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

Galena, May 2013

Courtesy: Alaska Dispatch News

Courtesy: NWS Alaska Region
Yukon River: Canada owns a third of the drainage

Note the lack of roads
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
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 inquires (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

Source: NWS-APRFC
Years with Major Ice Jam Flooding Yukon River (1979-2015)

Alaska Wildfire Acreage Increasing

- 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 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 cyrosphere 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