



September 5, 2025

Juneau/Mendenhall River Flooding

Suicide Basin Glacier Dammed Lake Release

Aaron Jacobs, Senior Service Hydrologist, Juneau Weather Forecast Office

Johnse Ostman, Service Coordination Hydrologist (Acting), Alaska-Pacific River Forecast Center

Nicole Ferrin, Warning Coordination Meteorologist, Juneau Weather Forecast Office

Crane Johnson, Senior Hydrologist, Alaska-Pacific River Forecast Center

Carrie Haisley, Chief, Emergency Services and Multimedia Branch

Weather Overview

A series of weather fronts moved across Southeast Alaska beginning Friday, August 8, 2025, and continued through the early morning of Tuesday, August 12, 2025 (*Figures 1 and 2*). These systems were linked to subtropical moisture and displayed the characteristics of an atmospheric river (AR), with a long fetch of deep moisture extending into the region (*Figure 3*). The AR persisted for more than 72 hours, bringing unseasonably warm temperatures and raising the freezing level above 11,000 FT.

Rainfall

The combination of very high freezing levels, strong orographic lift, and above-normal precipitable water vapor produced significant rainfall across the Mendenhall River watershed, which includes the Mendenhall Glacier. From August 7, 2025, 4:00 AM to August 12, 2025, 4:00 AM AKDT, storm-total precipitation ranged from approximately 5.5 IN in the Mendenhall Valley to just under 8 IN at Suicide Basin (*Figure 4*). This represents the highest 7-day total for this period on record at the National Weather Service (NWS) Juneau Weather Forecast Office (WFO) (*Figure 5*).

This precipitation, combined with glacier-dammed lake dynamics, set the stage for record flooding on the Mendenhall River.

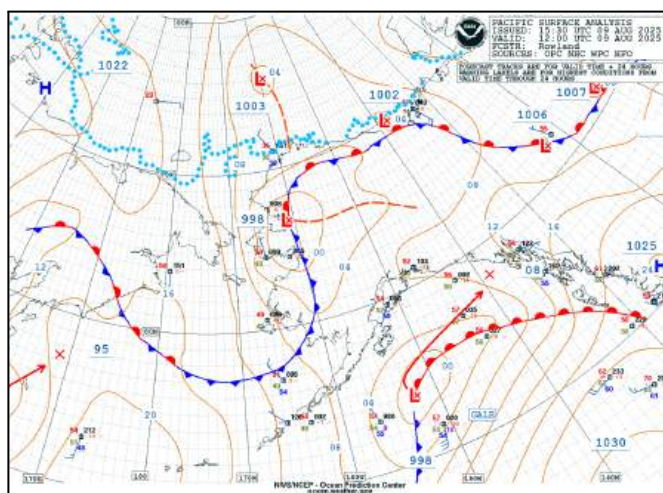


Figure 1: Surface Analysis – August 9, 2025
(4:00 AM AKDT)

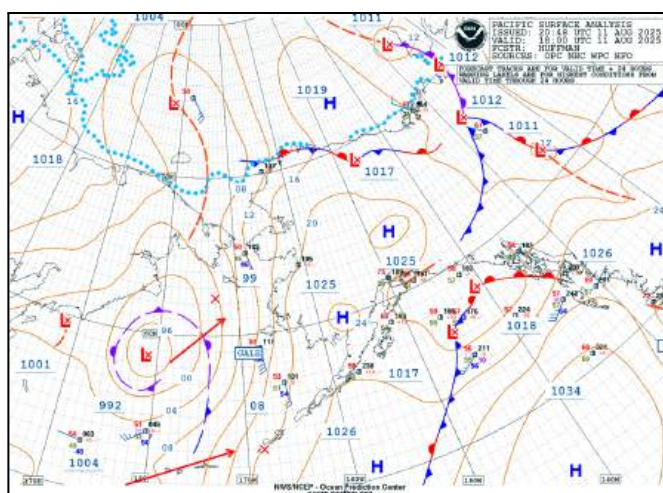


Figure 2: Surface Analysis – August 11, 2025
(10:00 AM AKDT)



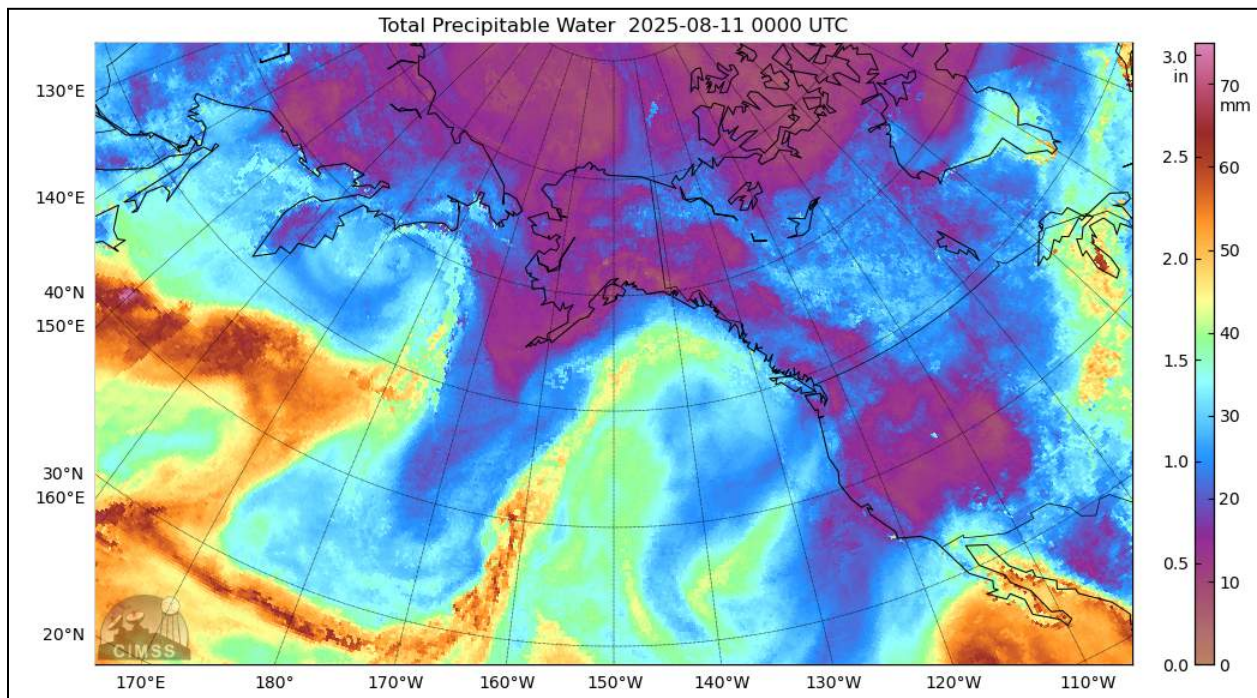


Figure 3: Total Precipitable Water – August 10, 2025 (4:00 PM AKDT). An above-normal moisture plume, characteristic of an atmospheric river, was on track to impact northern Southeast Alaska.

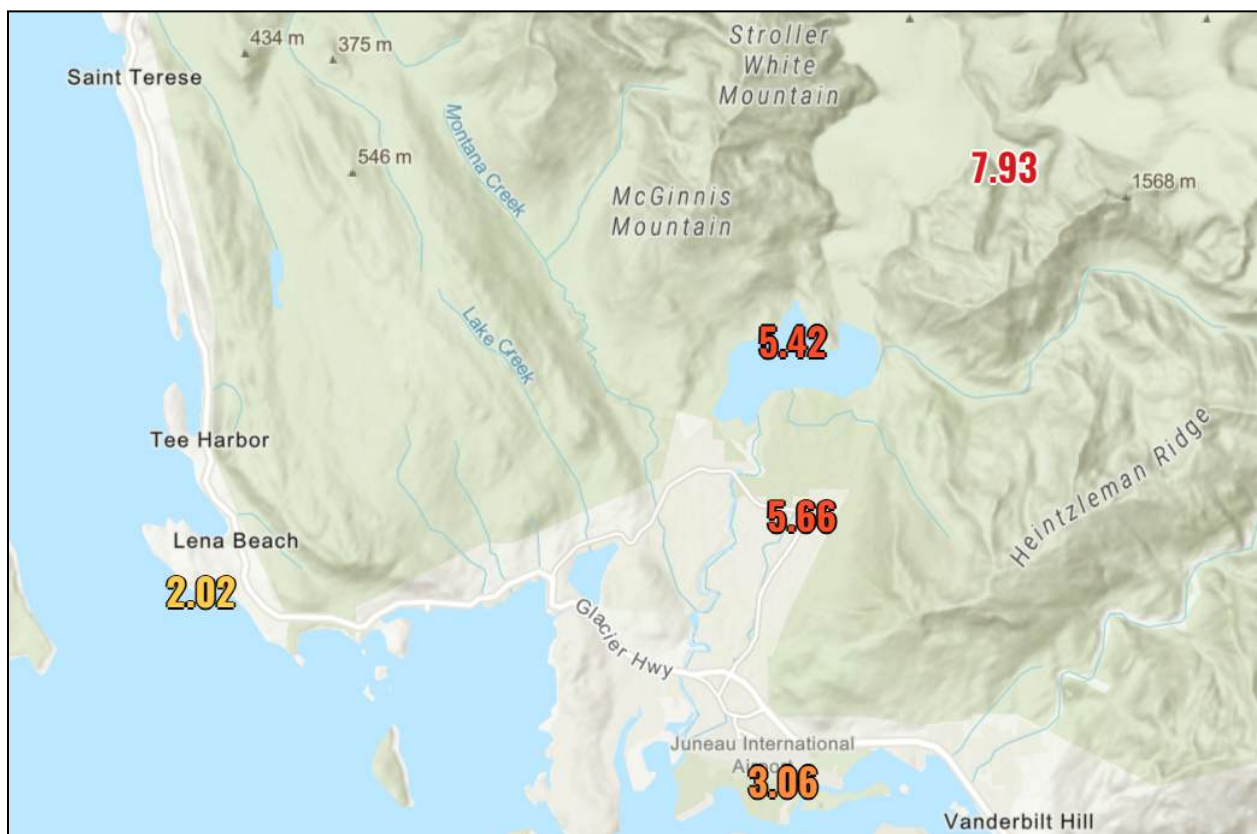


Figure 4: Juneau area storm-total accumulated precipitation – August 7, 2025 (4:00 AM AKDT) to August 12, 2025 (4:00 AM AKDT). The USGS tipping bucket at Suicide Basin measured 7.93 IN of rainfall, which is provisional and subject to change.

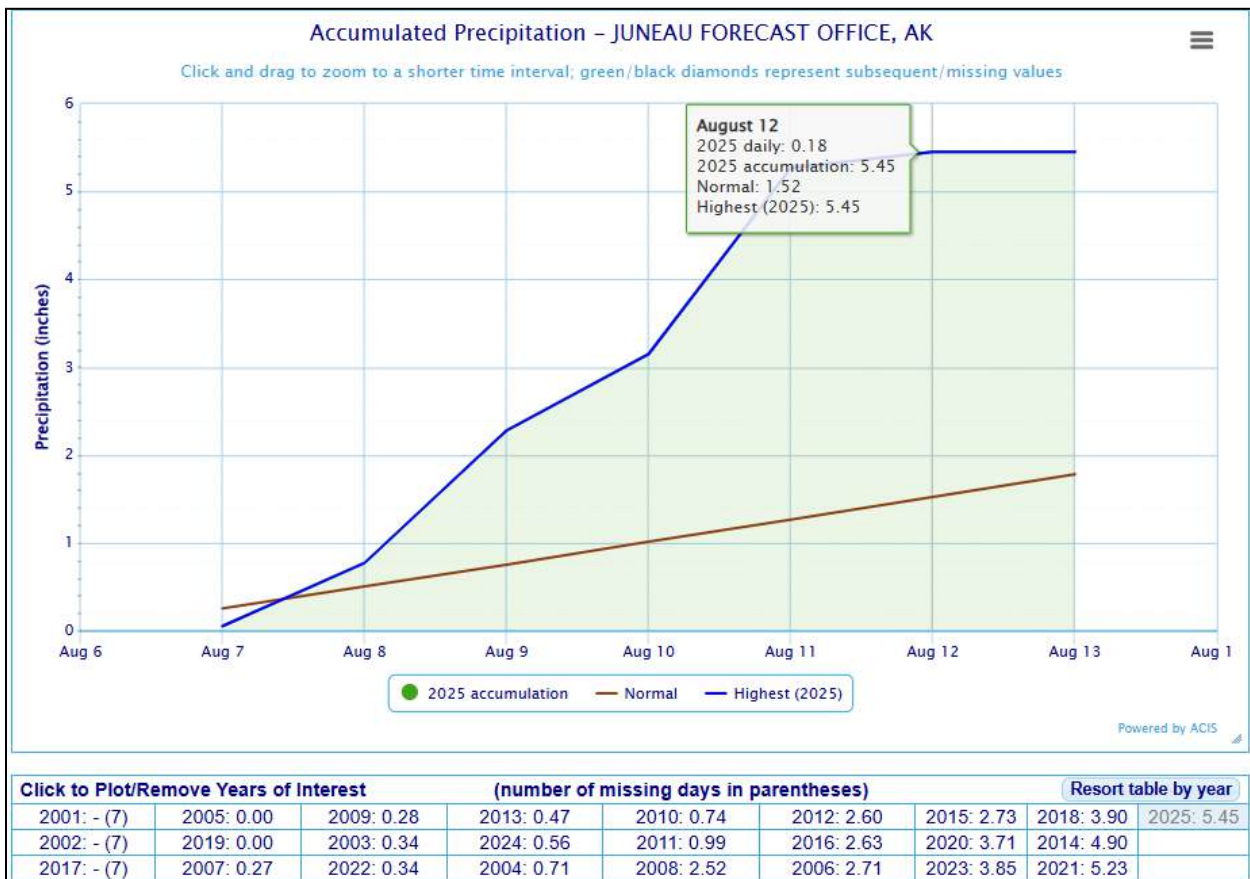


Figure 5: NWS Juneau Forecast Office [storm-total accumulated precipitation](#) and 7-day period statistics – August 7 to August 12, 2025. This figure shows precipitation totals and statistical context for the 7-day period, highlighting the record-breaking rainfall associated with the event.

Hydrology Overview

A glacial lake outburst flood (GLOF) occurred in the Mendenhall Valley, approximately 10 miles northwest of downtown Juneau, on August 13, 2025. The flood originated from [Suicide Basin \(NWS JSBA2\)](#), a tributary glacial basin located less than one mile upstream of the Mendenhall Glacier terminus. Suicide Basin was once filled with ice from Suicide Glacier, but that glacier has receded and no longer contributes ice. Today, the basin fills annually with snowmelt, glacier melt, and rainfall runoff until reaching the spillway of the Mendenhall Glacier dam. At that point, hydrostatic pressure lifts the glacier dam up and then erodes a subglacial channel, causing drainage to increase through the event until the volume of water in the basin is gone. Ice dynamics along the main trunk of the Mendenhall Glacier and calving icebergs complicate understanding of basin volume capacity, pressure dynamics, and drainage mechanics.

The US Geological Survey (USGS) has operated a stream gage on the Mendenhall River near Auke Bay ([15052500](#); [MNDA2](#)) since 1965, and a lake gage at Suicide Basin ([1505248590](#); [JSBA2](#)) intermittently since 2014. Prior to July 2011, no GLOFs were recorded at MNDA2, with the highest [peak streamflow](#) occurring during a rainfall event in September 1995 (16,000 FT³S⁻¹). Since 2011, Suicide Basin has drained approximately 48 times, producing release volumes up to 55,000 AC-FT and Mendenhall River flows as high as 51,000 FT³S⁻¹ (*Table 1*). Notably, until August 2023, all GLOFs were partial-volume releases.

Crest Date	GLOF Event Volume	Peak MND A2 Discharge	MND A2 Discharge Increase	Peak MND A2 Stage	GDL Level Start	GDL Level End	GDL Volume Released (c)
	(AC-FT)	(CFS)	(CFS)	(FT)	(FT gage datum)	(FT gage datum)	(%)
2025-08-13 (a)	58500 (c)	51000*	43230*	16.65*	1363*	977*	TBD
2024-08-06	51181	42700	40010	15.99	1371	899	111
2023-08-05	48089	34200	30610	14.97	1387	< 951	98
2021-08-14 (d)	31722	15200	9550	11.56	N/A (b)	N/A (b)	N/A (b)
2016-07-01	25733	16300	13060	11.99	1445	N/A (b)	N/A (b)
2024-10-21	23987	13300	11560	10.77	1245	928	91
2014-07-11	15533	20000	15840	11.85	N/A (b)	N/A (b)	N/A (b)
2022-10-27	27100 (a)	12400	10660	10.33	N/A (b)	N/A (b)	N/A (b)
2020-08-01	24400 (a)	15200	11510	11.55	1407	1302	46

(a) Includes excessive rainfall before or during GLOF.
(b) GDL pool elevation unavailable.
(c) Based on 2024-08-06 DEM.
(d) GDL minor release in June.
* USGS 2025 data are provisional and subject to change.
PEAK OF RECORD (1965-2025)

*Table 1: Significant Mendenhall Glacier Lake Outburst Floods, 2011–2025.
The August 2025 GLOF set a new MND A2 peak of record for both stage and discharge.*

Mendenhall GLOF timing and volume estimates are derived from [USGS MND A2](#) streamflow data, [JSBA2](#) water levels, and [University of Alaska Southeast](#) orthophotography drone surveys to develop a Digital Elevation Model (DEM) used to define basin elevation–volume relationships. NWS forecasts are based on analog relationships scaled by JSBA2 volume and issued at 6-hour model ordinates (12Z, 18Z, 0Z, 6Z UTC). Pre-GLOF rainfall and delayed data transmission frequently complicate event detection and forecast timing.

On August 10, 2025, Suicide Basin reached its maximum lake elevation (~1,363 FT, gage datum) and began overtopping the Mendenhall Glacier dam. As in prior years, overflow eroded the left-margin spillway prior to subglacial release. However, in 2025, concurrent heavy rainfall (Figures 3–4) recharged the basin and complicated event detection. Elevated flows at MND A2 masked the GLOF onset; on August 11, 2025, MND A2 baseflow was ~7,700 FT³S⁻¹ compared with ~3,000 FT³S⁻¹ in 2024, when the event was first detected by just a +0.1 FT rise in stage (*Figure 6*).

During August 10–11, 2025, the Alaska-Pacific River Forecast Center (APRFC), WFO Juneau, and the Mendenhall Science Team coordinated in near real time to assess Suicide Basin water levels, volume estimates, spillway elevation, GLOF onset detection, Mendenhall River hydrograph rise, and forecast crest timing and magnitude.

Satellite transmission outages at JSBA2 on August 10–12, 2025 delayed confirmation of drainage versus spillway overtopping. As a result, Juneau Forecast Office hydrologic products [Hydrologic Outlooks

(ESFs) and Flood Advisories] continued to reference rainfall-driven effects on MNDA2 into Tuesday morning (Figure 7).

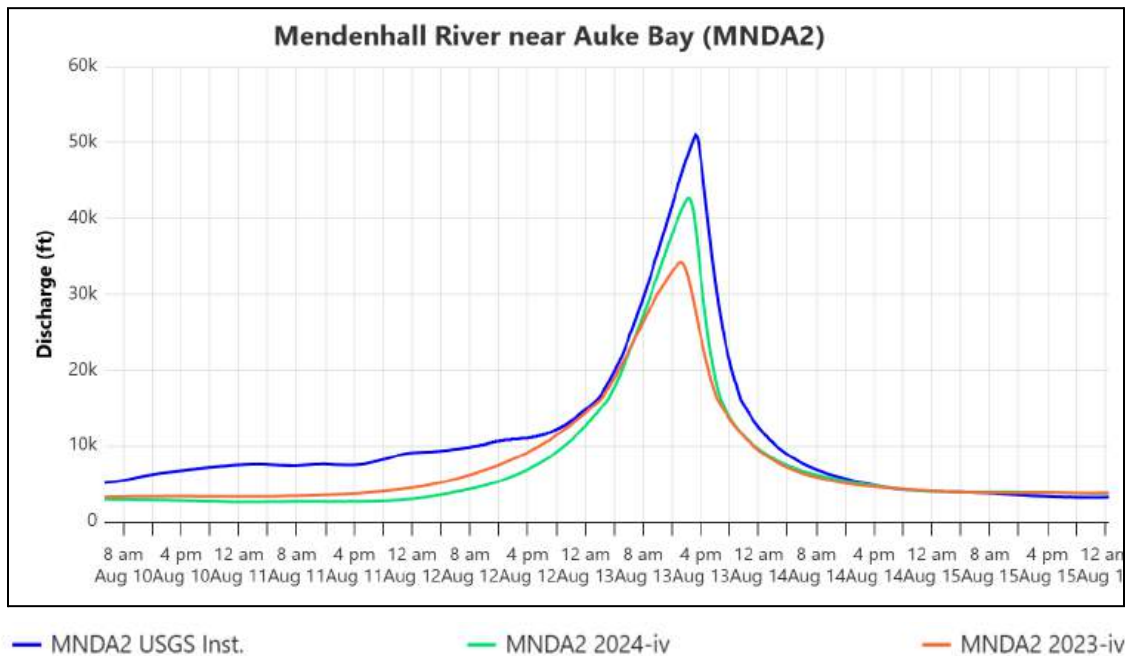


Figure 6: [USGS Mendenhall River near Auke Bay \(NWS MNDA2\)](#) streamgauge hydrograph – August 10, 2025 (8:00 AM AKDT) to August 15, 2025 (12:00 AM AKDT). The 2025 hydrograph (blue) is compared with the 2024 (green) and 2023 (red) GLOFs, shifted in time. At the GLOF “start” on August 11, 2025, 7:15 AM AKDT, the river included an additional $4,770 \text{ FT}^3\text{S}^{-1}$ of baseflow compared with previous years. [USGS 2025 data](#) are provisional and subject to change.

The first NWS GLOF forecast for MNDA2 was issued at 8:47 AM AKDT, August 12, 2025, followed shortly by a Flood Warning (Figure 7) with a flood crest height ranging between 16.25 and 16.75 FT (gage datum) around 2 PM and 6 PM AKDT on August 13th. Later that afternoon, as MNDA2 rapidly approached its Moderate flood stage of 10 FT (Figure 8) and then going over 12 FT later in the evening, real-time review of JSBA2 volumes and MNDA2 rise suggested an earlier onset. NWS revised the forecast at 6:15 PM AKDT, August 12, 2025, projecting the same crest range but sped up the crest timing to range from 8 AM to 12 PM AKDT on August 13, 2025. This adjustment in time to MNDA2 crest was due to the heavy rain masking the start of the sub-glacier release.

The Mendenhall River crested at 16.65 FT (gage datum) at 7:15 AM AKDT, August 13, 2025 (a new peak of record), with a preliminary discharge of $51,000 \text{ FT}^3\text{S}^{-1}$ and an estimated event volume of 58,500 AC-FT (Figure 6). USGS data remain provisional and subject to revision. This record crest was influenced both by glacier dammed lake drainage rate and heavy rainfall which increased the river level at the start and during the event.

As in past years, the river receded quickly after the crest, falling below flood stage by the afternoon of August 13, 2025 (Figure 8). All flood products were subsequently cancelled (Figure 7).

Key 2025 GLOF Characteristics

- Water levels remained above:
 - Minor Flood Stage (9 FT) for ~38 hours (*Figure 8*)
 - Moderate Flood Stage (10 FT) for ~25 hours (*Figure 8*)
 - Major Flood Stage (14 FT) for ~10 hours (*Figure 8*)
- Maximum-volume basin releases appear to represent a new drainage regime, with consecutive full volume releases in August 2023, August and October 2024, and August 2025.
- USGS 15052500 (MNDA2) new peak of record (1965–2025):
 - Stage: 16.65 FT (gage datum; USGS provisional)
 - Discharge: 51,000 FT³S⁻¹ (USGS provisional)

Event Timeline (Products)

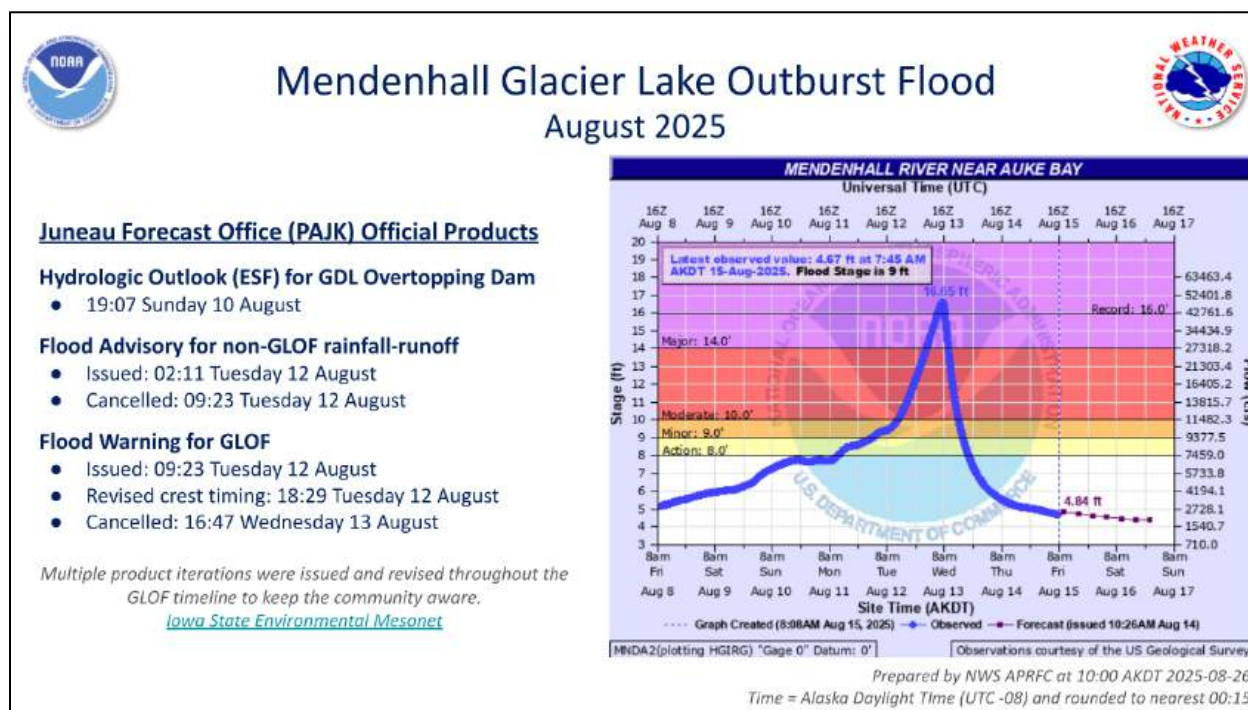


Figure 7: Mendenhall River GLOF event timeline – August 2025. This figure shows water levels referenced to gage datum and the timing of stages reaching respective flood categories throughout the event. GDL refers to Suicide Basin (JSBA2) water level.

Event Timeline (Levels)

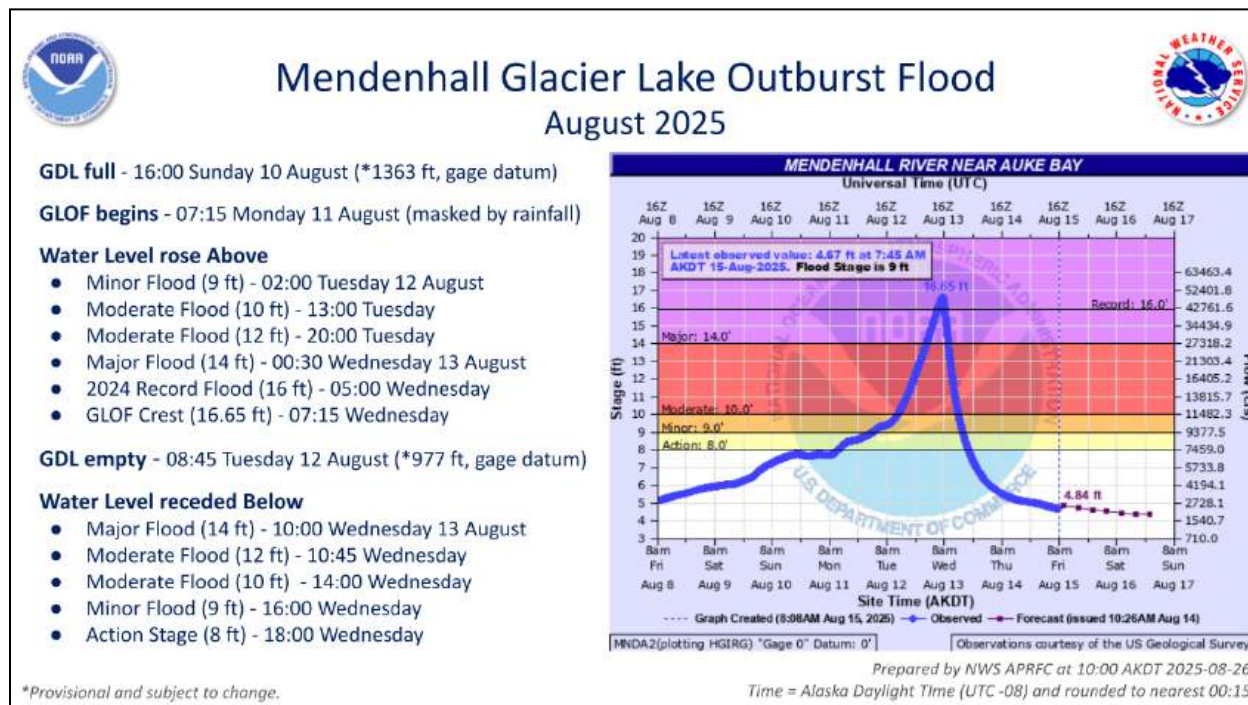


Figure 8: Mendenhall River GLOF event timeline – August 2025. This figure shows the sequence of NWS Juneau Forecast Office (PAJK) Hydrologic Outlooks and Flood products issued during the event. All products can be reviewed at the Iowa State Environmental Mesonet. GDL refers to Suicide Basin water level.

Impact Summary

According to the City and Borough of Juneau (CBJ), this major flooding event produced significant impacts upstream of the Back Loop Road Bridge, along with minor impacts downstream along the Mendenhall River. Based on FEMA damage definitions, CBJ identified 35 homes as affected: 11 with minor damage and 6 with major damage.

The most severe flooding occurred in the View Drive area, where CBJ reported 5 homes sustained major damage after 4–5 FT of water entered living spaces. Additional homes along Meander Way (15 total) were also impacted, including 2 with minor damage and 1 with major damage caused by water seeping under or through HESCO barriers. Homes near River Road were also affected, and storm drains near the Safeway parking lot at Brotherhood Bridge backed up, contributing to localized flooding.

CBJ also documented severe erosion along the left bank (river left) near the Back Loop Road Bridge at the event peak. This erosion damaged the bridge approach, which was already closed, and severed telecommunication and power lines. The loss of a utility pole into the river cut power and internet connectivity to nearby homes and businesses.

Storm Reports

Time & Date	City Location	County Location	Source	Remarks
08/12/2025 04:39 PM	2 N Mendenhall Valley	Juneau, AK	AK DOT&PF	Back Loop Rd Bridge closed from Mint Way to Montana Creek Rd due to flooding.
08/12/2025 07:00 PM	3 NNE Mendenhall Valley	Juneau, AK	USFS	Glacier Spur Road was closed due to anticipated flood impacts, and anticipated to reopen once water levels recede to a safe level.
08/12/2025 12:30 PM	4 NNE Mendenhall Valley	Juneau, AK	Official NWS Obs	Mendenhall River (MND A2) at Moderate flood stage of 10 ft, gage datum, and continues to rise.
08/13/2025 00:25 AM	4 NNE Mendenhall Valley	Juneau, AK	Official NWS Obs	Mendenhall River (MND A2) at Major flood stage of 14 ft, gage datum, and continues to rise.
08/13/2025 02:30 AM	1 N Mendenhall Valley	Juneau, AK	NWS Employee	NWS employee reports seeping and flooding of water on Meander Way.
08/13/2025 05:33 AM	4 NNE Mendenhall Valley	Juneau, AK	NWS Employee	Mendenhall River (MND A2) rises above the 2024 record flood stage of 15.99 ft, gage datum, and continues to rise.
08/13/2025 05:50 AM	2 N Mendenhall Valley	Juneau, AK	Local Official	Reports of seepage and ponding on roadway on Marion Dr.
08/13/2025 07:00 AM	1 NNE Mendenhall Valley	Juneau, AK	AK DOT&PF	Road was closed due to flood waters seeping through HESCO barriers and flowing back out of storm drains as the river rose.
08/13/2025 07:00 AM	2 NNE Mendenhall Valley	Juneau, AK	AK DOT&PF	Road was closed due to flood waters seeping through HESCO barriers and flowing back out of storm drains as the river rose.
08/13/2025 07:11 AM	2 N Mendenhall Valley	Juneau, AK	Public	Flooding in low spots on River Rd.
08/13/2025 07:12 AM	2 NNE Mendenhall Valley	Juneau, AK	Public	About 4–5 ft water flooding outside residence View Dr.
08/13/2025 07:14 AM	3 NE Auke Bay	Juneau, AK	NWS Employee	Skaters Cabin Rd flooded out.

08/13/2025 07:15 AM	Mendenhall Valley	Juneau, AK	NWS Employee	Water coming up from storm drains behind Safeway, some flooding around the back.
08/13/2025 07:15 AM	4 NNE Mendenhall Valley	Juneau, AK	Official NWS Obs	The Mendenhall River (MNDA2) crests at 16.65 ft, gage datum, a new peak of record (1965-2025), and begins to quickly recede.
08/13/2025 10:11 AM	2 N Mendenhall Valley	Juneau, AK	Broadcast Media	KTOO-Alaska Public Media posts a video online showing damage to the Back Loop Rd Bridge approach from the flood waters.

Images



Image 1: Damage to Back Loop Road Bridge and a telecommunication/power pole. Photo courtesy of NWS.



Image 2: Damage to Back Loop Road Bridge and a telecommunication/power pole. Photo courtesy of NWS.



Image 3. Flooding along View Drive. Photo courtesy of NWS.



Image 4. Flooding along Meander Way. Photo courtesy of NWS.