

Spring 2017 Breakup – A look at our Rivers and Coasts

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Crane Johnson and Rick Thoman National Weather Service April 18th 2017

Outline



> Breakup process

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- Recap of 2016 Alaska Breakup
- Current 2017 conditions
- Climate Outlook
- A look at trends: past, present and future
- Spring 2017 Breakup Outlook

Types of 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

Breakup Overview

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Thermal transition from an ice covered river to icefree open water



Napaskiak, April 12th 2016

Breakup Overview



Dynamic or Mechanical transition from an ice covered river to ice-free open water



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Bishop Rock May 27, 2013

Galena Flooding May 28, 2013

Recap of 2016





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- Generally below average snowpack for most of the state.
- Large portions of the state were snow free by mid April



Alaska Snow Coverage April 10th, 2016

Recap of 2016



January – March Temperatures

Above average
JFM temperatures
throughout the
state.

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 April 1st measured ice thicknesses were below average for most areas in the State.



Recap of 2016 - Timing



Kuskokwim River Breakup Dates 1980 - 2015 ≡ Jun 10 Jun 3 May 27 **Breakup Date May 20** May 13 May 6 Apr 29 Apr 22 Apr 15 Apr 8 NIKOlai (30) Mccrath 36 soked creek 30) Aniak (33) akakel Yukon River Breakup Dates 1980 - 2015 ≡ Jun 10 Jun 3 May 27 **Breakup Date** May 20 May 13 May 6 Apr 29 Apr 22 Apr 15 Apr 8 , YUKON (32) alena 35) Eagle 35) Circle (32) nana (31) Kalta9 30) HOWCLOSS 2UDY BO

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Compared to the average (1980-2015), breakup in 2016 was extremely early with many locations experiencing a record early breakup.

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Recap of 2016 - Severity



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 Moderate Flooding – Ice jam on the Inmachuk River flooded the access road to the airport

Eagle

- Minor Flooding Ice jam formed on the Yukon River approximately 10 miles downstream from Eagle
- Sag River
 - No significant flooding

2017 Current Conditions







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2017 Snow Coverage

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2017 Winter Temperatures



Freezing Degree Days - Percent of Normal





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2017 Winter Temperatures





EAGLE AP FREEZING DEGREE DAYS





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April Ice Thickness Measurements





2016/2017 Winter Ice Anomalies



- Mid winter ice jam on the Kenai River
 - No flooding
- Northslope
 - Normal aufeis conditions reported on the Sag River
- Good Winter Travel Conditions
- Notably un-eventful river ice conditions around the state





Climate Outlook For Spring 2017



- Week 2 (late April)
- Week 3-4 (late April to mid-May)
- Monthly (May and June)
- Ocean and Sea Ice Status

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Temperature and Precipitation





2017-04-17 GEFS Rfcst-Calib Temperature Forecast for Days 8-14

April 25-May 01, 2017

90%



Week 3-4 (end April to mid-May



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CPC Outlook Issued Friday April 14

Model Forecast from Tuesday April 17



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May 2017 Temp Departure Outlooks



Avg Dep (°C)

3-Category Probabilities

Calibrated 3-Category Probs



Model Forecast for May Temperatures

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June 2017 Temp Departure Outlooks



Avg Dep (°C)

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3-Category Probabilities

Calibrated 3-Category Probs





Nino 1+2

Niño 4 SSTs and Break-up

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Ocean Surface Temperatures

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Bering Sea Ice Extent now falling

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Region 12 – Bering Sea (4km resolution)



Sea Ice as of Sunday afternoon 🔍

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Climate Outlook Summary



- Better than average chances for near to above normal temperature in May and June
- Sea ice retreat now well underway in Bering and just starting in the Chukchi. Slower than last year all areas.







What does that mean? 2017 Breakup Outlook



Trending towards a 'normal' breakup year

- Increased potential for a dynamic breakup along most major rivers in Alaska
- Flooding is possible at the typical locations along all rivers subject to ice jam and snow melt flooding

Current outlook is for low likelihood of flooding along the Sag River. The road has been elevated with less aufeis than in previous year.

Average Breakup Date

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Breakup Date Outlook





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Flood Outlook Potential

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Temperature Influence



2009

NOAA



Spring Temperatures are the biggest driver for ice jam flooding.....



Temperature Influence

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2009



2012

Daily Temperature Data - FAIRBANKS INTL AP, AK

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Period of Record - 1929-12-01 to 2017-04-09. Normals period: 1981-2010. Click and drag to zoom chart.



Breakup Map



APRFC Breakup Map

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View / Download Map Ima Download shapefile Issued when a river level has exceeded, or is forecast to exceed,

Tanana at Nenana April 11th



Nenana Ice Can, Nenana, Alaska

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- Call 907-266-5158 or email if you are interested benjamin.johnson@noaa.gov





NWS Fairbanks service hydrologist Ed Plumb (left) presents a Weather-Ready Nation Ambassador sign to Dave Schirokauer, the acting deputy superintendent of Denali National Park.



Current Forecast and River Conditions: www.weather.gov/aprfc



Data Sharing.....

- Email: <u>nws.ar.aprfc@noaa.gov</u>
- We can follow your social media
- #Akriverwatch,#AKwx
- > Call: 907-266-5160
- Post an observation to the LEO Network
- Submit an observation to the NWS



