

NORTHERN FIRE AND ICE: CLIMATE SERVICES AND ADVANCE PLANNING FOR SPRING RIVER ICE BREAKUP AND WILDFIRES IN ALASKA

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Monthly and Sub-Seasonal Springtime Decision Support Services

- Climate conditions during April and May set the stage for two high impact and potentially cost environmental threats for Alaska
 - River Ice Break-up: ice jam flooding, rivers as highways
 - Wildfire Season: fire and smoke

Today's agenda

- Quick Alaska and spring climate orientation
- What NWS Alaska Region Climate Services provides to core partners
- What those partners do with climate scale outlooks

When It Goes Bad...

Card Street Fire, June 2015



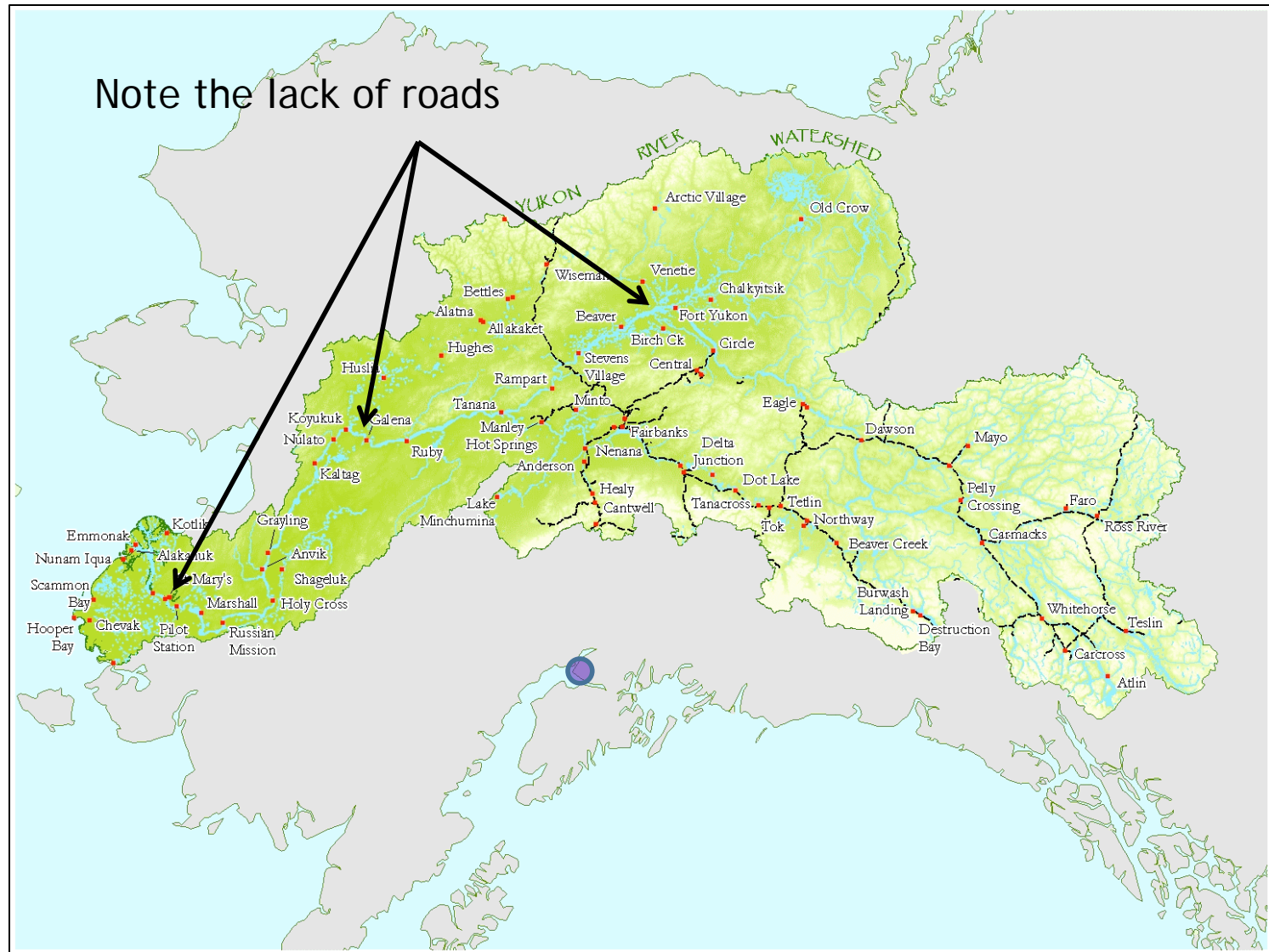
Courtesy: Alaska Dispatch News

Galena, May 2013



Courtesy: NWS Alaska Region

Yukon River: Canada owns a third of the drainage



Why the Difference?

Every spring, winter's grip loosens, the six month snow cover melts, and ice clears from rivers and lakes. What makes one year different from another?

Alaska river ice break-ups come in two different flavors

- Dynamic (ice strong, greater risk of ice jam flooding)
- Thermal (ice rots in place, lower risk of ice jam flooding)
- Timing of snowmelt primary driver of early season fire fuels

Both processes are **STRONGLY** control by temperatures in the six weeks from early April to mid-May (end of winter snowpack, ice thickness, sunshine all secondary)

Spring is the dry season: in-season pcpn rarely a factor

Breakup Overview



Thermal

Best Case Scenario

Low snow pack with predominantly clear skies and consistent above normal temperatures through the spring e.g. Interior in 2015



Dynamic

Worst Case Scenario

Low to moderate snow pack, cloudy cold through most of April then abrupt transition to much above normal temperatures end of April into May, e.g. 2009

In general, late break-ups have greater potential for ice jam flooding

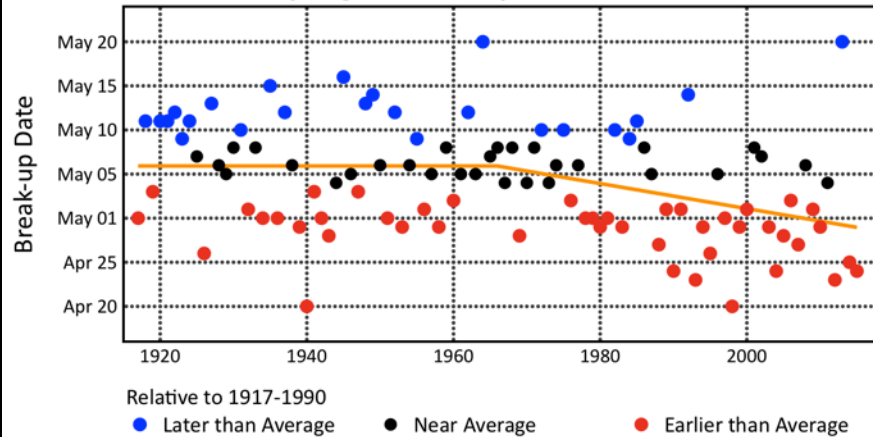
What NWS Alaska Region Provides

- Enhancement of routine services
 - Include Apr/May outlooks in late winter/early spring Climate Outlook webinars
 - Increased media inquiries (RFC, WFOs and Regional)
- Special briefings and webinars
 - Alaska Center for Climate Assessment and Policy (ACCAP)
 - Alaska-Pacific River Forecast Center
 - Spring Break-up Outlook webinar (2015 edition had ~100 in-person and online attendees)
 - Alaska Fire Service (joint state/federal partnership) F2F briefings
 - GAAC Meteorologists
 - Fuels Specialists
 - Managers



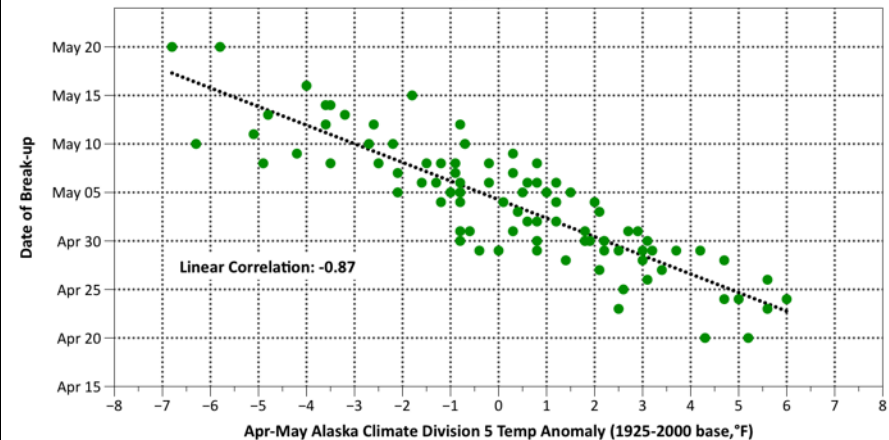
A "Century" of Spring Ice Break-up

Tanana River at Nenana
Spring Ice Break-up Date, 1917-2015

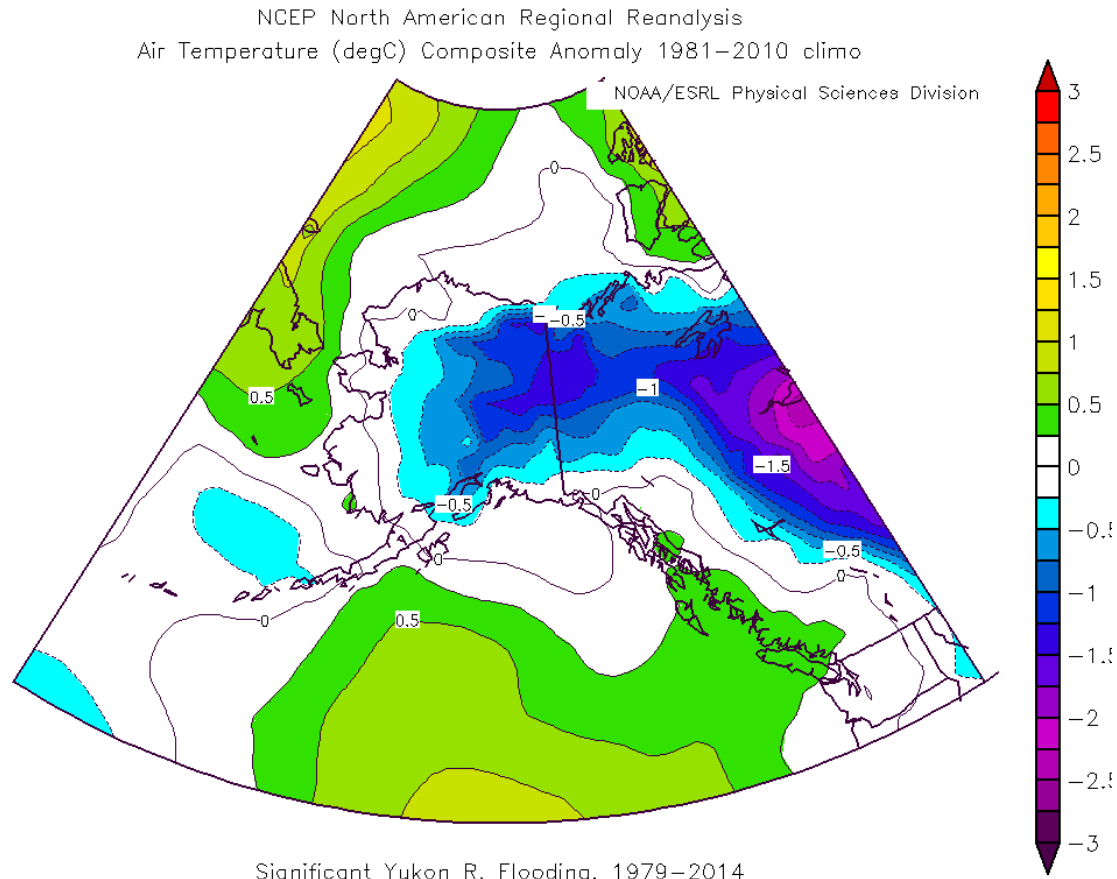


Source: NWS-APRFC

Tanana R. at Nenana
Break-up Date vs. Apr-May Mean Temp Anomaly
1925-2015



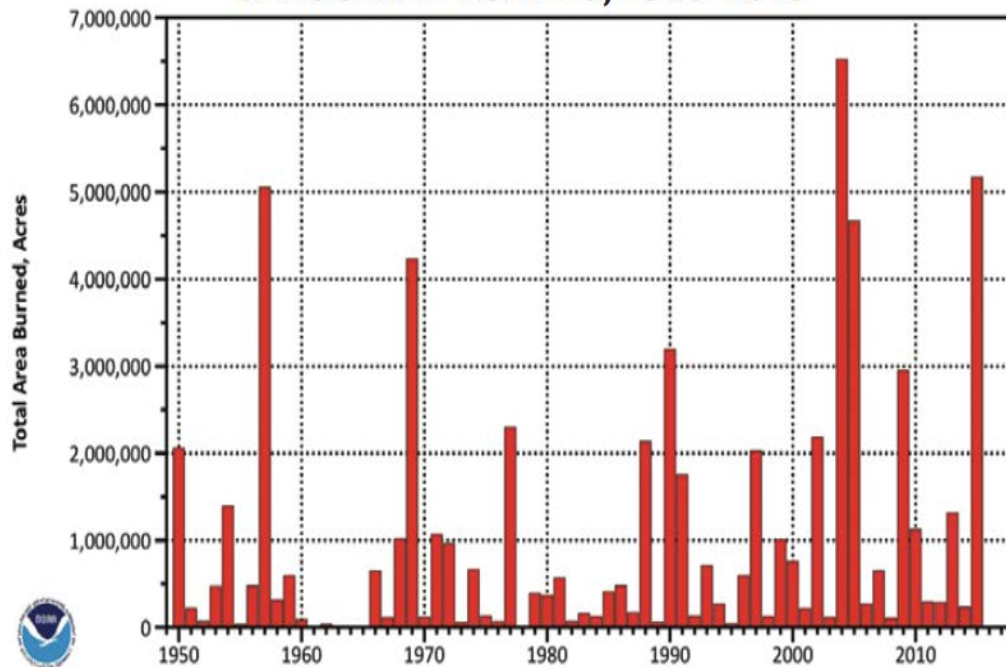
Years with Major Ice Jam Flooding Yukon River (1979-2015)



1979, 1992, 1994, 1995, 2009, 2013

Alaska Wildfire Acreage Increasing

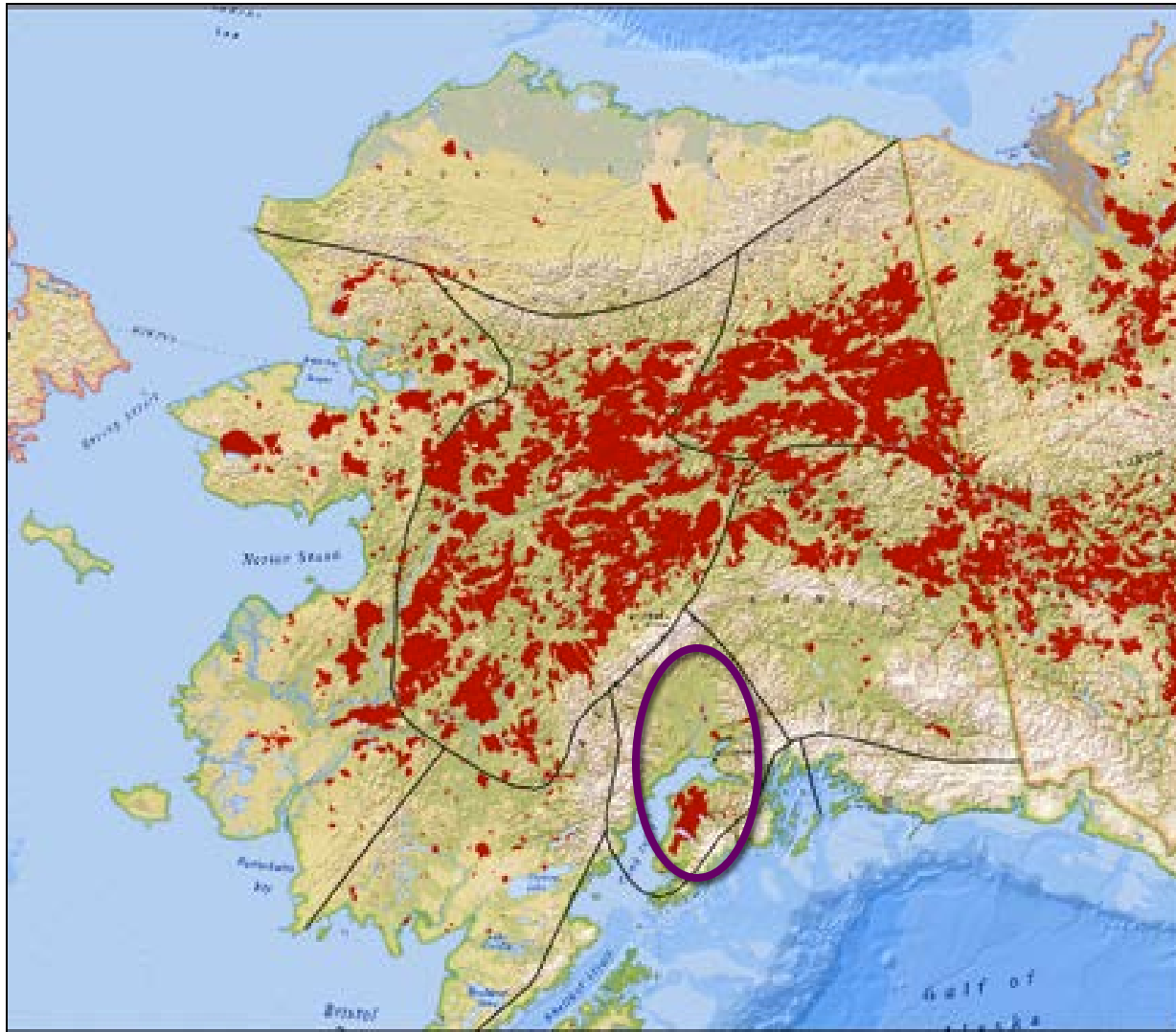
**ALASKA WILDLAND FIRE ACREAGE:
SEASONAL TOTALS, 1950–2015**



- No correlation between total acreage and overwinter snowpack/winter
- Early season threat in areas with low acreage but high population

Million acre seasons >twice as frequent since late 1980s

1950-2015 Wildfire Perimeters

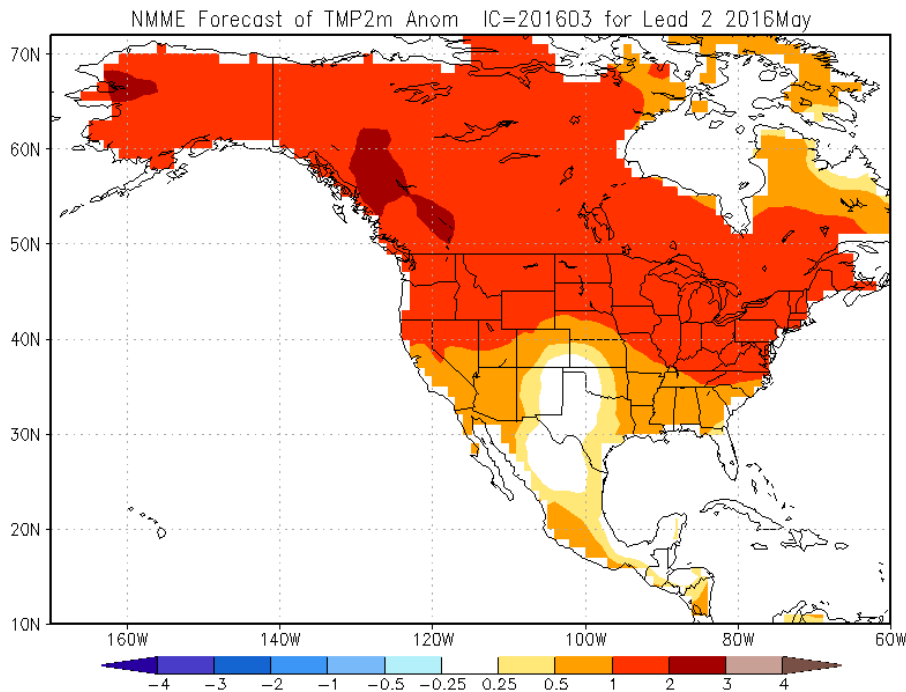


Tools for Sub-Monthly to Sub-Season Outlooks

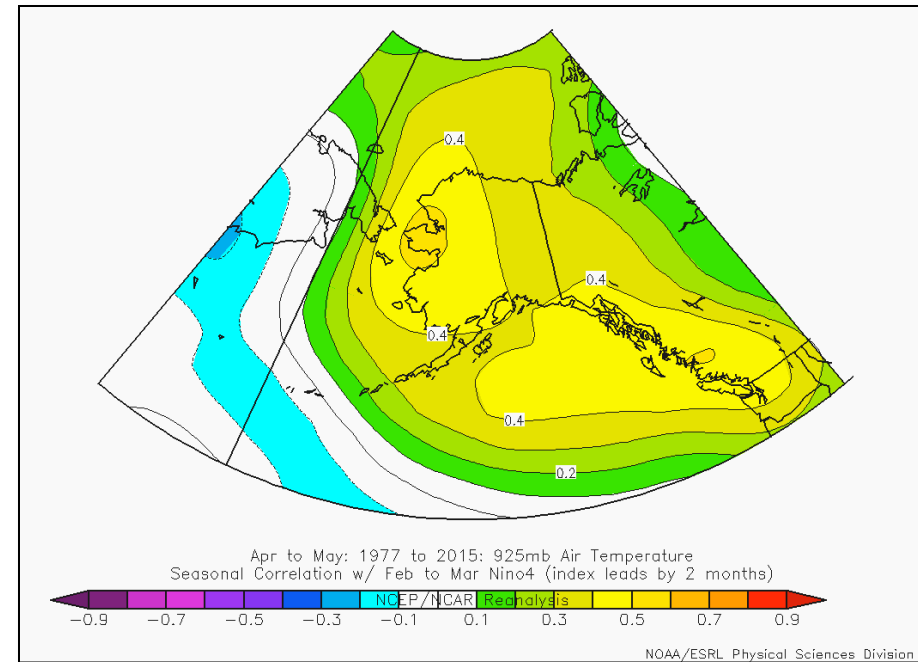
Since break-up is most strongly tied to April and May temperatures

- Statistical
 - Relationship of spring temperatures to oceanic climate drivers (PDO, ENSO, NPM)
 - Long Term Trend
- Dynamic modeling
 - Monthly: from many different centers and research groups (NMME, International)
 - Weekly to Monthly
 - NOAA's Climate Forecast System updated daily
- Official Forecasts
 - Alaska: Climate Prediction Center (weekly to seasonal)
 - Environment Canada: Monthly and Seasonal

Sub-Seasonal Tools: Dynamic and Statistical

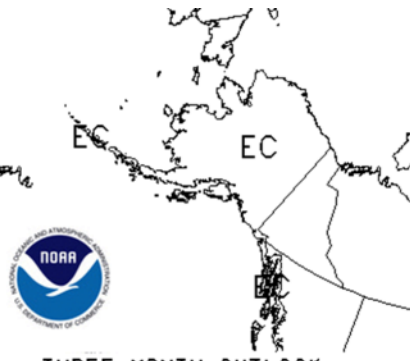
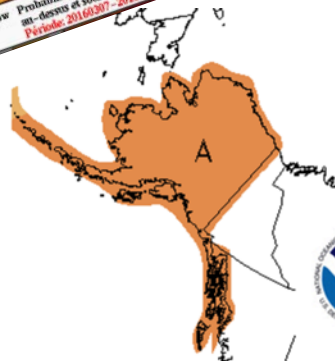
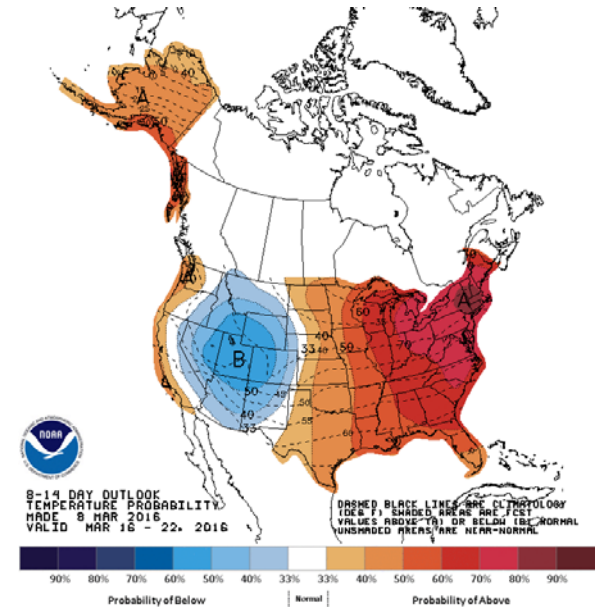
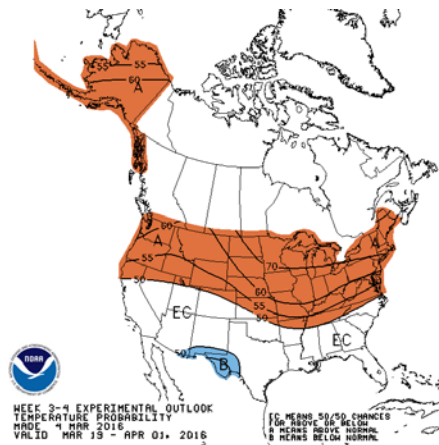
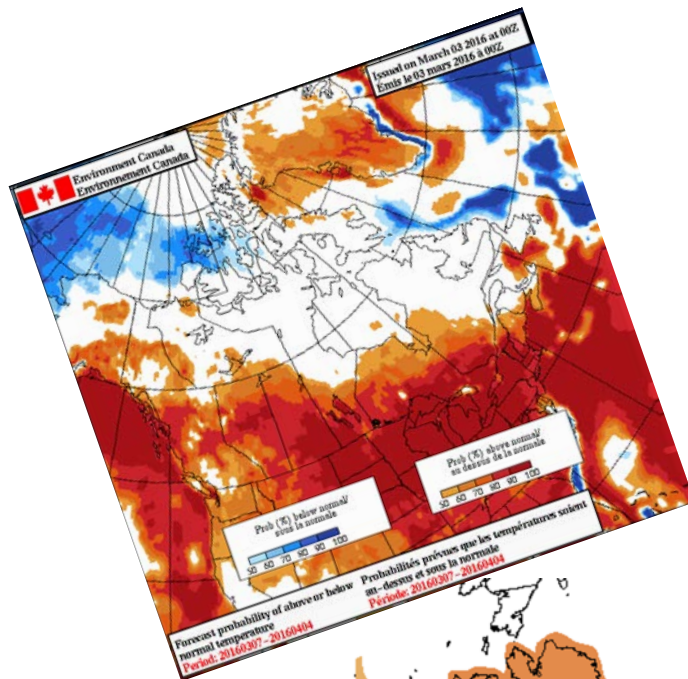


May Temperature Anomaly
(average of seven different
ensemble systems)



Lagged Niño 4 temps
correlations about
twice Niño 3.4

Official Outlooks



Official forecasts do not offer all the time scales, lead times and focus needed

River Breakup: Who does what with Spring Outlooks?

- NWS Internal
 - WFOs (WCM, SH)
 - Community and Emergency Manager Planning Meetings
 - Alaska-Pacific River Forecast Center
 - Informs the Break-up Outlook
- External Partners
 - State of Alaska Emergency Operations: Advance planning for RiverWatch
 - Reserving aircraft and scheduling personnel
 - State of Alaska Department of Transportation & PF
 - Highway Protection
 - Alaska Native Organizations
 - Tanana Chiefs Conference
 - Communities
 - Seasonal preparedness
 - Local experts availability
 - No emergency managers

Wildfires: Who does what with Spring Outlooks?

- Emergency Managers
 - Planning
 - Public Awareness
- Alaska Fire Service
 - Seasonal staff return dates
 - Warehouse scheduling
 - Jumper training

Like many land management questions, weather/climate outlooks are just one piece of the puzzle

Summary

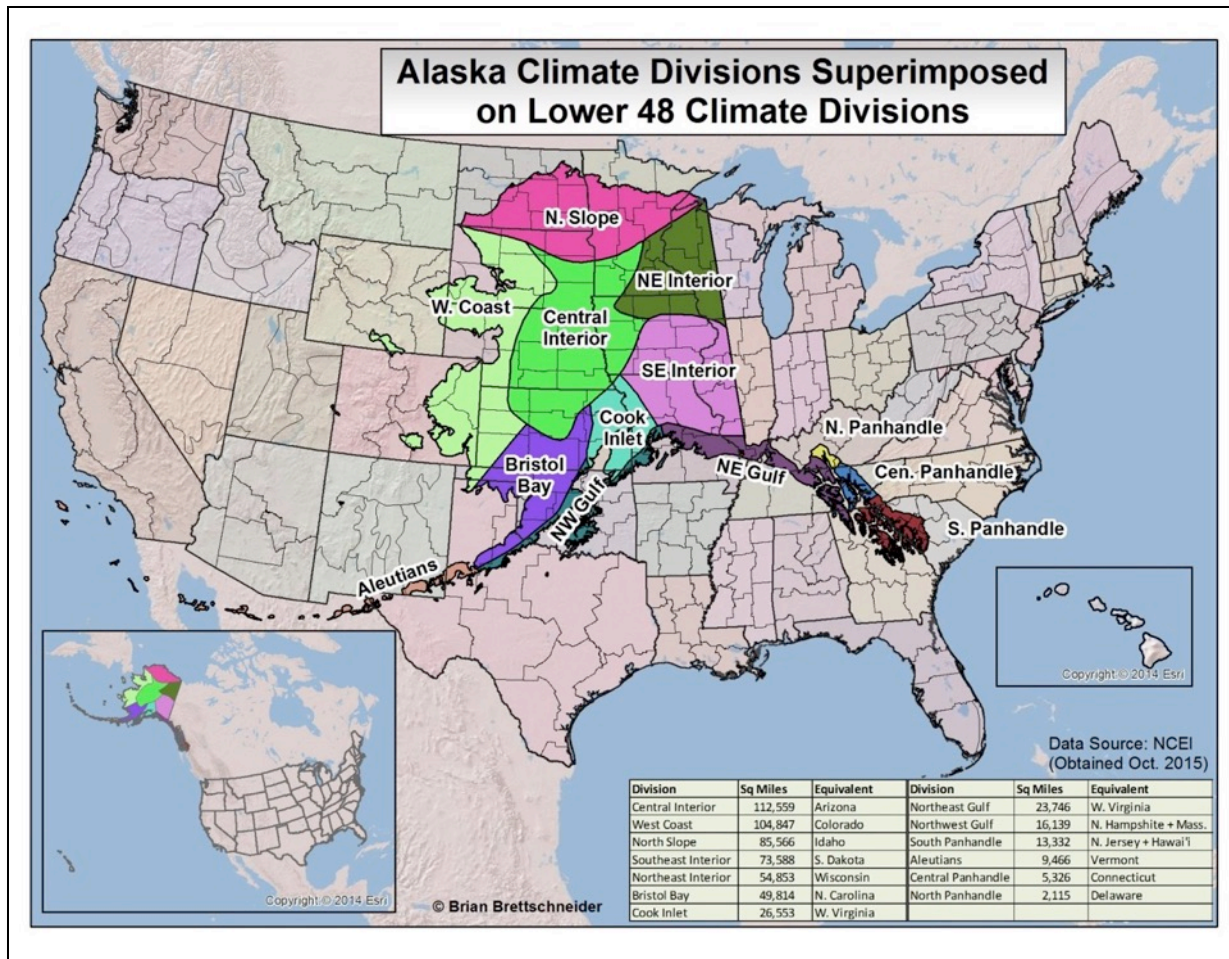
- Timing and nature of spring cryosphere transition sets the stage for two high risk environmental threats: ice jam flooding and wildfires
- Interest in pre-season planning widespread and increasing
- NWS Alaska Region steps up to provide user driven Impact Based Decision Support
 - Sub-seasonal (weeks to a month)

ACCAP Webinar April 12th for
2016 Break-up Outlook



Supplemental Slides

Alaska In Context



- Complex Terrain
Denali is just the tip
- High Latitude
55 to 71N
- End of the supply chain
Most communities are "off-road"

Tanana River at Nenana: When will the tripod fall?

- Unregulated river, single channel, 61 downriver miles from Fairbanks
- Same scheme & place since 1917

