



# Kuigmek: one who watches the river

May, 2018

## Please Note:

Observers, don't forget to send in your Break-up Forms! These can now be completed on the web at <https://www.weather.gov/aprfc/breakupForm> or let us know if you need a paper copy. Also note that the web form can be submitted multiple times if you want to submit the timing of 'unsafe', 'breakup', and other events separately.

## In This Issue:

- Send us your photos and videos
- Breakup Outlook 2018
- Spring cleaning and water runoff pollution
- Anchor River Ice Jams
- Winter flood hazards: Ptarmigan Creek Outburst
- Eye in the Sky: Satellite Flood Product
- Winter Construction: Lowell Creek
- Kuskokwim Highway
- IDSS In Action: Hydropower
- What are the Chances? A move toward probabilistic forecasting
- Collaboration with Students
- Pacific Sector: April Flash floods on Kauai
- Flood Awareness Week
- APRFC and NWS Service Hydro Staff

**Alaska-Pacific  
River Forecast Center**  
6930 Sand Lake Road  
Anchorage, AK 99502-1845  
907-266-5160  
1-800-847-1739  
<http://weather.gov/aprfc>

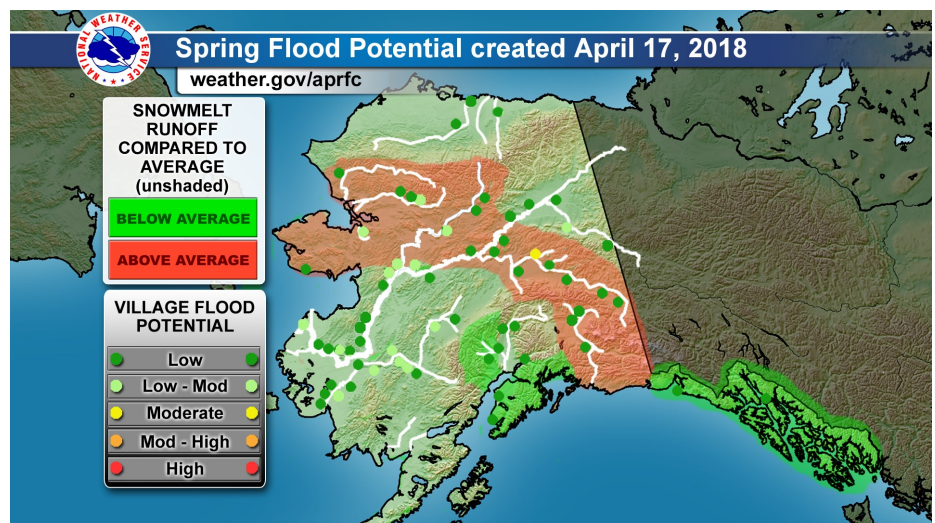
## Send Us Your Photos and Videos

Many thanks to those of you who have sent us pictures and videos of river ice conditions, flooding, erosion or other hydrologic phenomena. We welcome those anytime at [nws.ar.aprfc@noaa.gov](mailto:nws.ar.aprfc@noaa.gov) and please let us know if we can use your photo or video in our own publications (with credit, of course). If you use a gps-enabled phone or camera, we can typically read the coordinates from the image file, otherwise please tell us where the photo or video was taken. Thanks for being our eyes and ears in the field! You can also Tweet us at #AKriverwatch and #AKwx.



Nenana River, Photo Credit Adam White

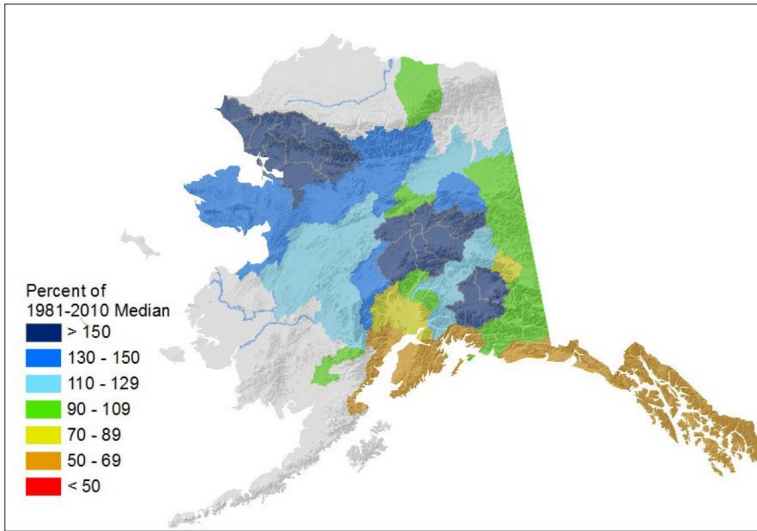
## Breakup Outlook 2018



## Breakup Outlook 2018 (continued)

### Alaska Snowpack as of April 1, 2018

Based on Snow Course and SNOTEL site Snow Water Content



When anticipating the severity of spring breakup, we look at the temperature forecasts and the existing snow pack and ice thickness. This year, parts of the Interior, Copper Basin, and Northwest Alaska had exceptional snow packs, while Southeast and Southcentral were drier than normal. Ice thickness, at its peak, was below normal in much of the state. These and other factors were considered during the development of the spring flood potential outlook. Breakup conditions will be posted throughout the season on our website at

<http://www.weather.gov/aprfc/>

## Spring Cleaning and Water Runoff Pollution

Remember that when spring snows melt, accumulated winter waste can be blown and washed into waterways, clog storm drains, and end up in the ocean. Picking up pet waste and trash in yards and along roadways helps keep our waters clean. Tuning up your vehicles can prevent oil and gas leakage. Participate in local cleanup efforts. Many communities in Alaska have social spring cleanup days. Thanks for doing your part to keep our water clean! Example events:

Akiak Cleanup Greenup: TBD

Anchorage Waterways Council: May 10-14

Anchorage Dog Parks: April 28

Fairbanks Clean-up Day: May 5

Juneau Community Wetlands Cleanup: April 28

Tanana Valley Watershed Association: TBD

## Anchor River Ice Jams

The Anchor River is a small, unglaciated catchment near Homer that is typically one of the first to break up in spring. Small ice jams are relatively common here. This year, our field team arrived for routine data collection just as an ice jam formed and the river moved toward minor flood stage. The Cook Inletkeeper group also did a flood impact survey with remotely powered aircraft.



Photo credit: APRFC Staff

## Winter flood hazards: Ptarmigan Creek Outburst

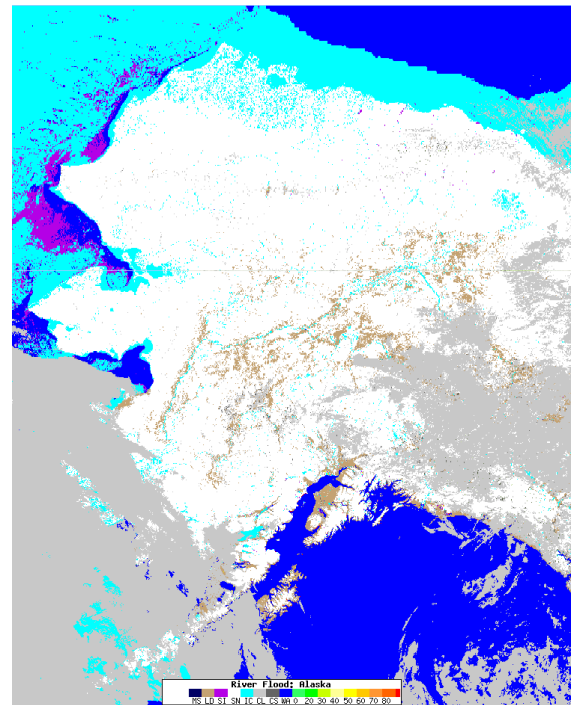


Photo credit: Gary Baker

Just because it's winter doesn't mean there are no flood risks. The image here was part of a video taken on Ptarmigan Creek near Kenai Lake at the end of January, 2018. It shows a fast-moving wave of water coming down what had been an almost dry creek bed. The source of the water was probably an upstream ice/snow dam that suddenly burst, which also happened on Ptarmigan Creek the previous winter. Beware of hiking in creek beds, any time of year.

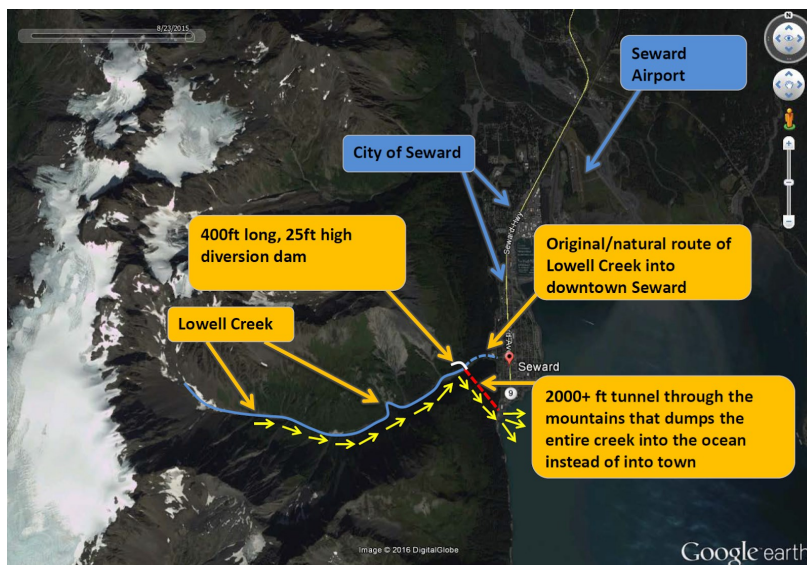
## Eye in the Sky: Satellite Flood Product

We here at the National Weather Service can't be everywhere at once. Our observational network is especially sparse here in Alaska. Increasingly, we depend on a satellite-based flood product generated by NOAA's Joint Polar Satellite System and project scientist Dr. Sanmei Li. Dr. Li and her collaborator, Dr. Donglian Sun, designed the algorithm, which is applied to satellite imagery as it's downlinked in Fairbanks at NOAA's Satellite data receiving station, and is then pushed to the NWS by the University of Alaska. This partnership allows us to get a map of the likelihood of flood conditions in any given 375m pixel, several times a day when the sky is clear.



JPSS River Flood Product, NESDIS/NWS/GMU/UAF

## Winter Construction: Lowell Creek Project



Graphic: APRFC Staff

Lowell Creek used to routinely flood the city of Seward. In 1940, a tunnel was built that diverts the creek away from downtown. Like all infrastructure, this tunnel needs routine maintenance. With low flows in winter, this was the best time for the maintenance team to 'dewater' the tunnel and finish their work. Our Anchorage Service Hydrologist, Andy Dixon, has been a point of contact for the project, helping alert team members when heavy precipitation is forecasted.

## Kuskokwim Highway

Dozens of communities dot the Kuskokwim River landscape and when the river freezes solid, it becomes an essential transportation corridor in winter. This year the Kuskokwim faced one of its latest freeze-up dates on record. Despite this, heavy equipment was able to get in and plow the ice road all the way to Crooked Creek, making this the longest Kuskokwim Ice Road in history. More than ten different communities collaborated to make this record-breaking road happen.



Photo credit: Mark Leary

## Impact Decision Support Services (IDSS) In Action: Southeast Alaska Hydropower

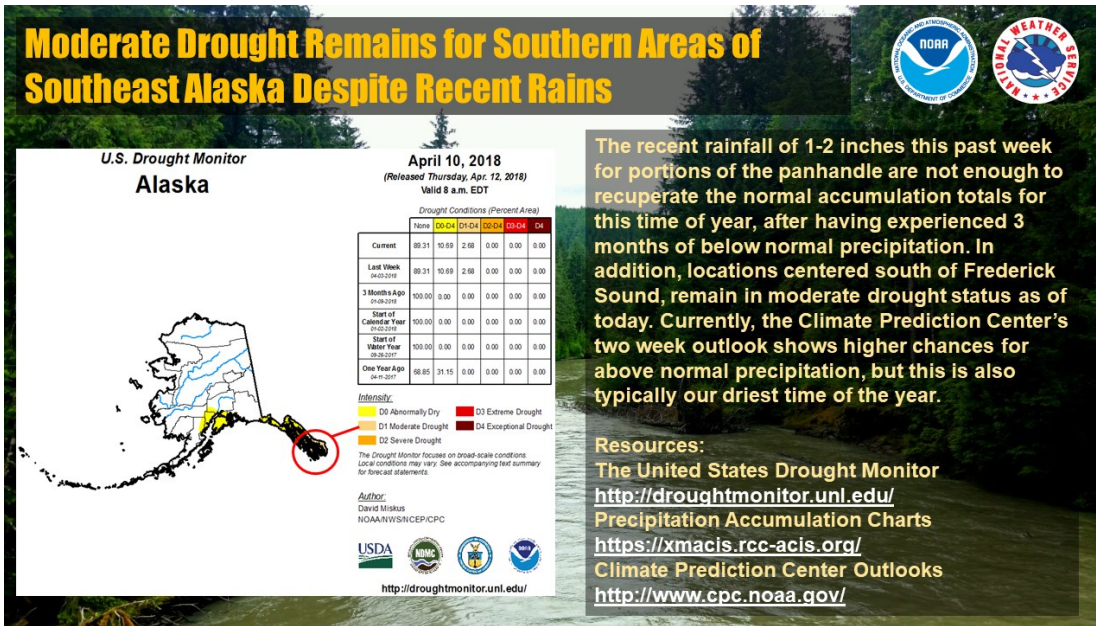
In each newsletter, we try to cover case studies of how the National Weather Service (NWS) provides what we call Impact-based Decision Support Services (IDSS) to our core partners: this spring, hydroelectric power is a hot topic. For much of the winter, Southeast Alaska has been dry (see Table 1). So dry, in fact, that the Swan Lake reservoir that powers the hydroelectric plant for Ketchikan has been drawn down to its lowest levels since construction. While Ketchikan can utilize some power from the Tye Lake project near Petersburg and Wrangell via an intertie, it also must use expensive diesel fuel to make up for hydropower shortcomings. Recent precipitation in mid-April helped alleviate the shortage in Ketchikan, but the extra costs of running the diesel generators have impacted the project. The abnormally dry conditions in the temperate rainforest of the panhandle did not just affect hydropower generation, but also drinking water availability. During the month of March, and into early April, the city of Wrangell issued water use restrictions as water levels in their reservoir was very low.

Table 1	Current water year precip (inches, Sept-March)	Normal precip (inches)	Percent of normal
Site			
Annette Island	38.70	65.77	59
Ketchikan	61.95	90.66	68
Klawock	30.49	59.74	51
Sitka	34.65	54.37	64
Juneau	30.52	34.86	88
Haines	20.09	33.84	59
Yakutat	58.51	91.87	64



Swan Lake reservoir showing record low water. Photo courtesy of Southeast Alaska Power Agency (SEAPA)

## IDSS for Southeast Alaska Hydropower (continued)



### Moderate Drought Remains for Southern Areas of Southeast Alaska Despite Recent Rains

**U.S. Drought Monitor Alaska**  
April 10, 2018  
(Released Thursday, Apr. 12, 2018)  
Valid 8 a.m. EDT

	Drought Conditions (Percent Area)					
	None	D0-D1	D2-D3	D4	D5	D6
Current	88.31	10.69	2.00	0.00	0.00	0.00
Last Week (4-03-2018)	88.31	10.69	2.00	0.00	0.00	0.00
3 Months Ago (1-08-2018)	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year (01-01-2018)	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year (06-01-2017)	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago (04-10-2017)	68.85	31.15	0.00	0.00	0.00	0.00

**Intensity:**  
 D0 Abnormally Dry    D1 Moderate Drought    D2 Severe Drought  
 D3 Extreme Drought    D4 Exceptional Drought

**Author:**  
David Miskus  
NOAA/NWS/NCEP/CPD

<http://droughtmonitor.unl.edu/>

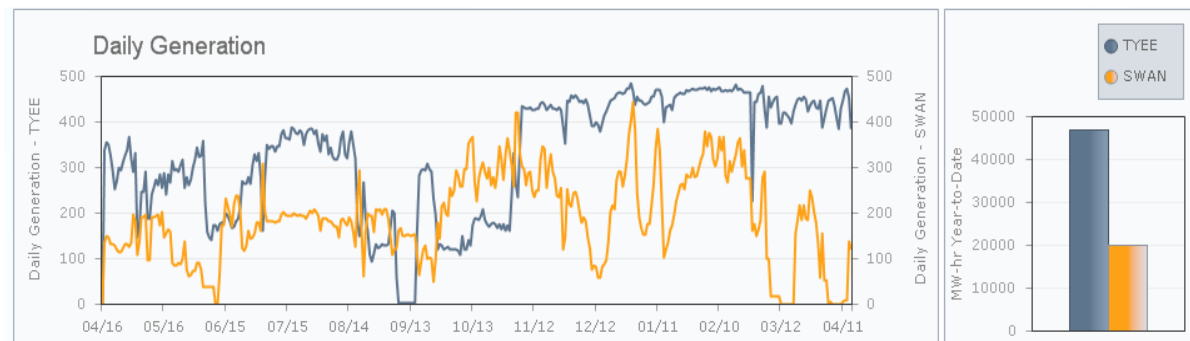
**Resources:**  
 The United States Drought Monitor <http://droughtmonitor.unl.edu/>  
 Precipitation Accumulation Charts <https://xmacis.rcc-acis.org/>  
 Climate Prediction Center Outlooks <http://www.cpc.noaa.gov/>

The recent rainfall of 1-2 inches this past week for portions of the panhandle are not enough to recuperate the normal accumulation totals for this time of year, after having experienced 3 months of below normal precipitation. In addition, locations centered south of Frederick Sound, remain in moderate drought status as of today. Currently, the Climate Prediction Center's two week outlook shows higher chances for above normal precipitation, but this is also typically our driest time of the year.

Example of IDSS sent over Facebook from the Juneau NWS WFO.

The NWS Weather Forecast Office (WFO) in Juneau provided IDSS to water managers and hydropower facilities across Southeast Alaska by sending out climate outlooks for one and three months, along with the current state of rainfall and snowpack deficits. The water managers

and hydropower operators forwarded information on the state of their facilities to the NWS, and that information was passed on to the National Drought Information group. This sharing of information between core partners and NWS



Graphic: Courtesy SEAPA

was instrumental in increasing the drought severity for the southern half of Southeast Alaska from abnormally dry (D0) to a moderate

drought (D1). The NWS Juneau office also put out social media posts so that the general public was more aware of the drought situation across the region. These efforts by the Juneau NWS WFO are helping to make Southeast Alaska communities ready, responsive, and resilient to weather and climate impacts, which is the goal of IDSS.

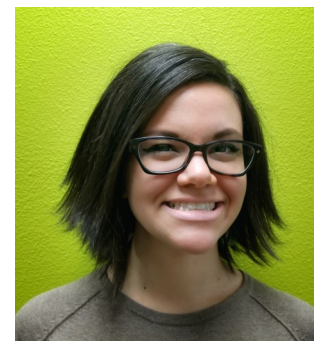
### New Forecast Points Coming Online in 2018

The APRFC will forecast five new points during the summer of 2018. These points are the Indian River at Sitka, Wulik River at Kivalina, Kobuk River at Ambler, Kobuk River at Kiana, and Knik River at Palmer. The Kobuk and Wulik River locations will be the first forecast points at the APRFC in the extreme northwest part of the state. The Indian River forecast point will operate at a 1 hour time step and have a shorter forecast horizon due to its small basin size.

### Collaboration with Students and Researchers

We here at NWS and the APRFC welcome opportunities to work with students and other researchers. This summer, Dina Abdel-Fattah, a PhD student at the University of Alaska Fairbanks, will be working with us to study the communication of forecast information and risk. Abdel-Fattah has a background in technology, process engineering, and communication, and is part of the Arctic Domain Awareness Center, a collaboration between NOAA, the Department of Homeland Security, and the University of Alaska.

Photo: Dina Abdel-Fattah



## What are the Chances? A move toward probabilistic forecasting

Weather and water modeling is starting to move towards what we call probabilistic approaches. After a period of testing, some of our hydrologic forecasts will include not just a single water height or flow volume, but a range of possible outcomes and some probability assigned to those ranges. This will help stakeholders who could be impacted by extreme high or low water, and want to prepare, even if those outcomes are unlikely.

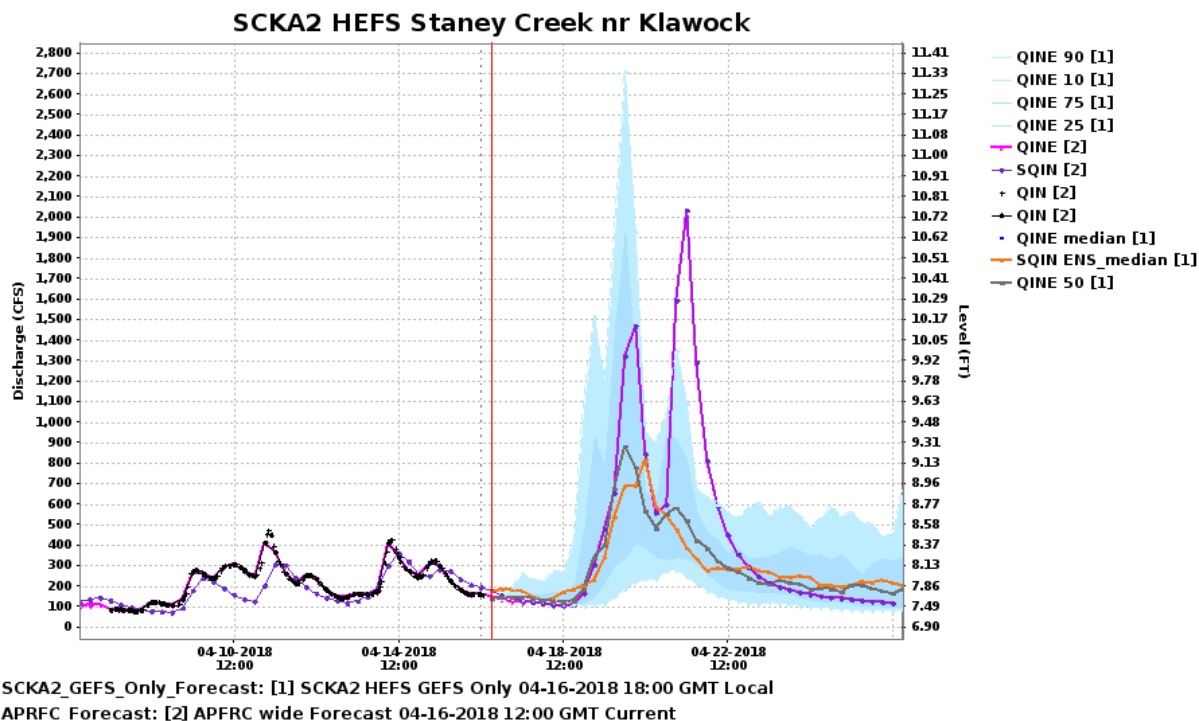


Image: Experimental output from the new Hydrologic Ensemble Forecast System (HEFS) shows an envelope of possible stage and discharge values for Staney Creek during one sample forecast period.

## Pacific Sector: April Flash floods on Kauai

The APRFC provides some modeling support to the NWS WFO in Honolulu, but responsibility for flash flooding falls with the WFO because of the speed at which it occurs and the localized nature of the impacts. From April 14-16 heavy, persistent rain led to significant flooding on the island of Kauai. Impacts included flooded roads, homes and other buildings, landslides, air rescues, and water service outages in some communities. Governor David Ige issued an emergency proclamation and cleanup is ongoing.



Kevin Olson Honolulu Star Advisor

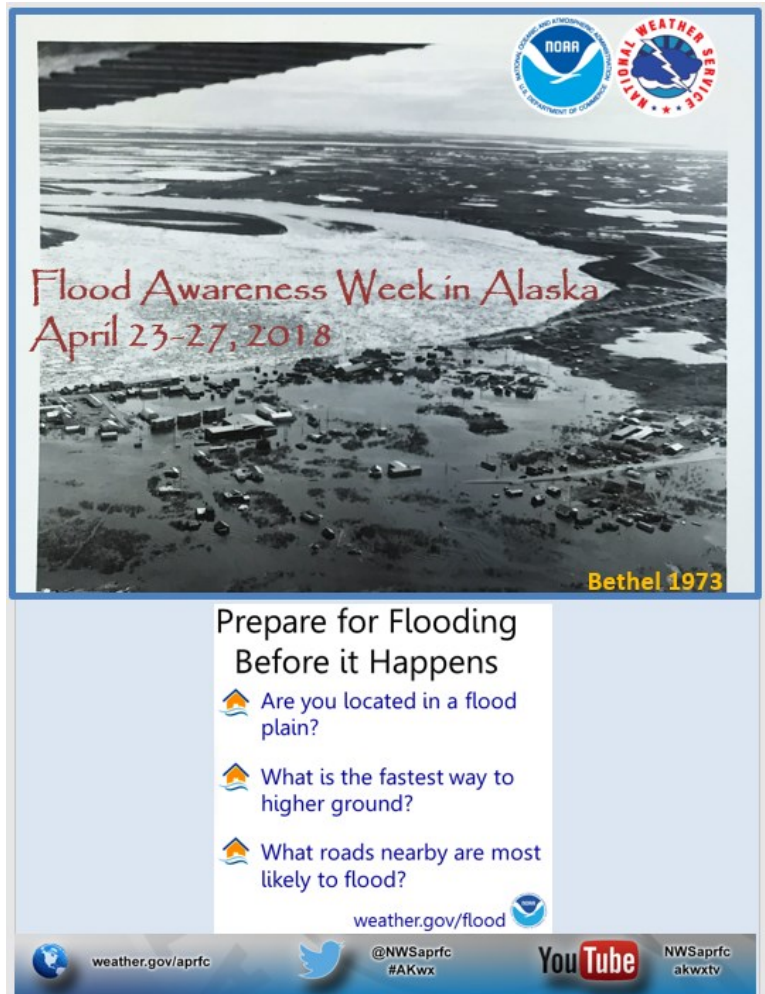
## Flood Awareness Week

Staff at the APRFC and NWS WFOs work together with the State of Alaska and other Federal agencies each year to promote Flood Awareness Week, just prior to spring breakup season. We use social media and in-person meetings to convey messages about flood hazards. This year's dates were April 23-27, 2018.

## Current APRFC Staff and NWS Service Hydrologists

Scott Lindsey, Hydrologist-In-Charge  
David Streubel, Development and Operations Hydrologist  
Crane Johnson, Service Coordination Hydrologist  
Jessica Cherry, Senior Hydrologist  
Eric Holloway, Hydrometeorologist  
Arleen Lunsford, Hydrometeorologist  
Edward Moran, Senior Hydrologist  
Celine van Breukelen, Hydrologist  
Rebecca Perry, Hydro Tech and Administrative Support  
Vacant, Computer Programming and Administration  
Vacant, Senior Hydrometeorologist

WFO Service Hydrologists: Andy Dixon (Anchorage), Karen Endres (Fairbanks), Aaron Jacobs (Juneau), Ed Plumb (now the Warning Coordination Meteorologist in Fairbanks)



The image is a promotional graphic for Flood Awareness Week in Alaska. At the top right are the NOAA and National Weather Service logos. The main image shows a flooded town with houses and cars submerged in water. Text overlay reads "Flood Awareness Week in Alaska April 23-27, 2018" and "Bethel 1973". Below the image is a white box with the heading "Prepare for Flooding Before it Happens" and three questions: "Are you located in a flood plain?", "What is the fastest way to higher ground?", and "What roads nearby are most likely to flood?". At the bottom are social media links for weather.gov/flood, @NWSaprfc #AKwx, and YouTube NWSaprfc akwxtv.



### Contact information:

[nws.ar.aprfc@noaa.gov](mailto:nws.ar.aprfc@noaa.gov)  
907-266-5160  
1-800-847-1739  
<http://weather.gov/aprfc>

*Fairbanks Service Hydrologist Karen Endres talks about satellite flood products at the Alaska Chapter of the American Water Resources Association meeting in Anchorage, 2018.*