

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24FA190

METEOROLOGY

Environmental Conditions

December 4, 2025

A. ACCIDENT

Date: June 12, 2024
Time: 1006 Pacific daylight time (PDT)
1706 coordinated universal time (UTC)
Location: Elk River, Idaho
Aircraft: Cessna 177 Cardinal Registration: N34903

B. FACTUAL WEATHER INFORMATION

The meteorology phase of the investigation was conducted remotely, collecting data from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources including the Weather Prediction Center (WPC), and the National Center for Environmental Information (NCEI). All times are reported as Pacific daylight time (PDT) based upon the 24-hour clock, local time is -7 hours from UTC, and UTC=Z. Airport and NWS station identifiers use the standard International Civil Aviation Organization 4-letter station identifiers versus the International Air Transport Association 3-letter identifiers, which deletes the initial country code designator "K" for U.S. continental airports. Directions are referenced to true north and distances in nautical miles. Heights are in feet (ft) above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles.

The accident site was estimated at latitude 46.8755°N and longitude 116.18433°W at an elevation of about 3,755 ft.

1.0 Synoptic Conditions

The NWS northwest section of the Surface Analysis chart for 1100 PDT (1800Z) is included as figure 1 with colored topography. The chart depicted a low-pressure system at 1017-hectopascals (hPa) over the British Columbia and the Washington border with a trough (abbreviated TROF) of low pressure extending southward over eastern Washington and Oregon. Another low at 1009-hPa and trough was located over central Idaho to the southeast of the accident site. The accident site was located ahead of the trough over Washington and in an area of light winds with no other boundaries in the vicinity of the accident site. The closest station model for Lewiston (KLWS), Idaho, southwest of the accident site indicated calm wind, clear skies below 12,000 ft agl, a temperature of 71° Fahrenheit (F), and a dew point temperature of 36°F. No significant weather was indicated over the area at the time.

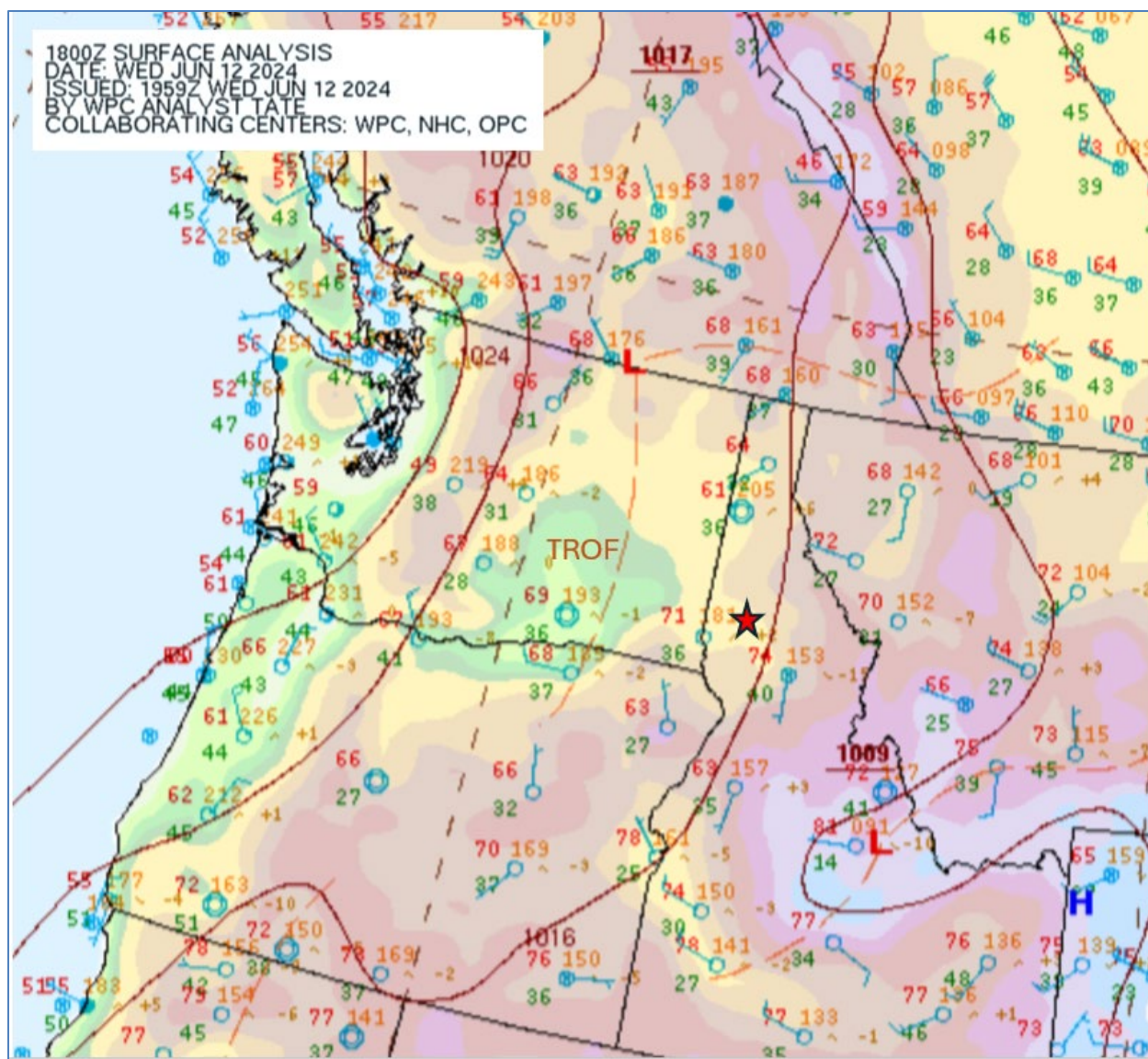


Figure 1 - Northwest section of the NWS Surface Analysis Chart for 1100 PDT with the approximate accident site marked by the red star.

2.0 Observations

The area surrounding the accident site was documented using official Aviation Routine Weather Reports (METAR) and Aviation Selected Special Weather Reports (SPECI). Cloud heights are reported above ground level (agl) in the following section. The magnetic variation over the area was estimated at 14° East based on the latest sectional chart for the area.

Elk River Airport (ID85) at an elevation of 2,827 ft has no weather reporting capability and only has a wind indicator on the field to estimate wind direction.

The closest weather reporting station to the accident site was from Pullman/Moscow Regional Airport (KPUW), Pullman/Moscow, Washington, located about 39 miles west at an elevation of 2,566 ft. The airport had an Automated Surface observation System (ASOS) which was not augmented by any human observer. The following conditions were reported at the approximate time of the accident:

KPUM Weather observation at 0953 MDT, automated, wind from 260° at 9 knots, wind from 230° variable 330°, visibility 10 miles or more, sky clear below 12,000 ft agl, temperature 15°C (°F), dew point temperature 4°C (°F), and an altimeter of 30.13 inches of mercury (inHg). Remarks: automated station with a precipitation discriminator, sea-level pressure 1018.5-hPa, temperature 15.0°C, dew point temperature 4.4°C.

The raw observations from 0653 through 1153 PDT and the Terminal Aerodrome Forecast (TAF) current during the period are included below.

METAR KPUW 121353Z AUTO 24007KT 10SM CLR 11/04 A3010 RMK AO2 SLP185 T01060044=

METAR KPUW 121453Z AUTO 25010KT 10SM CLR 12/04 A3011 RMK AO2 SLP189 T01220039 52014=

METAR KPUW 121553Z AUTO 27009KT 10SM CLR 13/05 A3012 RMK AO2 SLP194 T01330050=

METAR KPUW 121653Z AUTO 26009KT 230V330 10SM CLR 15/04 A3013 RMK AO2 SLP197
T01500044=

Accident 1706Z

METAR KPUW 121753Z AUTO 26009G15KT 10SM CLR 16/04 A3013 RMK AO2 SLP200 T01560044
10156 20083 51006=

METAR KPUW 121853Z AUTO 26009G15KT 240V300 10SM CLR 17/03 A3013 RMK AO2 SLP197
T01720028=

TAF KPUW 121128Z 1212/1312 25006KT P6SM SKC
FM121800 28007KT P6SM SCT250
FM130400 VRB03KT P6SM SCT250=

3.0 Sounding

A High-Resolution Rapid Refresh (HRRR) numerical model data were retrieved from the NOAA Air Resource laboratory for the closest grid point to the accident site. The data was then plotted on a standard Skew T/Log P diagram using the RAOB Analysis software. Figure 2 is the HRRR sounding plot for 1000 PDT from the surface to 450-hPa or approximately 21,000 ft.

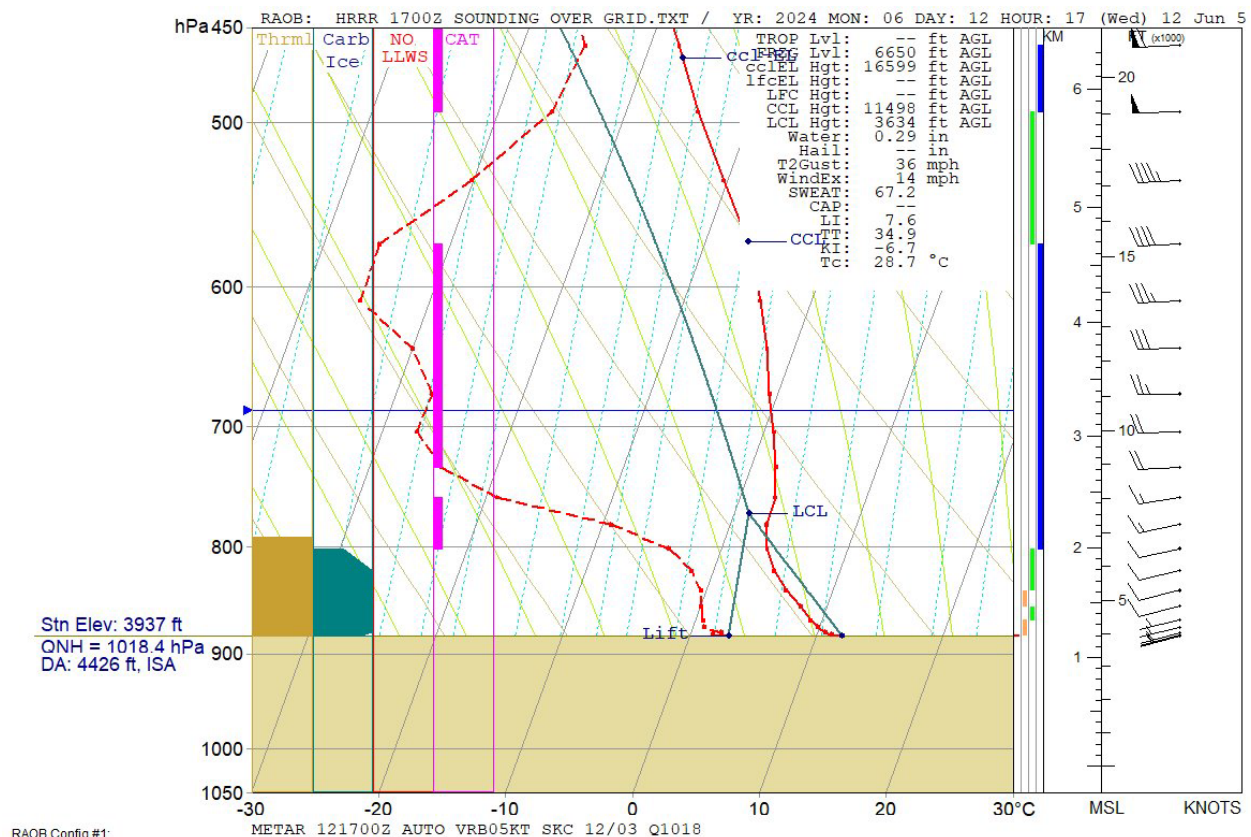


Figure 2 - High-Resolution Rapid Refresh (HRRR) numerical model over the closest grid point to the accident site for 1000 PDT depicting the vertical structure of the atmosphere over the area.

The sounding indicated an elevation of 3,937 ft over the grid point with a near surface temperature of 53.6°F (12°C), a dew point temperature of 37.6°F (3.1°C), with a relative humidity of 54%, which resulted in a density altitude of 4,426 ft. The sounding indicated a dry low-level environment with the lifted condensation level (LCL) at 3,634 ft agl, which supported thermals from the surface through 3,000 ft. The atmosphere was characterized as stable above 3,300 ft agl with a Lifted index (LI) of 7.6, with no positive convective available potential energy (CAPE) indicated. The precipitable water content was 0.29 inches and the freezing level was identified at 10,587 ft, with no structural icing conditions indicated. Based on the sounding temperature and moisture profile the RAOB Analysis program indicated a severe risk of carburetor or induction system icing from the surface through 6,000 ft (indicated by dark green shading on left axis).

The sounding wind profile indicated a westerly wind at 5 knots, with winds slowly increasing with altitude to 20 knots at 9,000 ft. No strong vertical or horizontal wind shears were noted below 12,000 ft to suggest anything but light turbulence.

A table of the sounding parameters of height, pressure (Pre), temperature (T), dew point temperature (Td), relative humidity (RH), wind direction and speed, Clear Air

Turbulence (CAT), Low-Level Wind shear (LLWS) and icing potential from the surface through 10,000 ft.

Height (ft msl)	Pres (hPa)	T (°C)	Td (°C)	RH (%)	Wind (dir/kt)	CAT (FAA)	LLWS (FAA)	Icing (USAF)
3937	882	12.0	3.1	54	253/ 5			
3968	881	11.2	1.8	52	254/ 5			
4030	879	10.6	2.4	57	254/ 6			
4186	874	9.9	0.9	53	255/ 7			
4405	867	9.1	0.6	55	255/ 7			
4815	854	7.9	0.1	58	255/ 8			
5294	839	6.3	-0.4	62	255/ 8			
5876	821	4.8	-1.7	63	255/ 8			
6535	801	3.6	-4.1	57	256/ 9	LGT		
7242	780	2.9	-9.4	40	258/ 13	LGT		
8037	757	2.8	-19.1	18	261/ 17			
8927	732	2.0	-24.4	12	266/ 18	LGT		
9956	704	0.8	-27.3	10	268/ 22	LGT		

1.0 Carburetor icing

At the last radar hit at 1003 PDT the accident airplane was at 5,400 ft. The HRRR indicated at 5,294 ft the forecast temperature was 42.8°F (6°C), the dew point temperature was 31°F (-0.4°C), with a relative humidity of 62%, and a density altitude of 5,390 ft. The RAOB Analysis program indicated severe carburetor icing at cruise or climb power based on the SAE 1970s Fuel and Lubricants Laboratory study on carburetor. The FAA carburetor icing chart given the weather conditions is plotted in figure 3, and indicated a serious icing condition in climb and cruise power.

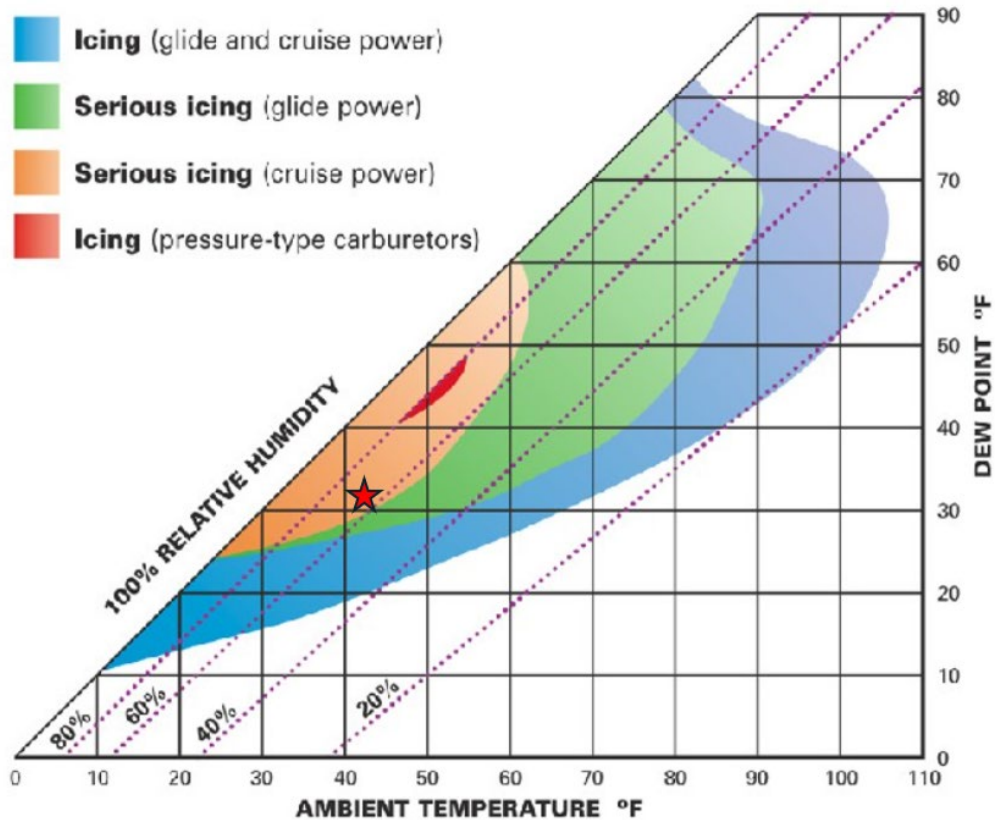


Figure 3 - FAA Carburetor icing Potential given the conditions over the area at 1000 PDT.

4.0 Inflight Weather Advisories

The NWS had no SIGMETs, Convective SIGMETs, Center Weather Advisories (CWAs) or AIRMETs current over the area for any convection, turbulence, LLWS, icing, IFR or mountain obscuration conditions surrounding the period of the accident.

Submitted by:

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