

The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The main title is centered in the upper half of the slide.

DROUGHT IN A RAINFOREST...HOW CAN THAT BE??

AARON JACOBS AND RICK THOMAN

NWS ALASKA REGION

TODAY'S AGENDA

- BASICS: DROUGHT, RAIN FORESTS AND SOUTHEAST ALASKA
- THIS PAST SEASON
 - **WHAT HAPPENED, COULD WE HAVE FORESEEN IT?**
- IMPACTS IN THE RAINFOREST
 - **HYDRO-ELECTRIC POWER GENERATION**
 - **DRINKING WATER SUPPLY**
 - **FISHERIES**
 - **WINTER SPORTS**
 - **RAINFOREST HEALTH**
- REVIEW OF 2017-2018 MODERATE DROUGHT IMPACTS
 - **KETCHIKAN/PRINCE OF WALES ISLAND**
 - **WRANGELL**

WHAT IS DROUGHT?

- DROUGHT ORIGINATES FROM A DEFICIENCY OF PRECIPITATION OVER AN EXTENDED PERIOD OF TIME
- IMPACTS RESULT FROM THE INTERPLAY BETWEEN THE NATURAL EVENT AND THE DEMAND PEOPLE PLACE ON WATER SUPPLY
- DROUGHT USUALLY DEFINED BOTH CONCEPTUALLY AND OPERATIONALLY

Source: drought.gov

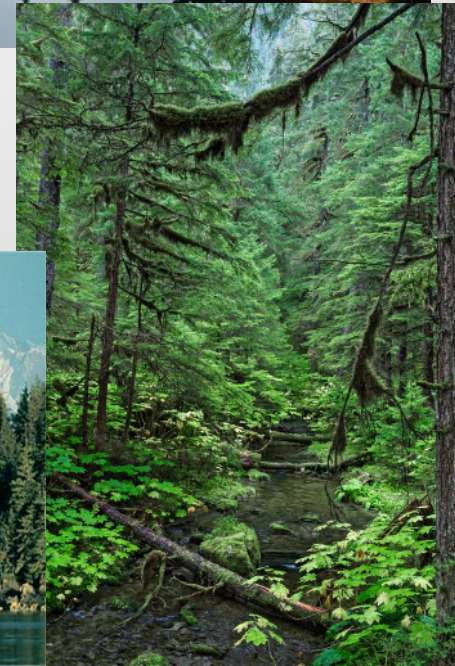


DROUGHT IN NORTHERN CLIMATES?

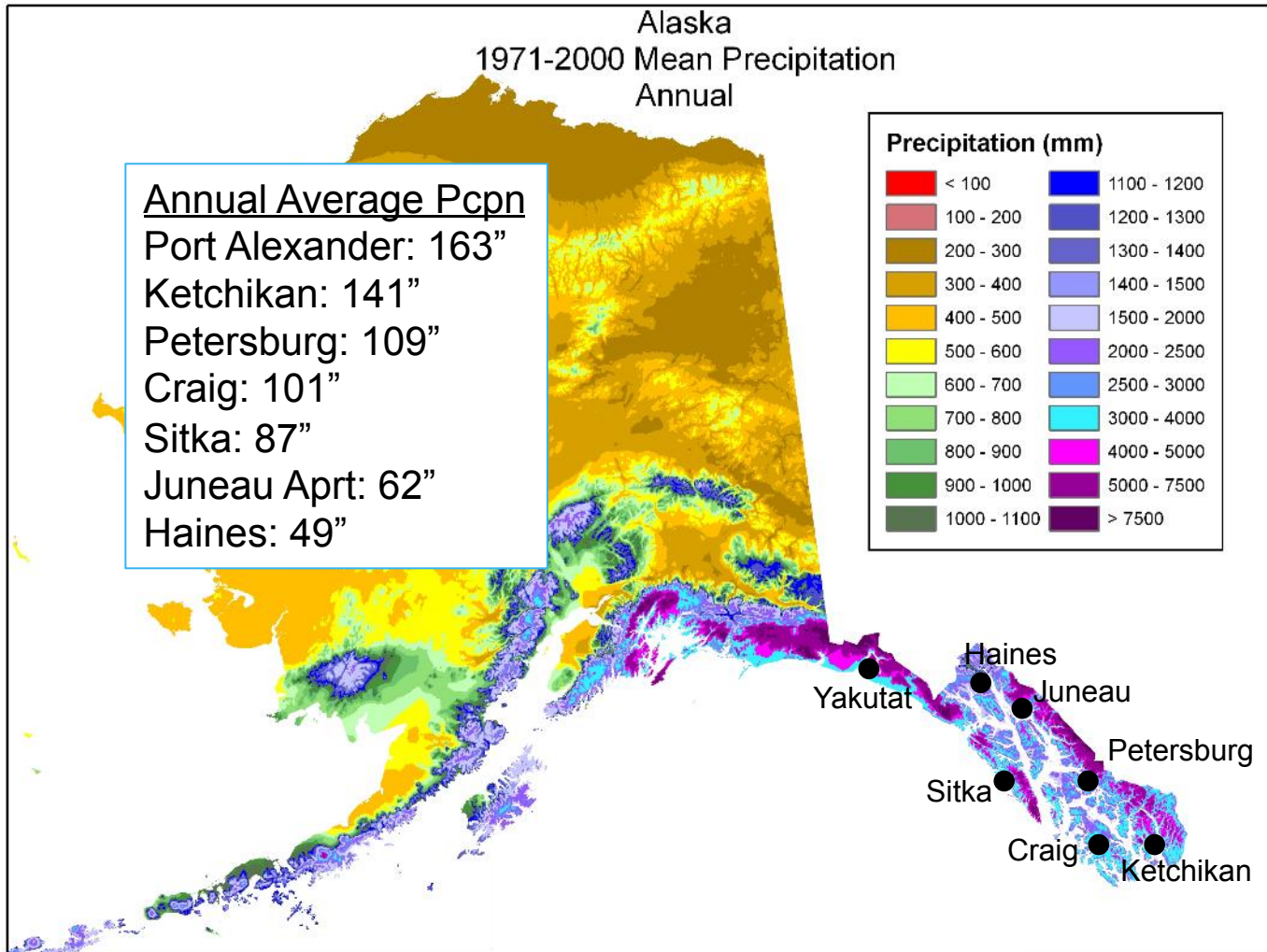
- DROUGHT NOT SO CLEARLY DEFINED IN AREAS WITH LONG SNOW COVER SEASON AND LOW EVAPORATION
- TIMING IS IMPORTANT
- PRECIPITATION DROUGHT VS. SNOW DROUGHT
 - **PRECIP DROUGHT:** LESS STUFF FALLS OUT OF THE SKY (2017-18)
 - **SNOW DROUGHT:** NEAR NORMAL PRECIP BUT BELOW NORMAL SNOW ACCUMULATION CAUSED BY HIGHER THAN USUAL SNOW LEVELS...SO LOW MOUNTAIN SNOW PACK (E.G. 2014-15)

COASTAL TEMPERATE RAINFOREST

- COASTAL TEMPERATE RAINFORESTS ARE RARE. THEY OCCUR IN ONLY 6 PLACES OUTSIDE OF ALASKA, TONGASS NATIONAL FOREST IS THE LARGEST IN THE WORLD (16.7MILLION ACRES).
- THE CANOPY OF TREES COVERING THE FOREST EXCLUDES 70 PERCENT OF THE SKY.
- WHAT MAKES TEMPERATE RAINFOREST DIFFERENT FROM TROPICAL RAINFORESTS? COOLER (MEAN TEMP 39-54°F), BUT JUST AS WET, FROM 60" TO 200+" PER YEAR, AND CLIMATE IS MODERATED BY PROXIMITY TO THE OCEAN.
- THE ALASKAN RAINFOREST IS HOME TO A COMPLEX WEB OF ECOLOGICAL INTER-RELATIONSHIPS.

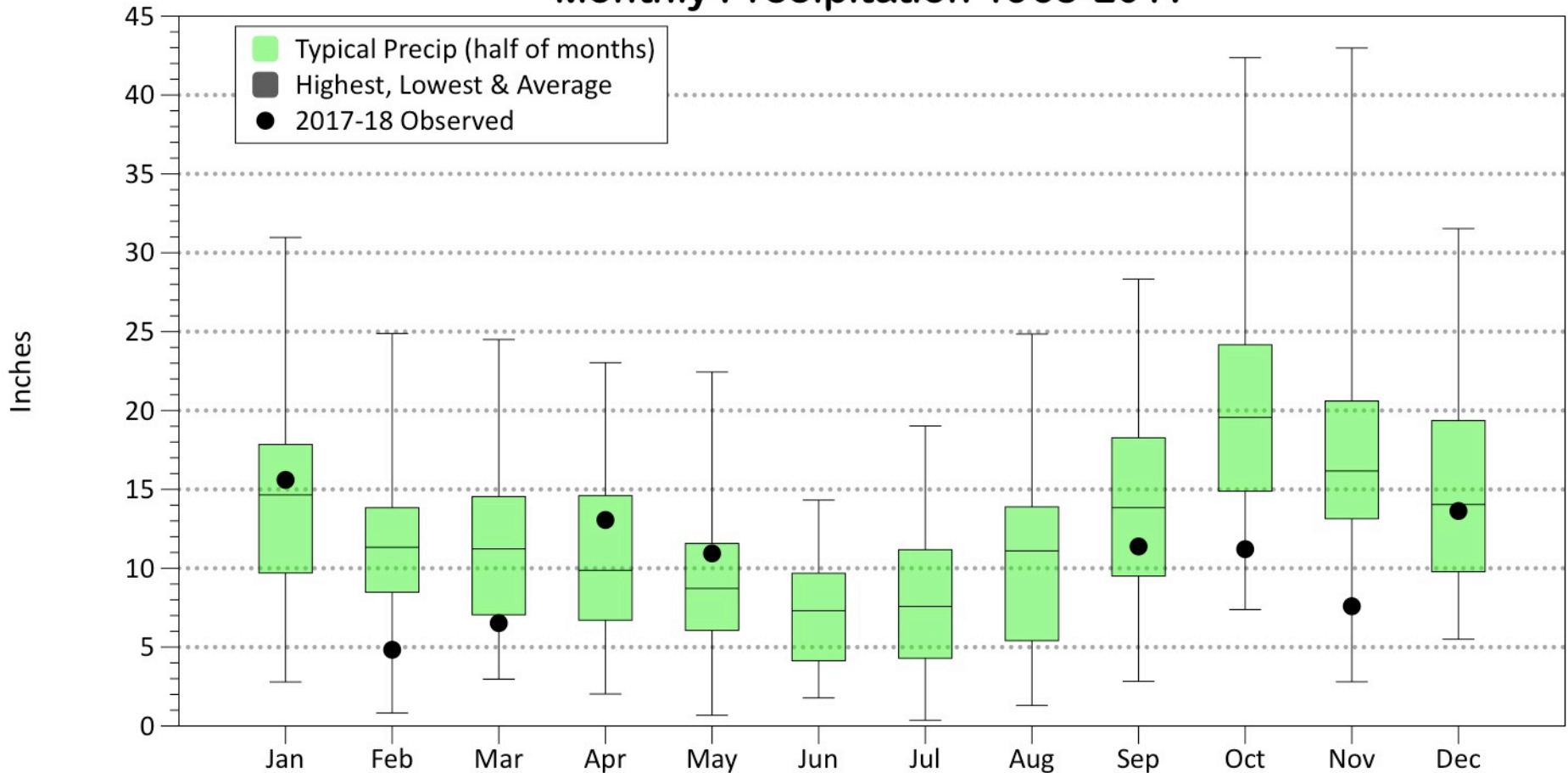


SOUTHEAST ALASKA LAND OF A LOT OF PRECIPITATION



KETCHIKAN MONTHLY PRECIPITATION

Ketchikan, Alaska Monthly Precipitation 1968-2017



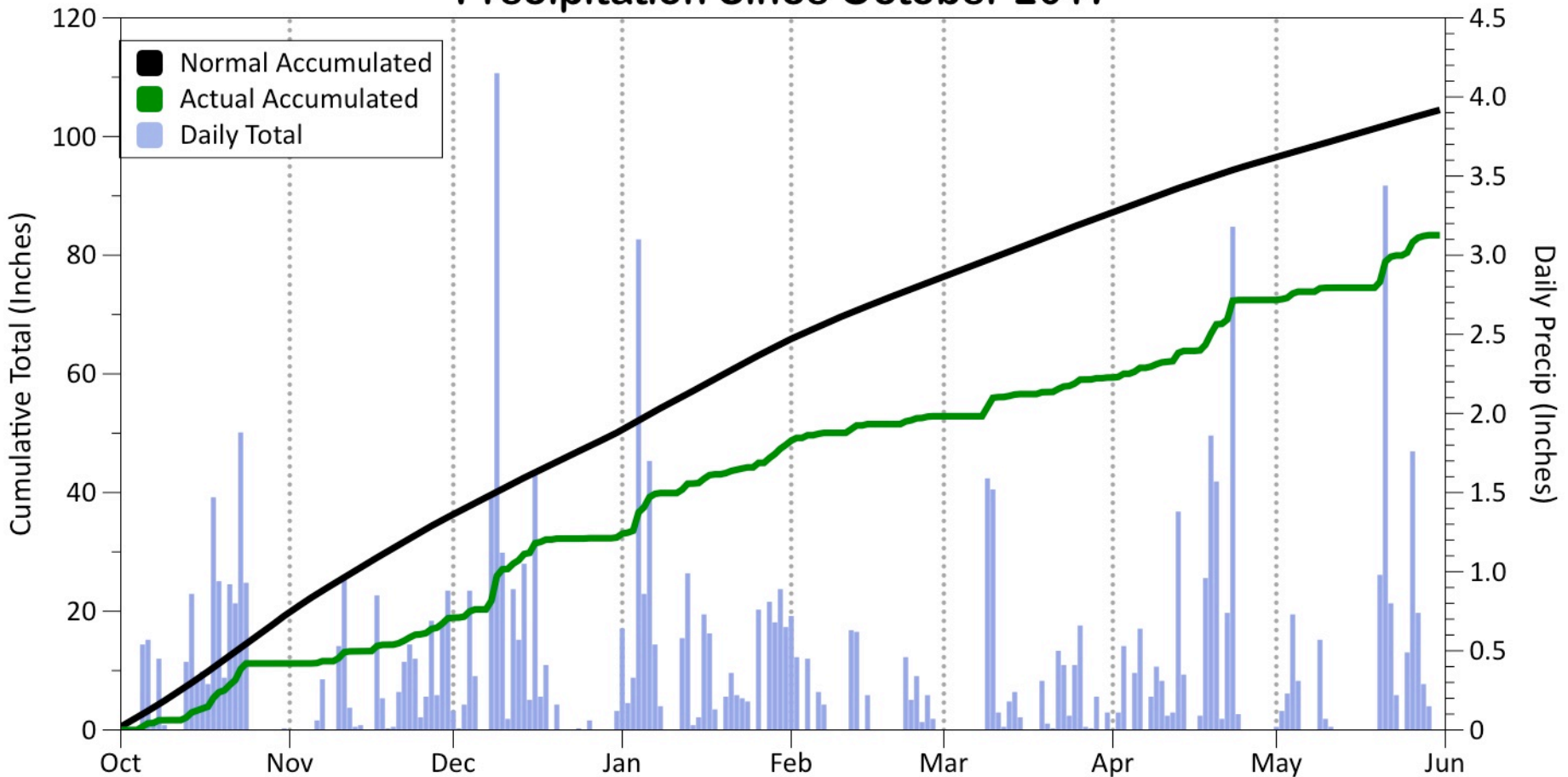
Data source: NOAA/NCEI & NWS



KETCHIKAN PRECIPITATION SINCE OCTOBER

Ketchikan, Alaska

Precipitation Since October 2017



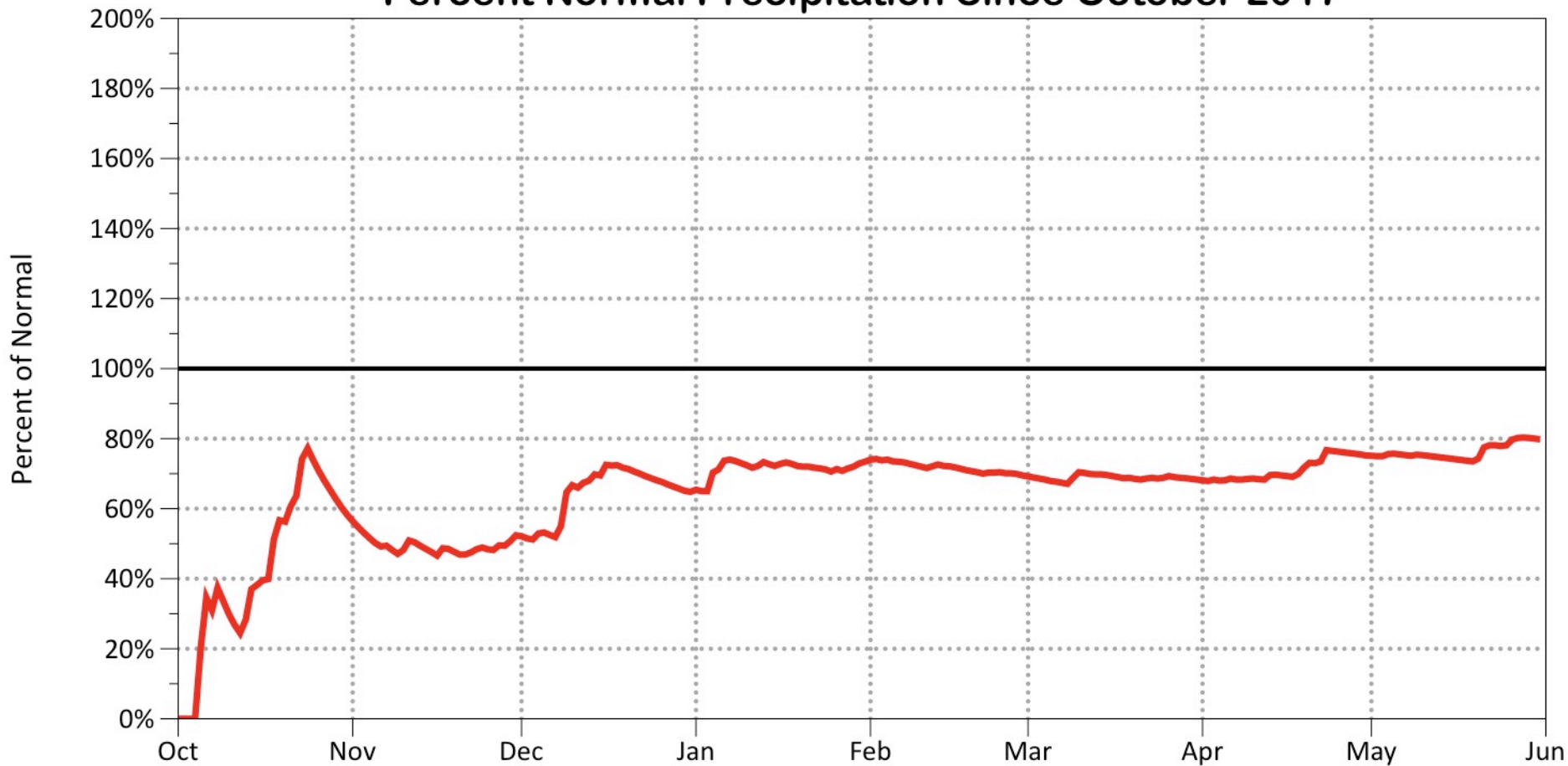
Data source: NOAA/NCEI & NWS



KETCHIKAN PRECIPITATION SINCE OCTOBER 2017

Ketchikan, Alaska

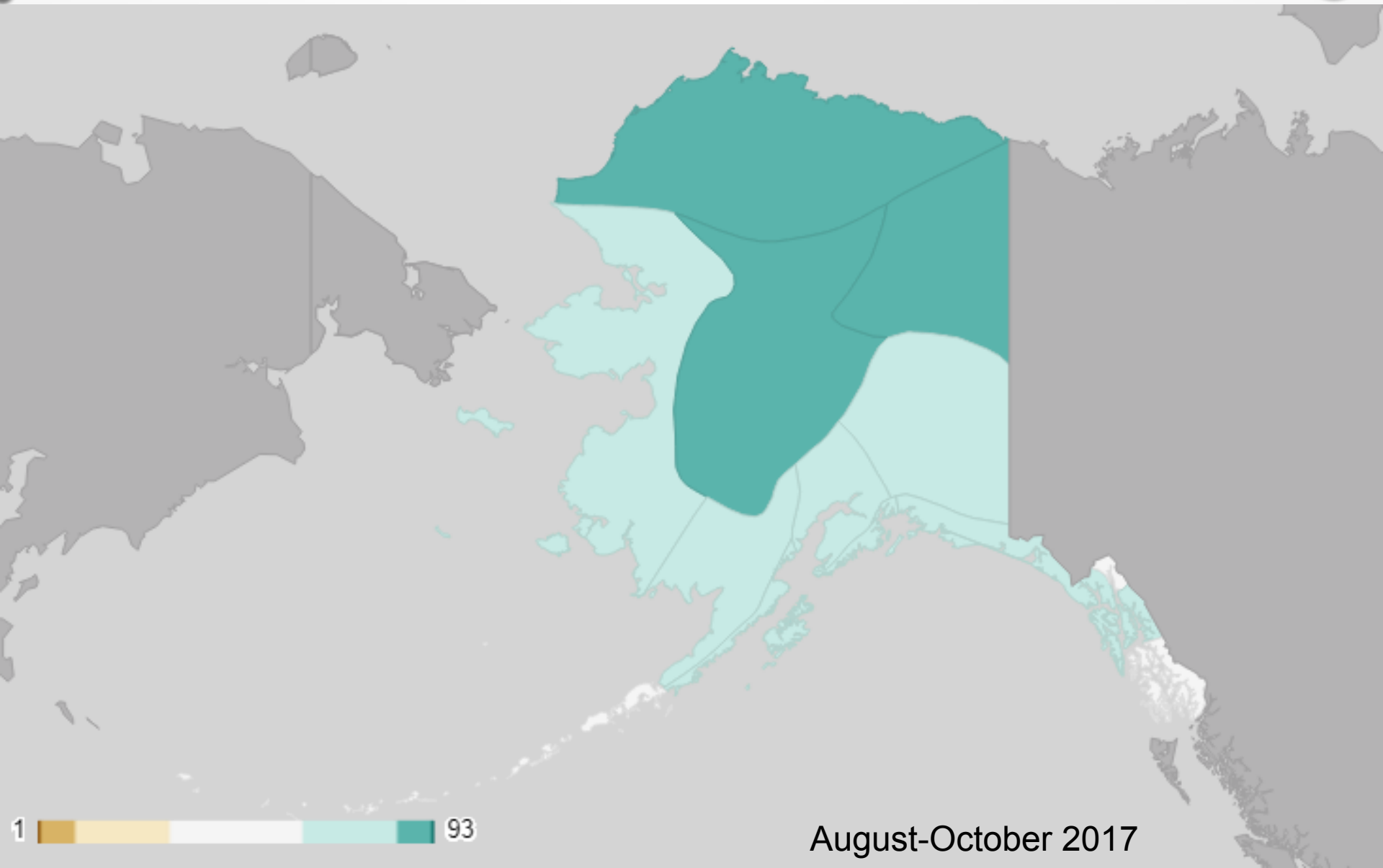
Percent Normal Precipitation Since October 2017



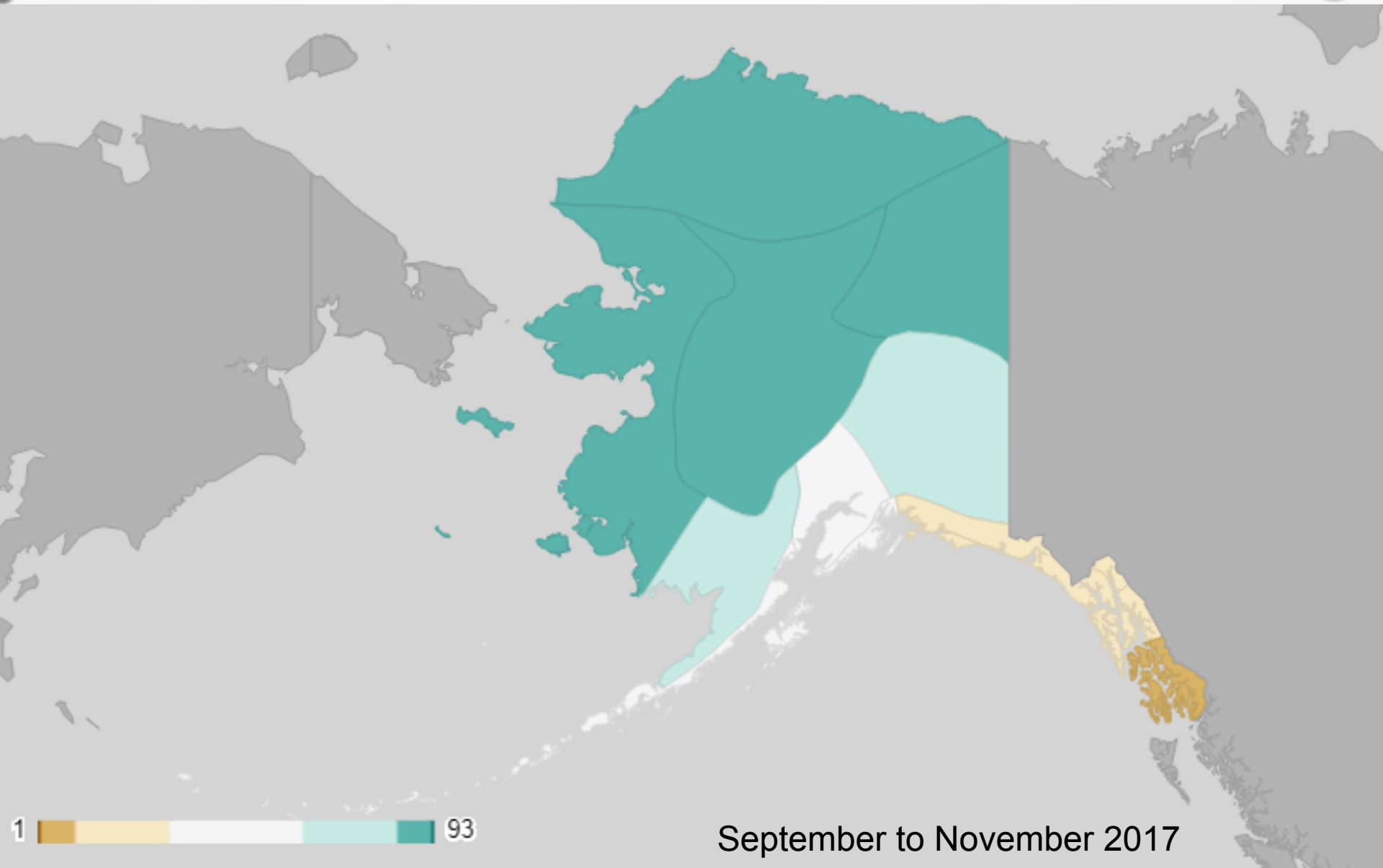
Data source: NOAA/NCEI & NWS



THREE MONTH TOTAL PRECIP RANKS

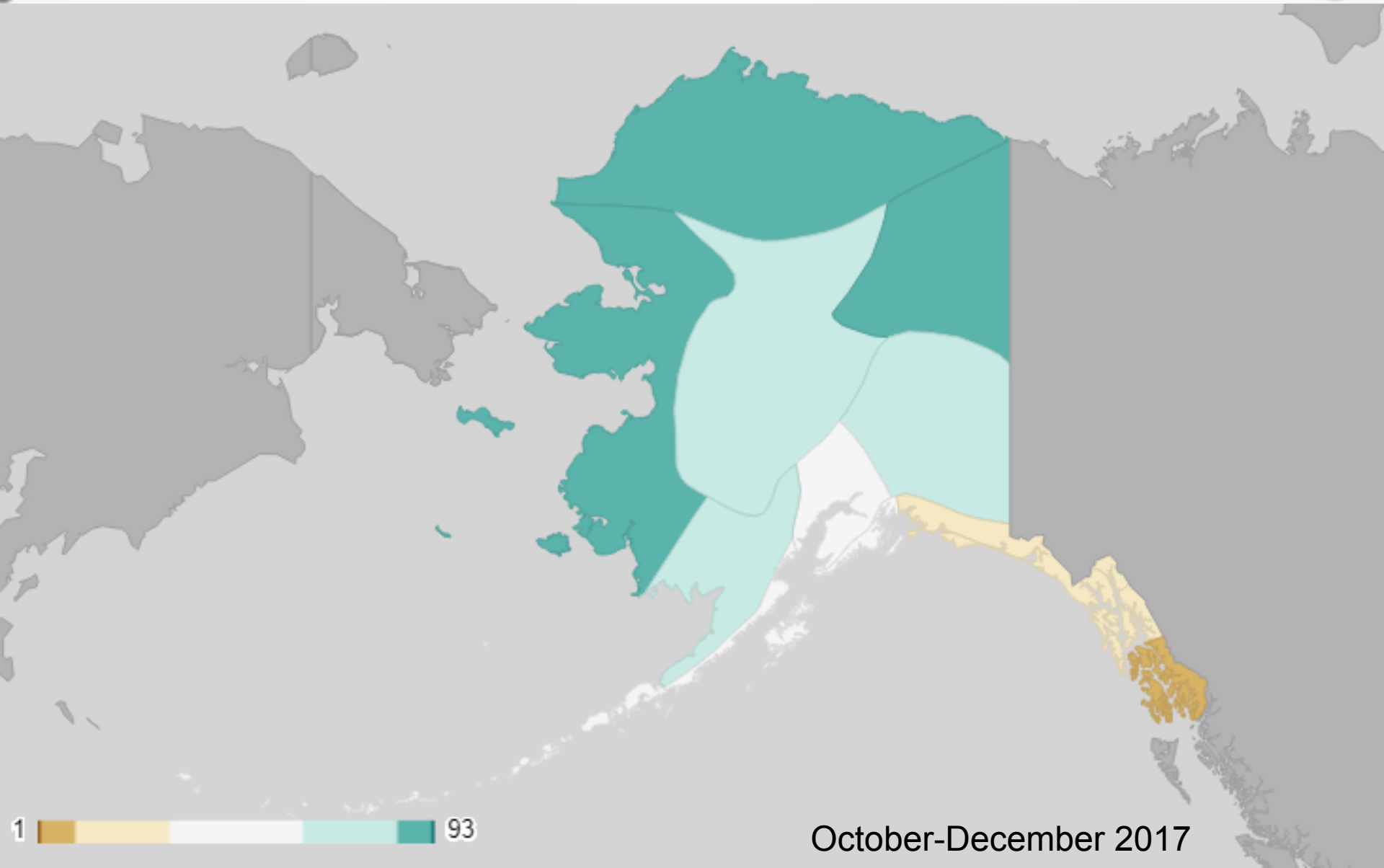


THREE MONTH TOTAL PRECIP RANKS

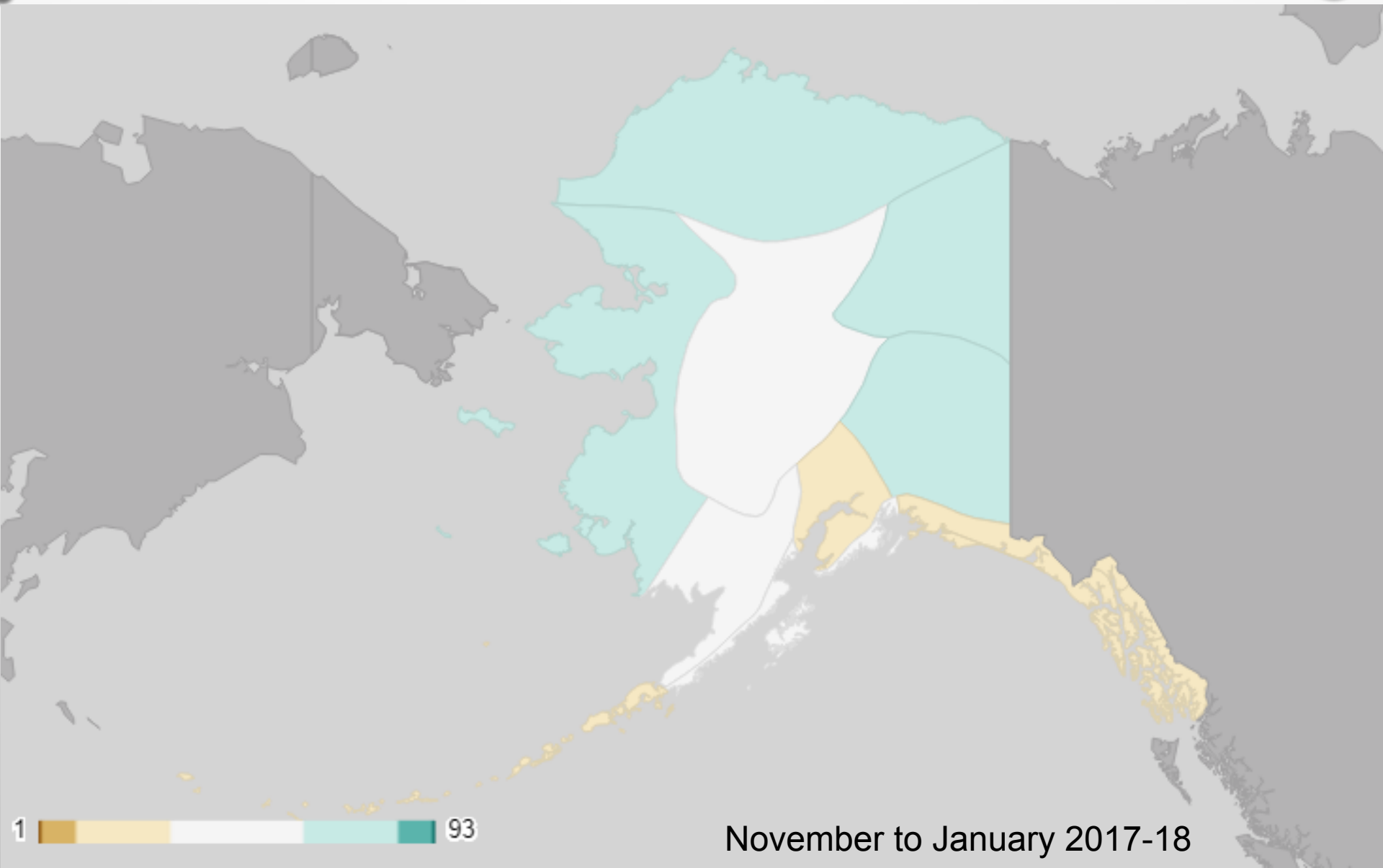


September to November 2017

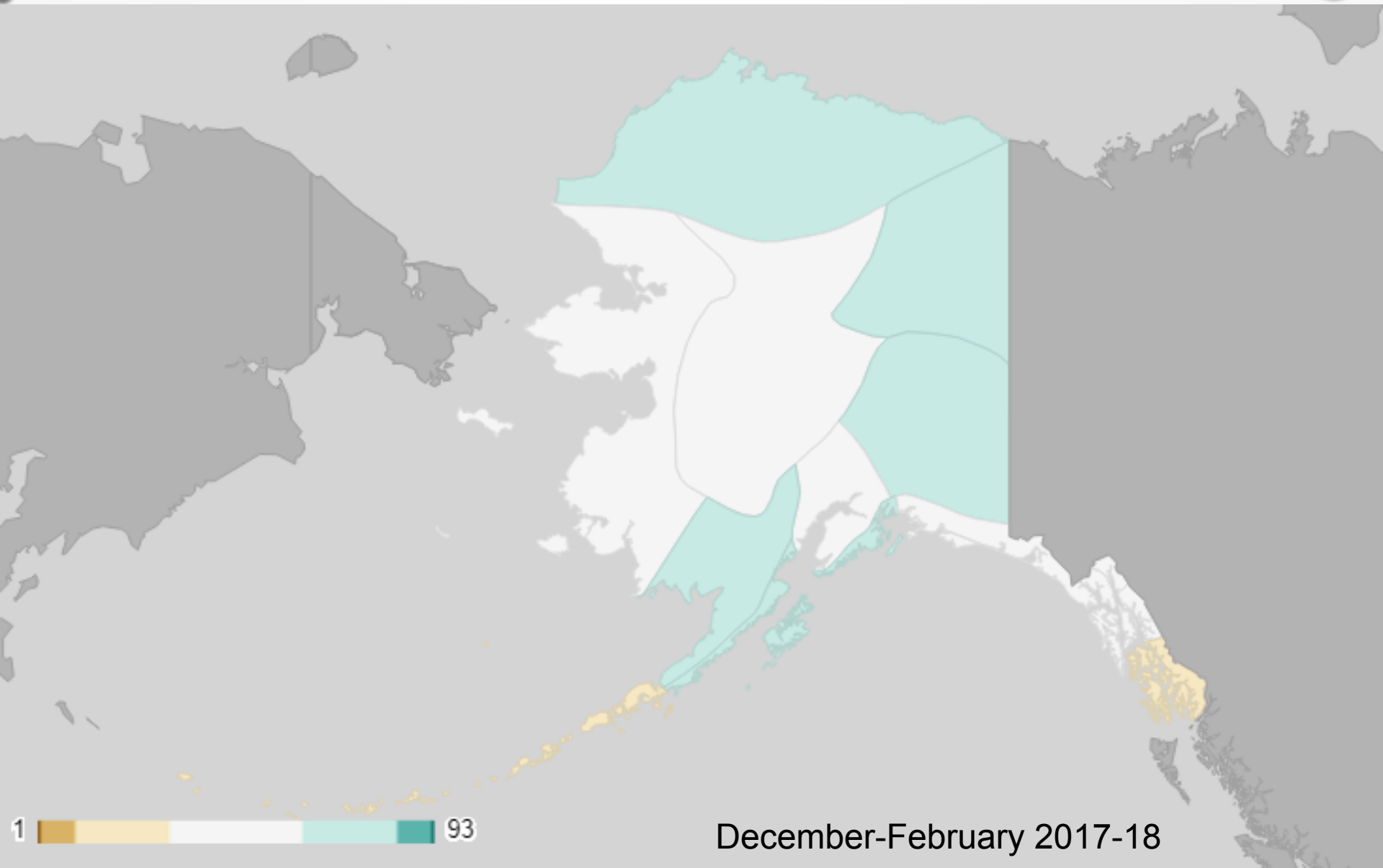
THREE MONTH TOTAL PRECIP RANKS



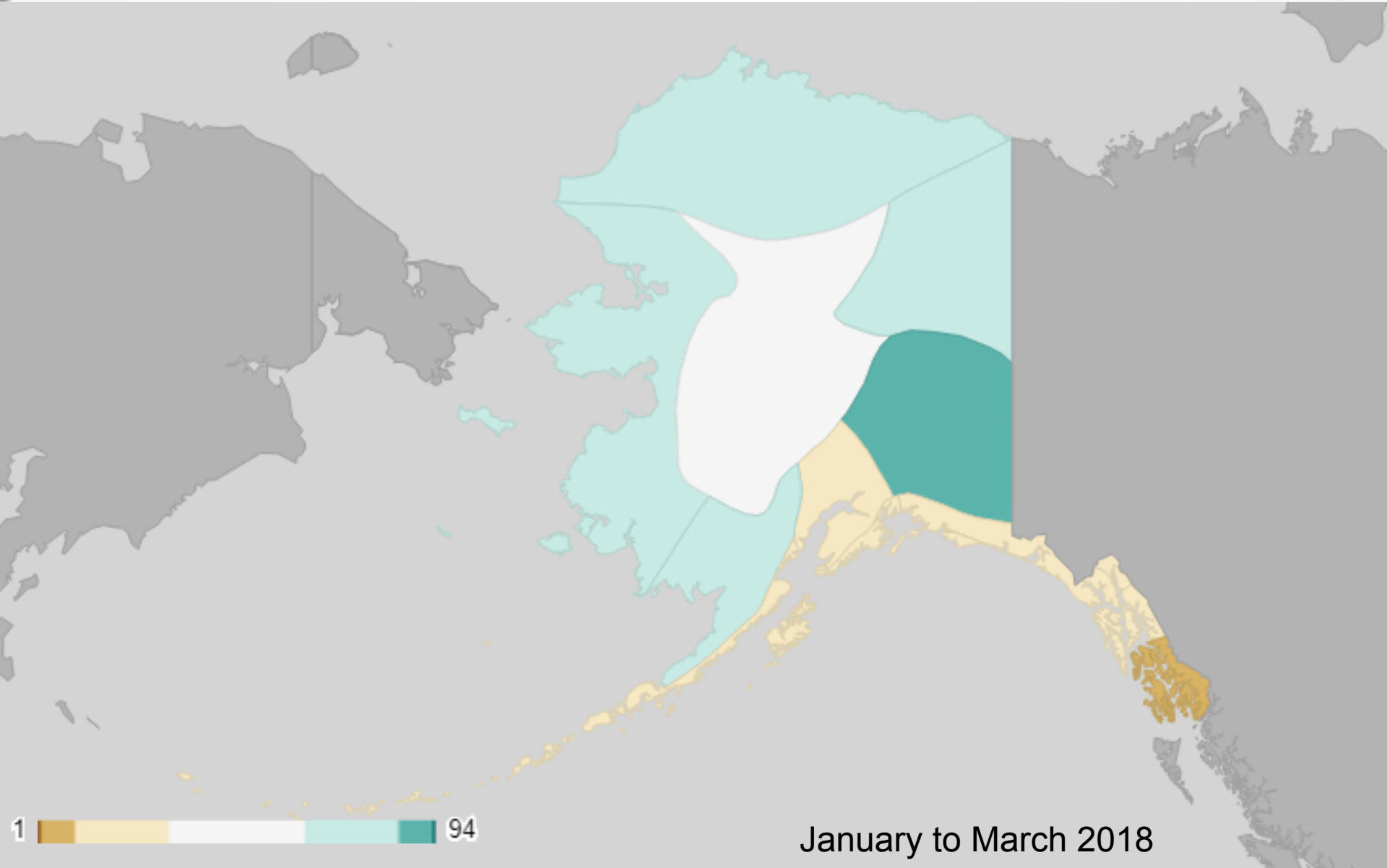
THREE MONTH TOTAL PRECIP RANKS



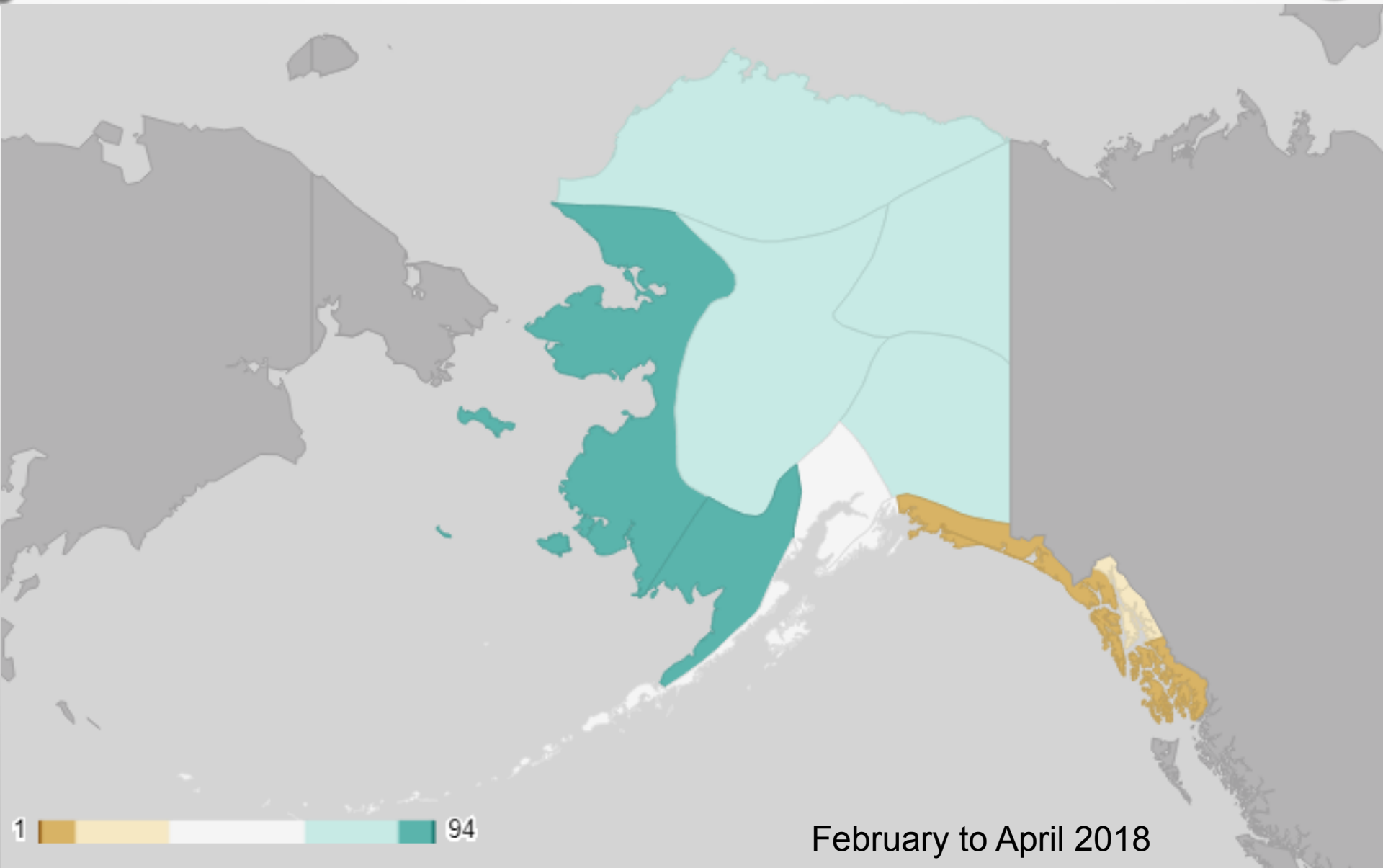
THREE MONTH TOTAL PRECIP RANKS



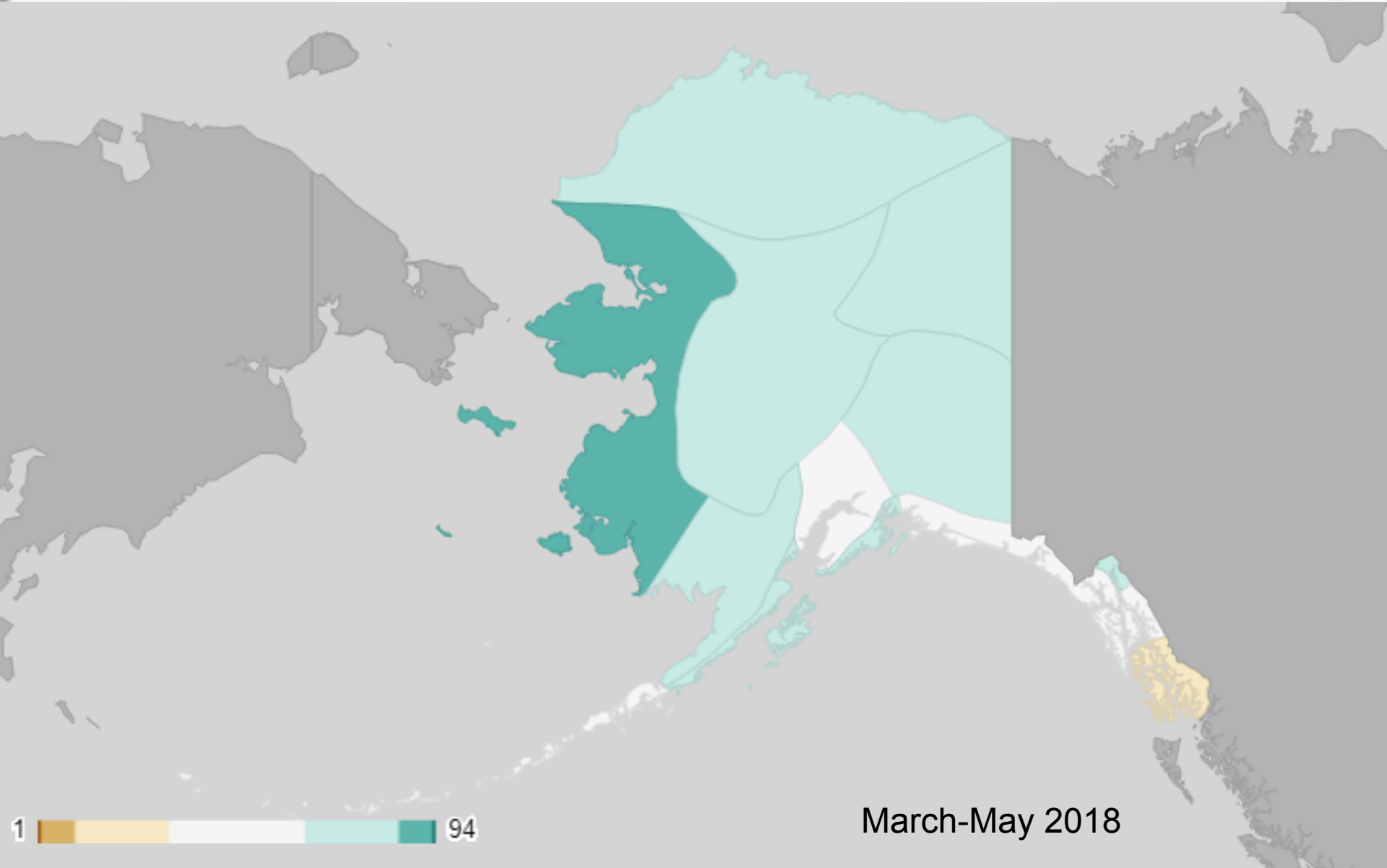
THREE MONTH TOTAL PRECIP RANKS



THREE MONTH TOTAL PRECIP RANKS

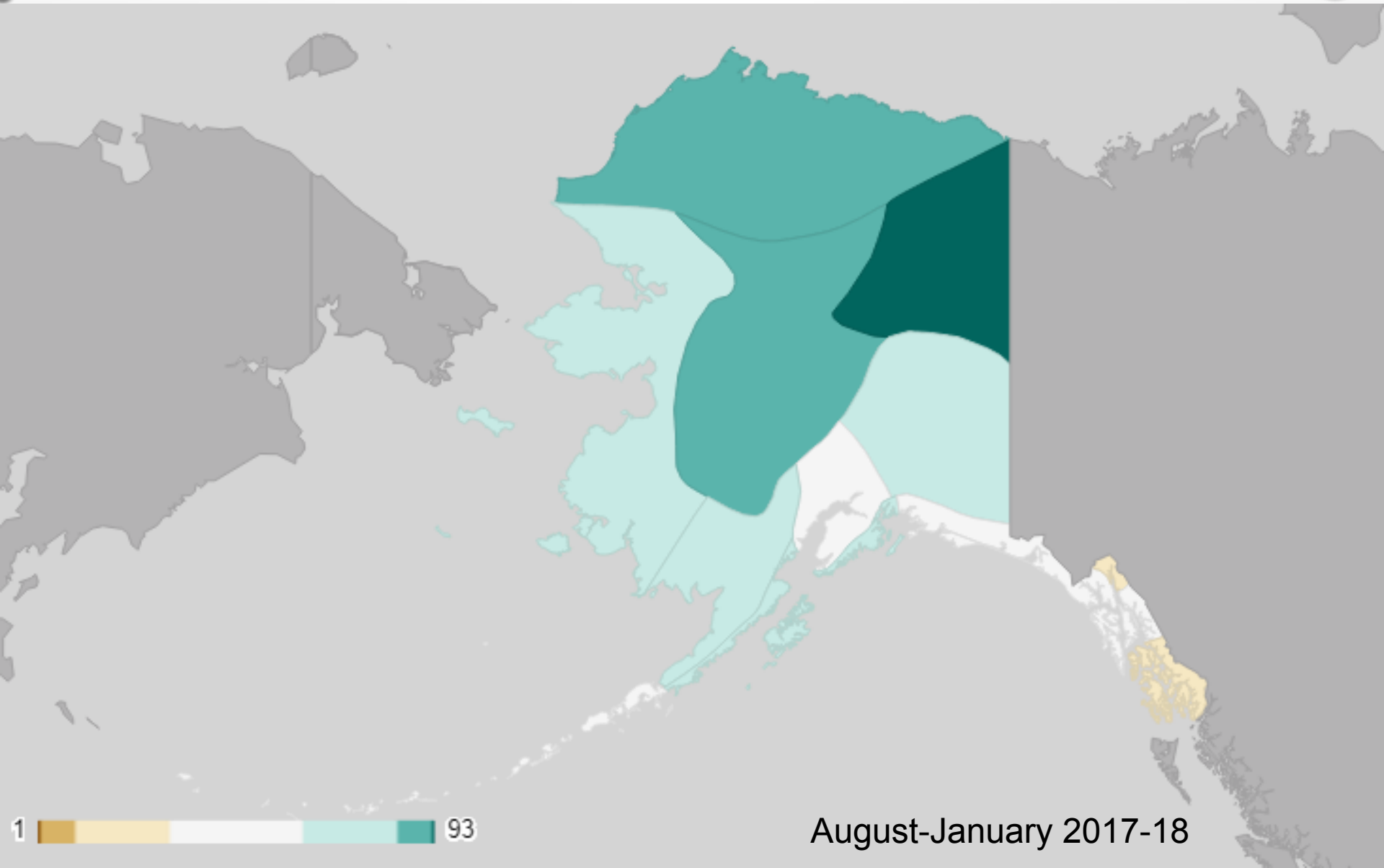


THREE MONTH TOTAL PRECIP RANKS



SIX MONTH TOTAL PRECIP RANKS

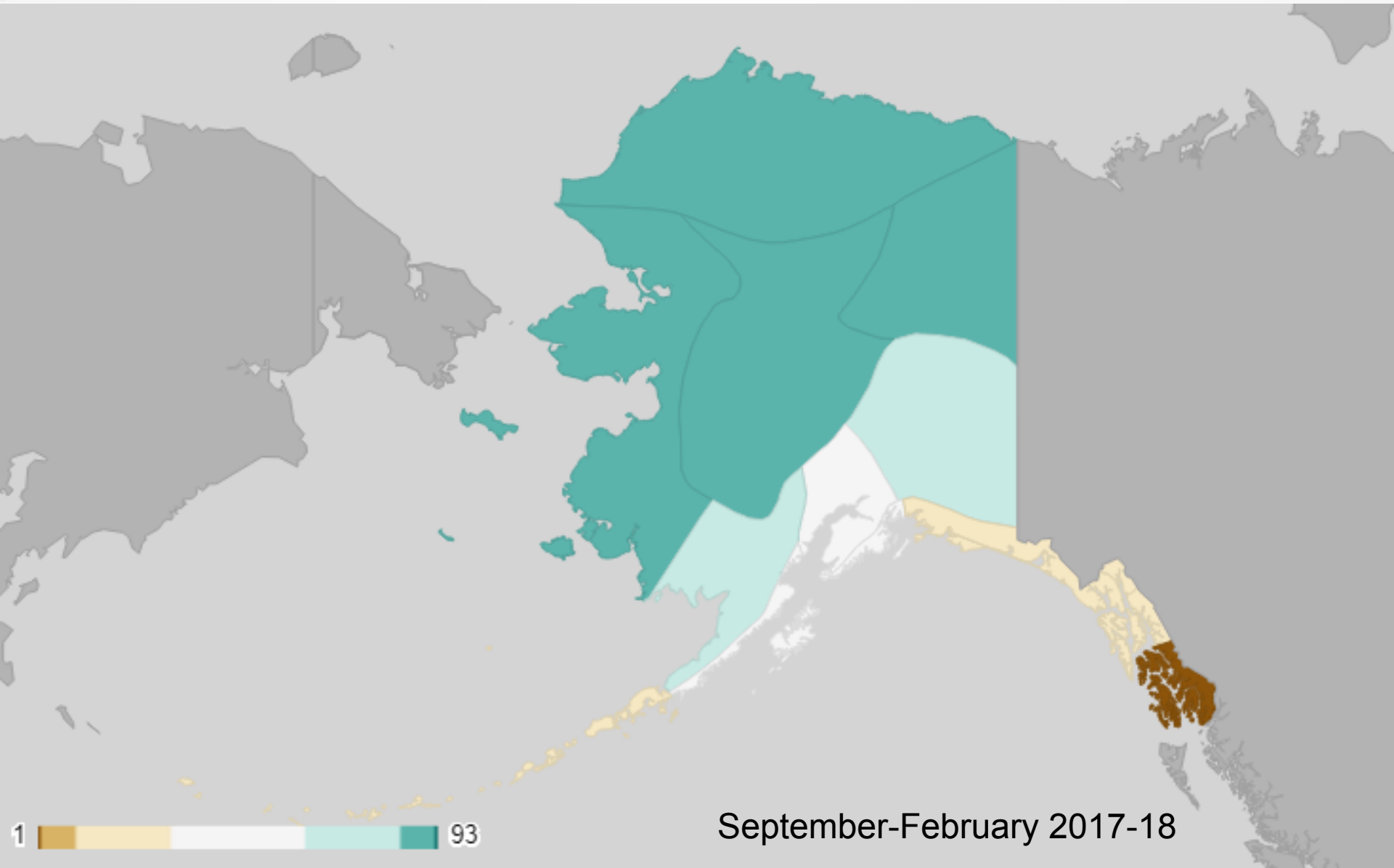
SIX MONTH TOTAL PRECIP RANKS



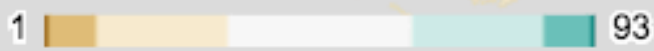
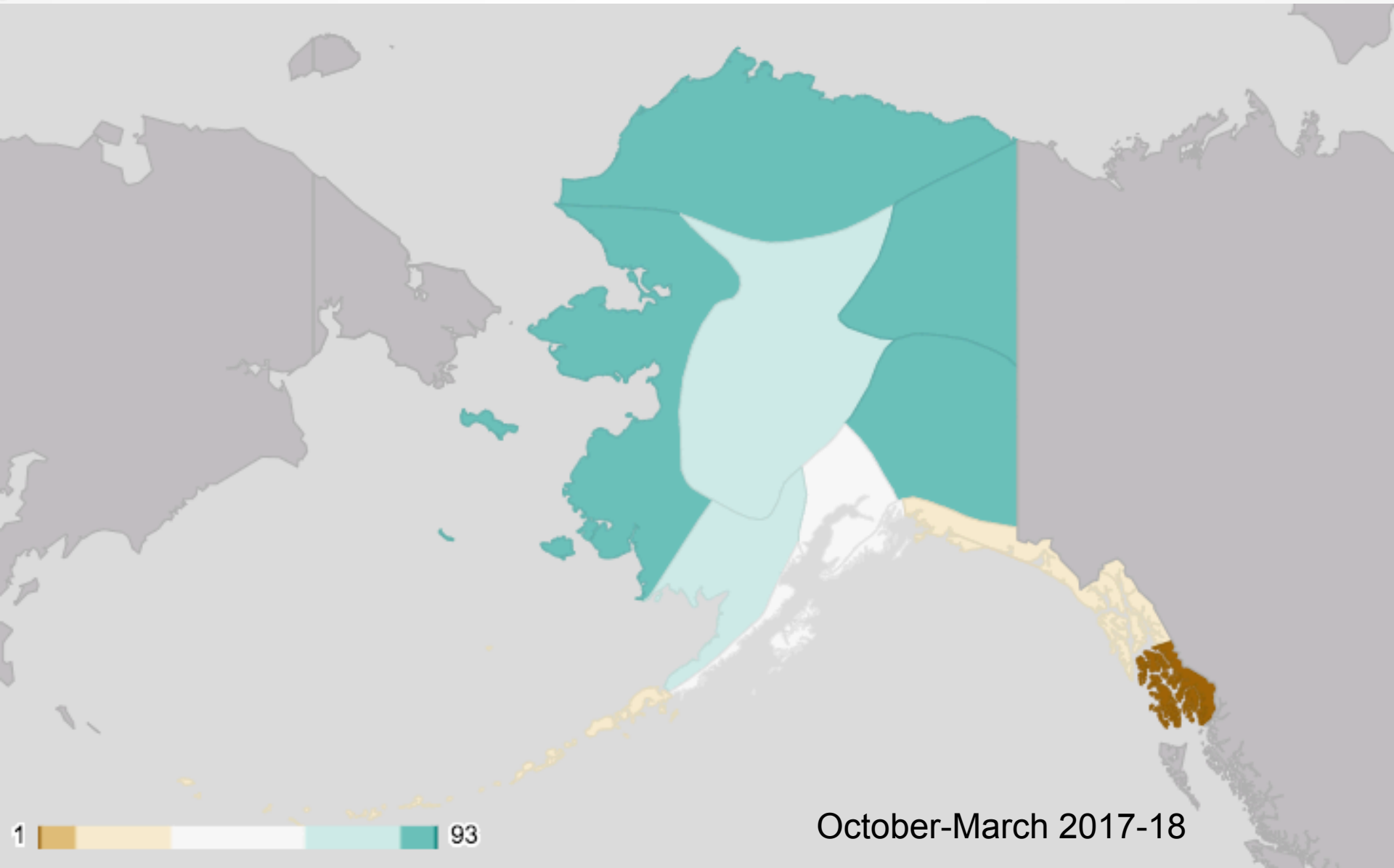
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August-January 2017-18

SIX MONTH TOTAL PRECIP RANKS

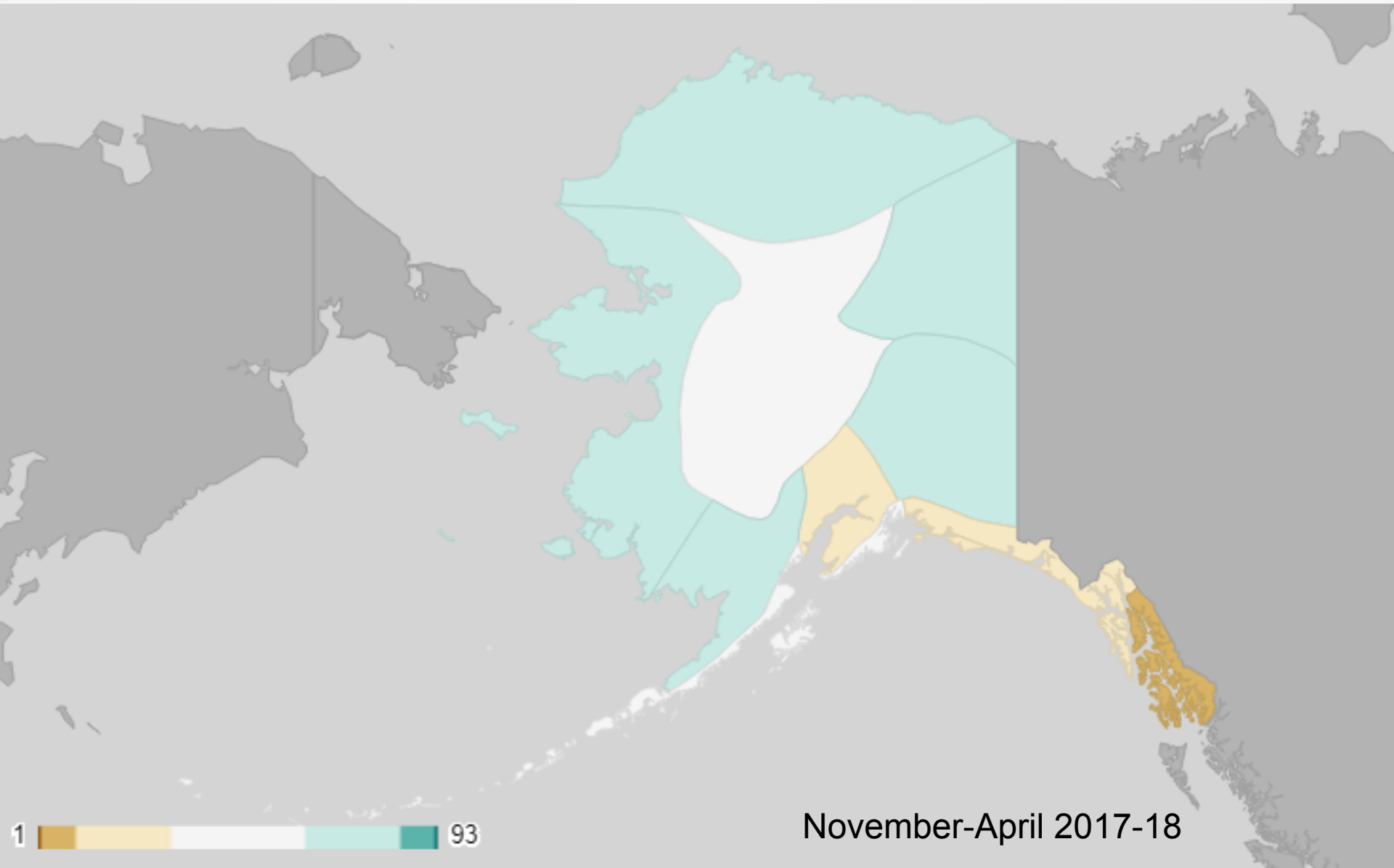


SIX MONTH TOTAL PRECIP RANKS



October-March 2017-18

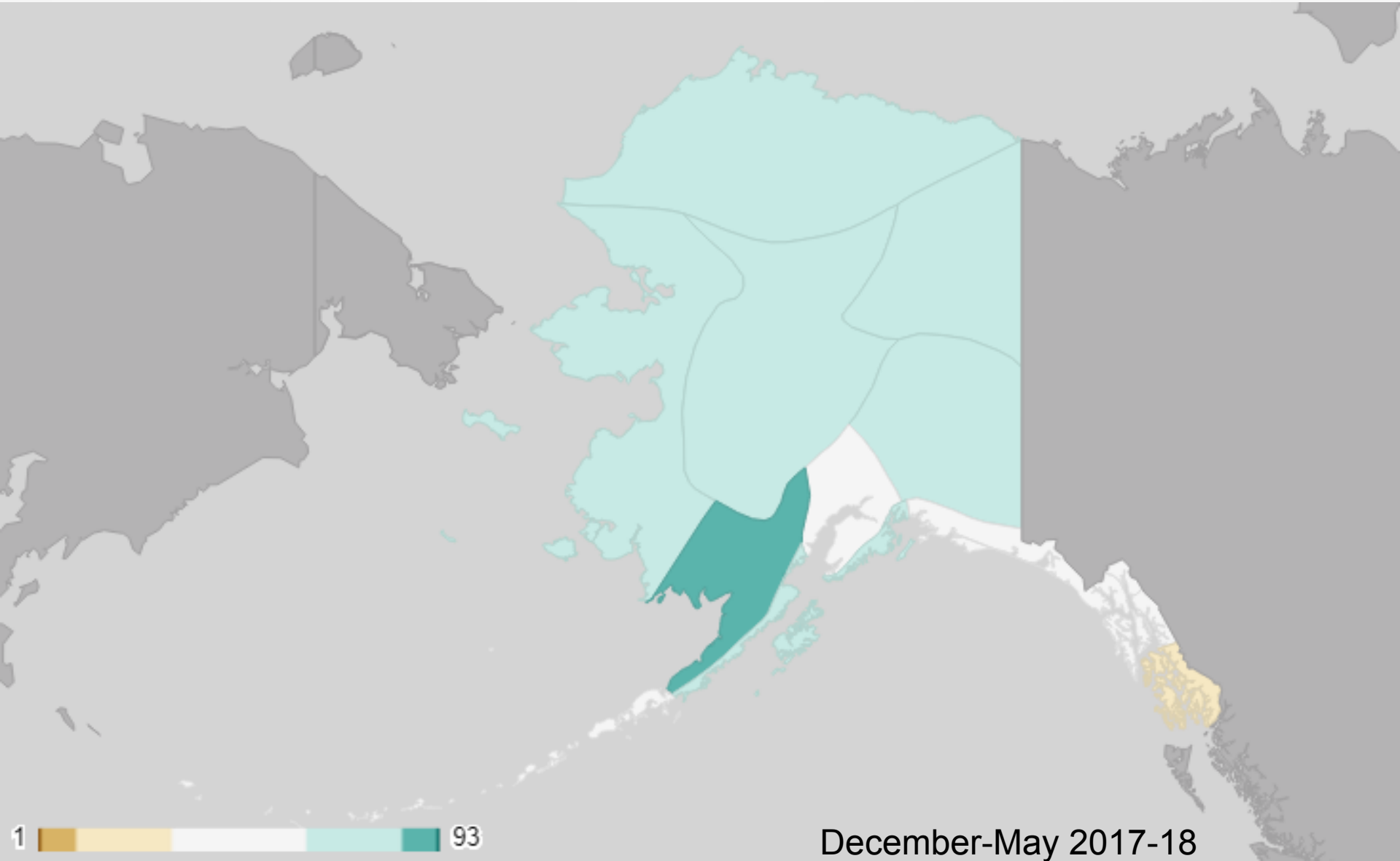
SIX MONTH TOTAL PRECIP RANKS



November-April 2017-18

1 93

SIX MONTH TOTAL PRECIP RANKS

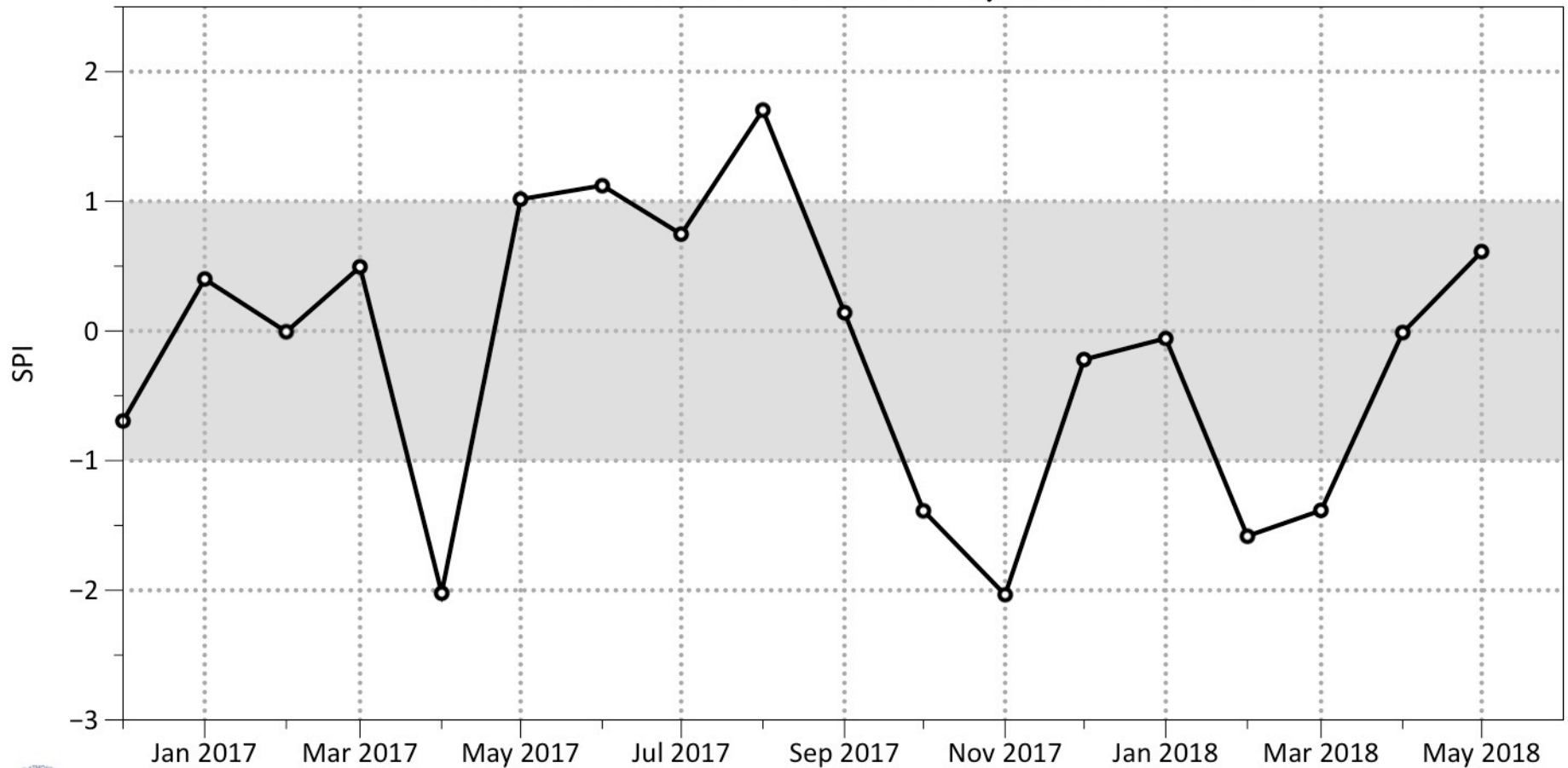


STANDARDIZED PRECIPITATION INDEX

- PUTS “DEPARTURES FROM NORMAL” INTO CONTEXT
 - REQUIRES ONLY PRECIPITATION DATA
- TAKES INTO ACCOUNT CLIMATOLOGY OF PLACE/REGION AND USEFUL FOR MULTIPLE DROUGHT “FLAVORS”
- COMPUTED FOR TIME SCALES OF WEEKS TO YEARS
- WIDELY USED TO MONITOR DROUGHT
 - RECOMMEND BY WMO IN 2009

SRN SOUTHEAST SPI PAST 18 MONTHS

Southern Southeast Alaska 1-Month Standardized Precipitation Index

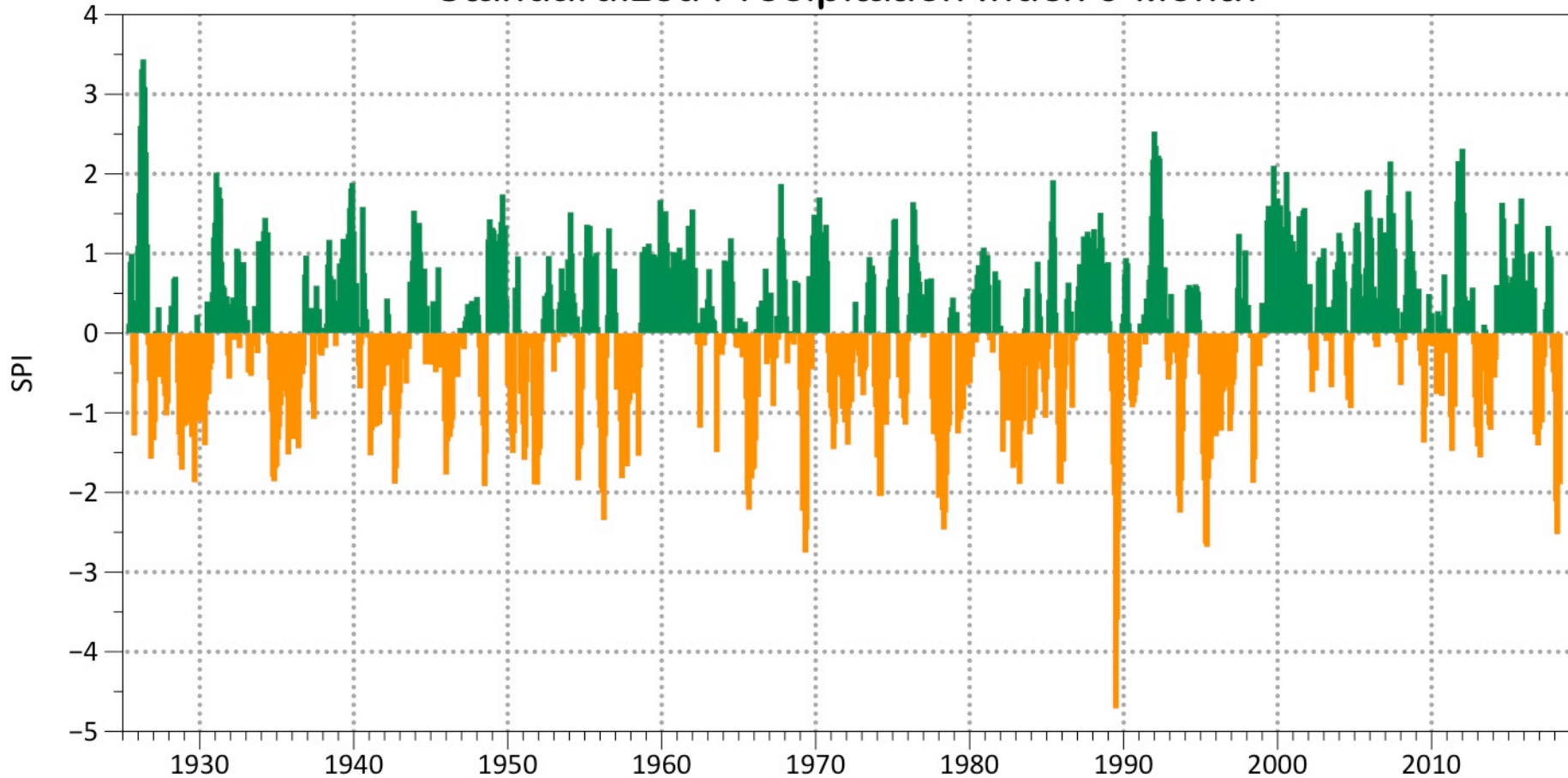


Data source: NOAA/NCEI



6-MONTH SPI FOR SRN SOUTHEAST

Southern Southeast Alaska Standardized Precipitation Index 6-Month

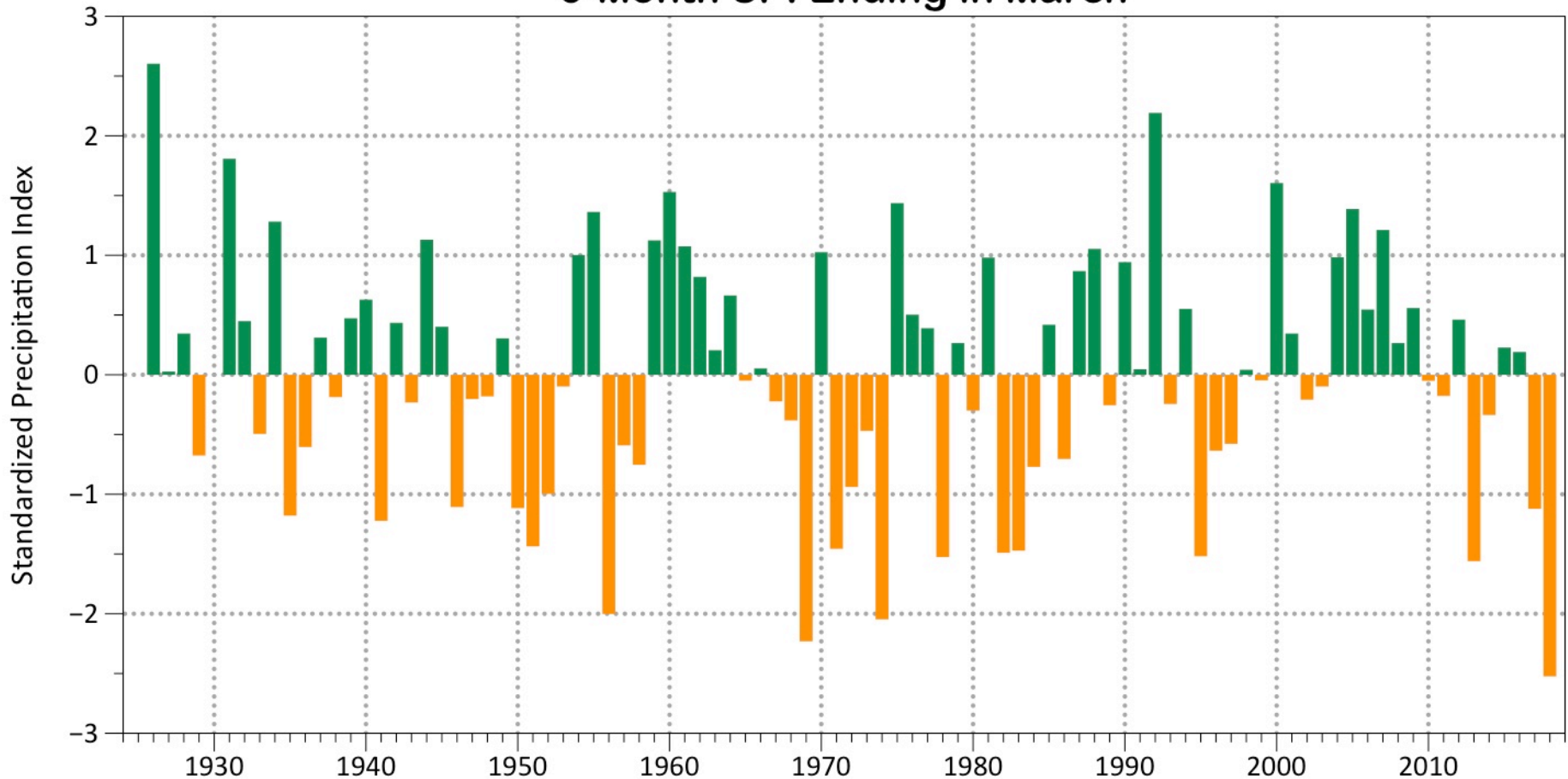


Data source: NOAA/NCEI



SPI FOR OCTOBER-MARCH ONLY

Southern Southeast Alaska 6-Month SPI Ending in March



Data source: NOAA/NCEI

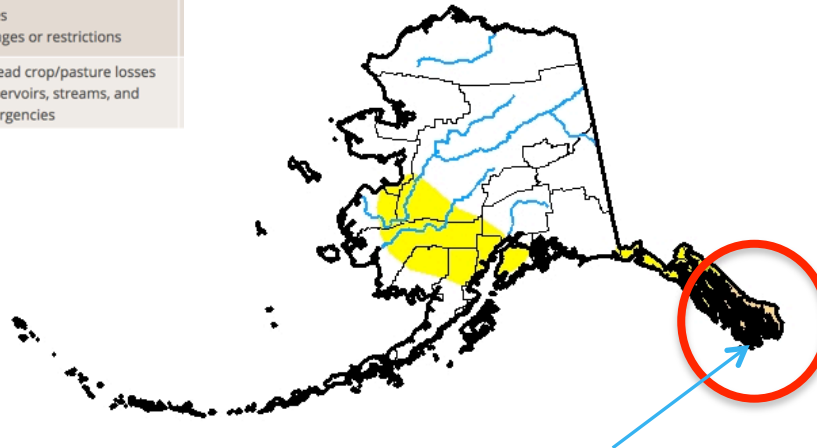


US DROUGHT MONITOR

Drought Severity Classification

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: <ul style="list-style-type: none"> • short-term dryness slowing planting, growth of crops or pastures Coming out of drought: <ul style="list-style-type: none"> • some lingering water deficits • pastures or crops not fully recovered
D1	Moderate Drought	<ul style="list-style-type: none"> • Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested
D2	Severe Drought	<ul style="list-style-type: none"> • Crop or pasture losses likely • Water shortages common • Water restrictions imposed
D3	Extreme Drought	<ul style="list-style-type: none"> • Major crop/pasture losses • Widespread water shortages or restrictions
D4	Exceptional Drought	<ul style="list-style-type: none"> • Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies

U.S. Drought Monitor Alaska



D0 first noted in Alaska late January
D1 for Southern SE March-mid-April

D1 "Moderate Drought"

March 20, 2018

(Released Thursday, Mar. 22, 2018)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	79.17	20.83	2.68	0.00	0.00	0.00
Last Week <i>03-13-2018</i>	73.39	26.61	2.68	0.00	0.00	0.00
3 Months Ago <i>12-19-2017</i>	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year <i>01-02-2018</i>	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year <i>09-26-2017</i>	100.00	0.00	0.00	0.00	0.00	0.00
One Year Ago <i>03-21-2017</i>	68.85	31.15	0.00	0.00	0.00	0.00

Intensity:

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

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Chris Fenimore
NCEI/NESDIS/NOAA

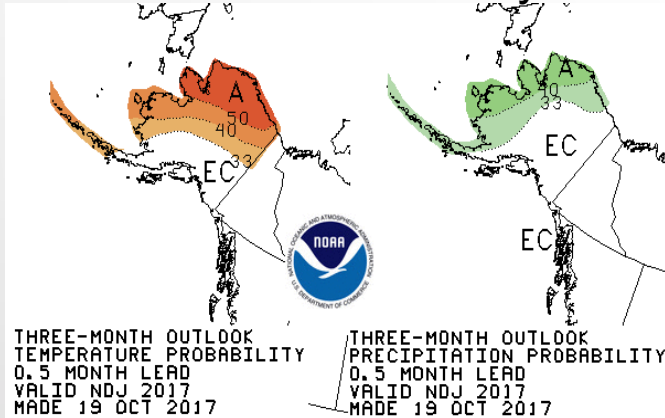


<http://droughtmonitor.unl.edu/>

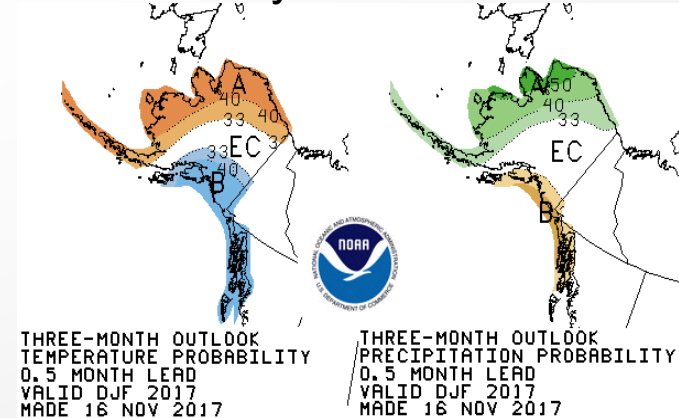


WHAT DID WE KNOW WHEN DID WE KNOW IT?

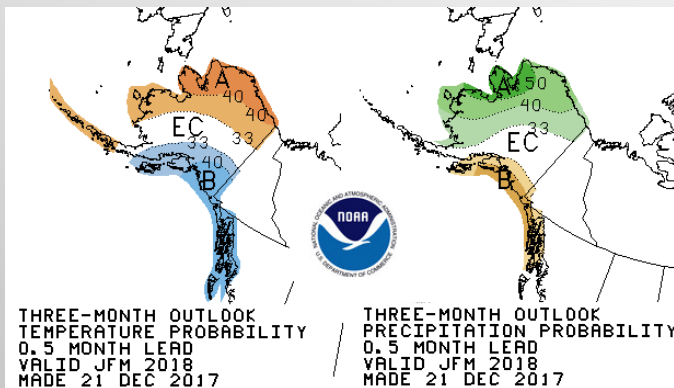
Mid-October
Last few weeks dry



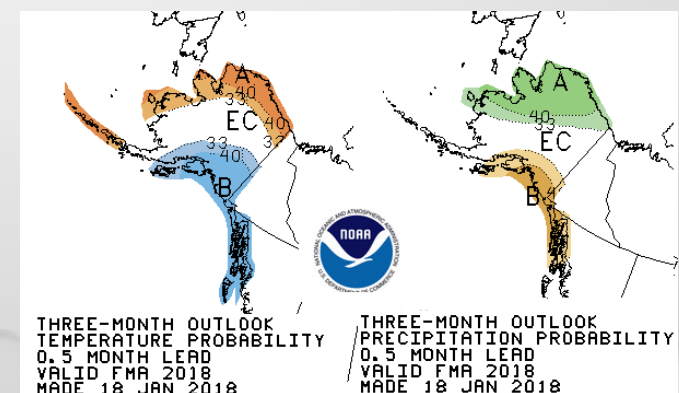
Mid-November
Oct dry and Nov similar



Mid-December
Oct-Nov dry, Dec better



Mid-January
Oct-Nov dry, since Dec near normal,



IMPACTS IN THE RAINFOREST

HYDRO-ELECTRIC POWER GENERATION

TYPES OF DAMS/ RESERVOIRS

- ALPINE LAKE (LAKE TAPPED FROM BELOW)
- RUN-OF-RIVER
- STORAGE DAMS
 - EARTHEN
 - DAMMED LAKES



Blue Lake Dam near Sitka
(Dammed Lake)



Long Lake, lake tapped (Snettisham
Hydroelectric near Juneau)



Falls Creek near Gustavus
(Run-of-River)

Impacts:

NO hydro-electric generation

- Pass-on cost of expensive diesel to general public (higher electric bills)

REASONS OF IMPACTS:

- LACK OF PRECIPITATION IN THE WET SEASON TO REFILL DAMS/RESERVOIRS
- NOT ENOUGH SNOWMELT(SNOW DROUGHT)
- NOT A PART OF THE USA/CANADA CONTINENTAL POWER GRID

IMPACTS IN THE RAINFOREST

DRINKING WATER SUPPLY

Community drinking water sources:

- Ground Water aquifer
- Surface water (pulls from streams)
- Reservoirs



Salmon Creek Reservoir near Juneau

Impacts:

Water Restrictions

- On the public (reduce water usage)
- Seafood processors (limited plant usage)

Reasons of impacts:

- Small communities
- Small reservoir storage
- Susceptible to low water levels from lack of rainfall in the wet season to fill reservoirs
- Low snow pack (snow drought), less water to fill reservoirs in spring/early summer
- Low stream flows - delay/lack of snowmelt (snow drought) due to changing weather patterns.

IMPACTS IN THE RAINFOREST

FISHERIES

Fishery activities across Southeast Alaska:

- Commercial fishing
- Recreation(sport) fishing
- Traditional(subsistence/personal use) fishing
- Fish hatcheries (aquaculture)



Dip netters for Sockeye Salmon
source:

"Changing Water Dynamics USDA FS Dec 2017"

Impacts:

- Fish kills
- Economic loss
- Loss of food resources
- Potential job loss

Reasons of impacts:

- Low stream flows: lack of rainfall and snowmelt(snow drought) during spawning periods
- Above normal water temperature
- Low dissolved oxygen

IMPACTS IN THE RAINFOREST

WINTER SPORTS

Winter Sport activities across Southeast Alaska:

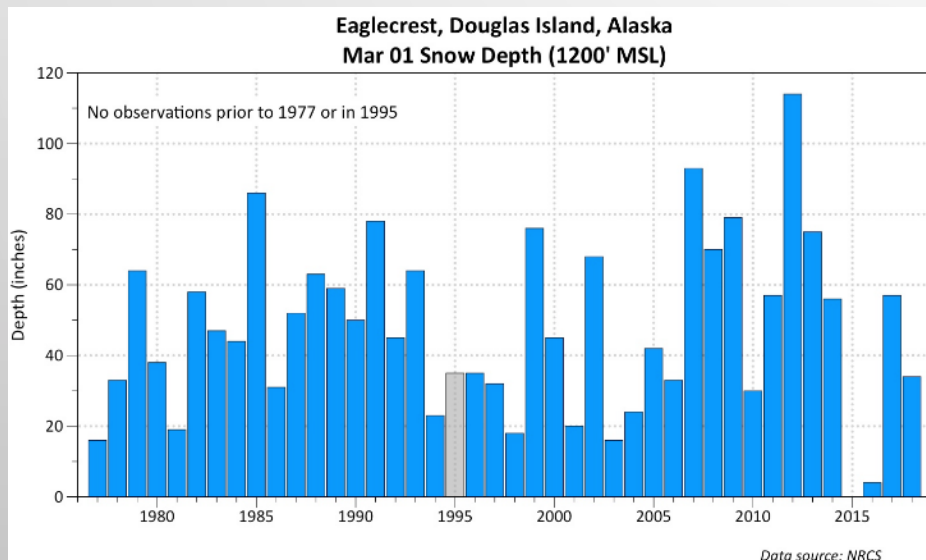
- Community owned Ski resorts (Eaglecrest in Juneau)
- Heli-skiing (Haines & Juneau)
- Snow machining
- Backcountry ski touring

Impacts:

- Economic loss to small communities
- Potential job layoffs

Reason for impacts:

- Snow drought

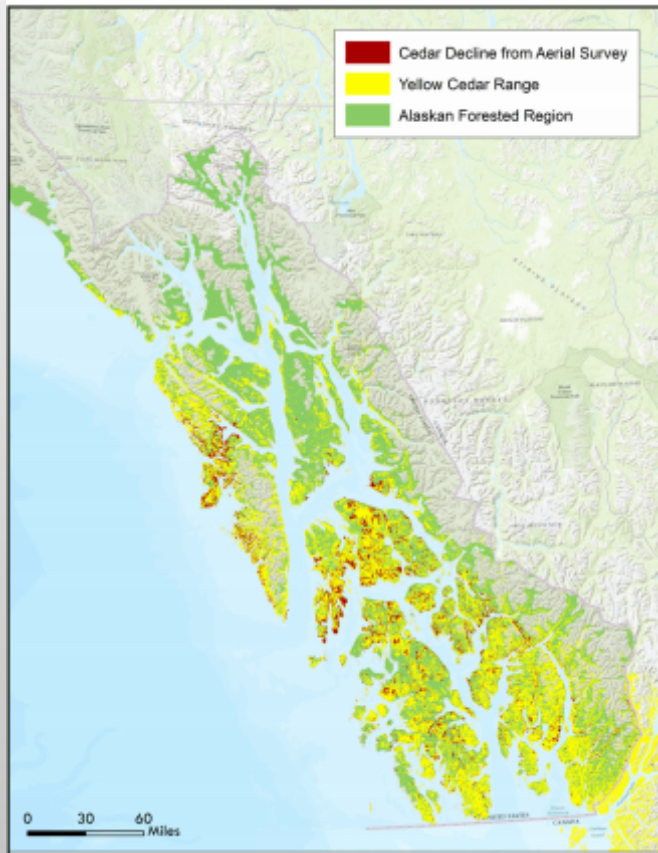


IMPACTS IN THE RAINFOREST

RAINFOREST HEALTH

Forest activities:

- Timber harvest industry
- Cultural values to Alaska Natives



Impacts:

- Yellow-cedar mortality increase
- Economic loss to small communities
- Potential job layoffs
- Increased threats to trees from insect and pathogens from changing water dynamics as a result higher temperatures and longer growing season (Hollingsworth et al. 2017)

Reason for impacts:

- Snow drought

source:

”Changing Water Dynamics USDA
FS Dec 2017”

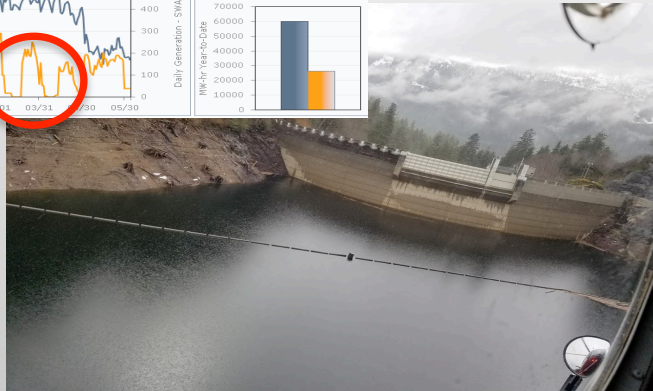
REVIEW OF 2017-2018 MODERATE DROUGHT IMPACTS

- City of Wrangell water officials impose water restrictions.
- Swan Lake Dam hydro-electric power generation suspended due to low reservoir levels, lowest levels since construction(1984).
- Black bear lake dam on Prince of Wales Island suspended power generation due to low levels.
- Higher electric cost of using diesel generation for power passed on to communities.

System Info - Swan-Tyee Control System (STICS)

The following STICS Dashboard is a digital communication link that provides the public and system operators with the ability to see SEAPA's Swan Lake and Tyee Lake generation and transmission data.

Reservoir Level and Power Produced Trends



City and Borough of Wrangell

March 13 · 🌐

Borough Declares Stage III CRITICAL Water Level

Effective immediately, the City and Borough of Wrangell has declared a Stage III - Critical water level, and we need your help! It is estimated that there is approximately one month's worth of water supply in the reservoirs at this time.

The City and Borough of Wrangell has moved from a Stage I – Watch to a Stage III – Critical level due to the extreme low drop in our reservoirs' water levels, and all customers are required to initiate Stage III water restrictions.

In discussing climate outlooks with NOAA, predictions are for drier and colder than normal conditions through March 2018. Additionally, their 3-month outlook indicates that below-normal temperatures are more likely for the Alaska panhandle. With continued predictions for drier-than-normal weather conditions, the Stage III water restrictions have been escalated for all of Wrangell beginning March 13, 2018.

The Stage III water restrictions will be aggressively monitored and strictly enforced. It is critical that all water customers suspend all non-essential water use. Water customers are encouraged to review and become familiar with the Stage III restrictions, as outlined in the Water Shortage Management Plan (copies on-line and at City Hall).

REVIEW OF 2017-2018 MODERATE DROUGHT IMPACTS IN THE MEDIA

☆ **KTOO** Public Media

Wrangell requests

us

By J

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Home / Weather / Article

A drought in an Alaska

By Tracy Sinclair | Posted: Mon 3:40 PM, May 07, 2018

[f](#) [t](#) [in](#) [g+](#) [e](#) [p](#)

ANCHORAGE, Alaska (KTUU) - The familiar

cattle. But a drought in a rainforest looks a li

"It is a very odd thing to see for a rainforest

Service in Juneau.

The City and Borough of

Wrangell Alaska

Community Business Visitors Government Resource Center



Home

Borough Removes Water Restrictions




April 10, 2018: The Borough today has removed restrictions on water use.

Due to the recent rain and warm spell, the reservoirs are now full.

Thank you for your conservation efforts during the cold and dry weather. PLEASE continue to USE WATER WISELY and CONSERVE wherever possible.

ares water emergency

2018



on July 24, 2014. (Creative Commons photo by James Brooks)

emergency. City officials say the Southeast community has So, they're asking residents to cut way back on use. Those re rainfall, could solve the problem.

monitor and strictly enforce" water restrictions for de no outside water usage, fixing plumbing leaks and

anything outside yet, because it's still too cold. But there's wash your cars," city manager Lisa Von Bargen said. "Please hing of decks or driveways or paved surfaces or things like

SUMMARY

- 2017-18 DROUGHT IN SOUTHERN SOUTHEAST MOST SIGNIFICANT DROUGHT DURING THE WET SEASON IN 40+ YEARS
- INDICATIONS BY LATE AUTUMN THAT THERE MIGHT BE A PROBLEM
- IMPACTS OF SUSTAINED PRECIPITATION DEFICIT ARE WIDE-RANGING EVEN IN A RAIN FOREST.