

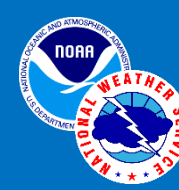
April 21st 2020 Breakup Briefing

NWS Alaska Region Briefing

Alaska Pacific River Forecast Center

Crane Johnson

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- **Ice thickness and areal extent, aufeis and jumbled ice formations**
- **Snowpack**
- **Spring weather pattern**
 - April and early May temps control
 - Snowmelt rates
 - Thermal condition and integrity of ice
 - Type of breakup (Dynamic vs. Thermal)

Most Breakups are a Blend

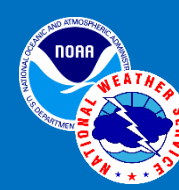
Dynamic breakup

- 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 weaken the ice

Thermal breakup



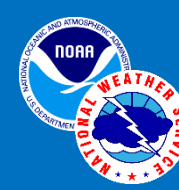
NWS Alaska Region



• Napaskiak, April 12th 2016

Tuesday, April 21, 2020

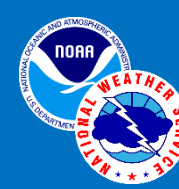
Dynamic Breakup



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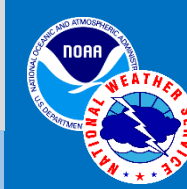
So what about this year?



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- Ice thicknesses around the state are near normal
- Snow depths across the Yukon, Koyukuk basins are above average and will be above average in the Canadian Yukon and Kuskokwim Basins
- CPC outlooks indicate generally equal chances for below/above normal temperatures the last part of April and tilting towards above normal for May.

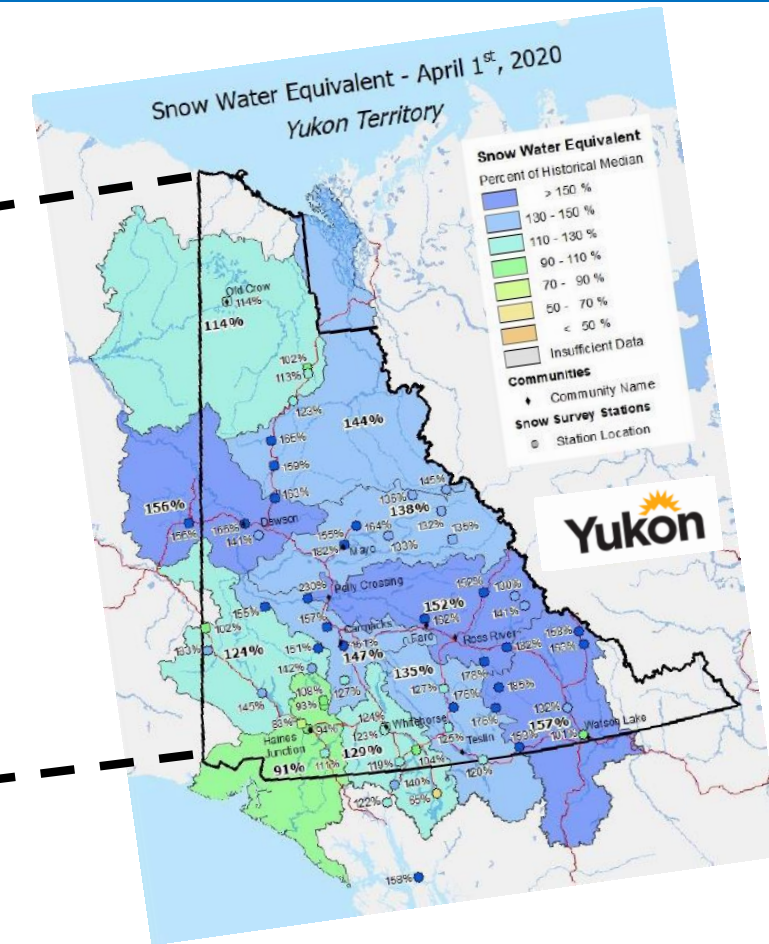
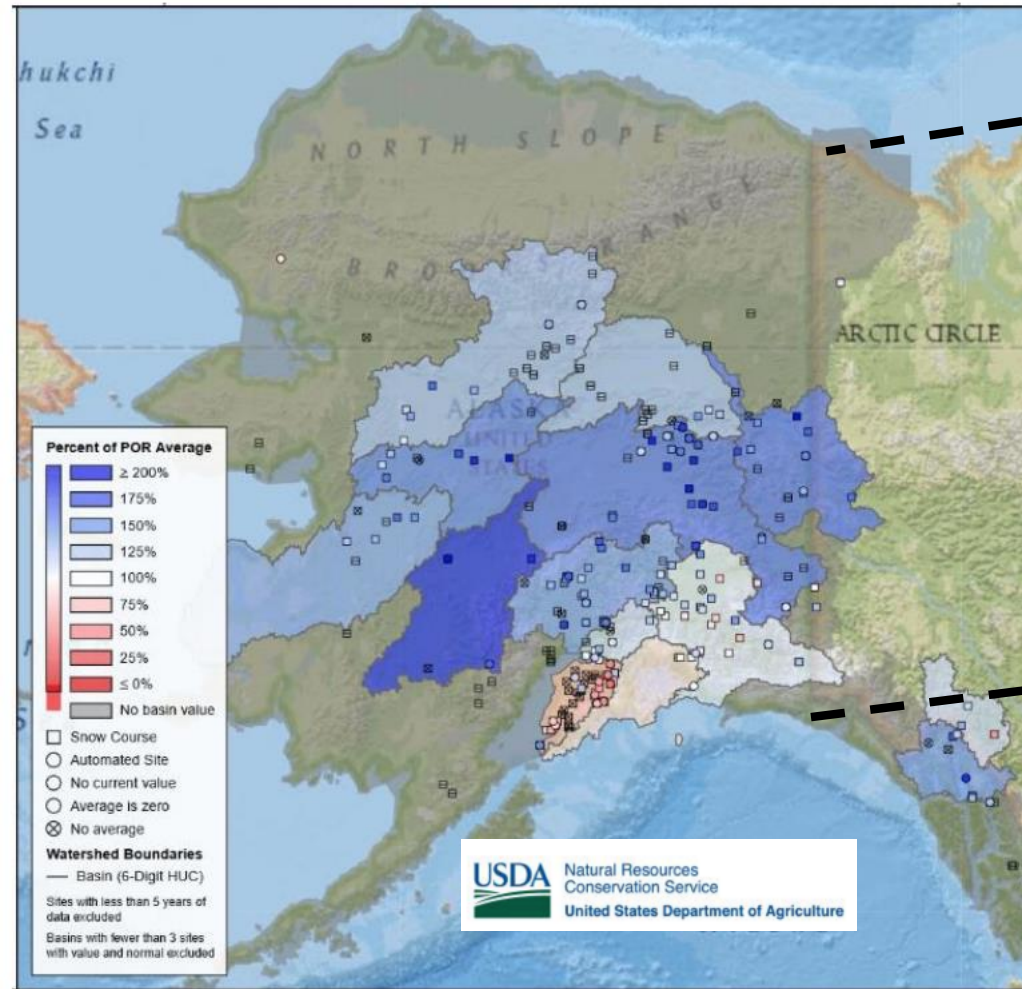
Alaska's Early March Snowpack



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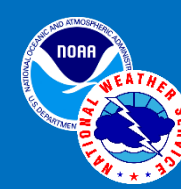
April 1st snow survey

- Above average snowpack in the Yukon, Tanana, Kuskokwim and Koyukuk River Basins
- Well above average snowpack in the Yukon Territory
- Likely average snowpack along the North Slope.



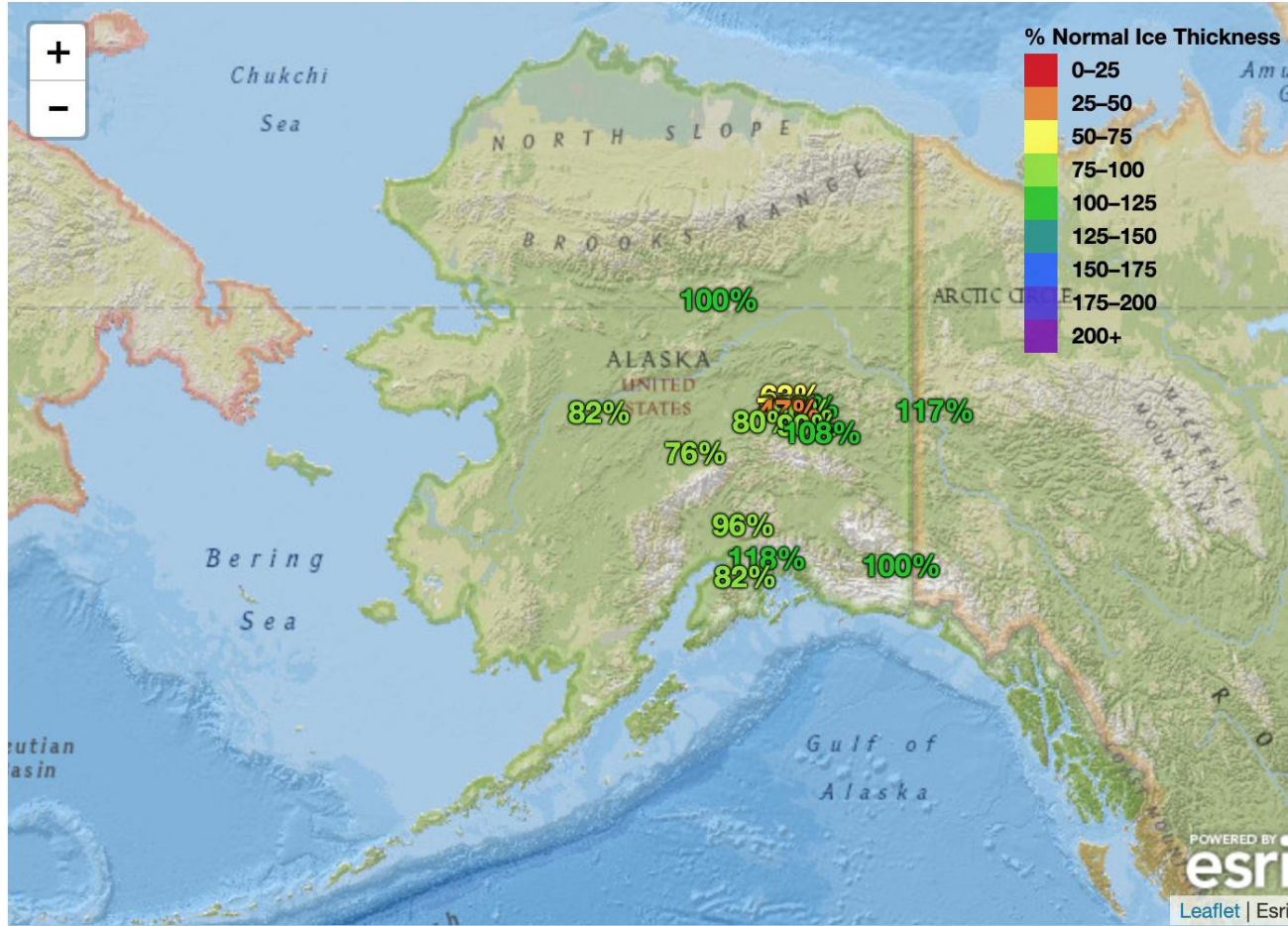
Above average snowpack in the Yukon Basin upstream of Eagle.

Ice Conditions

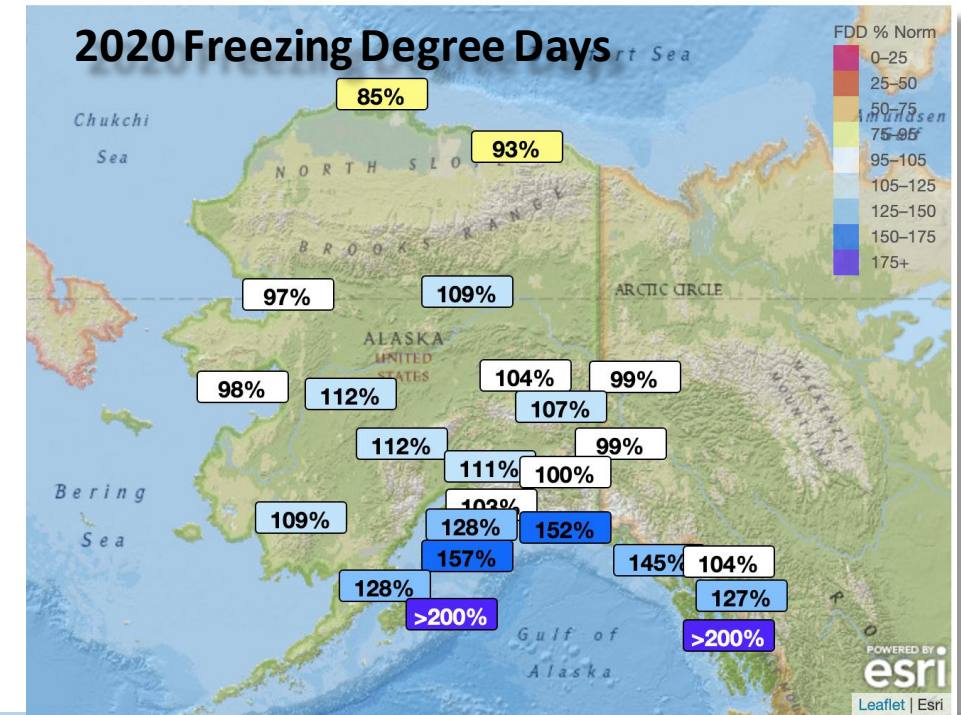


Rivers

% Average Ice Thickness Map



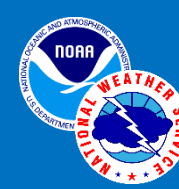
Measured ice thicknesses are near the long term average at limited locations.



Average ice thickness

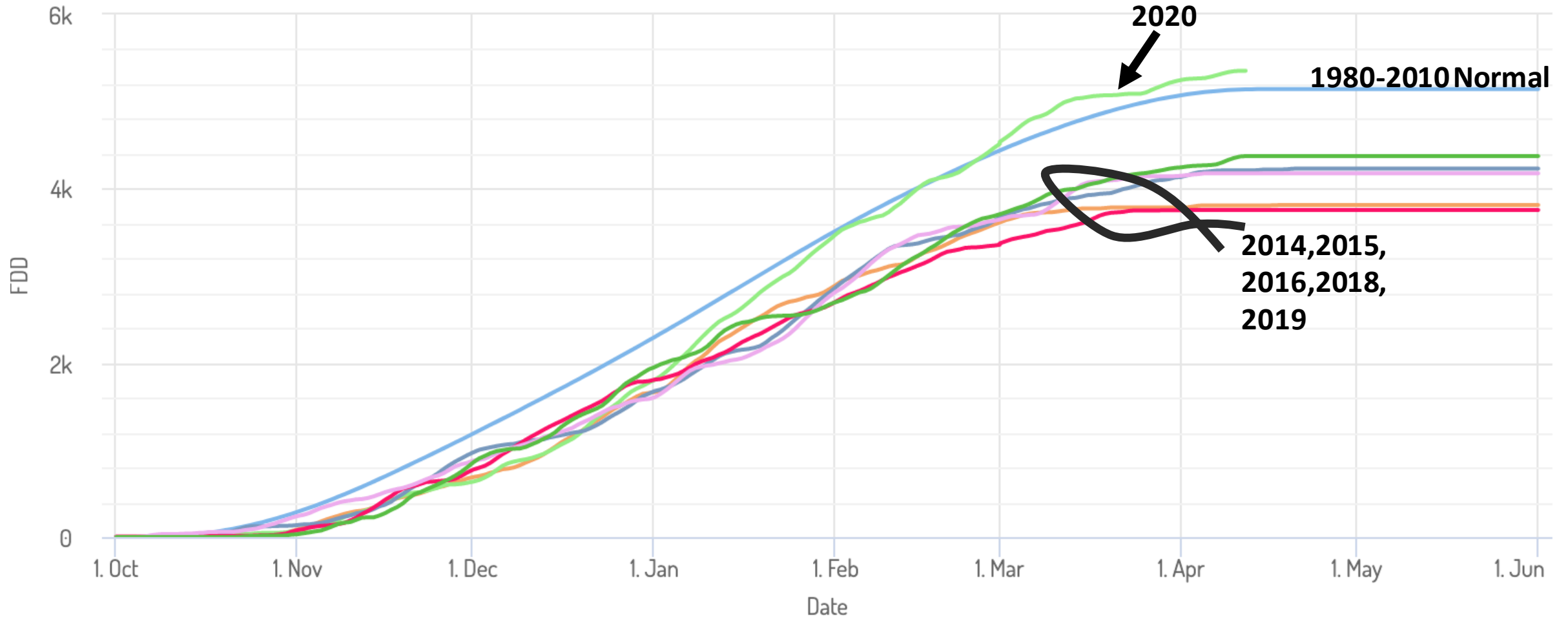
Freezing Degree Days

Fairbanks

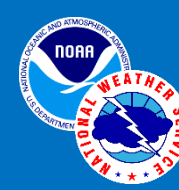


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FAIRBANKS INTL AP FREEZING DEGREE DAYS



Willow Creek Freezeup Jam



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Photograph courtesy of the Matsu Borough

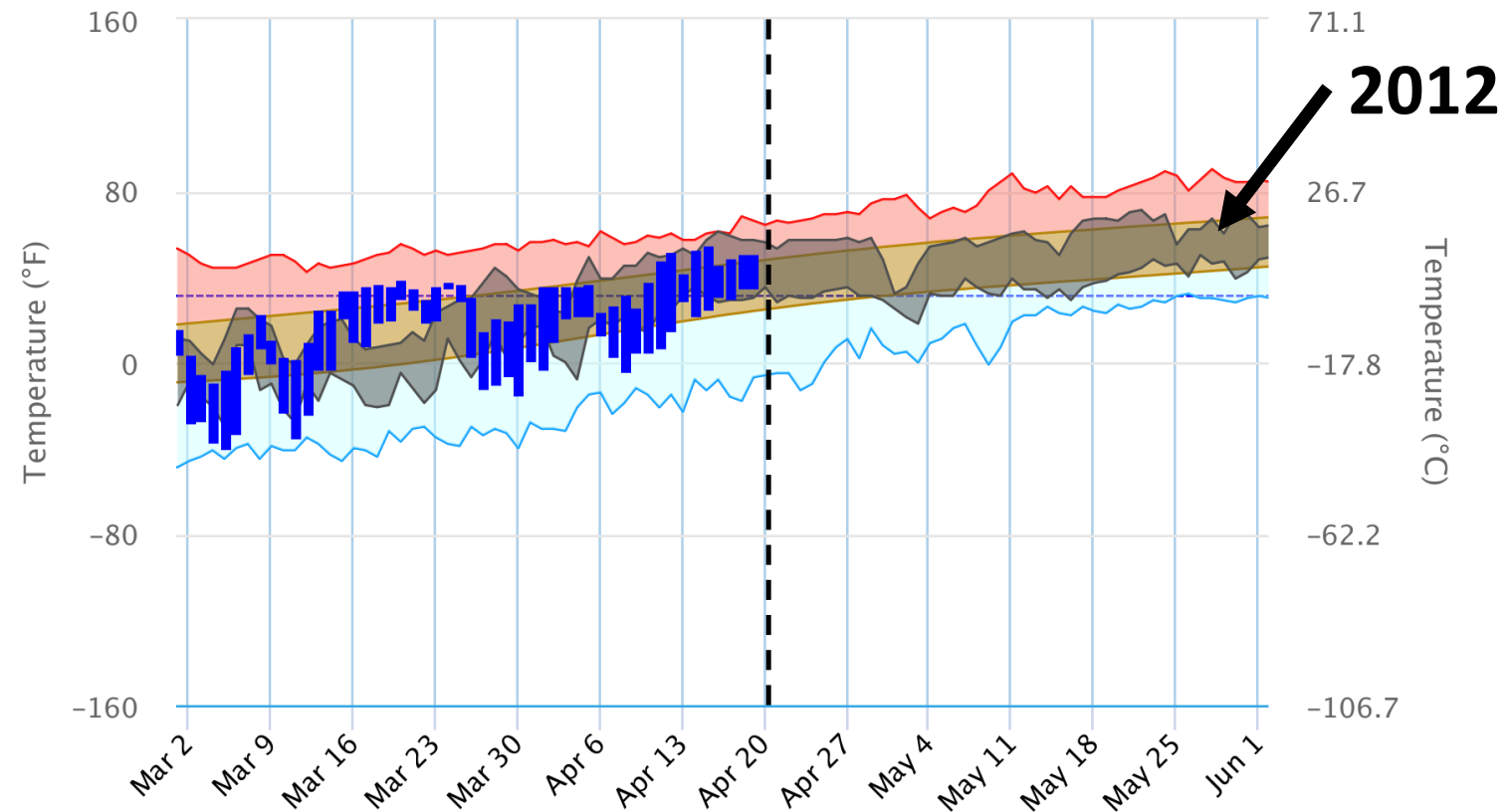
Weather pattern leading up to breakup controls -

- snowmelt rate
- thermal condition of the ice



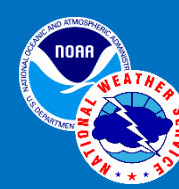
Daily Temperature Data – FAIRBANKS INTL AP, AK

Period of Record – 1929-12-01 to 2020-04-19. Normals period: 1981-2010.



Spring Weather

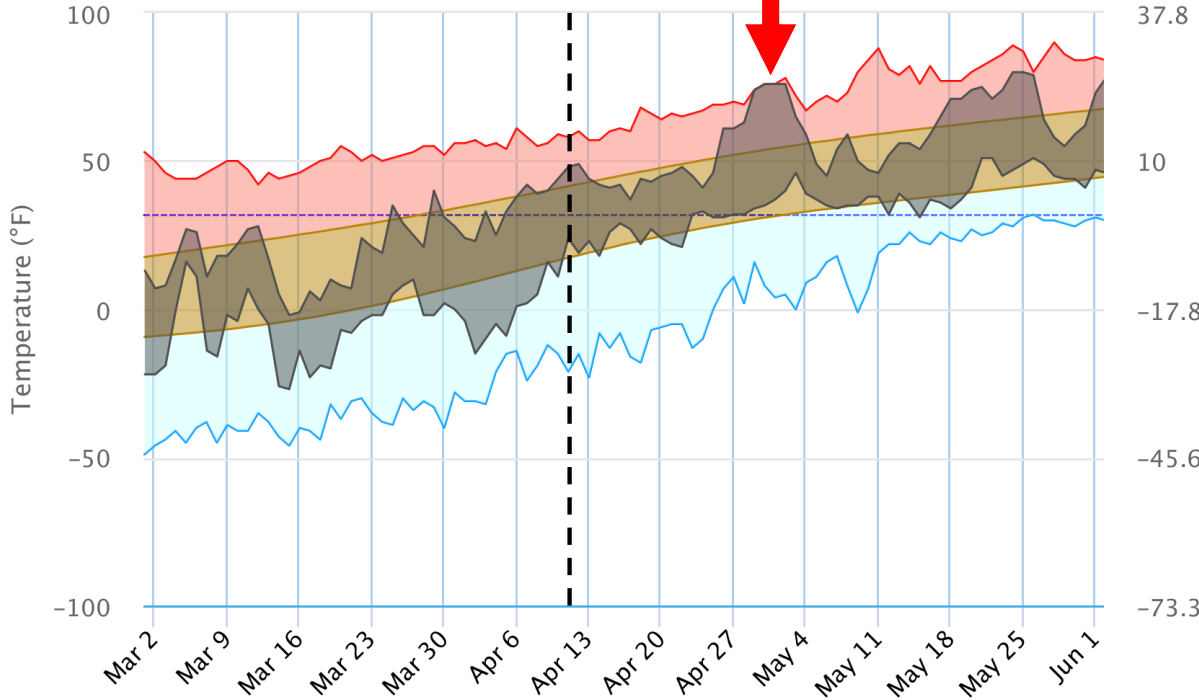
Rapid Warmup



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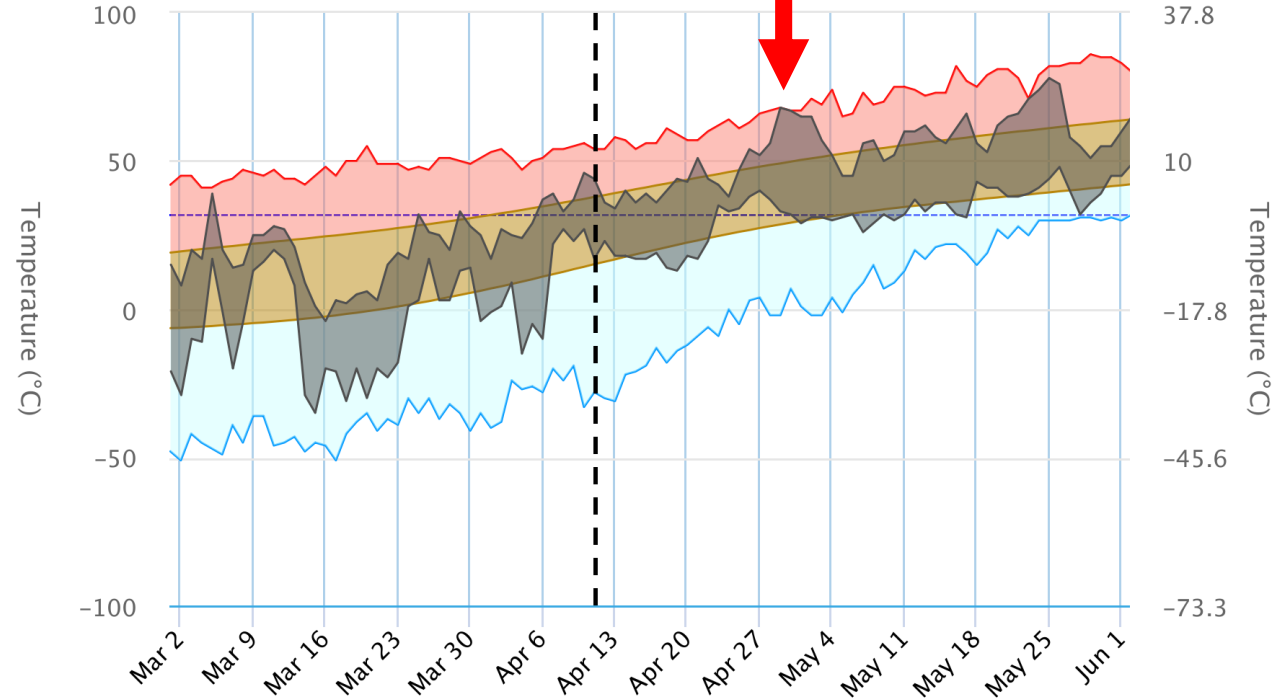
Daily Temperature Data – FAIRBANKS INTL AP, AK

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Daily Temperature Data – MCGRATH AP, AK

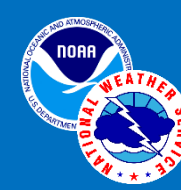
Period of Record – 1941-06-01 to 2020-04-10. Normals period: 1981-2010.



1989, 1991, 2002, **2009** – Ten or more communities grouped into state or federal declarations

Spring Weather

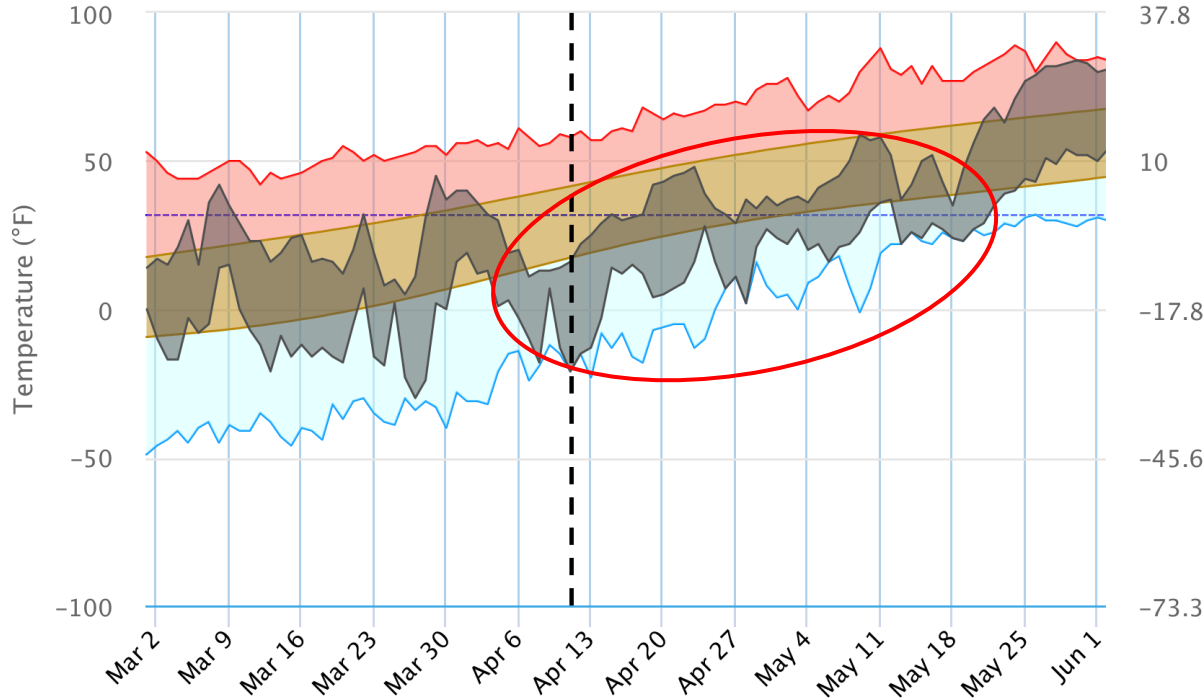
Cold Spring



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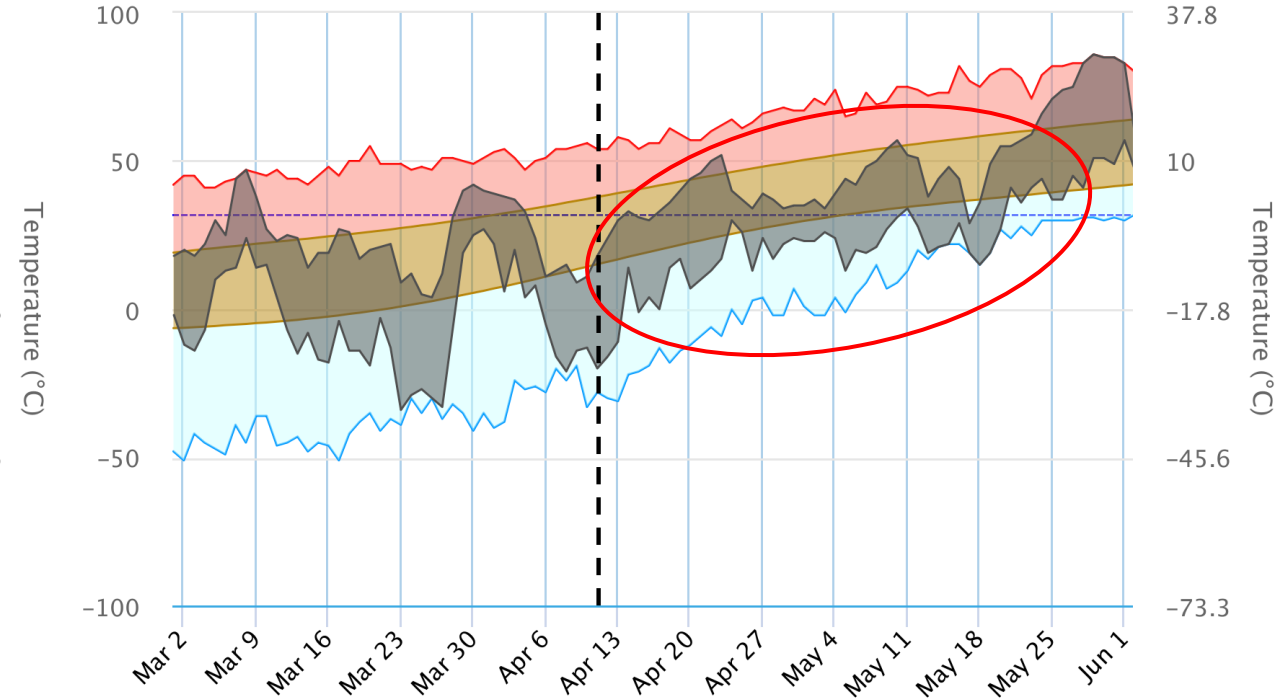
Daily Temperature Data – FAIRBANKS INTL AP, AK

Period of Record – 1929-12-01 to 2020-04-10. Normals period: 1981-2010.



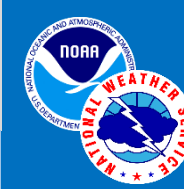
Daily Temperature Data – MCGRATH AP, AK

Period of Record – 1941-06-01 to 2020-04-10. Normals period: 1981-2010.



1992, 1994, 2006, **2013** – Five or more communities were included in state or federal declarations

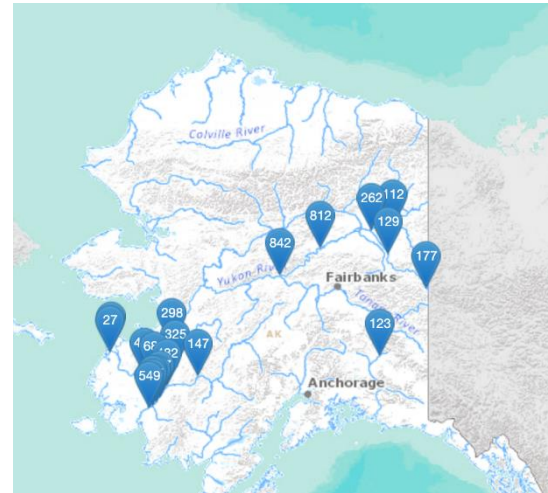
Previous years



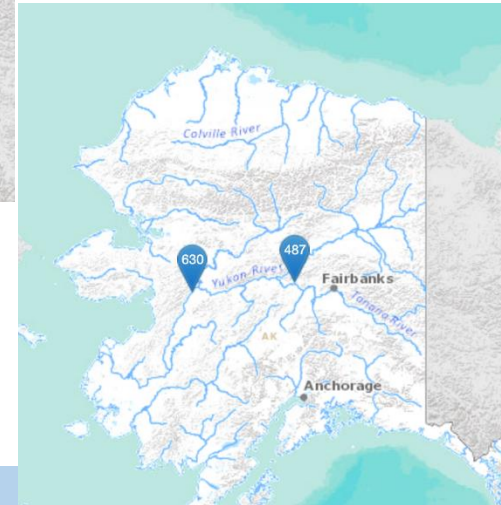
Similar Snow and Ice Conditions

- 2009, 2012 and 2013 had similar snow conditions.
- Ice thicknesses in 2009, 2012 and 2013 were likely similar or thicker than this year.
- Both 2009 and 2013 had significant ice jam flooding. 2012 had ice jams, but no major flooding (moderate flooding at two locations)

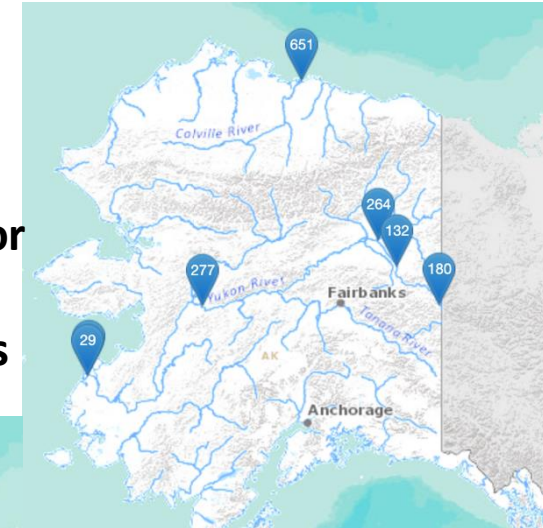
2009
9 locations with major flooding, 11 with moderate



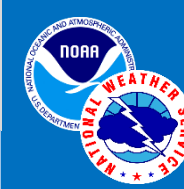
2012
No locations with major flooding. Moderate flooding at 2 locations



2013
4 locations with major flooding, 2 with moderate flooding



Spring Outlook Temperatures



NWS Alaska Region

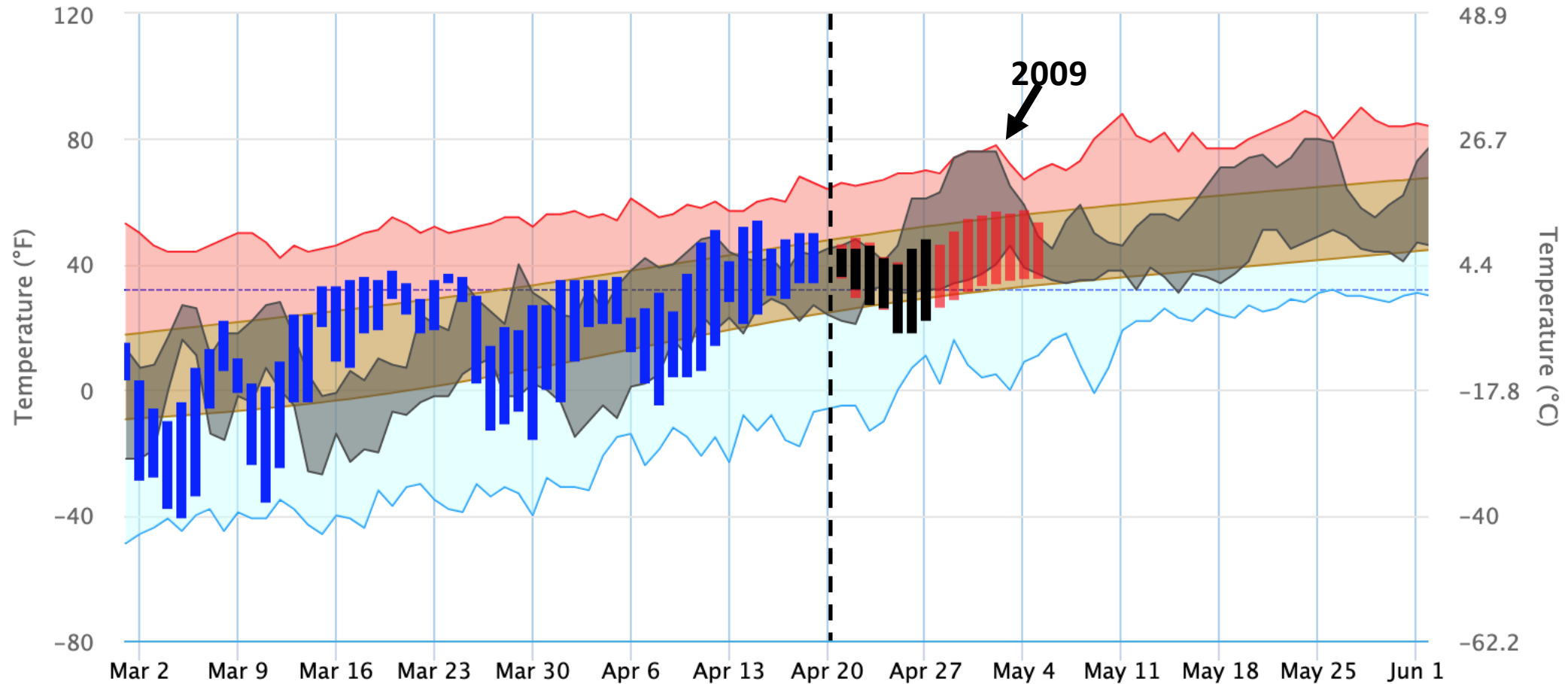
Upper Yukon

Daily Temperature Data – FAIRBANKS INTL AP, AK

Reset zoom



Period of Record – 1929-12-01 to 2020-04-19. Normals period: 1981-2010.

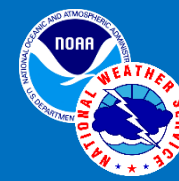


NWS Weather Forecast

EKDmos Max/Min Temperatures

Spring Outlook Temperature

Kuskokwim

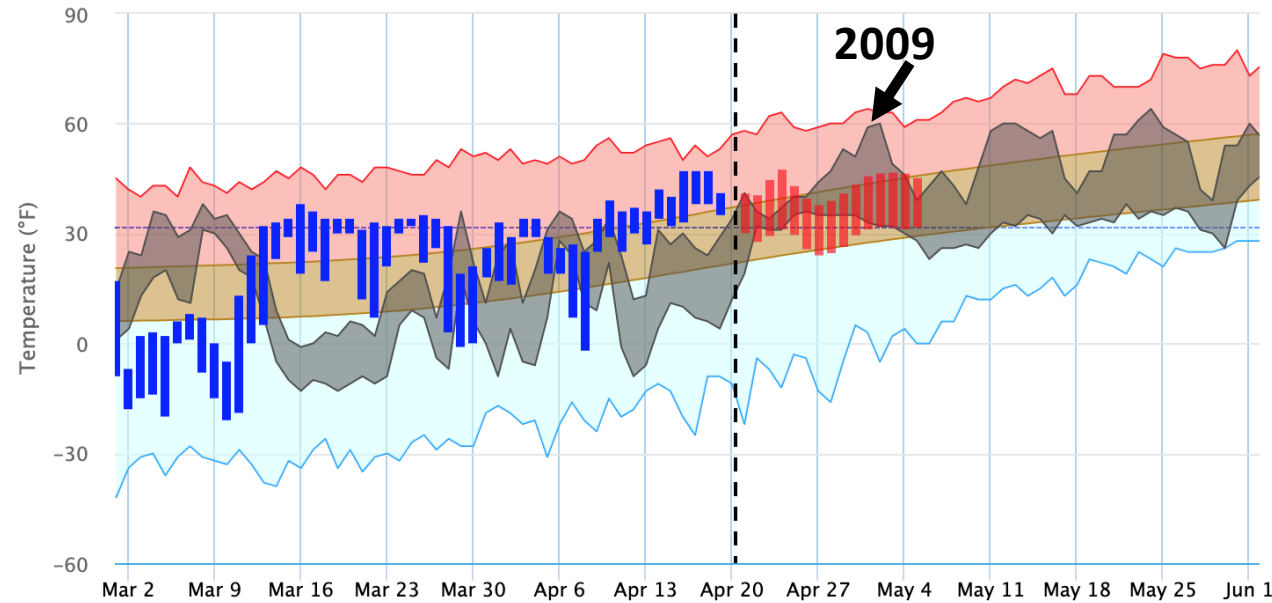


NWS Alaska Region

Daily Temperature Data – BETHEL AIRPORT, AK

Period of Record – 1923-08-01 to 2020-04-19. Normals period: 1981-2010.

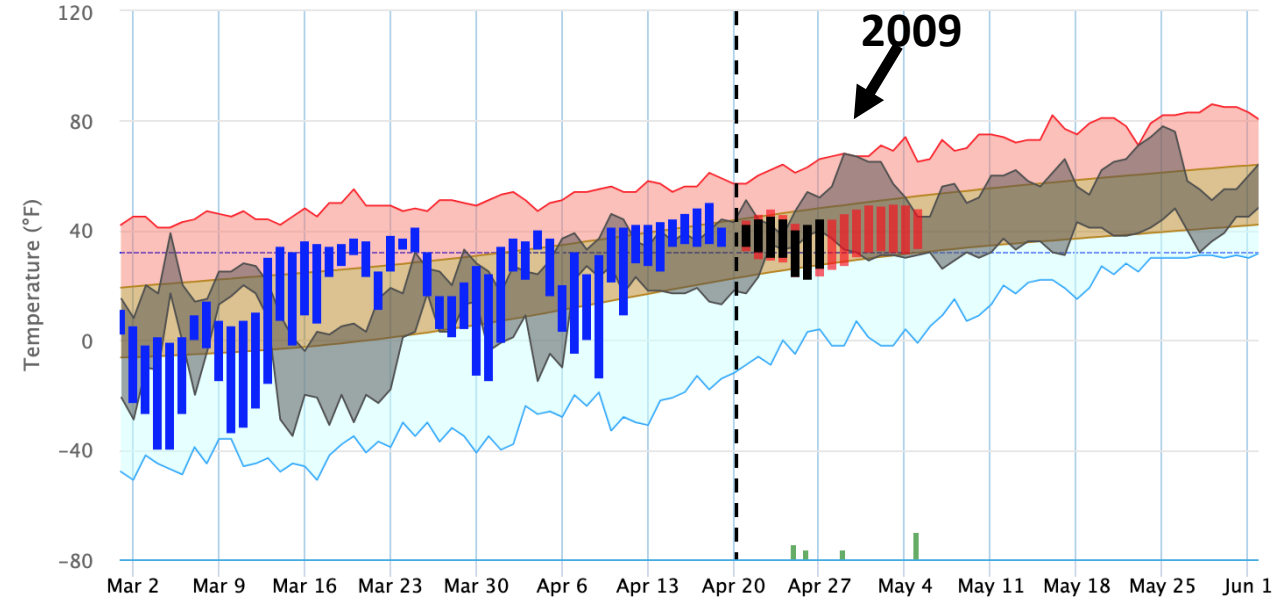
Reset z



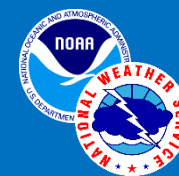
Daily Temperature Data – MCGRATH AP, AK

Period of Record – 1941-06-01 to 2020-04-19. Normals period: 1981-2010.

Reset z



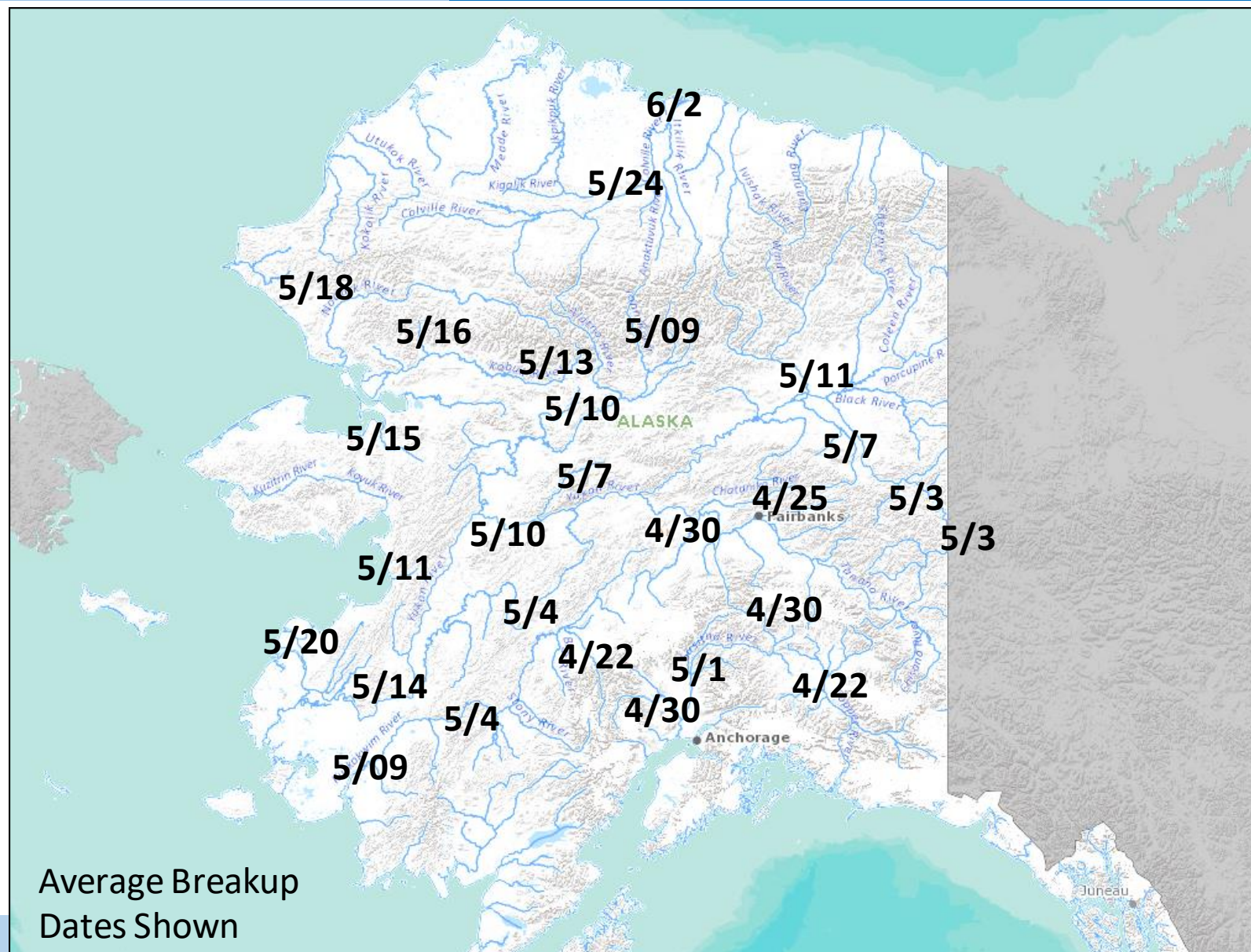
Alaska Breakup Timing



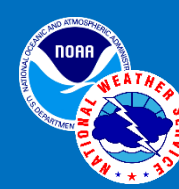
NWS Alaska Region

Average breakup dates across the state

(1980-2019)



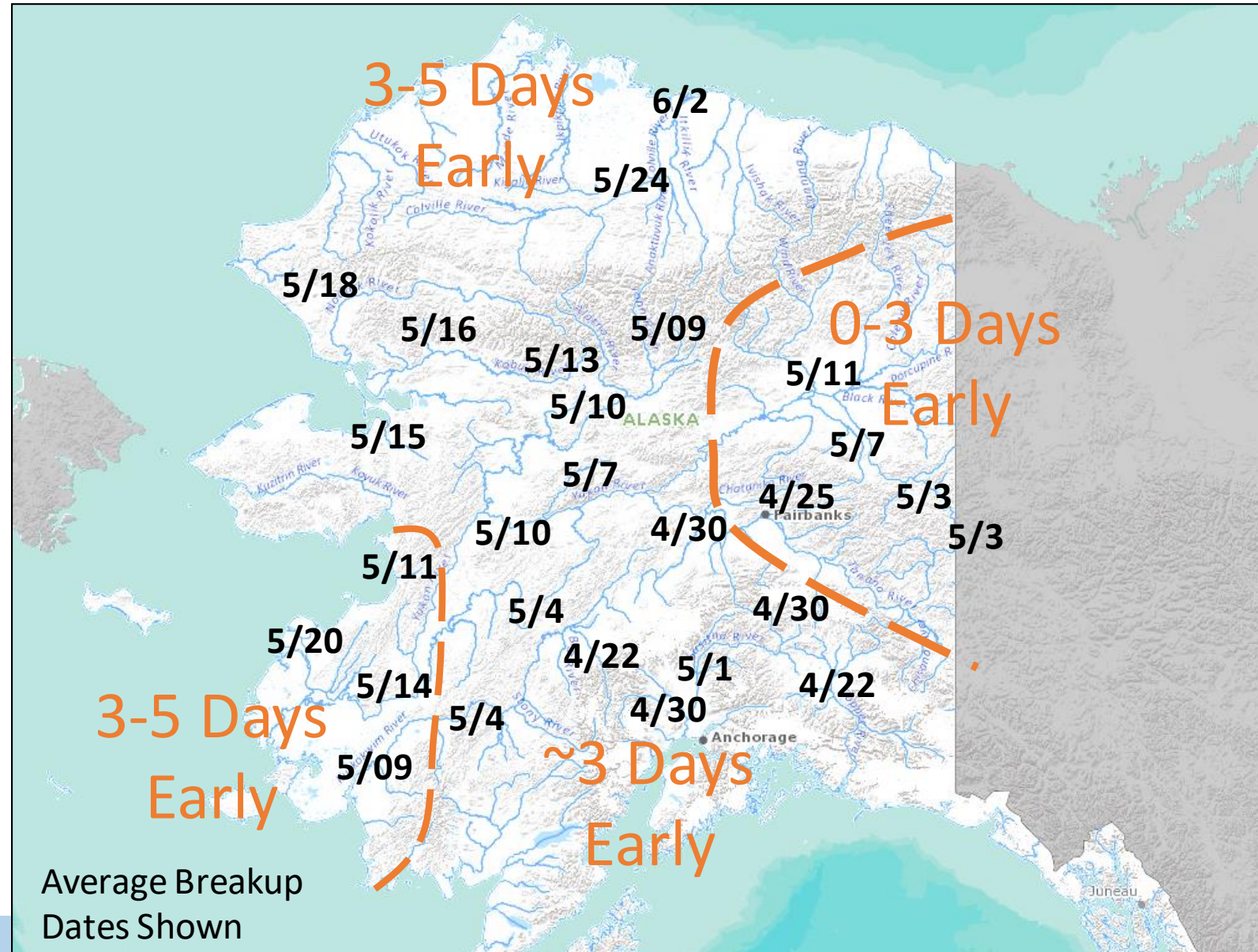
Alaska Breakup Timing



NWS Alaska Region

Normal to slightly earlier than normal breakup dates across the state based on the current forecast temperatures.

Breakup date outlook based on long range forecasts and subject to change.



Current outlook is trending towards dynamic

2020 Trending



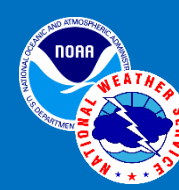
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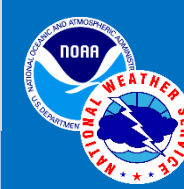
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- Ice becomes very rotten (candled) before ice from upstream arrives
- Rotten ice is weak and has less resistance to breaking into very small pieces
- No significant ice jams form
- Extreme case would occur with very little snow melt inflow and warm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



- Breakup this year is expected to be **different than the last 6 years**
- Trending towards a **dynamic breakup** on Alaska's major Rivers
- Flood potential at most locations is **above average**

Spring Flood Potential Overview

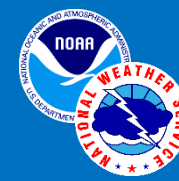


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April 20th 2020

Yukon, Tanana and Koyukuk Rivers	Ice Jam Flooding	Above Average
Kuskokwim River	Ice Jam Flooding	Above Average
North Slope Rivers	Ice Jam/Snow Melt Flooding	Average
Susitna River	Ice Jam Flooding	Above Average
Chena River Flood Potential	Snow Melt Flood	Above Average
Buckland, Deering and Kobuk Rivers	Ice Jam Flooding	Above Average

2020 Breakup Outlook Map



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Spring Flood Potential created April 14, 2020

weather.gov/aprffc

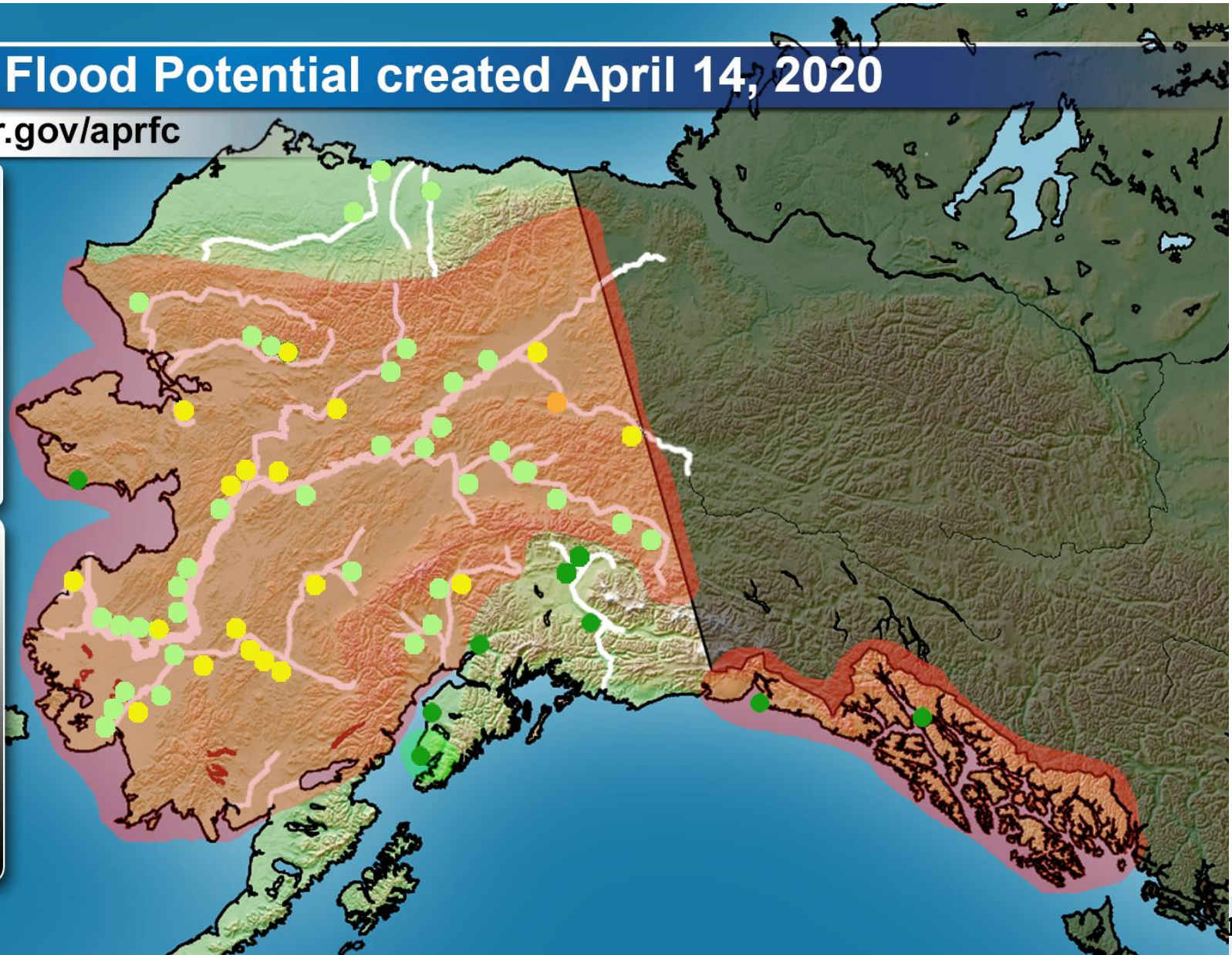
SNOWMELT
RUNOFF
COMPARED TO
AVERAGE
(unshaded)

BELOW AVERAGE

ABOVE AVERAGE

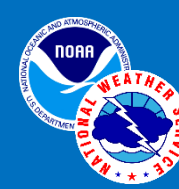
VILLAGE FLOOD
POTENTIAL

- Low
- Low - Mod
- Moderate
- Mod - High
- High



2020 Breakup

Anchor River April 16th



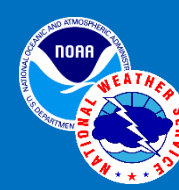
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Photo Mike Barret

2020 Breakup

Tozitna River April 20th



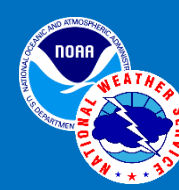
NWS Alaska Region



Photo courtesy of Russ Wood

2020 Breakup

Kuskokwim at Napiamute April 20th



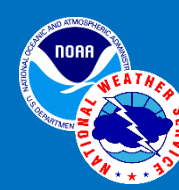
NWS Alaska Region



Photo courtesy Ben Leary

Dawson City

April 20th 2020



NWS Alaska Region



Credit: Sebastian Jones

Online Resources – Questions?

Tanana River at Nenana April 20th 2020

Current Breakup Outlook:

<https://www.weather.gov/aprfc/FGAK78PACR>

Alaska Breakup Map:

<https://www.weather.gov/aprfc/breakupMap>

Graphical Breakup Outlook:

<https://www.weather.gov/aprfc/riverView>

We need observations from your community this year:

Web Form: <https://www.weather.gov/aprfc/submit?site=aprfc>

Email: nws.ar.aprfc@noaa.gov

Phone: 907-266-5160 or 1-800-847-1739

