

Alaska River Breakup 2016 Spring Outlook What we can expect?

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Outline

- Breakup process
- Recap of 2015 Alaska Breakup
- Current 2016 conditions
- Climate Outlook
- A look at trends: past, present and future
- Spring 2016 Breakup Outlook



Alaska Pacific River Forecast Center



APRFC Vision Statement: "Keeping a Watch Over Alaska's Waterways "

The Breakup Process

Most Breakups are a Blend

Dynamic breakup

- Ice remains hard and resistant to breaking up
- Ice moves when pushed by ice from upstream
- Ice jams form that can cause upstream flooding
- Extreme cases are Kenai River in January 1969 and January 2007 and Yukon River in May 2009 and 2013.

Thermal breakup

- Ice becomes very rotten (candled) before ice from upstream arrives
- Rotten ice is weak and has less resistance to breaking into very small pieces
- No significant ice jams form
- Extreme case would occur with very little snow melt inflow and warm sunny weather to rot the ice

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Breakup Overview

The transition from an ice covered river to ice-free open water



Upstream of Coffee's Bend site of midwinter ice jam on the Kuskokwim River.

May 5th 2015

Thermal



Breakup Overview

The transition from an ice covered river to ice-free open water



Galena Flooding

May 28, 2013

Dynamic or Mechanical

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Ice Jam Locations in Alaska



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Recap of 2015 – at this point

Spring snow conditions

 General trend from well below normal in Southwest Alaska to well above normal in Northeast Alaska and the Northern Yukon Territory

Spring ice thickness

 Thinner than normal on lower Kuskokwim trending to normal to above normal in the interior and Northslope

 Large aufeis field developed on the Sag River with flooding of the Dalton Highway in March

Weather outlook in mid to late April? – Increased chances of above normal temperatures through April 30

Snow Pack on April 1, 2015



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2015 Breakup Summary

- Kuskokwim River experienced a thermal breakup and most locations were ice free earlier than normal.
- Yukon experienced a mostly thermal breakup with average timing or slightly ahead of average dates
 - One minor ice jam below Emmonak with water levels rising to bank full (1 watch and 1 warning issued)
 - Minor flooding in Fort Yukon 1 week after breakup.
 Flooding caused by snowmelt from the Porcupine basin (Warning issued)
- Wide spread flooding on the Northslope
 Sag, Kuparuk and Colville Rivers all flooded (numerous watches and warnings issued)



Sag River 2015



May 20th 2015 Image Credit: NASA Worldview

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Photo Credit: AK DOT&PF

- Major Flooding on the Sag River
- Dalton Highway Closed for 3 weeks
- Damages estimated at 15 million+

2016 Snow Water Equivalent





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2016 Snow Coverage



April 17th 2016, US National Ice Center

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2016 April Ice Conditions



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2016 Winter Ice Anomalies

- Large aufeis field has formed on the Sag River, similar to last year
- Dust and sand reported on the lower Kuskokwim River
- Mid winter breakup and refreeze on the Yukon River between Eagle and Circle
- Areas of open water through the winter reported
- Early areas of open water, especially in Southcentral and Kenai
- Consistent reports of weaker than normal ice for this time of year

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2016 Sag River Aufeis

VIIRS False Color and GMU Flood Map - 04/12/2016





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2016 Temperatures

January – March Temperatures



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2016 Spring Temperatures

Thawing Degree Days as of 4/10/2016



1980-2010 Normal Date to Reach these Values

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Tools for Forecasting Break-up

• The past

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- Long term trends and changes
 - Ice and Snow conditions
- River Observations throughout the winter
- Models of spring temperatures

 Break-up timing and severity are strongly (not totally) controlled by temperatures during the spring

CPC 6-10 Day and 8-14 Day Outlook Temperatures and Precipitation



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CPC Week 3-4 Outlook







What does that mean? 2016 Outlook

- Trending towards thermal breakup on the Yukon, Kuskokwim Rivers and other interior rivers
- Breakup will likely be early at most locations, possibly the earliest on record at some locations
- Current outlook is for mod to high likelihood of flooding along the Sag River. Impacts to the road will depend on May temperatures and mitigation efforts.

Flood Outlook Potential

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Average Breakup Dates



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Breakup Map



River Notes Database

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CONTRACTOR OF					- · ·	Search Enter Search Here	
Local Forecasts	HOME	NWS	Site Map	National Nev	vs Organiza	tion	
by City, State, Zip	River Not	es Data	base Sear	ch Result	5		
City,State Go							
	These are u	unoffical	remarks whi	ich may not	have been qι	uality controlled.	
Rivers & Hydrology							
Forecasts & Info	Number of r	records fo	und: 98				
Quick Briefing							
48hr Flood Pot							
Outlook	Date	Time	Rive	er	Location	Remarks - Piren Times in LITC (-8hrs for ADT)	1
Nat'l AHPS page	2016-04-12	23:55:15	Sagavanirkto	k r	alton Hwy	Notes from meeting with partners about overflow issues on	
Precip & Weather	2010 01 12		Gugurunni		alloning	the Sagavanirktok: Climate prediction indicates warmer	
Observed Precip						than normal temperatures for the foreseeable future	
Forecast Precip						statewide, however the anomaly is weaker on the North	
AK Show Maps Nat'l Show Info						Slope. The Sag has the issues typical of a north-flowing	
Wx Forecasts						river in the northern hemisphere - the tributaries begin	
Observations						to melt while the lower elevation portions of the basin	
Radar Satellite						remain with stronger ice. DOT reports: In 2015, the	
Data in Google						Ice conditions became unsate for mitigation work on May 3.	
Maps						or the first few days of May we do not expect the ice to	
Breakup & Ice						be safe longer into the season than last year. DOT	
Quick Briefing						reports seeing open water entering trenches now. There is	
Breakup Map						more aufeis than last year - last year it stopped at mile	
Summarv						396, this year it extends up to the lvishak. UAF	
Ice Maps						plans to begin their snow surveys on the North Slope on	
Freezing DD						4/15, the surveys are expected to provide ~2 weeks of	
More						data. UAF is using freezing degree days to model breakup	
A	2016 04 12	21.05.26	Kuckolawim		likoloi	Udles. From McCrath community message board: 4/10/2016, 9:40 cm	1
River Database	2010-04-12	21.00.00	NUSKOKWIII	ľ	inolal	The river is open at Nikolai last night around 8pm maybe 2	
/ Drought Info						in 2 wks the Nenana mite go out? Geese have been spotted as	
Predictions						well, make trip plans and travel safe.	
Additional Info	2016-04-12	20:29:50	Kuskokwim		likolai	Resident reports that the ice went out last night and the	
Related Links						river is completely open now. Water levels came up and are	
Observer forms						back down this morning. Very sunny today.	
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Yukon River at Eagle

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O Breakup Dates 🔲 Outliers 🔜 Max, Min, Avg, STdev — Shaded Area Trend (s=-0.05)

http://aprfc.arh.noaa.gov

Tanana at Nenana Yesterday

www.borealisbroadband.net

Images courtesy of Borealis Broadband

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http://aprfc.arh.noaa.gov/ 907-266-5160

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