, 2.9 max VIL Tmax YC = 17.2C and a trace of rain. Tmax QF = 13.5C and no rain data. Tmax Lacombe = 14.0C and no rain. Tmax Radar = 13.4C and a trace of rain.	No aircraft operations.
September 10, Monday	A fast-moving shortwave trough was modeled to progress across the project area Monday afternoon. Mid-level temperatures were modeled to drop by nearly 3C during this time, along with considerable PVA. Chinook clouds were	HS1 was launched at 1848Z for convection moving into the project area southwest of Calgary. They were airborne at 1902Z. HS1 began patrolling Calgary at 1915Z. They stopped seeding and RTB at

	observed spreading south along the foothills Monday morning, shading the western project area. Insolation was forecast to be crucial for convective potential Monday afternoon, with a small hail threat predicted if temperatures rose into the upper teens in the southern project area. A weak cold front was also modeled to spread southeast across the project early Sunday afternoon, turning surface winds northwest behind it. Periods of PVA were expected to continue overnight, though instability was forecast to fade rapidly as surface heating was lost in the evening. Stratiform rain showers exited the project area to the northeast Monday morning, followed by mid-level chinook clouds. Scattered orographic convection initiated around 18Z west of Calgary, and was strong enough to warrant patrol as it spread east. Most cells were short-lived and were not radar-indicated hail threats, but ice pellets were observed in High River around 20Z. Another convective cell briefly produced radar-indicated grape size hail near Strathmore just before 0Z (09/11). All convective thundershowers weakened and exited after 0Z (09/11), though mostly cloudy skies with occasional stratiform rain showers continued across the northern half of the project area overnight. Max cell top: 6.9km, 60.1 max dBz, 32.2 max VIL Tmax YC = 17.9C and no rain. Tmax QF = 12.2C and no rain data. Tmax Lacombe = 10.6C and 1.9mm of rain. Tmax Radar = 12.9C and no rain.	1944Z, and landed at 2001Z. Flight Summary HS1: 1856Z-2004Z; no seeding; patrol Calgary.
September 11, Tuesday	A split upper level jet was observed Tuesday morning with the main branch far to the south and an arctic branch diving south from the Yukon. The project area lay in upper level troughing between these features, though mid-troposphere temperatures were projected to remain stable and anomalously cool. Wind shear was not modeled to be significant, and synoptic scale convective triggers were forecast to be weak. Low-level upslope flow was expected, however, along with diurnal instability around 500 J/kg. This was predicted to foster widespread orographic convection Tuesday afternoon, with activity gradually overspreading the project area from west to east. A small, short-lived hail threat was anticipated in the stronger cells. Scattered rain showers, but no hail threats, were forecasted overnight. Spotty stratiform rain showers gradually dissipated Tuesday morning followed by mostly clear skies. Towering cumulus clouds were observed along the foothills by late morning, and widespread orographic showers and thunderstorms developed between 18Z and 19Z. This activity slowly spread east across much of the project area, though individual cells were generally short-lived. Lightning was observed with this activity, along with a few brief hail threats. Storm #1 was an area of convective cells that developed near and inside Calgary between 20Z and 22Z. These cells were seeded as they progressed east across Calgary and Airdrie. Convection continued east across nearly	HS4 flew a maintenance flight. They were airborne at 1817Z and landed at 1902Z. HS1 was launched at 2009Z for convection approaching Calgary. They were airborne at 2023Z. HS1 started patrolling the Calgary area at 2031Z. At 2041Z the aircraft started top seeding storm #1 for Calgary and Airdrie. They stopped seeding and began patrolling the Calgary area at 2156Z. At 2212Z HS1 RTB and landed at 2223Z. Flight Summary HS4: 1805Z-1906Z; no seeding; maintenance flight. HS1: 2015Z-2226Z; 0 EJ, 12 BIP; #1 Calgary and Airdrie.

	the entire project throughout the afternoon, exiting the eastern buffer around 2Z (09/12). Embedded rain showers continued through the night across the northern project area, though activity diminished after 8Z (09/12). Pea size hail was reported in northwest Calgary. Max cell top: 8.4km, 57.3 max dBz, 24.9 max VIL Tmax YC = 17.5C and no rain. Tmax QF = 18.4C and no rain data. Tmax Lacombe = 17.0C and 0.1mm of rain. Tmax Radar = 16.4C and 6.3mm of rain.	
September 12, Wednesday	Alberta was modeled to remain in upper level troughing as an arctic jet dug south and degraded. Mid-level PVA was projected to be subtle, but capable of instigating a few showers from the afternoon into the overnight hours. Strong northwest cold air advection was predicted to overwhelm diurnal surface heating, with high temperatures for the day occurring in the morning hours. Upslope flow was anticipated along the foothills, with orographic precipitation expected. Precipitation mode was forecast to change from rain to snow from north to south, with light snow accumulations possible in the north and northwest project area by Thursday morning. Instability was predicted to remain near zero through the period. Scattered light rain showers were observed between 12Z, and 15Z, with overcast skies and brisk northwest flow continuing through the morning. More widespread orographic snow showers were observed from Limestone Mountain southeast, gradually spreading east into the western project area around 21Z. Scattered bands of snow showers continued into the overnight hours, with a few centimeters of accumulation occurring in the northern project area (e.g. Red Deer and Rocky MH). No convective threats were observed. No TITAN cells, 43.5 max dBz, 2.2 max VIL Tmax YC = 8.1C and no precipitation. Tmax QF = 8.3C and no precipitation data. Tmax Lacombe = 8.9C and 2.2mm of precipitation. Tmax Radar = 6.8C and a trace of precipitation.	No aircraft operations.
September 13, Thursday	The axis of a strong, cold upper level trough was forecast to slide east across Alberta Thursday. Significant mid-level PVA, which was helping instigate a band of snow in the northwest project area Thursday morning, was modeled to pivot southeast through the day. Surface high pressure was projected to move east into Saskatchewan, with surface flow flipping southeast by Friday morning. Instability was expected to remain near zero through the forecast period. High temperatures were barely predicted to eclipse the freezing mark, with all precipitation falling as snow across the project area. Minor accumulations were expected on elevated or grassy surfaces.	No aircraft operations.

	A broad band of light to moderate snow was observed in the northwest project area Thursday morning. This band largely remained in place through the day, finally slipping further south and east in the late afternoon. Additional snow showers moved across the southern project area between 23Z and 3Z (09/14). Isolated areas of flurries continued overnight, but no significant additional accumulation occurred. No TITAN cells, 37.0 max dBz, 0.7 max VIL Tmax YC = 2.6C and 0.2mm of precipitation. Tmax QF = 0.3C and no precipitation data. Tmax Lacombe = 0.6C and 5.0mm of precipitation. Tmax Radar = -1.2C and a trace of precipitation.	
September 14, Friday	A strong 140kt upper level jet was observed stretching northeast from Idaho into southern Saskatchewan, but was predicted to remain south of the project area Friday. A slow moving upper level trough was projected to move southeast in western B.C. through the period, leaving Alberta in persistent moist southwest flow. Several small-scale disturbances with PVA were modeled to reside in this flow, and were predicted to instigate periods of scattered precipitation through the forecast period. Warm moist southeast flow was anticipated in the low levels, and a warm front was projected to move north from Montana into southeast Alberta overnight. Overrunning precipitation, potentially with embedded convection, was forecast ahead of the warm front in the southeast project area in the late overnight hours. Overcast skies with mist and drizzle were observed for much of the period. Heavier showers moved northeast in the southern project area between 2Z and 5Z (09/15), and again after 9Z (09/15). Embedded convection developed in the southeast project area and northeast of Olds early Saturday morning, but no lightning or discrete convection was observed. No TITAN cells, 49.0 max dBz, 3.0 max VIL Tmax YC = 4.2C and 0.2mm of precipitation. Tmax QF = 3.2C and no rain data. Tmax Lacombe = 2.7C and no precipitation. Tmax Radar = 2.7C and a trace of precipitation.	No aircraft operations.
September 15, Saturday	A jet streak was observed passing southeast of the project into Saskatchewan. A broad, deep upper level trough was modeled to slowly move east in western B.C. Moist southwest flow was forecast to continue in the mid and upper levels, above a strong inversion with northerly low-level flow. This inversion was predicted to trap low-level moisture, with low stratus and drizzle continuing through the day. Small areas of PVA were also expected to produce periods of scattered light rain showers through the forecast period. Embedded rain showers intensified early Saturday morning. A discrete convective cell developed around 1245Z north of Vulcan, and briefly produced lightning before becoming	No aircraft operations.

	embedded and exiting the eastern buffer. Rain showers slowly weakened through the morning, with fog, low stratus, and drizzle continuing across much of the project area. Occasional light showers were observed moving northeast across the project area from the afternoon through the overnight hours. Max cell top: 6.1km, 52.0 max dBz, 10.8 max VIL	

APPENDIX C – AIRCRAFT OPERATIONS SUMMARY TABLE

	Air Time				
	HS1	HS2	HS3	HS4	HS5
JUNE	17:31	11:13	10:41	15:01	9:32
JULY	27:18	33:57	16:01	26:24	25:48
AUGUST	13:49	9:42	4:16	7:04	7:11
SEPTEMBER	2:59	0:00	0:00	0:00	0:00

	HAILSTOP 1 - Beech King Air			HAILSTOP 2 - Cessna 340A				HAILSTOP 3 - Beech King Air			HAILSTOP 4 - Cessna 340A				HAILSTOP 5 - Beech King Air			Daily Totals	
STORM DAY	Flight Time	EJ Flares	BIP Flares	Flight Time	EJ Flares	BIP Flares	Gen Time	Flight Time	EJ Flares	BIP Flares	Flight Time	EJ Flares	BIP Flares	Gen Time	Flight Time	EJ Flares	BIP Flares	No. of Storms	Daily Agl (grams)
JUNE																			
1-Jun	1:32	11																1	220
3-Jun	2:36										2:17				0:29				
4-Jun				0:24				1:43			1:49								
9-Jun	1:52			2:34		8	146	1:14	11		2:00		2	132	1:29	124	9	1	6,114
15-Jun	2:23	10						3:18	34									2	880
16-Jun	0:51	1	2															1	320
21-Jun	2:25	75	4	1:40		5	35				1:37		9	90				1	4,454
22-Jun				4:52		22	294	3:11	57	7	0:42				3:56	163	27	1	13,396
23-Jun	2:58	45	2								2:21		3	34				3	1,719
25-Jun								1:15			1:13				0:50				
29-Jun	2:54	14	2	1:43			40											2	661
30-Jun											3:02			174	2:48	12	5	3	1,343
JULY																			
1-Jul	2:38	34	7	5:18		11	226	3:21	239	11	2:45		14	256	1:47	9		7	13,067
2-Jul	1:13		7															1	1,050
3-Jul	1:09	19																1	380
6-Jul	2:18	301	12	4:59		20	324	2:18	98	8	5:00		17	334	4:17	152	17	6	23,454
8-Jul	2:15	55		2:25		5	174	1:21	21		3:29		9	238				2	4,456
10-Jul	2:23	20	14	2:00			232	1:55	12	3					1:05			7	3,660
13-Jul	1:36	96	5	3:04		11	160	1:20	229	11	3:07		16	252	2:06	156	9	4	18,256
18-Jul	6:49	44	51	2:46		11	236	1:49		7	2:30		5	142	4:13		19	8	15,597
19-Jul				3:13		12	246	1:24	80	14	2:00		12	182	2:00			2	8,168
20-Jul				2:02				1:29			0:55								
21-Jul											0:54				0:53		7	1	1,050
23-Jul	2:18	193	19	2:02		22	208				1:40				2:17		29	1	14,782
24-Jul															1:00				
26-Jul	2:32	25	18	3:20		11	155				0:56			36	2:22	218	15	5	11,847
30-Jul	2:07		27	2:48		16	302	1:04			3:08		17	138	2:54	280	22	3	18,792
31-Jul															0:54				
AUGUST																			
1-Aug	4:26	516	45	4:05		30	339	1:47	176	13	2:46		23	230	3:35	304	32	6	42,524
2-Aug	5:46	381	32	4:17		30	291	2:29	289	15	4:18		6	184	3:20	62	46	6	34,953
3-Aug	2:05																		
11-Aug															0:16				
12-Aug	1:32	97	13	1:20		6	120											1	5,033
SEPTEMBER																			
10-Sep	0:59																		
11-Sep	2:00		12															1	1,800

Tables are seed and patrol only.

All flight times are AIR time, not engine time.

APPENDIX D – FLIGHT SUMMARY TABLE

ALBERTA HAIL SUPPRESSION PROJECT 2018 - Universal Time Coordinates

MONTHLY FLIGHT TIME TOTAL:

	JUNE	JULY	AUGUST	SEPTEMBER	*Season Total*
HS1	19:19	30:22	14:55	3:35	**68:11**
HS2	15:36	39:41	10:41	0:22	**66:20**
HS3	12:22	19:12	6:04	1:45	**39:23**
HS4	17:45	33:09	9:48	1:01	**61:43**
HS5	10:32	27:49	8:54	0:16	**47:31**
					283:08

HailStop #1 became N521JP on July 17th
HailStop #1 - N304DK/N522JP
HailStop #2- N234PS
HailStop #3- N127ZW
HailStop #4- N7358
HailStop #5- N516TS

	TOTAL TIME	AIR TIME
Seeding hours:	215:31	198:05
Patrol hours:	47:23	40:22
Reposition hours:	3:03	2:01
PR hours:	6:24	3:31
Mx hours:	10:47	5:45
Ferry hours:	0:00	0:00
Cur hours:	0:00	0:00
	283:08	249:44

MONTHLY FLARE USAGE:

		JUNE	JULY	AUGUST	SEPTEMBER	*Season Total*
HS1	BIP	10	160	90	12	**272**
	EJECT	156	787	994	0	**1937**
HS2	BIP	35	119	66	0	**220**
	EJECT	0	0	0	0	**0**
HS3	BURNERS	515	2263	750	0	**3528**
	BIP	7	54	28	0	**89**
	EJECT	102	679	465	0	**1246**
HS4	BIP	14	90	29	0	**133**
	EJECT	0	0	0	0	**0**
	BURNERS	430	1578	414	0	**2422**
HS5	BIP	41	118	78	0	**237**
	EJECT	299	815	366	0	**1480**

PILOT/OBSERVER	Initials	PILOT/OBSERVER	Initials
Adam Brainard	ARB	John Proppe	JP
Andreas Bertoni	AMB	Matt Burrus	MB
Andrew Brice	AB	Michael Benson	MAB
Andrew Wilkes	AW	Trevor Black	TB
Bradley Waller	BLW	Mitchell Donst	MD
Brian Kindrat	BK	Jody Fischer	JF
Brook Mueller	BM	Erin Fischer	EF
Dan Gilbert	DBG	Bruce Boe	BB
Jenelle Newman	JN	Terry Krauss	TK
Joel Zimmer	JZ	Mike Torris	MT

(Storm-day chemical totals ONLY include flares spent for seeding).
(Storm-day totals ONLY include flight hours for seed and patrol).

TOTALS	# Flights: 167			283:08			249:44	4663	951	5950		Storm-Day Sub-Totals: Total Time for the Day	Total EJ	Total BIP	Total Burner		** Only flares spent for seeding	77			
Date (UTC)	**Aircraft**	**Engine On (UTC)**	**Engine Off (UTC)**	**Total Time (hh:mm)**	**Take-Off Time (UTC)**	**Landing Time (UTC)**	**Air Time (hh:mm) (all flights)**	**EJ (#)** *used in flight tests	**BIP (#)** *used in flight tests	**Burner Minutes** *Test burns	**Flight Type**	262:54	4663	951	5950	**Seed Amount (Per Day) (Grams)**	**Season Seed Accumulation (Grams)****	**# Storms**	**Captain**	**Co-Pilot**	**Observer**
01-Jun-18	HS2	18:05	18:48	0:43	18:14	18:45	0:31	0	0	0	MX					0	0		AW	MB	
02-Jun-18	HS1	0:25	2:07	1:42	0:33	2:05	1:32	11	0	0	SEED	1:42	11	0	0	220	220	1	AB	JP	
04-Jun-18	HS4	2:21	4:54	2:33	2:32	4:49	2:17	0	0	0	PATROL					0	220		JN	TB	
04-Jun-18	HS1	2:34	5:22	2:48	2:43	5:19	2:36	0	0	0	PATROL					0	220		AB	JP	
04-Jun-18	HS5	5:16	5:58	0:42	5:27	5:56	0:29	0	0	0	PATROL	6:03	0	0	0	0	220		BM	BK	
04-Jun-18	HS4	20:05	22:03	1:58	20:12	22:01	1:49	0	0	0	PATROL					0	220		JN	MAB	
04-Jun-18	HS2	20:20	20:58	0:38	20:31	20:55	0:24	0	0	0	PATROL					0	220		AW	BK	
04-Jun-18	HS3	22:31	0:28	1:57	22:41	0:24	1:43	0	0	0	PATROL	4:33	0	0	0	0	220		JZ	MT	
09-Jun-18	HS5	20:41	22:20	1:39	20:48	22:17	1:29	124	9	0	SEED					0	220	1	BM	MB	
09-Jun-18	HS2	20:44	23:29	2:45	20:52	23:26	2:34	0	8	146	SEED					0	220		AW	BK	
09-Jun-18	HS4	21:29	23:42	2:13	21:39	23:39	2:00	0	2	132	SEED					0	220		JN	TB	
09-Jun-18	HS1	21:30	23:32	2:02	21:38	23:30	1:52	0	0	0	PATROL					0	220		AB	JP	
09-Jun-18	HS3	22:00	23:34	1:34	22:16	23:30	1:14	11	0	0	SEED	10:13	135	19	278	6114	6334		JZ	MB	
15-Jun-18	HS3	17:17	20:53	3:36	17:30	20:48	3:18	34	0	0	SEED					0	6334	1	JZ	MT	
15-Jun-18	HS1	20:39	23:12	2:33	20:47	23:10	2:23	10	0	0	SEED	6:09	44	0	0	880	7214	1	AB	JP	
17-Jun-18	HS1	0:38	1:35	0:57	0:42	1:33	0:51	1	2	0	SEED	0:57	1	2	0	320	7534	1	AB	JP	
20-Jun-18	HS4	17:20	17:51	0:31	17:36	17:44	0:08	0	0	0	MX					0	7534		JN	TB	
20-Jun-18	HS2	17:30	18:10	0:40	17:43	18:07	0:24	0	0	0	MX	0:00	0	0	0	0	7534		AW	MB	
21-Jun-18	HS1	17:47	18:17	0:30	17:57	18:13	0:16	0	0	0	PR					0	7534		AB	JP	
22-Jun-18	HS1	0:25	2:56	2:31	0:29	2:54	2:25	75	4	0	SEED					0	7534	1	AB	JP	
22-Jun-18	HS2	0:29	2:18	1:49	0:35	2:15	1:40	0	5	35	SEED					0	7534		AW	MB	
22-Jun-18	HS4	0:31	2:27	1:56	0:46	2:23	1:37	0	9	90	SEED					0	7534		JN	TB	
22-Jun-18	HS2	4:12	4:30	0:18	4:18	4:27	0:09	0	0	0	MX	6:16	75	18	125	4454	11987		AW	MB	
22-Jun-18	HS2	17:34	20:42	3:08	17:38	20:40	3:02	0	22	294	SEED					0	11987	1	AW	MB	
22-Jun-18	HS5	18:06	22:11	4:05	18:11	22:07	3:56	163	27	0	SEED					0	11987		BM	AMB	
22-Jun-18	HS3	19:22	22:09	2:47	19:32	22:03	2:31	57	7	0	SEED					0	11987		MT	MB	
22-Jun-18	HS4	19:55	20:53	0:58	20:06	20:48	0:42	0	0	0	PATROL					0	11987		JN	TB	
22-Jun-18	HS2	22:56	0:55	1:59	23:02	0:52	1:50	0	0	0	PATROL					0	11987		AW	MB	
23-Jun-18	HS3	1:07	2:00	0:53	1:13	1:53	0:40	0	0	0	PATROL	13:50	220	56	294	13396	25384		MT	MB	
23-Jun-18	HS4	21:57	0:32	2:35	22:05	0:26	2:21	0	3	34	SEED					0	25384	1	JZ	TB	
23-Jun-18	HS1	21:58	1:10	3:12	22:08	1:06	2:58	45	2	0	SEED	5:47	45	5	34	1719	27102	2	AB	JP	

25-Jun-18	HS2	17:25	17:50	0:25	17:35	17:48	0:13	0	0	0	MX					0	27102		BK	MD	
25-Jun-18	HS3	17:30	19:05	1:35	17:42	18:57	1:15	0	0	0	PATROL					0	27102		JZ	MT	
25-Jun-18	HS4	17:40	19:09	1:29	17:50	19:03	1:13	0	0	0	PATROL					0	27102		JN	TB	
25-Jun-18	HS2	20:31	20:49	0:18	20:37	20:47	0:10	0	0	0	MX					0	27102		BK	MD	
25-Jun-18	HS5	22:16	23:16	1:00	22:24	23:14	0:50	0	0	0	PATROL	4:04	0	0	0	0	27102		BM	AMB	
28-Jun-18	HS2	17:26	17:56	0:30	17:36	17:53	0:17	0	0	0	PR					0	27102		AW	MD	
29-Jun-18	HS2	1:08	1:34	0:26	1:13	1:32	0:19	0	0	0	PR	0:00	0	0	0	0	27102		AW	MD	
29-Jun-18	HS2	19:34	21:31	1:57	19:44	21:27	1:43	0	0	40	SEED					0	27102	1	AW	MB	
29-Jun-18	HS1	19:35	22:39	3:04	19:43	22:37	2:54	14	2	0	SEED	5:01	14	2	40	661	27764	1	BK	JP	
30-Jun-18	HS5	20:00	21:50	1:50	20:07	21:47	1:40	0	0	0	PATROL					0	27764		BM	AMB	
30-Jun-18	HS4	20:01	21:58	1:57	20:12	21:51	1:39	0	0	116	SEED					0	27764	1	JN	MD	
30-Jun-18	HS5	23:14	0:30	1:16	23:19	0:27	1:08	12	5	0	SEED					0	27764	1	BM	AMB	
30-Jun-18	HS4	23:35	1:10	1:35	23:41	1:04	1:23	0	0	58	SEED	6:38	12	5	174	1343	29106	1	JN	MD	
01-Jul-18	HS4	18:33	21:29	2:56	18:40	21:25	2:45	0	14	256	SEED					0	29106	1	JN	MD	
01-Jul-18	HS3	18:49	21:53	3:04	19:02	21:49	2:47	239	11	0	SEED					0	29106		JZ	TB	
01-Jul-18	HS2	19:07	22:00	2:53	19:15	21:56	2:41	0	11	158	SEED					0	29106	2	AW	MB	
01-Jul-18	HS3	22:25	23:13	0:48	22:33	23:07	0:34	0	0	0	PATROL					0	29106		JZ	TB	
01-Jul-18	HS2	22:47	0:03	1:16	22:53	0:00	1:07	0	0	14	SEED					0	29106	1	AW	MB	
01-Jul-18	HS1	22:48	1:36	2:48	22:55	1:33	2:38	34	7	0	SEED					0	29106	2	BK	JP	
02-Jul-18	HS5	3:20	5:15	1:55	3:25	5:12	1:47	9	0	0	SEED					0	29106	1	BM	AMB	
02-Jul-18	HS2	3:24	5:04	1:40	3:30	5:00	1:30	0	0	54	SEED	17:20	282	43	482	13067	42174		AW	MB	
02-Jul-18	HS1	22:18	23:40	1:22	22:25	23:38	1:13	0	7	0	SEED	1:22	0	7	0	1050	43224	1	BK	JP	
03-Jul-18	HS1	15:01	15:38	0:37	15:08	15:33	0:25	0	0	0	MX					0	43224		AB	JP	
03-Jul-18	HS1	23:26	0:42	1:16	23:31	0:40	1:09	19	0	0	SEED	1:16	19	0	0	380	43604	1	AB	JP	
05-Jul-18	HS4	17:28	17:55	0:27	17:43	17:51	0:08	0	0	0	MX	0:00	0	0	0	0	43604		JN	MAB	
06-Jul-18	HS4	19:43	20:20	0:37	19:56	20:15	0:19	0	0	0	REPO					0	43604		JN	TB	
06-Jul-18	HS4	20:54	21:09	0:15	21:00	21:07	0:07	0	0	0	MX					0	43604		JN	TB	
06-Jul-18	HS4	21:23	22:58	1:35	21:30	22:54	1:24	0	0	76	SEED					0	43604	1	JN	TB	
06-Jul-18	HS5	21:45	0:39	2:54	21:52	0:37	2:45	56	9	0	SEED					0	43604	2	BM	MD	
06-Jul-18	HS2	21:45	1:27	3:42	21:54	1:24	3:30	0	13	234	SEED					0	43604	2	AW	MB	
06-Jul-18	HS3	23:47	1:14	1:27	23:56	1:09	1:13	98	8	0	SEED					0	43604		AB	MAB	
06-Jul-18	HS4	23:49	3:34	3:45	23:55	3:31	3:36	0	17	258	SEED					0	43604		JN	TB	
07-Jul-18	HS1	0:29	2:53	2:24	0:33	2:51	2:18	301	12	0	SEED					0	43604		BK	JP	
07-Jul-18	HS5	1:59	3:38	1:39	2:03	3:35	1:32	96	8	0	SEED					0	43604	1	BM	MD	
07-Jul-18	HS2	2:22	4:00	1:38	2:28	3:57	1:29	0	7	90	SEED					0	43604		AW	MB	
07-Jul-18	HS3	2:52	4:10	1:18	3:00	4:05	1:05	0	0	0	PATROL					0	43604		AB	MB	
07-Jul-18	HS4	4:19	4:48	0:29	4:25	4:39	0:14	0	0	0	REPO	20:22	551	74	658	23454	67058		JN	TB	
09-Jul-18	HS4	0:11	3:55	3:44	0:20	3:49	3:29	0	9	238	SEED					0	67058	1	JN	TB	
09-Jul-18	HS2	1:18	3:52	2:34	1:25	3:50	2:25	0	5	174	SEED					0	67058	1	BK	MB	
09-Jul-18	HS1	1:19	3:42	2:23	1:25	3:40	2:15	55	0	0	SEED					0	67058		AB	JP	
09-Jul-18	HS3	2:07	3:52	1:45	2:25	3:46	1:21	21	0	0	SEED	10:26	76	14	412	4456	71514		JZ	MD	
10-Jul-18	HS1	16:40	19:16	2:36	16:49	19:12	2:23	20	14	0	SEED					0	71514	3	AB	MD	
10-Jul-18	HS5	21:30	22:43	1:13	21:35	22:40	1:05	0	0	0	PATROL					0	71514		BM	AMB	
11-Jul-18	HS3	0:04	2:19	2:15	0:18	2:13	1:55	12	3	0	SEED					0	71514	2	MT	MAB	
11-Jul-18	HS2	0:23	2:32	2:09	0:30	2:30	2:00	0	0	232	SEED					0	71514	2	AW	MD	
11-Jul-18	HS4	1:23	1:45	0:22	1:30	1:37	0:07	0	0	0	MX					0	71514		JZ	TB	
11-Jul-18	HS1	2:47	3:28	0:41	2:57	3:24	0:27	0	0	0	MX	8:13	32	17	232	3660	75174		AB		
11-Jul-18	HS4	17:24	17:50	0:26	17:33	17:42	0:09	0	0	0	MX	0:00	0	0	0	0	75174		JZ	TB	
13-Jul-18	HS2	20:48	21:30	0:42	20:52	21:28	0:36	0	0	0	REPO					0	75174		AW	MB	
13-Jul-18	HS4	22:44	2:01	3:17	22:50	1:57	3:07	0	16	252	SEED					0	75174	4	JN	MD	
13-Jul-18	HS3	22:55	0:35	1:40	23:10	0:30	1:20	229	11	0	SEED					0	75174		JZ	MAB	
13-Jul-18	HS2	22:48	0:45	1:57	22:55	0:44	1:49	0	11	148	SEED					0	75174		AW	MB	
13-Jul-18	HS5	23:40	1:53	2:13	23:45	1:51	2:06	156	9	0	SEED					0	75174		BK	AMB	
14-Jul-18	HS1	1:00	2:47	1:47	1:09	2:45	1:36	96	5	0	SEED					0	75174		AB	JP	
14-Jul-18	HS2	1:17	2:46	1:29	1:25	2:40	1:15	0	0	12	SEED					0	75174		AW	MB	
14-Jul-18	HS4	3:08	3:55	0:47	3:16	3:50	0:34	0	0	0	REPO	12:23	481	52	412	18256	93430		JN	MD	
17-Jul-18	HS2	15:25	16:10	0:45	15:35	16:04	0:29	0	0	0	MX					0	93430		AW	MB	
18-Jul-18	HS2	2:50	3:39	0:49	3:10	3:35	0:25	0	0	0	MX	0:00	0	0	0	0	93430		AW	MB	

18-Jul-18	HS1	11:42	14:10	2:28	11:46	14:07	2:21	15	16	0	SEED					0	93430	1	BK	JP	
18-Jul-18	HS3	12:20	14:20	2:00	12:26	14:15	1:49	0	7	0	SEED					0	93430		MT	MAB	
18-Jul-18	HS4	12:42	13:04	0:22	12:47	12:58	0:11	0	0	0	PATROL					0	93430		JZ	TB	
18-Jul-18	HS5	19:18	21:32	2:14	19:25	21:30	2:05	0	0	0	PATROL					0	93430		BM	AMB	
18-Jul-18	HS1	21:11	1:49	4:38	21:19	1:47	4:28	29	35	0	SEED					0	93430	3	AB	JP	
18-Jul-18	HS4	21:50	23:27	1:37	21:58	23:22	1:24	0	3	98	SEED					0	93430	2	JN	MD	
18-Jul-18	HS2	21:54	22:25	0:31	22:03	22:21	0:18	0	0	0	PATROL					0	93430		AW	MB	
18-Jul-18	HS2	23:19	1:55	2:36	23:24	1:52	2:28	0	11	236	SEED					0	93430	1	AW	MB	
18-Jul-18	HS5	23:35	1:55	2:20	23:41	1:49	2:08	0	19	0	SEED					0	93430		BM	AMB	
19-Jul-18	HS4	7:37	8:45	1:08	7:45	8:40	0:55	0	2	44	SEED	19:54	44	93	378	15597	109027	1	JN	MB	
19-Jul-18	HS5	21:24	23:41	2:17	21:40	23:40	2:00	0	0	0	PATROL					0	109027		BM	AMB	
19-Jul-18	HS2	21:35	1:00	3:25	21:42	0:55	3:13	0	12	246	SEED					0	109027	2	AW	MB	
19-Jul-18	HS4	23:00	1:14	2:14	23:10	1:10	2:00	0	12	182	SEED					0	109027		JN	MB	
19-Jul-18	HS3	23:12	0:53	1:41	23:22	0:46	1:24	80	14	0	SEED	9:37	80	38	428	8168	117195		JZ	TB	
20-Jul-18	HS2	18:50	21:04	2:14	19:00	21:02	2:02	0	0	0	PATROL					0	117195		AW	MB	
20-Jul-18	HS4	21:11	22:30	1:19	21:27	22:22	0:55	0	0	0	PATROL					0	117195		JN	TB	
20-Jul-18	HS3	21:26	23:16	1:50	21:38	23:07	1:29	0	0	0	PATROL					0	117195		AB	MAB	
20-Jul-18	HS2	22:32	23:00	0:28	22:37	22:55	0:18	0	0	0	REPO	5:23	0	0	0	0	117195		AW	MB	
21-Jul-18	HS4	19:54	21:03	1:09	20:03	20:57	0:54	0	0	0	PATROL					0	117195		JN	TB	
21-Jul-18	HS5	20:08	21:10	1:02	20:15	21:08	0:53	0	7	0	SEED	2:11	0	7	0	1050	118245	1	BM	AMB	
23-Jul-18	HS1	21:04	23:33	2:29	21:12	23:30	2:18	193	19	0	SEED					0	118245	1	AB	MD	
23-Jul-18	HS2	21:21	23:35	2:14	21:28	23:30	2:02	0	22	208	SEED					0	118245		AW	MB	
23-Jul-18	HS5	21:40	0:02	2:22	21:43	0:00	2:17	0	29	0	SEED					0	118245		BM	AMB	
23-Jul-18	HS4	22:34	0:27	1:53	22:43	0:23	1:40	0	0	0	PATROL	8:58	193	70	208	14782	133026		JN	TB	
24-Jul-18	HS5	21:12	22:19	1:07	21:16	22:16	1:00	0	0	0	PATROL	1:07	0	0	0	0	133026		BM	MB	
26-Jul-18	HS2	20:26	23:56	3:30	20:35	23:55	3:20	0	11	155	SEED					0	133026	3	AW	MB	
26-Jul-18	HS4	20:30	21:39	1:09	20:38	21:34	0:56	0	0	36	SEED					0	133026	1	JN	MD	
26-Jul-18	HS5	21:27	23:59	2:32	21:34	23:56	2:22	218	15	0	SEED					0	133026	1	BK	AMB	
26-Jul-18	HS1	22:11	0:49	2:38	22:15	0:47	2:32	25	18	0	SEED					0	133026		AB	JP	
26-Jul-18	HS4	22:14	22:31	0:17	22:20	22:27	0:07	0	0	0	MX					0	133026		JN	MD	
27-Jul-18	HS2	1:37	1:48	0:11	1:41	1:44	0:03	0	0	0	MX	9:49	243	44	191	11847	144874		AW	MB	
30-Jul-18	HS5	20:45	23:46	3:01	20:50	23:44	2:54	280	22	0	SEED					0	144874	1	BM	AMB	
30-Jul-18	HS2	20:46	23:44	2:58	20:53	23:41	2:48	0	16	302	SEED					0	144874		AW	MB	
30-Jul-18	HS1	21:37	23:52	2:15	21:43	23:50	2:07	0	27	0	SEED					0	144874		BK	JP	
30-Jul-18	HS4	22:28	1:49	3:21	22:37	1:45	3:08	0	17	138	SEED					0	144874	2	JN	TB	
30-Jul-18	HS3	22:59	0:23	1:24	23:10	0:14	1:04	0	0	0	PATROL	12:59	280	82	440	18792	163666		JZ	MAB	
31-Jul-18	HS5	23:16	0:16	1:00	23:20	0:14	0:54	0	0	0	PATROL	1:00	0	0	0	0	163666		BM	AMB	
01-Aug-18	HS1	20:05	22:22	2:17	20:12	22:20	2:08	293	31	0	SEED					0	163666	1	AB	MB	
01-Aug-18	HS2	20:10	22:51	2:41	20:19	22:47	2:28	0	20	252	SEED					0	163666	1	AW	MD	
01-Aug-18	HS4	20:12	23:14	3:02	20:23	23:09	2:46	0	23	230	SEED					0	163666		JN	TB	
01-Aug-18	HS5	20:14	23:59	3:45	20:22	23:57	3:35	304	32	0	SEED					0	163666	1	BM	AMB	
01-Aug-18	HS3	21:21	23:22	2:01	21:32	23:19	1:47	176	13	0	SEED					0	163666		JZ	MAB	
01-Aug-18	HS1	23:03	0:50	1:47	23:07	0:47	1:40	223	13	0	SEED					0	163666	1	AB	MB	
01-Aug-18	HS2	23:48	1:08	1:20	23:54	1:05	1:11	0	10	87	SEED					0	163666	1	AW	MD	
02-Aug-18	HS5	1:38	2:02	0:24	1:44	2:00	0:16	0	0	0	MX					0	163666		BM	AMB	
02-Aug-18	HS1	1:39	2:25	0:46	1:46	2:24	0:38	0	1	0	SEED					0	163666	1	AB	MB	
02-Aug-18	HS2	1:51	2:24	0:33	1:55	2:21	0:26	0	0	0	PATROL	18:12	996	143	569	42524	206190		AW	MD	
02-Aug-18	HS2	18:22	20:43	2:21	18:30	20:39	2:09	0	24	222	SEED					0	206190	1	BK	MD	
02-Aug-18	HS1	18:23	20:01	1:38	18:28	20:00	1:32	248	24	0	SEED					0	206190		AB	MB	
02-Aug-18	HS5	18:39	20:43	2:04	18:42	20:40	1:58	1	38	0	SEED					0	206190		BM	AMB	
02-Aug-18	HS3	18:44	20:54	2:10	18:55	20:48	1:53	289	10	0	SEED					0	206190		JZ	MAB	
02-Aug-18	HS4	19:03	21:18	2:15	19:13	21:15	2:02	0	5	88	SEED					0	206190	1	JN	TB	
02-Aug-18	HS1	21:48	2:09	4:21	21:51	2:05	4:14	133	8	0	SEED					0	206190	2	AB	MB	
02-Aug-18	HS4	21:59	0:27	2:28	22:07	0:23	2:16	0	1	96	SEED					0	206190		JN	TB	
02-Aug-18	HS5	22:38	0:08	1:30	22:43	0:05	1:22	61	8	0	SEED					0	206190	1	BM	AMB	
02-Aug-18	HS2	23:18	1:34	2:16	23:24	1:32	2:08	0	6	69	SEED					0	206190	1	BK	MD	
02-Aug-18	HS3	23:36	0:24	0:48	23:43	0:19	0:36	0	5	0	SEED	21:51	732	129	475	34953	241143		JZ	MAB	
03-Aug-18	HS1	19:44	22:02	2:18	19:55	22:00	2:05	0	0	0	PATROL	2:18	0	0	0	0	241143		AB	BK	
09-Aug-18	HS3	16:15	16:53	0:38	16:40	16:51	0:11	0	0	0	PR	0:00	0	0	0	0	241143		JZ	TB	
10-Aug-18	HS3	15:06	15:33	0:27	15:16	15:30	0:14	0	0	0	PR	0:00	0	0	0	0	241143		JZ		

12-Aug-18	HS5	0:22	0:45	0:23	0:27	0:43	0:16	0	0	0	PATROL	0:23	0	0	0	0	241143		BM	AMB	
12-Aug-18	HS1	21:06	22:54	1:48	21:19	22:51	1:32	97	13	0	SEED					0	241143	1	AB	MD	
12-Aug-18	HS2	21:10	22:40	1:30	21:18	22:38	1:20	0	6	120	SEED	3:18	97	19	120	5033	246177		BK	JP	
16-Aug-18	HS4	17:20	17:55	0:35	17:33	17:52	0:19	0	0	0	PR					0	246177		JN	MD	
16-Aug-18	HS4	22:35	23:11	0:36	22:41	23:07	0:26	0	0	0	PR	0:00	0	0	0	0	246177		JN	MD	
22-Aug-18	HS4	17:39	18:06	0:27	17:47	18:04	0:17	0	0	0	PR	0:00	0	0	0	0	246177		JN	MAB	
25-Aug-18	HS4	19:09	19:34	0:25	19:19	19:30	0:11	0	0	0	PR	0:00	0	0	0	0	246177		JN		
29-Aug-18	HS5	17:18	17:45	0:27	17:26	17:42	0:16	0	0	0	PR					0	246177		BM	MB	
29-Aug-18	HS5	22:20	22:41	0:21	22:24	22:38	0:14	0	0	0	PR	0:00	0	0	0	0	246177		BM	MB	
06-Sep-18	HS3	17:47	18:24	0:37	18:00	18:20	0:20	0	0	0	PR					0	246177		JZ	MAB	
06-Sep-18	HS3	22:40	23:05	0:25	22:49	23:00	0:11	0	0	0	PR	0:00	0	0	0	0	246177		JZ	MAB	
07-Sep-18	HS5	17:27	17:43	0:16	17:35	17:41	0:06	0	0	0	MX					0	246177		BK	AMB	
07-Sep-18	HS2	17:40	18:02	0:22	17:51	17:59	0:08	0	0	0	MX					0	246177		AW	JP	
07-Sep-18	HS1	18:05	18:21	0:16	18:16	18:20	0:04	0	0	0	MX	0:00	0	0	0	0	246177		AB	MB	
08-Sep-18	HS3	17:24	18:07	0:43	17:36	18:00	0:24	0	0	0	MX	0:00	0	0	0	0	246177		JZ	TB	
10-Sep-18	HS1	18:56	20:04	1:08	19:02	20:01	0:59	0	0	0	PATROL	1:08	0	0	0	0	246177		BK	MB	
11-Sep-18	HS4	18:05	19:06	1:01	18:17	19:02	0:45	0	0	0	MX					0	246177		JN	MD	
11-Sep-18	HS1	20:15	22:26	2:11	20:23	22:23	2:00	0	12	0	SEED	2:11	0	12	0	1800	247977	1	AB	MB	

APPENDIX E – FORMS

Weather Forecast Worksheet

DAILY FORECAST

Weekday XX MONTH

Alberta Hail Suppression Project 2018

WEATHER MODIFICATION INTERNATIONAL

Forecaster: SELECT NAME

Today's CDC	Synopsis:
X	

Forecast:

Day 2 Outlook CDC: X

Model Sounding	XXX	XXZ
Freezing Level:		kft
- 5˚C Level:		kft
-10˚C Level:		kft
Equilibrium Level:		kft
Tropopause:		kft
Cloud Base Height:		kft
Cloud Base Temp:		˚C
Cell Motion:	@	kts
Storm Motion:	@	kts
Temp Max:		˚C
Dew Point:		˚C
Convective Temp:		˚C
CAPE:		J/Kg
CIN:		J/Kg
Lifted Index:		
Showalter Index:		
Total Totals:		
Precipitable Water:		inches
WINDEX:		mph
BRN Shear:		m^2/s^2

Hailcast Model Output

CALGARY:

RED DEER:

☐ Jet PVA	☐ Morning Fog
☐ Midlevel PVA	☐ Gusty SFC Winds
☐ Lee Cyclogenesis	☐ Loaded Gun
☐ Directional Wind Shear	☐ Theta E Ridge
☐ Speed Shear	☐ Chinook
☐ Lee Trough	☐ Fast Moving Storms
☐ AM ACC or Cloud Streets	☐ Surface Heating
☐ NE/SE Moisture Advection	☐ Embedded Storms
☐ Cooling at 500mb	☐ Frontal Lift
☐ Warming at 500mb	☐ Upslope Flow
☐ Dry Line or Dry Slot	☐ Low Ceilings
☐ Smoke/Haze	☐ Flood Potential

Verification

Observed CDC:	
Max TITAN cell top:	km
Max reflectivity:	dBz
Max VIL:	kg/m^2
YYC:	
YQF:	
EA3:	
Hail Reports:	

Convective Day Category (CDC)		
-3	No Seeding	Clear skies, fair weather cumulus, or stratus without rain, no deep convection
-2	No Seeding	Nimbostratus or weak embedded convection. No TITAN cells.
-1	No Seeding	Discrete convective cells with TCU. May or may not reach TITAN cell criteria. No lightning. No threat of hail.
0	Patrol/Seeding	Thunderstorms (at least one) but no hail. VIL < 20 kg/m2 within the project area or buffer zones
+1	Seeding	Thunderstorms with pea or shot size hail (0.5 to 1.2 cm diameter). 20 kg/m2 < VIL < 30 kg/m2
+2	Seeding	Thunderstorms with grape size hail (1.3 to 2.0 cm diameter). 30 kg/m2 < VIL < 70 kg/m2
+3	Seeding	Thunderstorms with walnut size hail (2.1 to 3.2 cm diameter). 70 kg/m2 < VIL < 100 kg/m2
+4	Seeding	Thunderstorms with golf ball size hail (3.3 to 5.2 cm diameter). VIL > 100 kg/m2
+5	Seeding	Thunderstorms with greater than golf ball size hail (>5.2 cm diameter).

1

300mb Jet Level Winds	500mb Heights & Vorticity
CLICK HERE TO UPLOAD IMAGE	CLICK HERE TO UPLOAD IMAGE
850mb Theta E / Winds	**Surface Analysis**
CLICK HERE TO UPLOAD IMAGE	CLICK HERE TO UPLOAD IMAGE

Tel: 1-701-235-5500 • Fax: 1-701-235-9717 • 3802 20th Street N • Fargo, ND 58102 • USA
weathermodification.com

WRF Model Sounding

CLICK HERE TO UPLOAD IMAGE

REV. 8, 06-2018

3

WMI Radar Observer Log

WMI Radar Log **2018 AHSP** **Olds-Didsbury Radar Operations Centre**		Date (UTC): _____ Operator(s): _____ Page: _____ of _____		
TIME hh:mm (UTC)	**Radar Summary** PRINE, stratus, TITAN cell etc	**Remarks, Action, Decision**	**Carvel Radar***	**Strathmore Radar***

REV. 3 05-2018

*provide Environment Canada radar summary when Olds-Didsbury radar enters no echoes

WMI Seeding Aircraft Flight Log

WMI CLOUD SEEDING FLIGHT LOG					Hobbs Off:		Engines Off:		Landing:		ZULU DEPARTURE DATE	
PROJECT:	PROJECT NAME	Mission Type:	TYPE		Hobbs On:		Engines On:		Takeoff:			
REV 3_5-2018		Departure Airport:			Total Hobbs:	0.0	Total Engine:		Flight Time:		Page #:	1
Pilot:		Copilot:		N-Number:	Aircraft #		HS #:	Hailstop #				

Time (UTC)	Event No.	Latitude (deg & min)	Longitude (deg & min)	Alt (kft)	Flares		Generators		Remarks and Observations
					Ejectable	BIP 150g	On	Off	

RH GEN			Page Total:		0	0		Flight Summary:	
LH GEN			Total Seeding Attempted:						
TOTAL	:	0	Less Misfires:						
			Total Flares Used:		0	0			

Mission Type Categories:							
	Seeding	SEED	Reposition	REPO	Maintenance	MX
	Recon	RECON	Publicity	PR	Ferry	FER
	Patrol	PAT	Currency	CUR		

APPENDIX F – AIRCRAFT SPECIFICATIONS

Several types of aircraft are presently utilized on the project. Though all are twin-engine, the engine type and other performance characteristics make each significantly different from the others. Of the five HAILSTOP aircraft presently used on the project, three are turboprop (prop-jet) aircraft, and the other two are powered by turbocharged, reciprocating piston engines. While the turboprop aircraft are faster and more powerful, they are also more expensive to operate, so the two piston-engine aircraft are used to operate where less performance is needed—at cloud base.

CESSNA 340A AIRCRAFT

Primary mission: cloud base seeding
Power Type, Turbocharged piston twin engine
6290 lbs gross weight
4184 lbs empty weight
1802 lbs useful load
310 hp per engine
280 mph max speed
263 mph rec. cruise
82 mph stall dirty
183 - 203 gals fuel capacity
29,800 feet all engine service ceiling
15,800 feet single engine service ceiling
1650 feet per minute all engine rate of climb
315 feet per minute single engine rate of climb
2175 feet for takeoff over 50 foot obstruction
1615 feet for takeoff ground roll
1850 feet land over 50 foot obstruction
770 foot land ground roll
34 ft 4 in length
12 ft 7 in height
38 ft 1 in wingspan

BEECHCRAFT KING AIR C90

Primary mission: cloud-top seeding
Power Type, Turboprop twin engine
PT6A-21 engines
Full deicing capabilities
9650 lbs gross weight
6382 lbs empty weight
3268 lbs useful load
550 hp per engine
208 kts max speed
185 kts recommended cruise
74 kts dirty stall
384 gals fuel capacity
30,000 feet all engine service ceiling
14,200 single engine service ceiling
1500 feet per minute all engine rate of climb
350 feet per minute single engine rate of climb
3100 for takeoff over a 50 foot obstruction
2250 feet take off roll
1730 feet for landing over 50 foot obstacle
800 foot landing roll
35 ft 6 in length
14 ft 3 in height
50 ft 3 in wingspan

Wednesday, May 30th, 2018

08:45 **Welcome and Staff Introductions**
Jim Sweeney, WMI Executive Vice President
Dr. Terry Krauss, Alberta Severe Weather Management Society (ASWMS) Project Director
Bruce Boe, WMI Vice President - Meteorology

09:00 **Introduction from the Insurance Industry**
Todd Klapak, Alberta Severe Weather Management Society Board Chair

09:15 **History of the AHSP and Status of Hail Suppression**
Dr. Terry Krauss

10:00 **Overview of 1996-2017 Alberta Operations**
Brad Waller, WMI Project Meteorologist

10:15 **Morning Break**

10:30 **Hail Program Overview and Hail Suppression Concepts**
Bruce Boe

11:15 **Numerical Modeling - AHSP 2018**
Adam Brainard, WMI Project Meteorologist/Numerical Modeler

11:45 **Severe Weather Forecasting and Content of the Daily Forecast Sheet**
Brad Waller

12:00 **Lunch (On Site - ASWMS Provided)**

12:45 **ATC Controlling Procedures**
Calgary Terminal &/or Edmonton Control (TBD)
YBW Springbank Tower (TBD)

13:30 **Aviation Weather & Special Procedures**
Cloud Seeding Aircraft & Equipment
Targeting - Seeding Rates
Storm Tracking and Directing
Jody Fischer, WMI Director of Flight Operations

14:45 **Afternoon Break**

15:00 **Project Operations: Routines, Procedures, and Meteorological Information**
Dan Gilbert, Lead Meteorologist/Chief Meteorologist

15:45 **Safety and Emergency Procedures**
Jody Fischer

16:00 **End of 1st Day of Ground School**

Attendance is mandatory for all Weather Modification project personnel

- Chemical Formulation: 2% AgI - 0.5 NH_4I - 0.1 $C_6H_4Cl_2$ - 1.0 $NaClO_4$
- Recommended Burn Rate: ~2.0 gph
- Nucleation Mechanism: Condensation Freezing
- Total Solution Weight: 33.5 lbs.
- Volume: ~ 5.0 gallons, (20 liters) scale for other amounts
- Seeding Aerosol: $AgI_{0.85}$ $AgCl_{0.15}$ NaCl

CONSTITUENT	CHEMICAL FORMULATION	MOLECULAR WT.(G/MOLE)	MASS (G)	WEIGHT (LB.)	VOLUME (GAL)
Silver Iodide	AgI	234.77	304.2	0.67	n/a
Ammonium Iodide	NH_4I	144.94	93.9	0.21	n/a
Paradichloro-benzene	$C_6H_4Cl_2$	147.00	19.0	0.042	n/a
Sodium Perchlorate, 99%	$NaClO_4$	140.48	181.8	0.40	n/a
Water	H_2O	17.99	607.7 or less	1.34	0.202
Acetone	$(CH_3)_2CO$	58.08	13985.5	30.84	4.645

Note: Sodium Perchlorate, anhydrous can be utilized in the formula by adjusting the weight or mass to include 0.34 lb or 158.1 g respectively, although proper handling becomes more difficult. Water amounts should be increased to 1.40 lb or 630 g (0.21 gal).

Note: Use 2.4 urinal pucks (85 gram Paradichloro-benzene) for 205 litre barrel of acetone.

Mixing procedures are as follows:

1.) Combine AgI and acetone in a 5 gallon container and begin stirring;
2.) Combine ammonium iodide, sodium perchlorate and water in another small container and stir until the solution is clear and cool (caution the perchlorate is a strong oxidizer and needs to be done at room temperatures, don't do this in a hot hanger)
3.) Add the ammonium iodide, sodium perchlorate and water mixture to the stirring silver iodide/acetone slurry;
4.) Continue mixing until the solution is clear;
5.) Add the Paradichloro-benzene any time after you have added container #2 and the solution is beginning to clear;
6.) Continue mixing for another 10 minutes until very clear; and
7.) Pump the solution into the aircraft generator immediately after mixing or store in an appropriate labeled sealed container. Storage containers can be either stainless or plastic (polypropylene).

Supplier: Solution Blend Service
2720 7th Avenue N.E., Calgary, AB, T2A 5G6
403-207-9840

APPENDIX I – DAILY METEOROLOGICAL STATISTICS

June 2018

2018 Date	FCST CDC	Precipitable Water (in)	0°C Level (kft)	-5°C Level (kft)	-10°C Level (kft)	Cloud Base Height (kft)	Cloud Base Temp (°C)	Maximum Cloud Top Height (kft)	Temp. Maximum (°C)	Dew Point (°C)	Conv Temp (°C)	CAPE (J/kg)	Total Totals	Lifted Index	Showalter Index	Cell Direction (deg)	Cell Speed (knots)	Storm Direction (deg)	Storm Speed (knots)	Low Level (700mb) Wind Direction (deg)	Low Level (700mb) Wind Speed (knots)	Mid Level (500mb) Wind Direction (deg)	Mid Level (500mb) Wind Speed (knots)	High Level (250mb) Wind Direction (deg)	High Level (250mb) Wind Speed (knots)	Observed CDC
1-Jun	1	0.66	9.0	11.3	13.7	6.0	5.9	25.0	13.0	7.5	13.0	266	54.2	-1	-0.7	306	25	313	13	299	24	282	18	267	21	2
2-Jun	0	0.50	9.4	11.1	13.3	9.9	-1.4	17.9	19.0	4.0	18.5	116	51.5	0	0.9	285	30	312	22	269	16	286	41	286	106	0
3-Jun	2	0.85	11.3	13.4	16.2	10.2	3.3	31.2	21.0	6.5	24.7	390	51.0	-1	0.1	218	38	251	27	221	39	243	41	248	62	-1
4-Jun	2	0.60	9.4	11.1	13.0	8.3	3.5	24.0	19.0	7.0	16.7	526	54.8	-3	-1.3	254	27	269	19	237	14	232	39	226	97	2
5-Jun	0	0.58	8.8	10.4	12.6	8.8	-0.2	21.3	17.0	4.5	16.2	273	55.6	-2	-1.0	267	27	284	15	222	15	266	31	269	67	-2
6-Jun	-3	0.48	11.8	14.0	16.9	12.3	-1.5	29.7	24.5	4.0	24.0	154	51.3	-1	0.1	274	33	288	19	248	13	262	37	251	65	-3
7-Jun	1	0.67	11.7	14.0	16.4	11.0	1.8	33.5	25.5	8.0	25.4	493	54.6	-3	-1.9	240	16	244	13	172	16	234	26	226	46	0
8-Jun	-1	0.67	12.5	14.2	16.6	12.5	-0.2	29.5	28.0	7.0	25.1	267	53.3	-2	-1.3	241	22	253	16	189	11	229	32	230	60	-1
9-Jun	3	0.90	12.2	14.8	17.2	9.9	6.2	36.8	25.0	10.0	23.6	1100	57.0	-4	-4.1	200	55	229	36	193	18	204	68	199	96	3
10-Jun	1	0.51	7.7	9.6	11.8	7.7	0.0	24.0	13.0	3.5	13.0	417	57.2	-2	-1.3	269	26	286	12	264	23	246	21	180	53	2
11-Jun	-1	0.38	8.4	10.1	12.3	10.0	-4.6	20.4	16.0	0.0	15.3	112	54.1	-1	0.0	286	39	321	24	305	43	273	35	280	9	-2
12-Jun	-2	0.41	9.4	11.1	12.8	11.1	-5.0	19.1	19.0	1.5	18.1	112	53.3	0	0.0	298	29	330	25	293	28	304	39	300	88	-2
13-Jun	2	0.66	9.8	12.0	14.1	9.2	1.6	25.9	20.0	5.5	19.3	460	58.1	-4	-2.9	275	19	287	12	246	15	262	23	256	54	0
14-Jun	1	0.78	8.5	11.2	13.9	5.7	6.9	30.7	14.0	10.0	14.9	568	54.3	-2	-1.1	031	15	063	7	034	14	040	7	218	13	1
15-Jun	2	0.73	8.8	11.5	14.3	6.0	7.0	30.6	15.0	8.0	15.1	763	54.2	-3	-1.2	086	8	167	2	075	12	193	6	232	29	1
16-Jun	1	0.75	9.5	12.1	14.7	6.1	7.5	30.3	15.0	9.5	15.0	664	54.9	-3	-1.7	031	8	045	7	040	13	012	10	267	17	2
17-Jun	-1	0.51	10.6	13.1	15.6	9.5	3.5	22.9	21.0	7.0	17.8	279	54.6	-2	-1.7	295	1	106	5	282	2	065	8	052	26	-1
18-Jun	-2	0.63	11.4	15.1	18.6	10.0	3.9	15.2	23.0	7.5	19.0	49	43.7	2	2.1	086	8	121	5	095	6	067	14	228	32	-3
19-Jun	-3	0.67	12.7	15.4	18.0	10.7	3.9	24.0	25.0	8.0	21.1	109	50.9	-1	-0.4	076	8	114	7	124	3	071	15	092	5	-3
20-Jun	-3	0.69	13.9	16.1	18.5	10.8	6.5	33.2	27.0	12.0	30.0	419	52.6	-2	-2.0	128	3	169	6	159	4	116	9	129	45	-3
21-Jun	2	0.86	12.8	15.4	18.0	10.1	7.2	36.6	26.5	11.0	23.9	1295	55.7	-4	-3.7	350	10	019	3	323	7	337	4	308	23	2
22-Jun	2	1.06	12.0	14.9	17.7	8.7	7.9	35.8	23.0	11.0	18.8	848	52.7	-3	-2.1	247	12	325	6	303	8	273	7	187	6	2
23-Jun	2	1.15	12.2	15.4	18.2	6.8	11.0	36.1	22.0	14.0	20.9	763	50.8	-2	-1.8	326	9	017	6	346	11	341	4	283	3	2
24-Jun	0	0.96	13.3	16.1	19.2	10.0	7.0	36.0	26.0	11.0	24.5	652	50.7	-2	-1.1	250	10	278	7	258	9	264	15	274	38	-1
25-Jun	3	0.98	13.7	15.7	17.9	12.1	4.0	37.5	25.5	13.0	25.0	1046	54.9	-4	-3.6	203	45	230	32	217	45	190	49	208	54	2
26-Jun	-1	0.39	9.4	11.1	12.8	11.3	-5.7	21.9	19.0	1.0	17.9	130	53.9	-1	-0.3	272	13	315	15	272	13	291	23	277	24	-1
27-Jun	-2	0.60	11.3	13.0	15.9	12.6	-3.9	15.6	23.0	2.0	21.1	20	46.3	2	2.7	283	28	308	20	277	11	277	40	267	78	-3
28-Jun	1	0.73	10.1	12.5	15.0	8.7	3.7	23.8	19.0	7.0	17.0	287	54.2	-2	-1.5	292	14	280	9	240	5	250	20	233	40	0
29-Jun	2	0.74	10.0	12.1	14.8	8.8	3.5	31.4	19.0	7.0	18.3	576	55.3	-3	-1.8	272	7	319	5	266	2	292	10	245	14	2
30-Jun	2	0.85	9.8	12.3	14.9	7.8	5.4	28.2	19.5	10.5	19.0	542	55.2	-3	-2.1	251	15	285	10	238	13	258	20	282	57	2

July 2018

2018 Date	FCST CDC	Precipitable Water (in)	0°C Level (kft)	-5°C Level (kft)	-10°C Level (kft)	Cloud Base Height (kft)	Cloud Base Temp (°C)	Maximum Cloud Top Height (kft)	Temp. Maximum (°C)	Dew Point (°C)	Conv Temp (°C)	CAPE (J/kg)	Total Totals	Lifted Index	Showalter Index	Cell Direction (deg)	Cell Speed (knots)	Storm Direction (deg)	Storm Speed (knots)	Low Level (700mb) Wind Direction (deg)	Low Level (700mb) Wind Speed (knots)	Mid Level (500mb) Wind Direction (deg)	Mid Level (500mb) Wind Speed (knots)	High Level (250mb) Wind Direction (deg)	High Level (250mb) Wind Speed (knots)
1-Jul	1	0.63	8.6	10.4	12.7	7.9	1.9	26.9	19.0	6.5	16.4	474	57.1	-2	-1.9	278	28	314	18	280	22	284	29	297	39
2-Jul	1	0.64	8.8	11.0	13.2	7.1	3.8	29.2	17.0	7.0	16.3	465	54.8	-2	-1.0	247	11	333	5	247	11	326	6	275	10
3-Jul	2	0.76	9.2	11.9	14.5	6.3	6.4	30.5	16.0	10.0	15.3	622	57.2	-3	-2.7	052	8	079	6	048	8	065	6	050	8
4-Jul	-1	0.64	10.0	13.3	16.2	7.8	5.6	32.1	20.0	8.0	15.4	362	51.7	-1	-0.3	022	8	018	5	007	8	336	6	271	24
5-Jul	-3	0.82	14.6	16.4	18.4	11.7	7.5	35.6	25.0	12.0	32.6	747	55.2	-4	-3.8	244	25	260	17	213	13	239	32	253	44
6-Jul	4	1.05	13.8	15.9	18.4	10.8	8.5	37.6	30.0	14.0	30.2	1641	59.3	-7	-5.7	213	26	251	20	194	17	235	44	245	92
7-Jul	1	0.57	10.8	12.6	15.0	10.6	0.6	26.3	23.0	7.0	22.1	409	55.6	-3	-1.9	279	29	307	21	293	24	267	35	255	86
8-Jul	2	0.84	11.7	14.3	17.0	9.9	5.1	30.4	24.0	9.0	21.0	466	54.5	-3	-2.2	259	18	280	15	238	17	259	31	260	79
9-Jul	-1	0.92	13.2	16.5	19.3	11.4	3.8	18.6	27.0	8.5	27.2	43	49.0	0	0.5	265	30	287	18	253	15	262	40	258	60
10-Jul	2	0.96	11.6	14.9	17.3	5.4	11.6	31.3	17.0	13.5	16.0	595	50.6	-3	-1.0	265	19	309	13	276	18	274	22	233	29
11-Jul	-1	0.81	11.7	14.6	17.9	9.6	5.2	20.3	23.0	9.0	22.5	126	48.7	0	0.8	312	19	337	11	303	8	304	19	308	31
12-Jul	2	0.94	12.3	14.9	17.9	8.7	8.1	35.7	25.0	12.5	25.0	591	52.5	-3	-2.1	290	26	312	16	296	18	278	33	293	60
13-Jul	4	1.08	12.9	15.8	18.5	8.8	10.2	37.5	27.0	15.0	27.4	1445	53.7	-5	-2.9	254	36	287	21	216	14	263	48	267	81
14-Jul	-2	0.59	10.5	13.2	15.9	9.7	1.7	18.8	20.0	5.5	19.2	39	50.3	0	0.9	305	30	333	22	301	22	301	36	283	74
15-Jul	-3	0.67	12.0	14.6	17.6	10.7	2.4	17.1	25.0	8.5	25.8	15	47.3	1	1.8	314	30	337	16	307	14	302	34	296	46
16-Jul	-3	0.77	13.9	17.3	19.9	11.2	4.9	34.1	29.0	11.0	29.1	105	47.8	0	0.8	298	24	324	13	287	12	295	27	314	38
17-Jul	2	0.86	14.5	16.8	19.2	12.3	5.7	38.3	31.0	10.5	31.1	1319	56.3	-4	-3.9	259	11	294	5	283	7	259	11	221	30
18-Jul	4	0.97	13.3	15.3	17.4	9.5	10.0	36.1	26.0	13.0	27.7	2067	61.9	-8	-7.8	284	19	318	11	287	12	277	21	264	28
19-Jul	3	0.94	12.9	15.1	17.6	8.6	9.8	36.3	24.5	13.0	22.5	1782	56.9	-5	-4.7	240	10	240	8	206	8	224	15	245	28
20-Jul	4	0.87	12.3	14.8	17.2	8.0	10.2	35.9	25.0	14.0	24.4	1832	58.5	-6	-5.9	203	30	232	22	204	18	203	45	233	59
21-Jul	1	0.60	11.3	13.0	14.7	11.8	-1.4	26.3	23.0	3.5	20.4	315	54.4	-2	-1.4	252	28	271	21	231	9	242	42	241	78
22-Jul	1	0.70	10.8	13.5	16.3	9.3	4.1	23.9	21.0	7.5	20.3	208	52.1	-1	-0.5	305	21	241	16	315	24	301	26	287	24
23-Jul	3	0.95	11.5	13.9	16.6	7.9	8.1	32.6	21.0	10.5	18.2	850	55.9	-4	-3.6	273	19	301	11	266	12	261	22	273	52
24-Jul	3	0.82	11.2	13.6	15.7	6.2	9.0	29.2	17.0	11.0	14.7	564	54.4	-3	-2.1	287	33	315	19	287	22	279	35	278	74
25-Jul	2	0.81	11.8	14.6	17.1	8.5	6.8	32.7	21.5	10.0	21.0	545	53.4	-2	-2.0	317	16	343	10	328	17	308	19	296	45
26-Jul	3	0.82	11.6	13.8	16.3	8.5	7.3	34.4	22.0	10.5	23.4	1268	56.2	-4	-3.3	309	21	337	10	335	11	299	21	293	44
27-Jul	0	0.72	11.1	13.8	16.6	9.7	4.3	34.3	24.0	9.0	23.0	462	52.9	-1	-1.3	332	11	014	7	354	12	347	13	327	10
28-Jul	-1	0.64	12.0	14.6	16.9	10.0	3.7	32.9	25.0	7.5	24.1	569	53.2	-3	-1.3	334	11	024	7	337	10	354	13	042	19
29-Jul	-3	0.61	14.4	16.8	19.1	13.7	1.2	36.2	29.0	7.0	30.6	337	50.4	0	-0.1	001	9	034	6	344	13	021	10	343	18
30-Jul	2	1.05	13.7	16.0	18.4	12.1	4.8	37.2	31.5	11.5	30.0	1218	56.7	-4	-3.8	302	17	328	11	297	8	295	23	303	28
31-Jul	3	1.03	13.8	15.8	18.2	10.3	9.0	37.9	25.5	13.0	29.1	1436	56.6	-5	-4.8	302	17	320	9	298	10	300	21	287	42

August 2018

2018 Date	FCST CDC	Precipitable Water (in)	0°C Level (kft)	-5°C Level (kft)	-10°C Level (kft)	Cloud Base Height (kft)	Cloud Base Temp (°C)	Maximum Cloud Top Height (kft)	Temp. Maximum (°C)	Dew Point (°C)	Conv Temp (°C)	CAPE (J/kg)	Total Totals	Lifted Index	Showalter Index	Cell Direction (deg)	Cell Speed (knots)	Storm Direction (deg)	Storm Speed (knots)	Low Level (700mb) Wind Direction (deg)	Low Level (700mb) Wind Speed (knots)	Mid Level (500mb) Wind Direction (deg)	Mid Level (500mb) Wind Speed (knots)	High Level (250mb) Wind Direction (deg)	High Level (250mb) Wind Speed (knots)	Observed CDC
1-Aug	4	1.14	13.4	15.8	18.3	9.1	11.1	38.8	29.0	15.0	28.8	2536	59.8	-7	-7.0	261	19	286	13	289	8	249	31	265	58	4
2-Aug	4	1.12	12.3	14.6	17.0	9.0	8.7	35.5	25.0	13.0	25.1	1727	60.2	-7	-6.1	237	14	274	11	219	10	254	22	257	63	5
3-Aug	2	0.77	11.5	13.5	16.0	10.8	1.9	31.4	23.5	7.0	22.4	644	55.2	-3	-2.2	285	21	317	9	285	9	275	13	270	9	2
4-Aug	0	0.85	11.3	14.1	17.0	9.0	5.7	34.0	22.0	9.0	19.9	518	53.7	-2	-1.9	330	15	015	8	335	20	347	5	124	18	0
5-Aug	0	0.83	11.7	14.8	17.4	8.6	7.1	34.6	23.0	9.5	22.5	616	53.0	-2	-1.9	340	12	018	4	331	13	002	4	044	11	-1
6-Aug	-1	0.85	12.8	15.5	18.2	12.0	2.5	32.8	27.5	7.5	27.4	345	51.8	-2	-0.8	308	23	324	11	288	10	288	17	321	21	-1
7-Aug	-3	0.87	14.2	17.3	20.1	12.8	2.5	16.2	30.0	8.0	28.4	8	47.6	0	1.2	325	22	345	11	284	8	321	20	356	18	-3
8-Aug	-3	0.76	15.0	17.7	20.2	14.2	1.5	37.4	31.0	9.0	32.0	700	49.8	-1	-0.2	290	20	314	11	282	16	286	20	300	36	-3
9-Aug	-3	0.65	16.5	18.9	21.3	14.3	4.5	40.2	33.0	8.0	40.0	7	43.6	2	3.4	278	23	307	14	265	15	292	22	286	42	-3
10-Aug	1	0.89	15.8	17.6	19.5	16.9	-2.8	38.8	35.0	8.0	37.3	487	53.6	-3	-1.8	261	39	279	20	243	22	258	40	247	54	0
11-Aug	1	1.07	15.0	17.0	19.2	17.4	-6.0	38.8	24.5	10.5	33.8	174	48.9	-1	-0.1	206	29	236	18	165	21	213	48	228	67	2
12-Aug	1	0.89	10.5	13.1	15.9	8.2	6.2	31.0	20.0	9.0	16.8	628	53.7	-2	-1.8	258	19	300	13	271	17	260	24	249	50	2
13-Aug	-3	0.62	11.3	14.5	17.0	8.8	5.0	26.0	20.5	8.0	18.2	95	50.4	0	0.1	337	13	357	8	311	18	339	10	039	50	-3
14-Aug	-3	0.83	14.3	17.4	20.6	13.7	1.2		28.0	7.0	33.4	0	43.8	3	3.2	306	15	334	9	327	14	304	18	327	9	-3
15-Aug	-1	0.71	14.1	16.5	19.2	13.5	1.3	24.2	30.0	7.0	30.8	91	51.1	-1	-0.6	278	17	299	9	300	11	258	23	240	39	-1
16-Aug	-1	0.81	13.8	16.2	18.4	12.7	2.7	32.3	27.0	8.0	30.2	374	52.2	-2	-1.1	263	24	283	14	242	15	260	28	277	28	-3
17-Aug	1	0.91	13.2	15.4	18.2	11.4	4.6	40.0	27.5	10.0	29.6	296	52.2	-2	-1.4	277	31	309	13	269	19	285	26	282	22	0
18-Aug	-3	0.67	11.8	14.6	18.4	12.4	-0.8		20.0	4.0	26.3	0	39.8	6	6.2	304	31	340	19	300	19	304	41	297	48	-3
19-Aug	-2	0.60	9.9	12.5	15.6	9.4	1.1	14.5	20.0	5.0	20.3	23	47.1	2	2.8	299	17	331	10	347	9	290	24	294	38	-2
20-Aug	-1	0.62	9.3	12.0	15.5	7.5	5.3	24.8	19.0	8.0	17.6	211	52.1	0	-0.3	013	9	060	8	107	5	011	16	043	89	-2
21-Aug	-3	0.57	14.2	17.1	19.9	12.6	3.0		25.5	4.0	35.9	0	39.7	5	5.8	012	14	035	8	347	9	007	18	019	34	-3
22-Aug	-3	0.73	15.5	17.9	20.2	22.0	-14.3	33.2	30.0	7.0	35.3	151	47.5	1	1.2	292	7	308	4	270	8	281	7	245	9	-3
23-Aug	1	0.70	13.1	15.5	18.1	13.5	-0.9	35.4	28.0	7.0	29.3	324	49.9	-1	0.2	264	19	282	13	195	5	254	30	244	58	0
24-Aug	-1	0.76	8.6	12.1	14.7	5.4	6.7	11.5	12.0	8.0	10.9	58	50.4	1	1.1	286	18	314	11	328	14	256	22	261	26	0
25-Aug	0	0.74	9.9	12.2	14.7	9.3	1.6	22.6	20.0	6.5	20.2	136	52.7	-1	-0.2	297	16	322	10	248	9	307	21	264	49	0
26-Aug	0	0.80	9.2	11.9	14.5	6.8	5.8	29.4	17.0	8.0	14.9	389	55.3	-2	-2.0	260	21	304	11	235	15	271	18	273	32	1
27-Aug	-2	0.44	7.9	9.7	14.5	7.7	0.6	11.1	13.0	3.0	9.2	45	50.2	2	2.3	341	15	005	12	003	16	317	17	009	42	-2
28-Aug	0	0.85	10.2	12.9	15.7	7.5	5.8	19.1	19.0	9.0	19.3	144	50.4	0	0.3	311	16	341	16	309	17	317	31	317	63	-1
29-Aug	0	0.84	10.3	12.8	16.0	8.8	4.0	30.6	21.0	8.0	21.3	301	49.7	-1	0.9	261	27	279	19	236	23	263	29	240	65	2
30-Aug	2	0.66	9.3	11.3	13.6	8.5	2.4	28.4	18.5	6.0	18.6	551	57.0	-3	-2.1	284	27	315	19	269	17	295	34	275	48	2
31-Aug	-2	0.59	9.5	11.3	13.3	9.6	-0.3	15.7	21.0	4.0	19.5	49	51.4	1	1.0	262	24	302	26	294	23	267	49	284	93	-2

September 2018 and Seasonal Variation

2018 Date	FCST CDC	Precipitable Water (in)	0°C Level (kft)	-5°C Level (kft)	-10°C Level (kft)	Cloud Base Height (kft)	Cloud Base Temp (°C)	Maximum Cloud Top Height (kft)	Temp. Maximum (°C)	Dew Point (°C)	Conv Temp (°C)	CAPE (J/kg)	Total Totals	Lifted Index	Showalter Index	Cell Direction (deg)	Cell Speed (knots)	Storm Direction (deg)	Storm Speed (knots)	Low Level (700mb) Wind Direction (deg)	Low Level (700mb) Wind Speed (knots)	Mid Level (500mb) Wind Direction (deg)	Mid Level (500mb) Wind Speed (knots)	High Level (250mb) Wind Direction (deg)	High Level (250mb) Wind Speed (knots)	Observed CDC
1-Sep	-1	0.48	9.3	11.0	12.9	10.6	-3.9	15.6	17.0	0.0	16.4	66	47.6	3	3.0	288	32	320	21	264	11	293	43	293	78	-1
2-Sep	-2	0.63	9.8	12.0	13.9	13.0	-7.7	16.8	18.5	3.0	20.3	18	49.6	1	1.9	272	24	299	19	267	23	284	36	273	103	-2
3-Sep	0	0.47	7.7	9.5	12.1	7.8	-0.1	20.0	14.0	3.0	14.7	123	55.1	0	0.0	304	31	340	33	319	32	305	33	272	55	-1
4-Sep	-2	0.40	8.1	11.0	13.8	7.8	0.9	11.0	15.0	4.0	14.9	13	51.3	1	1.7	303	25	332	15	305	20	306	28	302	51	-2
5-Sep	-3	0.44	11.8	14.4	17.1	11.6	0.3		20.0	5.0	25.5	0	45.8	2	3.2	262	19	296	14	287	9	274	32	264	45	-3
6-Sep	-2	0.75	12.3	14.3	16.6	15.1	-6.7	19.2	22.5	7.0	27.1	11	50.7	0	0.2	272	27	293	15	262	12	272	31	270	55	-1
7-Sep	1	0.74	12.2	14.3	16.9	10.3	5.1	35.3	26.0	9.0	26.8	863	55.5	-3	-2.9	247	19	278	13	237	9	250	27	245	59	-2
8-Sep	1	0.89	11.1	13.4	15.8	5.7	10.1	34.7	18.0	12.0	17.9	968	55.2	-4	-3.3	207	22	259	10	238	17	205	21	242	28	0
9-Sep	-1	0.72	10.3	12.4	15.0	8.7	3.3	10.5	17.0	6.0	18.6	62	50.0	1	0.8	276	22	302	16	254	17	277	30	277	71	-1
10-Sep	1	0.67	9.6	11.4	14.0	9.0	1.8	26.8	18.0	5.0	16.6	511	57.2	-3	-2.6	240	20	282	12	268	12	245	22	250	71	2
11-Sep	1	0.64	8.4	10.8	13.2	6.6	4.4	29.0	15.0	7.0	15.3	578	57.6	-3	-2.4	269	14	299	8	266	12	275	16	250	46	1
12-Sep	-2	0.49	8.1	10.5	12.8	8.6	-1.0		9.0	2.0	15.1	0	50.8	2	2.8	270	16	294	12	274	14	260	22	240	39	-2
13-Sep	-2	0.43	3.7	5.5	11.4	4.2	-1.4	4.2	2.0	0.0	1.7	24	39.9	10	11.0	271	28	292	19	274	20	256	39	260	64	-2
14-Sep	-2	0.52	9.2	11.2	13.2	12.4	-8.0	15.7	5.0	1.0	2.4	9	45.7	0	6.1	241	43	259	26	219	27	235	45	239	82	-2
15-Sep	0	0.59	9.5	11.7	13.9	4.7	2.7	5.2	6.0	4.0	5.3	1	41.5	7	8.1	231	28	263	19	224	12	232	36	227	84	0
Average	0.1	0.74	11.3	13.7	16.3	9.9	3.2	27.9	21.7	7.8	21.8	481	52.4	-1.4	-0.7	253	20.8	256	13.5	252	14.7	251	25.1	245	46.1	-0.1
StdDev	2.1	0.18	2.2	2.3	2.3	2.8	4.6	8.5	5.9	3.5	7.0	504	4.3	2.8	2.9	077	9.5	098	6.7	073	7.5	078	12.6	071	25.2	2.1
Maximum	4.0	1.15	16.5	18.9	21.3	22.0	11.6	40.2	35.0	15.0	40.0	2536	61.9	10	11.0	350	55.0	357	36.0	354	45.0	354	68.0	356	106.0	5.0
Minimum	-3.0	0.38	3.7	5.5	11.4	4.2	-14.3	4.2	2.0	0.0	1.7	0	39.7	-8	-7.8	001	1.0	005	2.0	003	2.0	002	4.0	009	3.0	-3.0

APPENDIX J – PROJECT PERSONNEL AND TELEPHONE LIST

ALBERTA HAIL SUPPRESSION PROJECT 2018

REV. 5, 05-2018

SPRINGBANK PILOTS	**PILOT OFFICE - SPRINGBANK, ALBERTA** PILOT OFFICE: 403-247-0001 ADDRESS: Springbank Aero Services, Inc. 208A Avro Lane, Calgary, Alberta T3Z 3S5 EMAIL: calgary@weathermodification.com			
	BRIAN KINDRAT	Project Ops Manager		
	ANDREW BRICE	Captain King Air - **HS1**		
	BROOK MUELLER	Captain King Air -**HS5**		
	ANDREW WILKES	Captain C340 - **HS2**		
	JOHN PROPPE	Co-Pilot King Air/C340		
	MATT BURRUS	Co-Pilot King Air/C340		
	ANDREAS BERTONI	Co-Pilot King Air/C340		a
	MITCHELL DONST	Co-Pilot King Air/C340		
RED DEER PILOTS	**PILOT OFFICE - RED DEER, ALBERTA** PILOT OFFICE: 403-886-7857 ADDRESS: Hangar #2 Red Deer Ind Airport, Penhold, Alberta, T0M 1R0 EMAIL: reddeer@weathermodification.com			
	JOEL ZIMMER	Captain King Air - **HS3**		
	JENELLE NEWMAN	Captain C340 - **HS4**		
	MICHAEL BENSON	Co-Pilot King Air/C340		
	TREVOR BLACK	Co-Pilot King Air/C340		
METEOROLOGISTS	**RADAR OPERATIONS CENTER - OLDS-DIDSBURY AIRPORT, ALBERTA** RADAR PHONE: 403-335-8359 ADDRESS: 1436, 320 Bergen Rd., Hangar 4, Didsbury, Alberta T0M 0W0 SHIPPING VIA FedEx/UPS: Weather Modification LLC Olds-Didsbury Airport, Hangar 4, 1436 Twp Rd 320, Didsbury, AB T0M 0W0 EMAIL: olds@weathermodification.com			
	DAN GILBERT	Chief Meteorologist Lead AHSP Meteorologist		
	BRAD WALLER	Field Meteorologist		b
	ADAM BRAINARD	Field Meteorologist/Modeler		
	ADDITIONAL SUPPORT SERVICES			
	SPRINGBANK FUEL TRUCK (AFTERHOURS)			
	AIR SPRAY (KIRK CARLETON)	Director of Maintenance		
	ATC EDMONTON OSS	Notification to Launch Aircraft		
	ATC SHIFT MANAGER EDMONTON			
	ATC CALGARY TERMINAL SUPERVISOR			
	ATC CALGARY TOWER			
	YYC INTERNATIONAL AIRPORT	Duty Manager Desk		
	STORM WATCH HOTLINE	Severe Weather Desk: 800.239.0484		
	RED DEER AIRPORT FLIGHT SERVICE			
	SKY WINGS (DENNIS COOPER)	Red Deer Fuel (JET-A)		
	HILLMAN AIR LTD (GARY HILLMAN)	Red Deer Fuel (100LL)		
	BARRY ROBINSON	Radar Technician		
	REDACTED			

ALBERTA HAIL SUPPRESSION PROJECT 2018

REV. 5, 05-2018

SPRINGBANK PILOTS	**PILOT OFFICE - SPRINGBANK, ALBERTA**			
	PILOT OFFICE: 403-247-0001 ADDRESS: Springbank Aero Services, Inc. 208A Avro Lane, Calgary, Alberta T3Z 3S5 EMAIL: calgary@weathermodification.com			
	BRIAN KINDRAT	Project Ops Manager		
	ANDREW BRICE	Captain King Air - **HS1**		
	BROOK MUELLER	Captain King Air -**HS5**		
	ANDREW WILKES	Captain C340 - **HS2**		
	JOHN PROPPE	Co-Pilot King Air/C340		
	MATT BURRUS	Co-Pilot King Air/C340		
	ANDREAS BERTONI	Co-Pilot King Air/C340		a
	MITCHELL DONST	Co-Pilot King Air/C340		
RED DEER PILOTS	**PILOT OFFICE - RED DEER, ALBERTA**			
	PILOT OFFICE: 403-886-7857 ADDRESS: Hangar #2 Red Deer Ind Airport, Penhold, Alberta, T0M 1R0 EMAIL: reddeer@weathermodification.com			
	JOEL ZIMMER	Captain King Air - **HS3**		
	JENELLE NEWMAN	Captain C340 - **HS4**		
	MICHAEL BENSON	Co-Pilot King Air/C340		
	TREVOR BLACK	Co-Pilot King Air/C340		
METEOROLOGISTS	**RADAR OPERATIONS CENTER - OLDS-DIDSBURY AIRPORT, ALBERTA**			
	RADAR PHONE: 403-335-8359 ADDRESS: 1436, 320 Bergen Rd., Hangar 4, Didsbury, Alberta T0M 0W0			
	SHIPPING VIA FedEx/UPS: Weather Modification LLC Olds-Didsbury Airport, Hangar 4, 1436 Twp Rd 320, Didsbury, AB T0M 0W0 EMAIL: olds@weathermodification.com			
	DAN GILBERT	Chief Meteorologist Lead AHSP Meteorologist		
	BRAD WALLER	Field Meteorologist		b
	ADAM BRAINARD	Field Meteorologist/Modeler		
	ADDITIONAL SUPPORT SERVICES			
	SPRINGBANK FUEL TRUCK (AFTERHOURS)			
	AIR SPRAY (KIRK CARLETON)	Director of Maintenance		
	ATC EDMONTON OSS	Notification to Launch Aircraft		
	ATC SHIFT MANAGER EDMONTON			
	ATC CALGARY TERMINAL SUPERVISOR			
	ATC CALGARY TOWER			
	YYC INTERNATIONAL AIRPORT	Duty Manager Desk		
	STORM WATCH HOTLINE	Severe Weather Desk: 800.239.0484		
	RED DEER AIRPORT FLIGHT SERVICE			
	SKY WINGS (DENNIS COOPER)	Red Deer Fuel (JET-A)		
	HILLMAN AIR LTD (GARY HILLMAN)	Red Deer Fuel (100LL)		
	BARRY ROBINSON	Radar Technician		

REDACTED

NOTICE OF INTENT TO ENGAGE IN WEATHER MODIFICATION ACTIVITIES
PURSUANT TO THE WEATHER MODIFICATION INFORMATION ACT AND REGULATIONS
SCHEDULE I

PART 1. GENERAL IDENTIFICATION OF ACTIVITY

Date of notice: May 9, 2018
Proposed starting date: June 1st, 2018
Expected duration: September 15th, 2018

Province and area to be affected: Central Alberta, covering the Red Deer to Calgary regions (see attached map showing project area which has remained essentially the same since 1996).

Weather elements to be modified: Thunderstorms
Modification expected: Hail Suppression
Class of operation: Operational
Operating method: airborne
Class of economy to benefit: insurance industry: private and public property primary, agriculture secondary.

PART 2. GENERAL INFORMATION CONCERNING WEATHER MODIFIER

Organization name: Weather Modification International (WMI)
http://www.weathermodification.com/
Parent Organization: Weather Modification LLC
3802 20th Street North
Fargo, ND USA 58102
Chief Officer: Mr. Neil Brackin, President Tel: (701) 235-5500
nbrackin@weathermod.com
Local Organization: Weather Modification International Tel. (403) 335-8359
Olds-Didsbury Airport, Highway 2A
Olds, AB T4H 1A1

Name and relevant qualifications of officer(s) designated in charge of project:

Chief Officer: Mr. Daniel Gilbert, Chief Meteorologist
B.S., 15 years' experience
WMA Certified Weather Modification Operator #78
Office Tel: (403) 335-8359
(see Part 5 for details of qualifications and experience)

Vice President - Meteorology Mr. Bruce Boe
Project Manager/Meteorology, 44 years' experience
Tel: (701) 235-5500

Primary activities of organization (see web page at www.weathermodification.com):
- cloud seeding
- atmospheric research
- air pollution monitoring
- meteorological radar monitoring
- equipment design and fabrication
- aircraft modifications

Amount of public liability insurance carried applicable to activity: CAD$50 million by the Alberta Severe Weather Management Society and US$5 million by Weather Modification LLC.

List of similar weather modification activities previously undertaken:

a. Canada: The Alberta Hail Project has been operating in its present form since 1996. The contractor (operator) for this entire period has been WMI.

b. Elsewhere:

- WMI has conducted the hail suppression cloud seeding in North Dakota for more than 50 years. This is an ongoing project.
- WMI conducted hail suppression in Mendoza, Argentina using 3 to 4 Cheyenne II aircraft and a Lear Jet 1998-2004.
- WMI conducted operational cloud seeding in Oklahoma for Rain Enhancement and Hail Suppression 1997-2001.
- WMI has conducted operational cloud seeding in Alberta, Burkina Faso, California, Idaho, Mexico, UAE, India, Mali, Nevada, North Dakota, Saudi Arabia, Senegal, and Wyoming within the last 10 years.

4. References:

1. Dr. Terry Krauss
   Krauss Weather Services
   79 Irving Crescent
   Red Deer, AB T4R 3S3 Tel. 403-318-0400
2. Mr. Darin Langerud, Director
   State of North Dakota Atmospheric Resource Board
   900 E. Boulevard Ave.
   Bismarck, ND 58505 Tel. 701-328-2788
3. Dr. Ronald E. Rinehart
   4408 Greystone Drive
   St. Joseph, MO 64505 Tel. 816-233-1394
4. Dr. Paul L. Smith
   South Dakota School of Mines & Technology
   501 E. St. Joseph Street
   Rapid City, SD 57701-3995 Tel. 605-394-2291

List of subcontractors: WMI owns and operates its own fleet of aircraft and weather radars. No major sub-contractors are being used on the Alberta Hail project for aircraft or radar services. Solution Blend Services, Calgary, Alberta (403) 207-9840 will be handling and mixing seeding solutions for the project.

PART 3. GENERAL INFORMATION CONCERNING ORGANIZATION FOR WHOM ACTIVITY IS TO BE CONDUCTED.

Name of organization: Alberta Severe Weather Management Society (ASWMS)

Chief officers: Mr. Todd Klapak, President
todd.klapak@intact.net
Ms. Sherre Newell, Secretary-Treasurer
sherre.newell@aviva.com

Nature of organization: A not-for-profit society of the property and casualty insurers and brokers operating in Alberta. The society was formed for the purpose of collecting funds from its members to operate a hail suppression program to help reduce insurance payout due to hail and stabilize insurance rates throughout the province.

PART 4. GENERAL INFORMATION CONCERNING FIELD BASES OF ACTIVITY

Address and location of project primary field base:
Olds-Didsbury Airport, Alberta. tel. 403-335-8359
Address(es) and locations(s) of project secondary field base(s):

- Springbank airport tel. 403-247-0001
- Red Deer industrial airport tel. 403-886-7857

PART 5. GENERAL INFORMATION CONCERNING OPERATING FIELD PERSONNEL

Name and title of field officer in charge: Mr. Daniel Gilbert, Chief Meteorologist
Old-Didsbury Airport, Highway 2A
Olds, AB T4H 1A1

tel. & fax. 403-335-8359,
e-mail: dgilbert@weathermodifcation.com
home page: http://www.weathermodification.com/

Qualifications of field officer in charge (Gilbert):

Education
Bachelor of Science, Meteorology and Environmental Studies (double major) May 2004, Iowa State University, Ames, IA
Associate of Arts, Liberal Arts, May 2000, Iowa Central Community College, Fort Dodge, IA

Weather Modification Experience
Chief Meteorologist, Weather Modification International (Wyoming and Alberta) - November 2009 to present
Forecaster, radar operator, rawinsondes, direction of seeding aircraft. Case declarations, wintertime (Wyoming) research program.
Meteorologist, RHS Consulting (Fresno, CA) – November 2008-February 2009
Directed airborne and ground based cloud seeding operations over portions of the central and southern Sierra Nevada Mountains. Set up and performed routine maintenance of ground based ice nucleus generators. Provided daily forecasts for clients and project personnel.
Meteorologist, Independent Contractor, (Boise, ID) – October 2007 to April 2008
Provided meteorological services to support Idaho Power Company's winter cloud seeding project in West Central Idaho, directed airborne and ground seeding operations, directed rawinsonde releases, provided short-term operational forecasts and nowcasts for pilots, communicated with aircraft via two-way radio
Field Meteorologist, North Dakota Cloud Modification Project, (Stanley or Bowman, ND) – Summers, 2003-2009
Operated 5 cm weather radar equipped with TITAN software package, launched and directed seeding aircraft using two-way radio and GPS tracking, performed data recording and documentation of cloud seeding operations, prepared silver iodide seeding solution, assisted with radar calibrations, prepared forecasts and briefed pilots daily, supervised intern meteorologists, presented case studies for ground school, operated cloud condensation nuclei counter for joint research with South Dakota School of Mines
Forecaster, Atmospherics Incorporated, (Fresno, CA) - October 2006 - May 2007
Field Meteorologist, Atmospherics, Inc. (Modesto, CA) - November 2005 - April 2006
Field Meteorologist, Atmospherics, Inc. (Paso Robles, CA) - December 2004 - February 2005
Provided daily forecasts for seeding operations and/or clients, operated 5cm weather radar, directed winter cloud seeding operations over the Sierra Nevada utilizing both glaciogenic and hygroscopic seeding agents, traced radar overlays, performed data recording of operations, wrote monthly and annual reports