

# Spring Breakup Flooding



## Overview

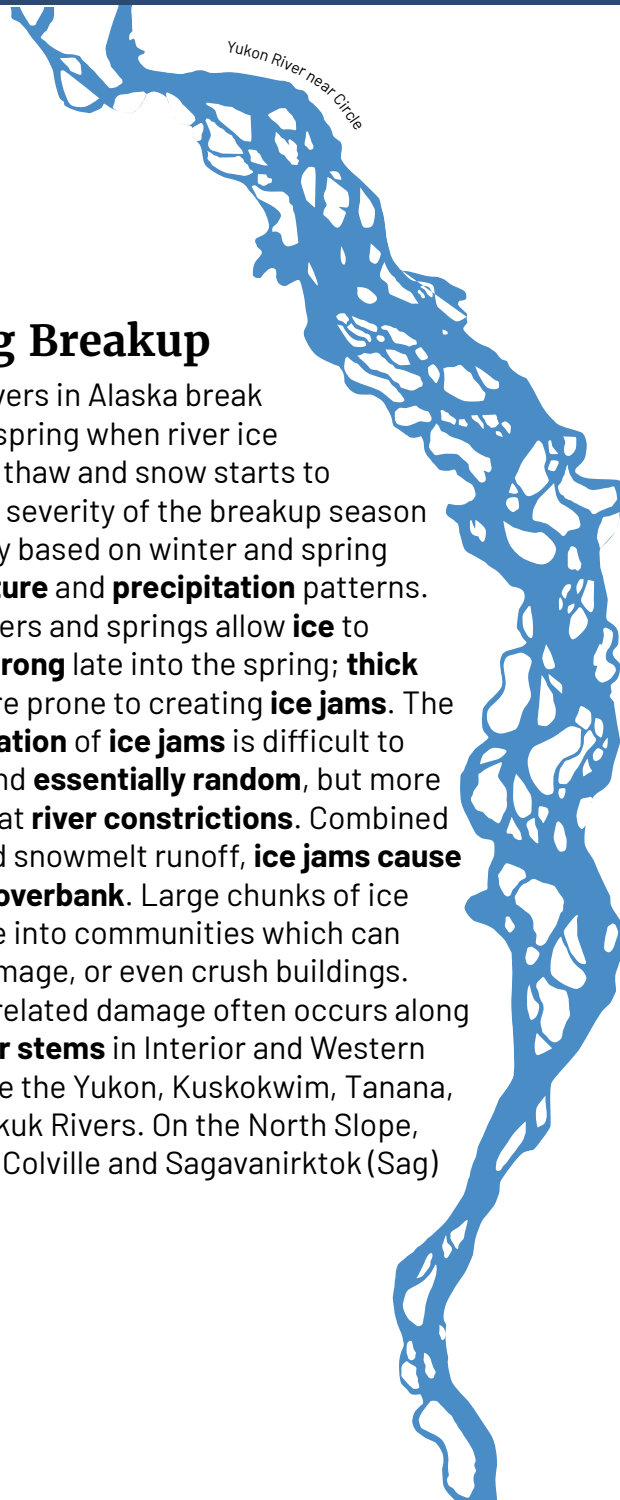
Spring breakup is an annual phenomenon along Alaska's rivers. However, its impacts vary annually and by location. Destructive breakup years often occur due to persistent low temperatures and high snow pack. But even in these conditions, flooding is site specific and often unpredictable. Communities like Buckland, Galena, and Circle are more prone to flooding while Eagle floods rarely but has experienced a few notable years of intense destruction. Because the severity of break-up is difficult to predict at any given place, the National Weather Service in collaboration with the Department of Homeland Security and Emergency Management annually conducts River Watch, aerial monitoring program of breakup progression and ice jams, to provide advance flood warnings and evacuation recommendations.



2023 ice jam at Circle which caused catastrophic flooding, photo by NWS

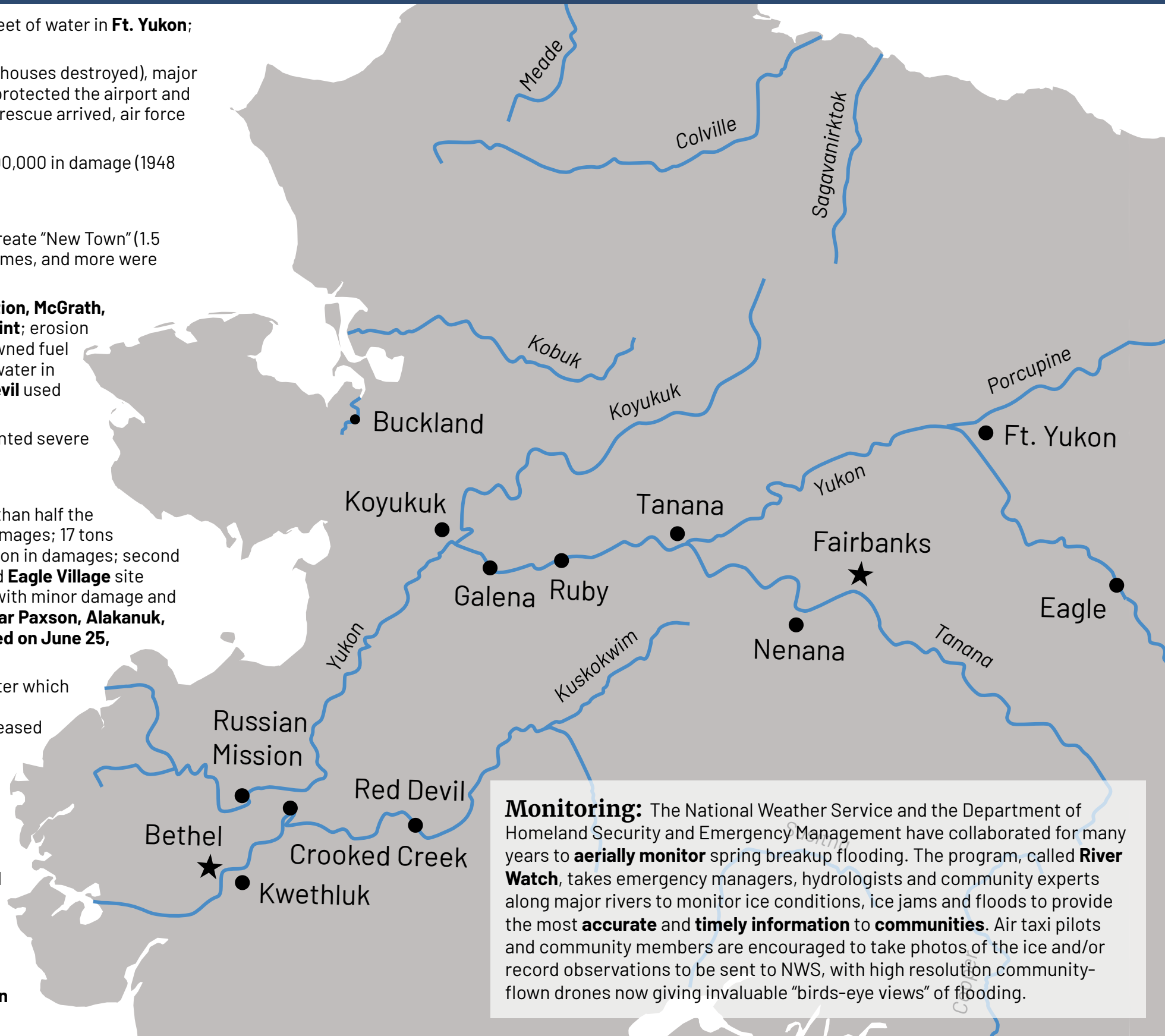
## Spring Breakup

Frozen rivers in Alaska break up every spring when river ice begins to thaw and snow starts to melt. The severity of the breakup season is partially based on winter and spring **temperature** and **precipitation** patterns. **Cold** winters and springs allow **ice** to remain **strong** late into the spring; **thick** ice is more prone to creating **ice jams**. The exact **location** of **ice jams** is difficult to predict and **essentially random**, but more common at **river constrictions**. Combined with rapid snowmelt runoff, **ice jams cause flooding overbank**. Large chunks of ice also move into communities which can move, damage, or even crush buildings. Breakup related damage often occurs along **main river stems** in Interior and Western Alaska like the Yukon, Kuskokwim, Tanana, and Koyukuk Rivers. On the North Slope, often the Colville and Sagavanirktok (Sag) Rivers.



# Selected floods through history

1937	<b>1937:</b> Over 13 feet of water and \$150,000 (1937 dollars) of damage in <b>Fairbanks</b> ; 3.66 feet of water in <b>Ft. Yukon</b> ; 6 feet of water lasted 5 days in <b>Nulato</b> ; flooded waterfront buildings in <b>Ruby</b>
1945	<b>1945:</b> Latest break-up at the time in <b>Nenana</b> ; catastrophic flooding in <b>Circle</b> (all warehouses destroyed), major flooding in <b>Ft. Yukon</b> (considered equivalent to 1937); serious damage to dike which protected the airport and construction site in <b>Galena</b> , people forced to take refuge on large gravel pile until air rescue arrived, air force attempted to break the ice jam with aerial bombs, but was ineffective
1948	<b>1948:</b> One of the worst break-up floods in <b>Fairbanks</b> , 30% of the city flooded and \$300,000 in damage (1948 dollars)
1964	<b>1964:</b> Major flooding along the Kuskokwim River in <b>Sleetmute, Red Devil, and Akiak</b>
1971	<b>1971:</b> Highest water in <b>Galena</b> to date, severe flooding caused a relocation effort to create "New Town" (1.5 miles away from the original site)— city offices, health clinics, schools, stores, 150 homes, and more were reconstructed.
1985	<b>1985:</b> Damage to public roads and buildings in <b>Buckland, Anvik, Emmonak, Pilot Station, McGrath, Sleetmute, and Red Devil</b> ; sewer leach field compromised water facility in <b>Pitka's Point</b> ; erosion at city petroleum dock and river bank damaged 8 homes in <b>Bethel</b> ; damage to city-owned fuel storage center in <b>Kobuk</b> ; Chena River flood control project operated to reduce high water in <b>Fairbanks</b> ; state disaster declared helped repair roads in many communities, <b>Red Devil</b> used funds to construct new road in a less hazardous place
1992	<b>1992:</b> Flooded Chena River activated Chena River Flood Control Project (which prevented severe damage in Fairbanks), elevated groundwater in <b>North Pole</b> damaged 90 homes
2009	<b>2009:</b> high impact, breakup flooding year (see event spotlight on next page)
2013	<b>2013:</b> Almost every building flooded and all residents evacuated in <b>Circle City</b> ; more than half the dwellings in <b>Galena</b> became uninhabitable, 14 homes destroyed and 90 with major damages; 17 tons of meat lost in resulting power outages, 300 out of 470 residents evacuated, \$15 million in damages; second worst flooding on record in <b>Eagle</b> with major damage to buildings on Front Street, old <b>Eagle Village</b> site covered with both ice and water; <b>Hughes</b> had 2 homes with major damage, 7 homes with minor damage and water surrounding the airport; additional flooding in <b>Ft. Yukon, Gulkana Hatchery near Paxson, Alakanuk, Emmonak, and Nuisqut</b> ; <b>state disaster declared on May 30, 2013, and FEMA declared on June 25, 2013.</b>
2021	<b>2021:</b> In <b>Buckland</b> , worst flooding in 1978, most of village inundated with 5 feet of water which forced evacuation, damage to homes, water treatment facilities, roads, and building foundations, washed out roads cut off access to the airport, hazardous materials released from fuel storage tanks; <b>state disaster declared May 19, 2021</b>
2022	<b>2022:</b> In <b>Manley Hot Springs</b> , highest water levels since 1978, homes flooded or surrounded by water, inundated roads cut off parts of town to cars, power and internet shut down, fuel sheen on water due to overturned heating fuel tanks, 500 feet of Elliot Highway impassable; community well flooded in <b>Circle</b> , needed disinfectant before being usable again; 15 homes with water damage in <b>McGrath</b> ; significant erosion and flooding in <b>Sleetmute and Red Devil</b> ; <b>state disaster declared on May 12, 2022 and FEMA declared on August 26, 2022</b>
2023	<b>2023:</b> high impact, breakup flooding year (see event spotlight on next page)
2025	<b>2025:</b> Overtopped roads and bridges throughout the North Slope, especially at <b>Anaktuvuk Pass and Sagwon</b> ; Colville River flooded at record high crest and flooded Umiat camp; major washout at Mileposts 314-355 caused a <b>four day closure of Dalton Highway</b>



**Monitoring:** The National Weather Service and the Department of Homeland Security and Emergency Management have collaborated for many years to **aerially monitor** spring breakup flooding. The program, called **River Watch**, takes emergency managers, hydrologists and community experts along major rivers to monitor ice conditions, ice jams and floods to provide the most **accurate** and **timely information** to **communities**. Air taxi pilots and community members are encouraged to take photos of the ice and/or record observations to be sent to NWS, with high resolution community-flown drones now giving invaluable "birds-eye views" of flooding.

Note: some events have been excluded for clarity and brevity.

# Breakup Spotlights

**Spring 2009:** Worst flooding in memory in **Eagle Village** and **Eagle**; most homes destroyed by ice washing ashore in **Eagle Village** which relocated after the event; in **Eagle**, ice smashed all structures on Front Street and water lifted some homes off their foundations, 26 homes destroyed and 7 with major damage, totaling to **\$6.30 million** in damage; worst flooding in 50 years in **Tanana**, 30 houses with major damage, 80 people evacuated, **\$5.90 million** in damage; nearly all of **Stevens Village** evacuated, only the school and 5 houses spared, utility poles knocked down by ice cut off power and phone service, major damage to road to airport, estimated **\$7.20 million** in damages; evacuations in **Ft. Yukon**, half the village flooded, road to airport flooded, estimated **\$1.90 million** in damage; moderate flooding in **Circle**, 20 inches of high water in town, **\$1.40 million** in damages; **Emmonak** lost power and evacuated, over **\$800,000** in damages; flooding damaged the **Nome-Teller** highway; additional damages to roads and buildings in **Sleetmute, Crooked Creek, Aniak, Nuiqsut, and Talkeetna.**



Ice at Eagle in 2009, photo by National Park Service

**Spring 2023:** Catastrophic flooding at **Crooked Creek** and **Circle**; most structures in town flooded or damaged by ice in Circle, airport apron and taxiway flooded, widespread power outages; record flooding in Crooked Creek, residents airlifted by national guard as most structure were destroyed by ice and flood waters; water inundated homes and damaged vehicles in **Kwethluk**; flooding lasted 7 days in **Russian Mission** damaging homes and runway; damage to protection barrier and flooded roads in **Eagle**; buildings inundated and airport runway damaged in **Red Devil**; homes and structures including the Tribal Hall in **Ft. Yukon** inundated with water; water damaged several homes in **Kobuk**; **state disaster declared May 15, 2023**

Flooding and overbank ice at Galena in 2013, photo by NWS

Explore other extreme events at [uaf-accap.org/projects/extreme-events-library](https://uaf-accap.org/projects/extreme-events-library)

Sources: Busey, B. VAWS: An Overview of the 2023 Alaska Spring Breakup Season | ACCAP. (2023, September 27), Fairbanks North Star Borough, NOAA Storm Events Database, Tanana Chiefs Conference, Thoman, R. (2023, May 13). Spring Break-Up Flooding [Substack newsletter], US Department of Commerce, NOAA River Watch Program, Van Peurse, K. and Thoman, R. Alaska Spring River Breakup Outlook | ACCAP. (2026, April 21).

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