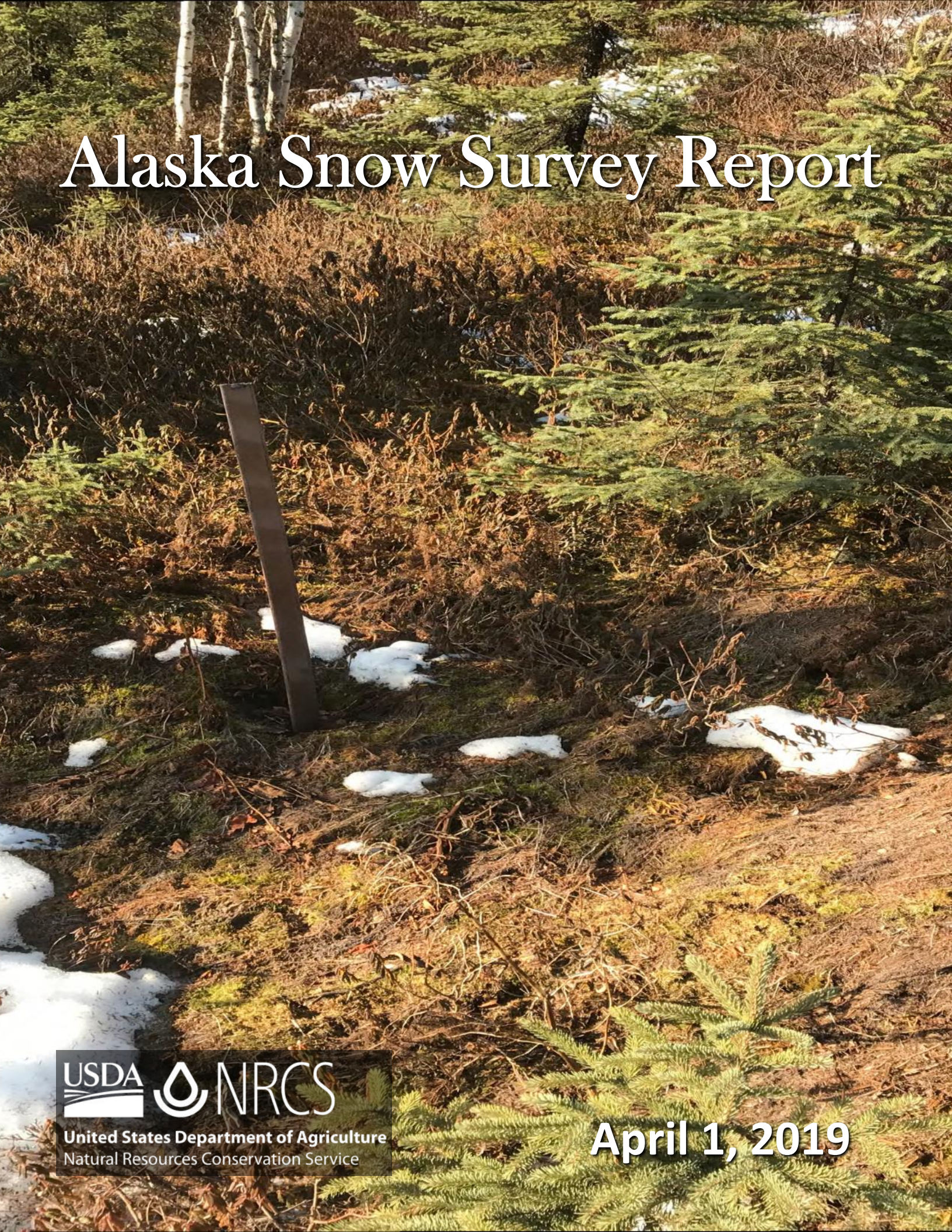
Alaska Snow Survey Report



USDA NRCS

United States Department of Agriculture
Natural Resources Conservation Service

April 1, 2019

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  - Tongass National Forest
- U.S. Department of Commerce
  - NOAA, Alaska Pacific RFC
- U.S. Department of Defense
  - U.S. Army Corps of Engineers
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- Alaska Department of Natural Resources
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- Soil and Water Conservation Districts
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Cover photo: Caribou Min Snow Course, in the headwaters of Salcha River, in the Tanana Valley, displays little snow. The official record for the 5 point snow course is 3" of snow depth and 0.8" of water content. It's lowest April reading in its 54 year history. Photo by Jon Oestreich.

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General Overview

SnowPack

The snowpack in Alaska is more similar to the beginning of May than April. Several sites around the state, from Southeast, to Southcentral and the Interior, reached peak snowpack between 2 and 5 weeks early. Snowpack has melted out in swaths of the low-lying Tanana Valley, the lower Kuskokwim and near coastal areas of Southcentral and Southwest Alaska. March was so warm that many snow measurement sites in the Interior southward saw their greatest March snowpack declines on record. As a result, the snowpack in the eastern Interior, Southcentral, Southwest, and Southeast Alaska is largely below normal. Some storms during March did drop snow at the higher elevations. Locations on the Kenai in the eastern Chugach gained up to 50 inches of snow by midmonth, before shedding some snowpack to high rain storms.

Northwest Alaska, including the lower Yukon and the Koyukuk Basin retain above normal snowpacks. Coldfoot and Bettles Field SNOTEL are at or near record high snowpacks as is the shorter-lived Kelly Station SNOTEL, roosted above the Noatak River. The Arctic likely has above normal snowpack, as well, though the data is more spotty. There are also enclaves of above normal snowpack in the upper Chena basin, in the eastern Chugach and in portions of the Alaska Range. With the warm March, the snow in these areas are more primed for meltout than other years at this time.

		Basin Index	
		Current	Last Year
Alaska Statewide Snowpack	**# of Sites**	**Percent of Median**	**Percent of Median**
Upper Yukon Basin	32	50	90
Central Yukon Basin	14	93	133
Tanana Basin	27	71	174
Koyukuk Basin	8	188	170
Kuskokwim Basin	4	95	128
Copper Basin	12	78	122
Matanuska-Susitna Basin	19	91	105
Northern Cook Inlet	12	52	67
Kenai Peninsula	22	62	60
Western Gulf of Alaska	10	70	68
Southeast Alaska	8	44	59

General Overview Continued

Precipitation

As usual, precipitation across the state was varied and sundry. Southeast Alaska amassed its second month of below normal precipitation with sites reporting 50-80% of normal monthly precipitation. However, unlike last month, the extent of this dry spell did not reach into the western half of the Gulf of Alaska. In fact, stations in Prince William Sound and on the eastern Kenai Peninsula reported either their wettest or second wettest Marches on record with 200%-350% of normal monthly precipitation. Cooper Lake SNOTEL, on the Kenai Peninsula near Kenai Lake, reported its wettest March since 1988.

Transitioning northwest, across the Kenai Peninsula to Cook Inlet, the region received less precipitation. Much of northern Cook Inlet and the lower Susitna Basin collected less than half of normal monthly precipitation.

Southwestern Alaska gained near normal amounts of precipitation during March, while Northwestern Alaska recorded above normal amounts of precipitation. Sites from the Seward Peninsula to the Koyukuk Valley collected 150-280% of normal amounts for the month. Similarly, the Arctic Plains gained above average March precipitation.

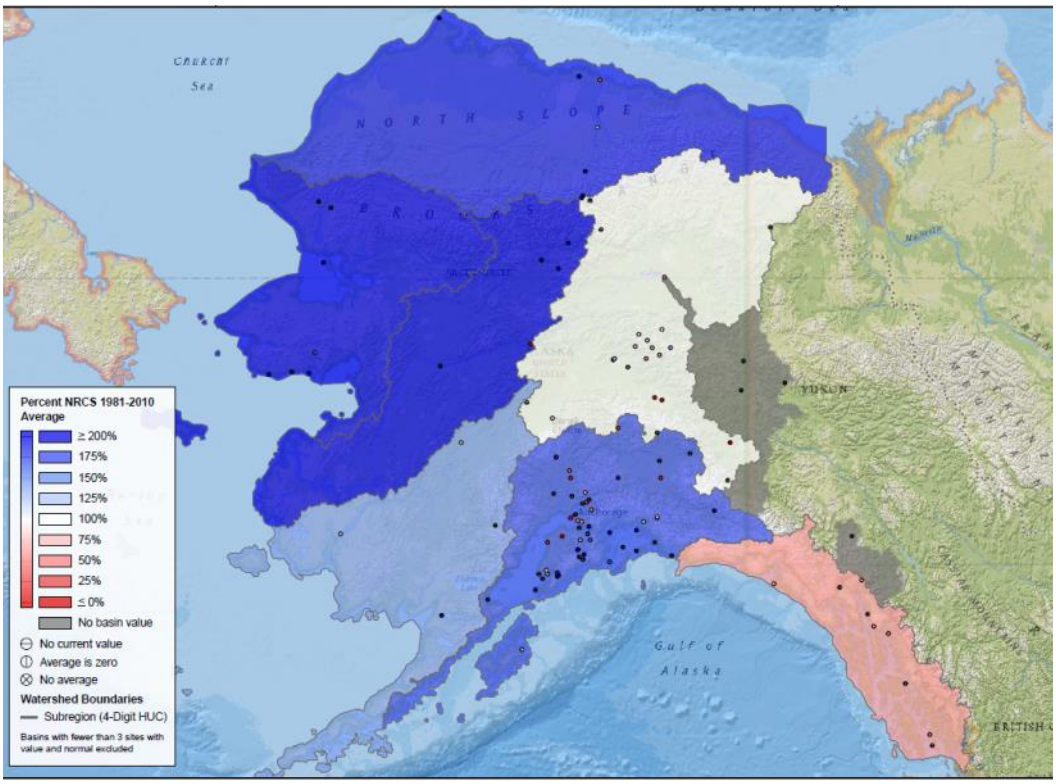
Temperature

Jonny Horton sang “When it’s springtime in Alaska, it’s forty below!” Not so much in 2019. March 2019 was exceedingly warm and will go down as one of the warmest Marches on record in Alaska. In many northern and western locales it was the warmest March on record. Utqiaġvik, Deadhorse, and Kotzebue all posted greater than 20°F above normal monthly temperatures. Likewise, the Interior and western Alaska basked in unseasonable warmth. Fort Yukon was 18°F above normal over the month. Nome, Bettles, Fairbanks, and Bethel were 15°F or 16°F above normal for the month. Further south, Talkeetna and Gulkana were 11°F and 12°F above the monthly normal. Even Homer and Cordova were 10°F and 8°F above the average March monthly temperature. In the Southeast panhandle, where cool nights and a cool beginning of the month kept Juneau to only 4°F above normal for the month, several locales across the region broke daily record highs during the month.

Alaska Statewide Precipitation Maps

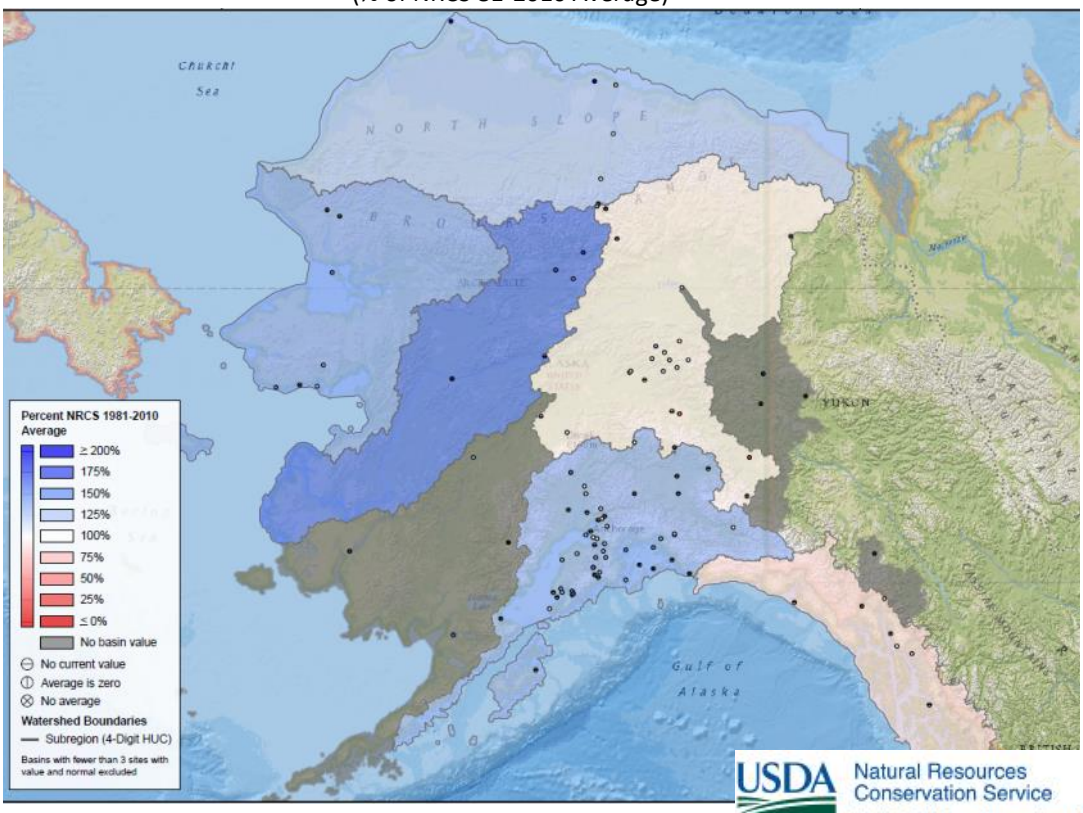
Monthly Precipitation for March, 2019

(% of NRCS 81-2010 Average)



Water Year-to-date Precipitation (Oct. 1-Feb. 28, 2019)

(% of NRCS 81-2010 Average)



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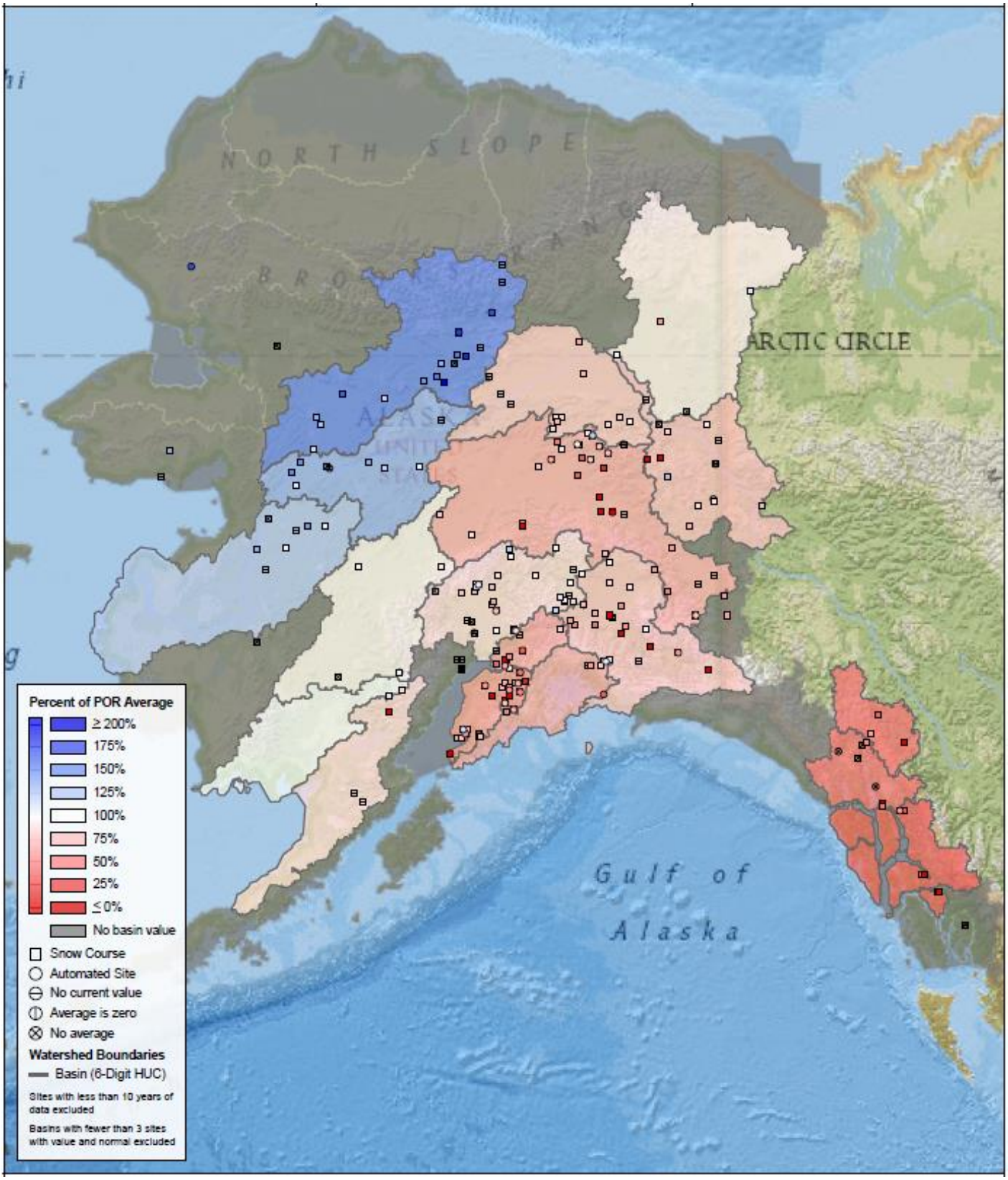
Alaska Statewide Snowpack Map

Based on April 1st, 2019 Snow Water Equivalent



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Streamflow Forecasts

FORECAST POINT*	Percent of Ave. Flow	Period
Yukon River at Eagle	80	April - July
Porcupine River nr Int'l Boundary……	95	April - July
Yukon River near Stevens Village	82	April - July
Tanana River at Fairbanks	84	April - July
Tanana River at Nenana	88	April - July
Little Chena River near Fairbanks	83	April - July
Chena River near Two Rivers	87	April - July
Salcha near Salchaket	86	April - July
Kuskokwim River at Crooked Creek	105	April - July
Sagvanirktok River near Pump Station 3	130	April - July
Kuparuk River near Deadhorse	125	April - July
Gulkana River at Sourdough	91	April - July
Little Susitna River near Palmer	90	April - July
Talkeetna River near Talkeetna	93	April - July
Ship Creek near Anchorage	74	April - July
Kenai River at Cooper Landing	85	April - July
Taiya River nr Skagway	82	April - July

Snowmelt Runoff Index (SRI): for streams which no longer have stream gauging stations

FORECAST POINT	INDEX
Koyukuk River at Hughes……..	2.3
MF Koyukuk R near Wiseman ……..	2.5
Slate Creek at Coldfoot……..	2.5
Beaver Creek above Victoria Creek……..	—
Birch Creek below South Fork……..	-1.5
Caribou Creek at Chatanika……..	-1.5
Susitna River near Gold Creek……..	-1.5
Chulitna River near Talkeetna……..	-2.0
Deshka River at mouth near Willow……..	-2.5
Montana Creek at Parks Highway……..	-0.5
Willow Creek near Willow……..	-2.0
Skwentna River at Skwentna……..	—
Chuitna River near Tyonek……..	—
Campbell Creek near Spenard……..	-2.5
Indian Creek at Indian……..	-2.5
Bird Creek at Bird Creek ……..	-2.5
Glacier Creek nr Girdwood ……..	-3.0
Six Mile Creek near Hope……..	-2.0
Resurrection Creek near Hope……..	-2.5
Grouse Ck at Grouse Lake Outlet nr Seward ……..	-2.5
Anchor River near Anchor Point ……..	-2.0
Deep Creek near Ninilchik……..	-2.5
Ninilchik River near Ninilchik……..	-2.5
Fritz Creek near Homer……..	-2.0
Skagway River at Skagway……..	-2.0
Municipal Watershed C nr Petersburg ……..	-2.5
Gold Creek near Juneau……..	-3.0

Index	Key:
-2 to -3	much below average snowmelt runoff
-1 to -2	below average snowmelt runoff
-1 to +1	average snowmelt runoff
+1 to +2	above average snowmelt runoff
+2 to +3	much above average snowmelt runoff

HOW FORECASTS ARE MADE

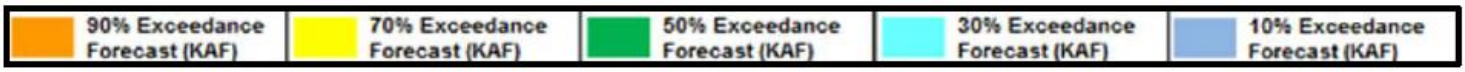
Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

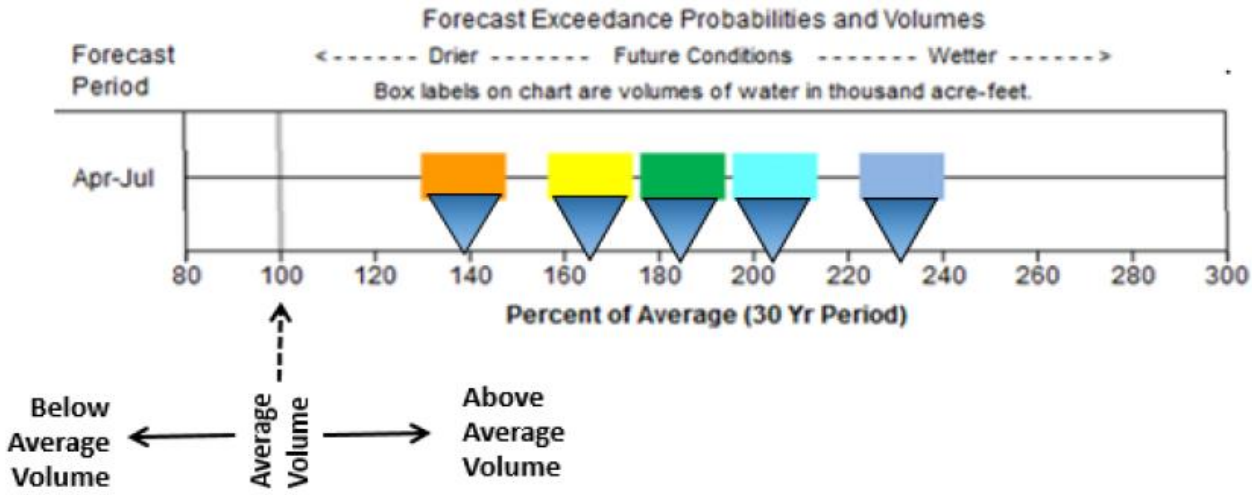
The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

How to Interpret the Streamflow Forecast Graphic:

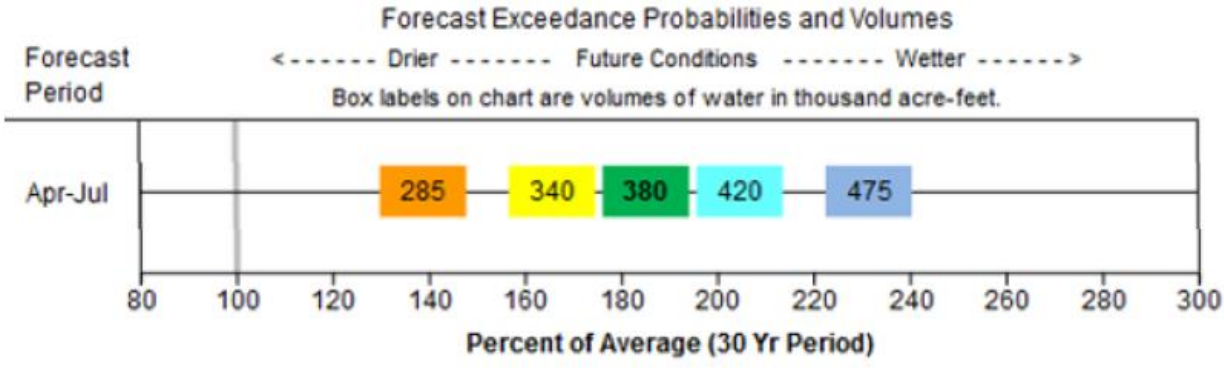
This graphic provides a visual alternative to the forecast tables the NRCS has presented for years. It gives both the volume and percent of average of each of the five forecast exceedances. The five colored boxes represent each forecast's five exceedances.



The center of each forecast exceedance box corresponds to that exceedance's percent of average on the horizontal axis. In this case the green 50% exceedance forecast box is centered over 185% of average streamflow. If drier future conditions occur the orange box (90% exceedance) is 139% of average. If wetter future conditions occur the darker blue box (10% exceedance) is 232% of average. In some cases when exceedance volumes are similar, the width of the colored boxes gets squeezed. Still use the center of the box to determine its percent of average. The width of the box is irrelevant.

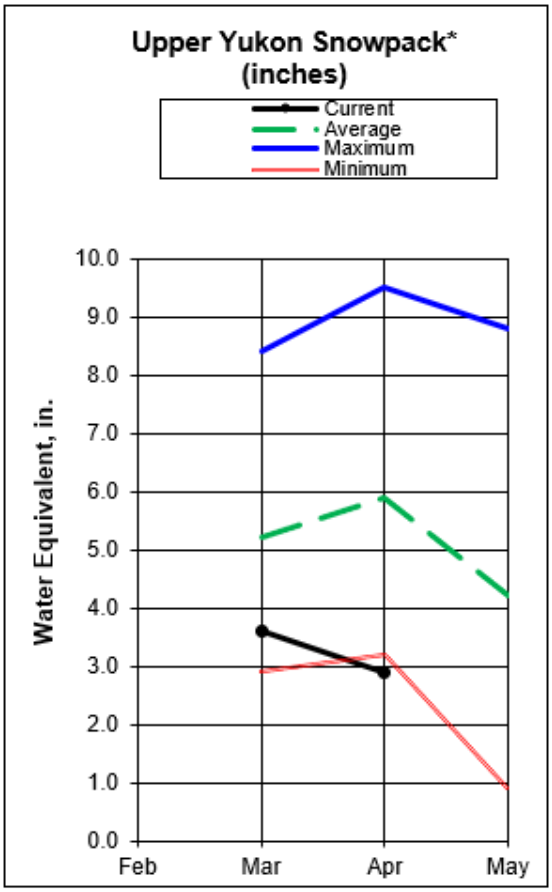


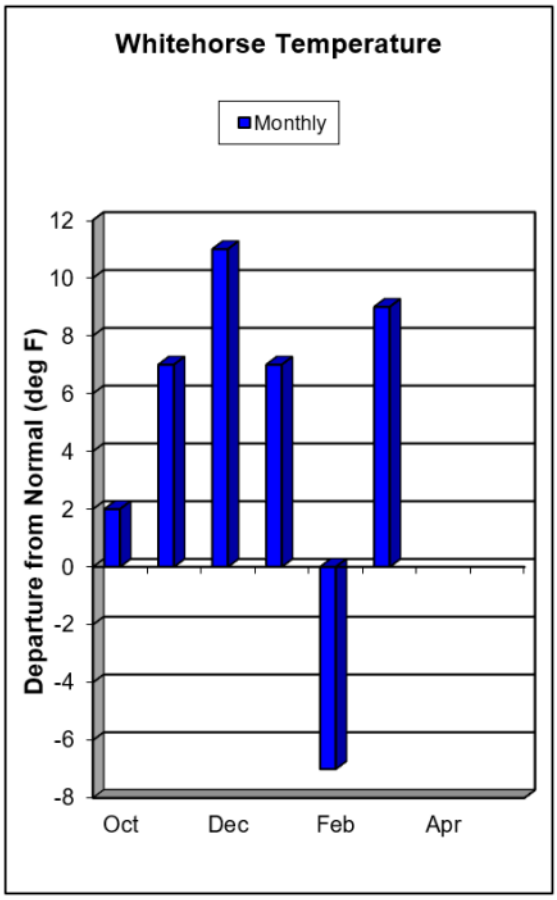
Boxes to the right of the gray 100% of average line represent above average volumes. Conversely, any boxes to the left of the gray 100% line represent below average volumes. In this case all forecast exceedances are for above average April-July volumes. Averages are based on the 1981-2010 period. The number inside or above each colored box represents the volume of that exceedance forecast in thousand acre-feet (KAF). In this case the green 50% exceedance forecast volume is 380 KAF which is centered above 185% of average. Volumes decrease with drier future conditions (left of green box) and increase with wetter conditions (right of green box).



Forecast graphics for other basins are available at: https://www.wcc.nrcs.usda.gov/wsf/Fcst_Chart/
This is an new product. Please submit likes, dislikes and questions to Daniel.Fisher@ak.usda.gov

Upper Yukon Basin





Snowpack

Snowpack in the Upper Yukon Basin started to melt out early this winter. Most sites lost snowpack during the month and several sites melted out completely. The basin as a whole is reporting 50% of normal snowpack, compared to 72% last month. The White River region was particularly hard hit as it didn't begin with much snow and now only has 34% of normal snowpack. Snowpack near Dawson remains the most robust, but still only is reporting 65% of normal.

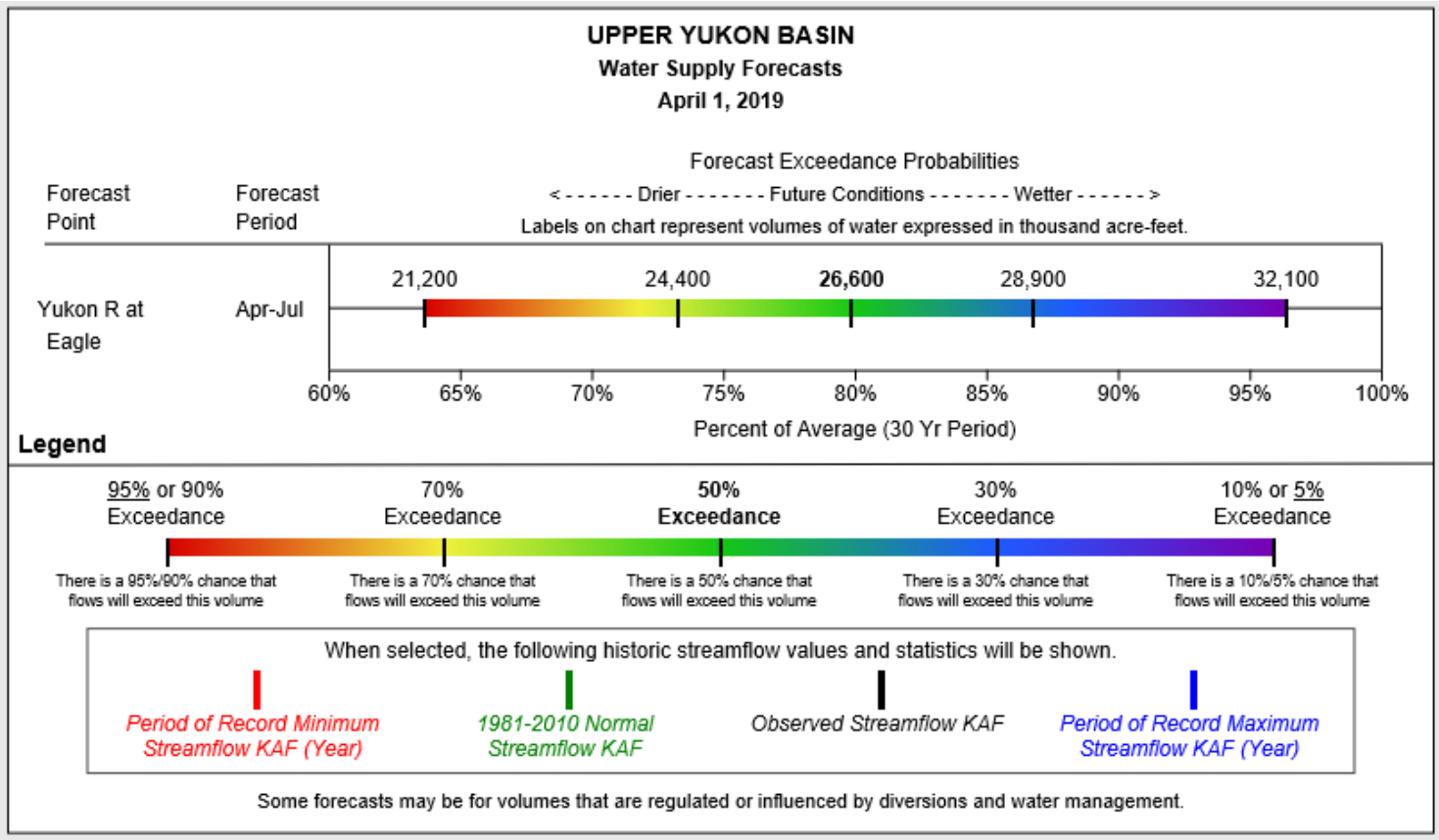
Upper Yukon Basin

Snowpack Data

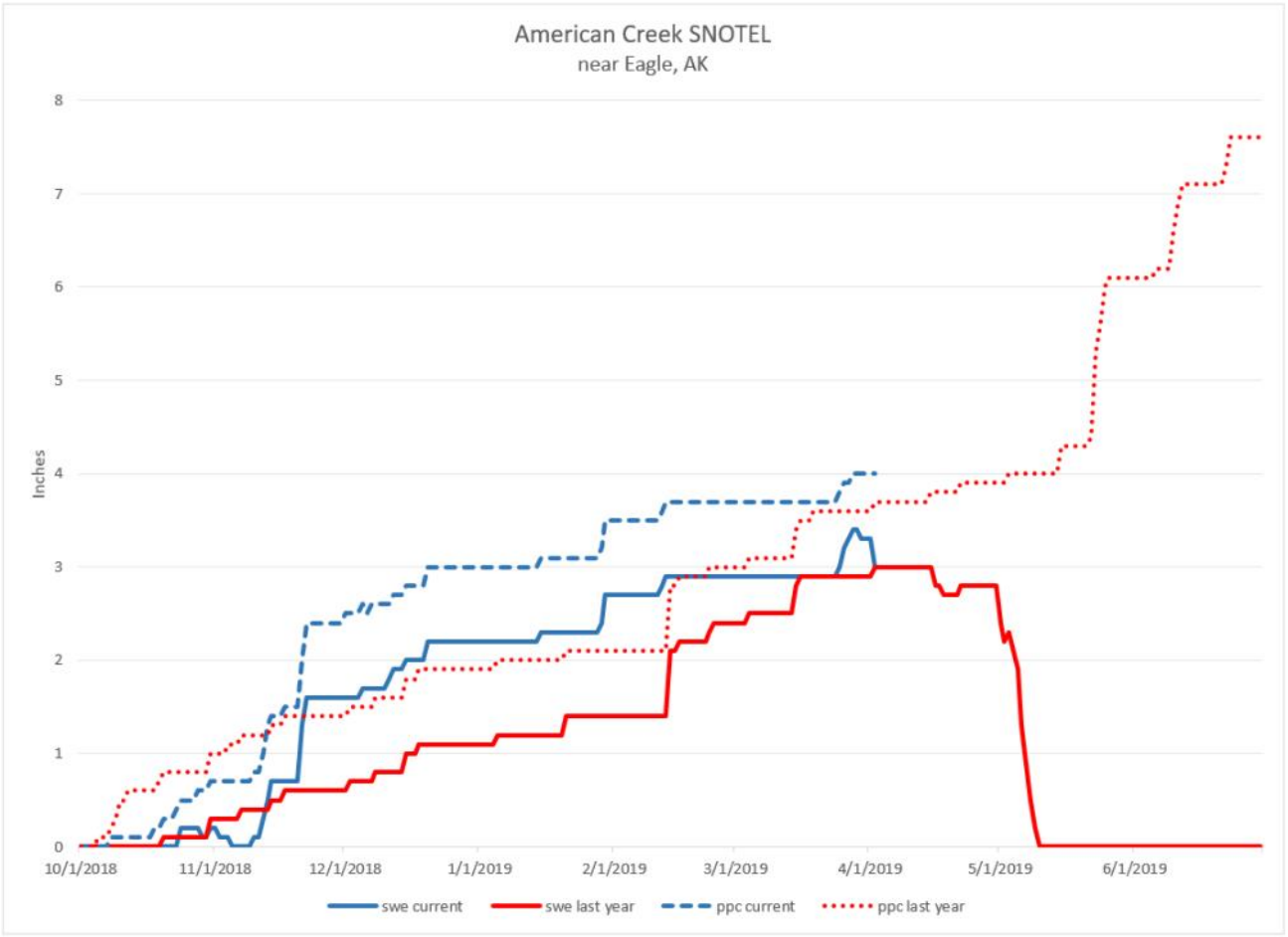
Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Atlin	2395	0	16	20	0.0	3.0	5.0
Beaver Creek	2150	9	23	17	2.0	4.4	3.2
Blackstone River	1020	14	25	---	2.8	4.8	---
Burns Lake	3650	25	30	39	6.0	6.2	8.9
Burwash Airstrip	2660	0	11	10	0.0	2.1	1.8
Calumet	4300	17	29	36	3.7	6.1	7.5
Canyon Mine	1160	1	19	---	0.3	3.8	---
Casino Creek	3495	18	36	26	2.9	8.0	5.0
Chair Mountain	3500	12	29	20	2.4	6.0	3.5
Eagle Plains	2330	30	32	31	7.7	7.0	6.6
Eagle River	1115	28	32	26	5.8	6.8	5.2
Edwards Lake	2720	15	24	30	3.2	4.3	6.4
Finlayson Airstrip	3240	13	23	20	3.1	4.6	4.2
Francis River	730	16	25	---	4.1	4.2	---
Fuller Lake	3695	22	27	33	4.1	4.9	7.7
Grizzly Creek	3200	22	28	31	4.7	6.3	6.8
Hyland	855	22	29	---	5.8	5.3	---
Jordan Lake	3050	9	26	25	1.9	4.8	5.2
King Solomon Dome	3540	15	31	30	3.3	6.8	6.3
Log Cabin (B.C.)	2900	26	41	50	9.0	11.2	15.7
Macintosh	3805	0	26	22	0.0	4.7	4.0
Mayo Airport	1770	0	14	18	0.0	2.6	4.2
Meadow Creek	4050	24	38	45	5.5	9.0	10.9
Midnight Dome	2805	19	30	28	4.3	6.3	5.8
Montana Mtn.	3350	8	26	26	2.1	5.7	5.9
Morley Lake	2700	9	23	26	1.8	5.0	5.8
Mt. Berdoe	3395	5	29	24	1.3	5.3	4.2
Mt. Mcintyre B	3600	14	33	28	3.6	7.2	6.2
Mt. Nansen	3350	6	19	18	1.3	3.0	3.2
Ogilvie River	550	20	22	---	4.0	4.0	---
Old Crow	980	28	---	24	5.5	---	4.4
Pelly Farm	1550	1	17	16	0.2	4.2	3.0
Pine Lake Airstrip	995	21	32	---	5.7	6.8	---
Plata Airstrip	2725	13	26	33	3.6	5.5	7.6
Rackla Lake	3410	24	26	37	6.0	4.9	7.8
Riffs Ridge	2130	23	29	29	5.2	6.5	5.7
Rose Creek (Faro)	1080	6	24	---	1.2	4.4	---
Russell Lake	3480	25	35	37	5.9	7.6	8.9
Satasha Lake	3630	0	19	20	0.0	3.6	3.8
Summit	985	28	30	35	7.6	7.1	9.9
Tagish	3540	10	28	26	2.5	6.5	6.0
Twin Creeks	2950	15	24	33	3.6	4.8	7.3
Watson Lake Airport	685	12	30	---	3.0	5.4	---
Whitehorse Airport	2300	6	24	20	1.6	4.9	4.0
Williams Creek	3000	7	22	20	1.8	3.8	3.8
Withers Lake	3200	22	32	39	6.0	6.7	8.8

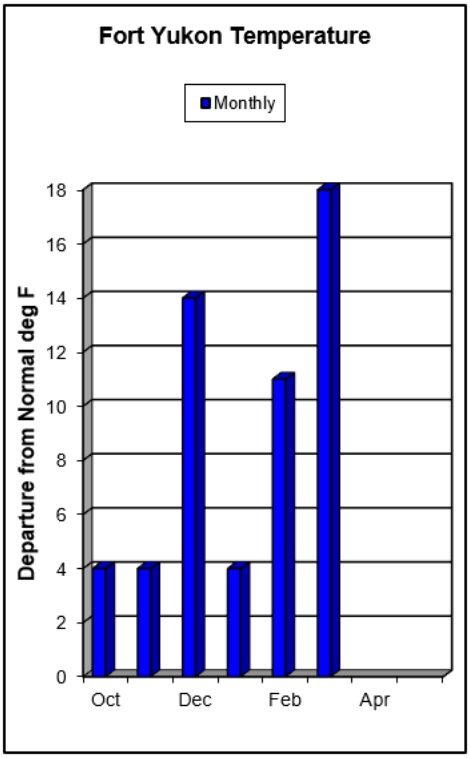
**Estimate*

Streamflow Forecasts



Central Yukon Basin





Snowpack

The measured snowpack in the Central Yukon Basin remains close to normal. Most sites reported either a marginal loss or gain of snowpack over the month of March. The upper Porcupine snowpack remains above normal, while the Yukon Flats, Forty Mile Region and White Mountains report snowpacks between 70 and 100% of normal. American Creek SNOTEL, near Eagle, hit peak snowpack on March 28th, three weeks ahead of schedule.

Central Yukon Basin

Snowpack Data

Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
American Creek	1050	11	17	---	3.3	2.9	---
Atigun Pass	4800	49	53	---	---	---	---
Borealis	1330	18	33	25	4.5	8.4	4.8
Boundary	3500	19	26	26	4.8	5.4	5.3
Chicken Airstrip	1650	11	14	16	2.8	3.2	3.2
Circle Hot Springs	860	14	22	24	3.9	4.0	4.1
Coal Creek	1000	10	23	---	2.9	4.3	---
Copper Creek	2000	0	---	---	0.0	---	---
Crescent Creek	2600	0	18	---	0.0	3.4	---
Eagle Summit	3650	10	23	---	---	---	---
Fort Yukon	430	18	21	---	---	---	---
Fort Yukon	430	18	19	20	3.8	3.6	3.6
Fossil	1400	15	36	24	3.6	8.9	4.8
Graphite Lake	600	7	22	---	2.0*	4.2	---
Jack Wade Jct	3585	24	30	---	4.0	5.2	---
Lost Chicken Hill	2150	13	17	18	3.1	3.5	4.0
Lower Beaver Creek	400	13	25	---	3.9*	4.8	---
Mt. Fairplay	3100	11	21	21	3.0	4.4	4.6
Old Crow	980	28	---	24	5.5	---	4.4
Ptarmigan Creek	2270	20	32	24	3.9	6.9	4.4
Stack Pup Creek	1620	13	22	25	3.1	4.2	4.0
Step Mountain	2850	16	31	---	4.5*	6.0	---
Three Fingers	3350	27	34	---	7.6*	6.9	---
Upper Nome Creek	2520	26	49	---	---	---	---
Vunzik Lake	500	9	27	---	2.6*	5.4	---
Windy Gap	1900	24	49	26	5.3	13.3	5.7
Wolf	1200	17	33	23	4.4	8.3	4.2

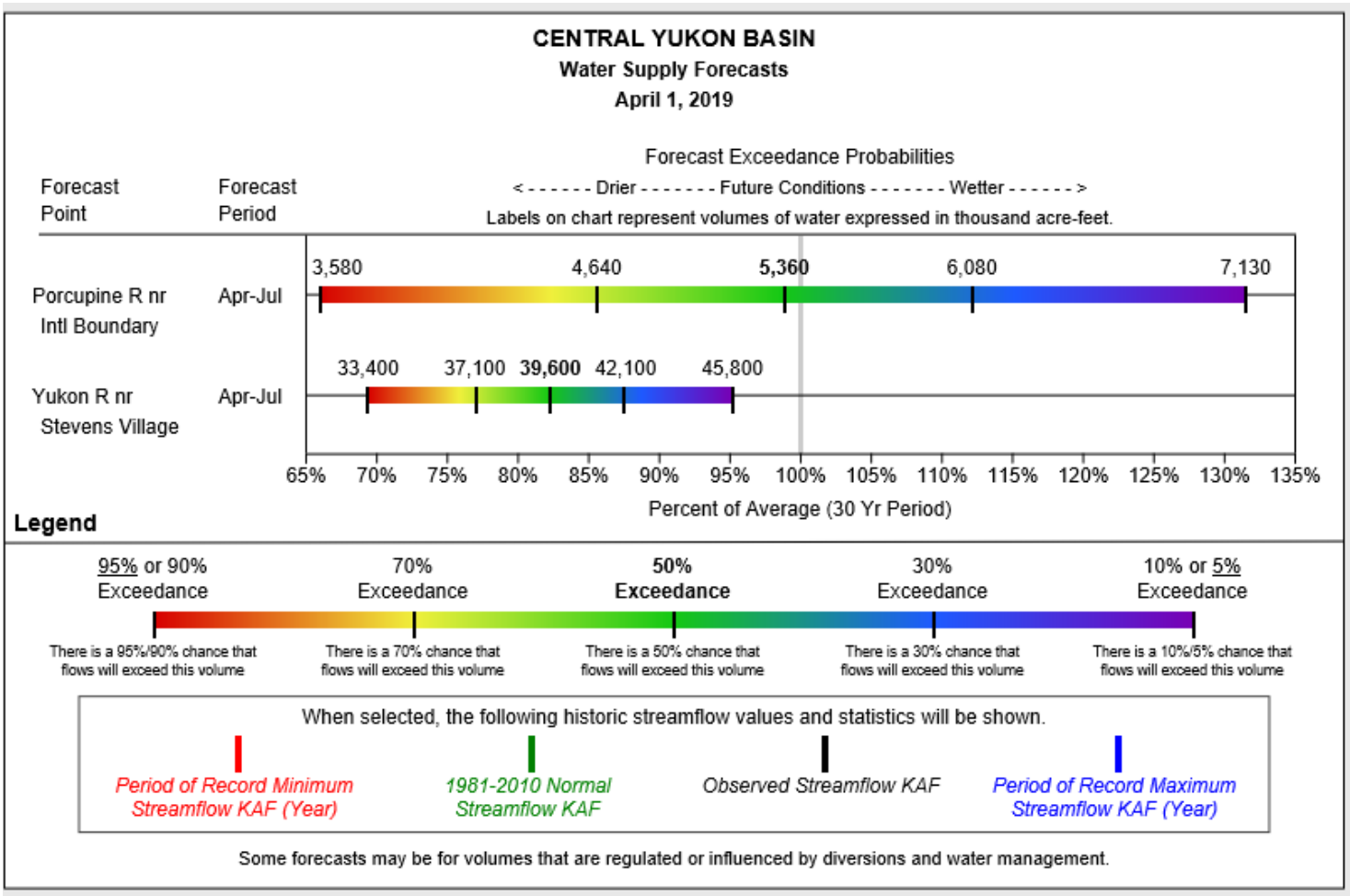
**Estimate*

Precipitation

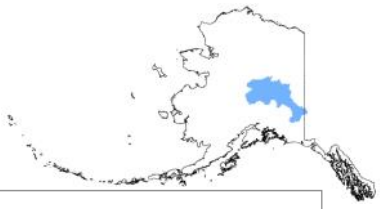
Inches Accumulated since October 1st

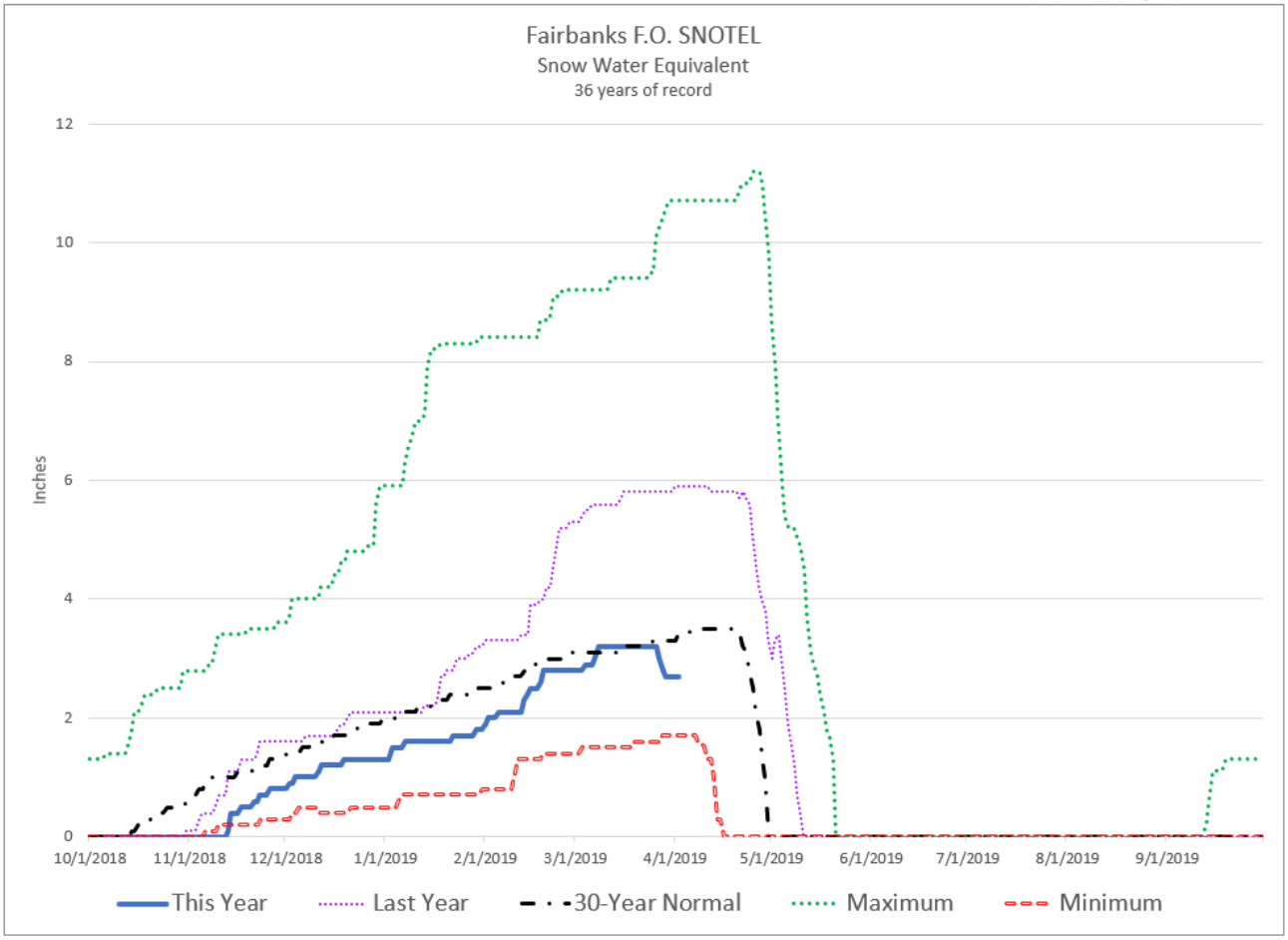
Site Name	Elev.	This Year	Last Year	1981-2010 Normal	% of Normal
American Creek	1050	4.0	3.6	---	---
Atigun Pass	4800	7.1	6.0	5.6	127%
Chandalar Camp	3300	7.3	5.6	4.5	162%
Eagle Summit	3650	5.0	9.4	5.3	94%
Fort Yukon	430	3.8	3.5	3.6	106%
Jack Wade Jct	3585	4.2	4.9	---	---
Upper Nome Creek	2520	6.9	12.8	5.2	133%

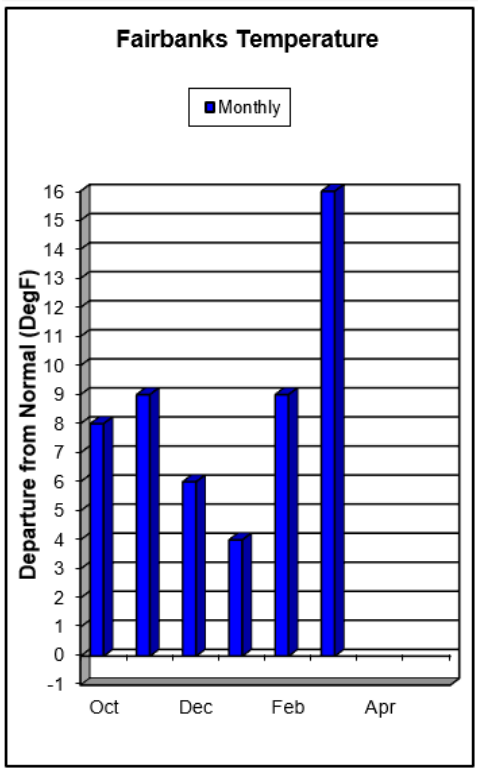
Streamflow Forecasts



Tanana Basin







Snowpack

Much of the middle Tanana Valley was melted out on April 1st. Granite Creek SNOTEL, near Delta Junction, melted out on March 27th, over three weeks ahead of average. Likewise, Fairbanks F.O. SNOTEL started to meltout on March 22nd, three weeks early. Colorado Creek snow course lost 0.8" of water over March and was measured with its lowest April 1st reading since 1970. Caribou Mine snow course, in the headwaters of the Salcha River, produced its smallest snowpack in its 54-year history. However, some snowpack in the Chena Basin remains near or even above normal. Mt. Ryan SNOTEL was measured at 120% of normal with 31" of snow and 7.2" of water content.

Tanana Basin

Snowpack Data

Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Bonanza Creek	1150	12	33	21	3.6	7.9	4.0
Caribou Creek	1250	7	28	20	2.2	7.3	3.8
Caribou Snow Pillow	900	12	31	20	3.9	7.8	3.9
Chisana	3320	13	21	---	2.9	4.8	4.6
Cleary Summit	2230	27	45	28	5.7	11.8	5.2
Colorado Creek	700	8	37	20	1.6	9.0	3.6
Fairbanks F.O.	450	9	29	---	2.7	5.9	3.3
Faith Creek	1750	18	38	26	4.5	9.0	4.8
Fielding Lake	3000	30	48	40	7.9	12.1	9.9
Fielding Lake SNOTEL	3000	30	43	---	7.4	10.5	---
Fort Greely	1500	0	27	17	0.0	4.2	3.2
French Creek	1800	9	47	24	2.1	13.2	5.2
Granite Crk	1240	0	23	---	0.0	4.6	3.8
Kantishna	1550	18	40	26	4.2	9.4	5.1
Lake Minchumina	730	14	22	20	3.2	4.6	3.8
Lost Creek	3030	8	26	18	1.7	4.9	3.7
Mentasta Pass	2430	14	32	27	3.5	7.8	6.2
Monument Creek	1850	12	38	---	3.7	9.1	4.6
Mt. Ryan	2800	28	40	---	7.0	10.3	5.1
Munson Ridge	3100	25	60	---	6.0	16.5	6.8
Rock Creek Bottom	2250	0	30	18	0.0	6.9	3.9
Shaw Creek Flats	980	0	26	14	0.0	4.6	2.9
Teuchet Creek	1640	7	28	---	3.1	6.9	3.8
Tok Junction	1650	9	14	20	2.1	2.4	3.5

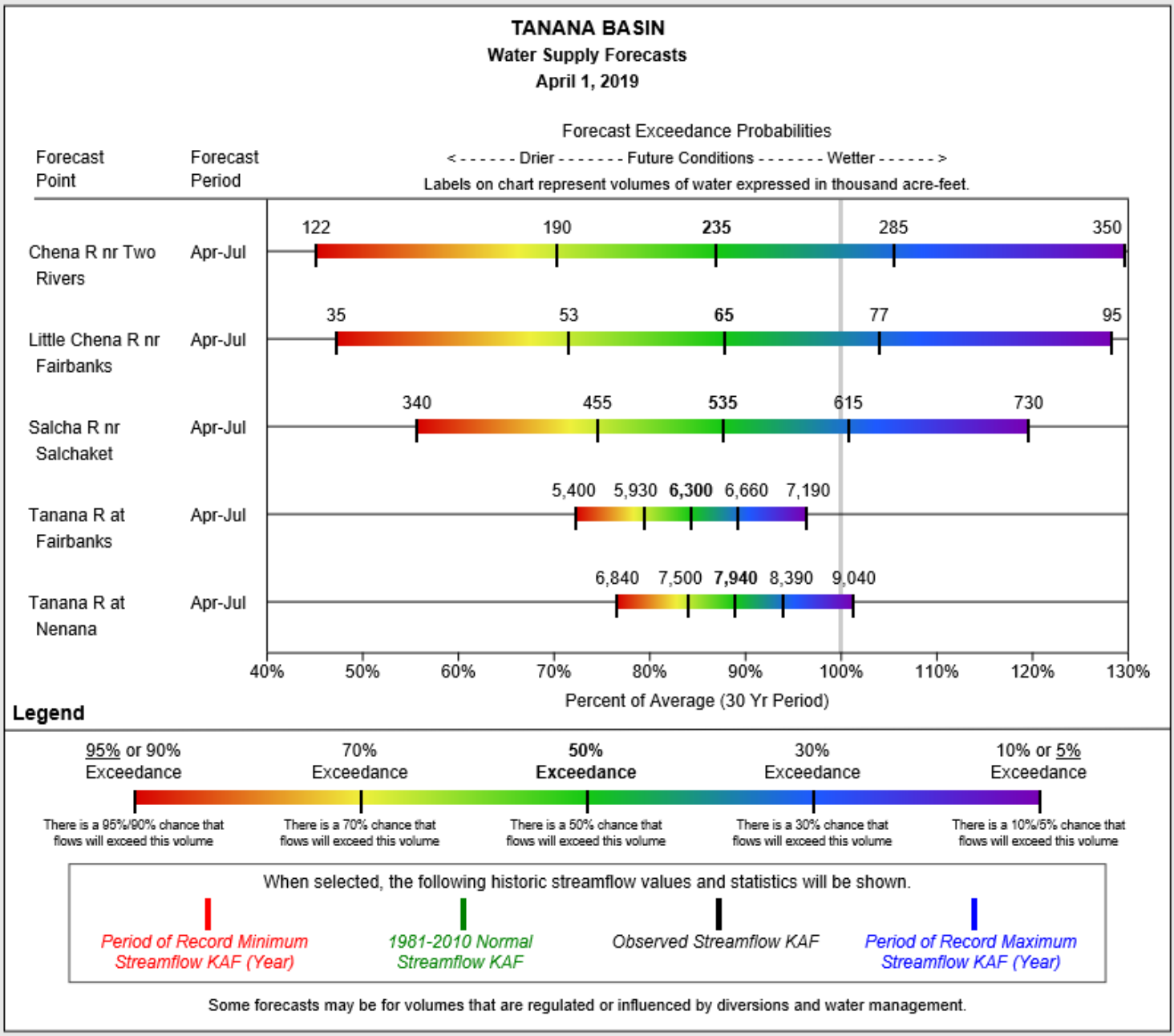
**Estimate*

Precipitation

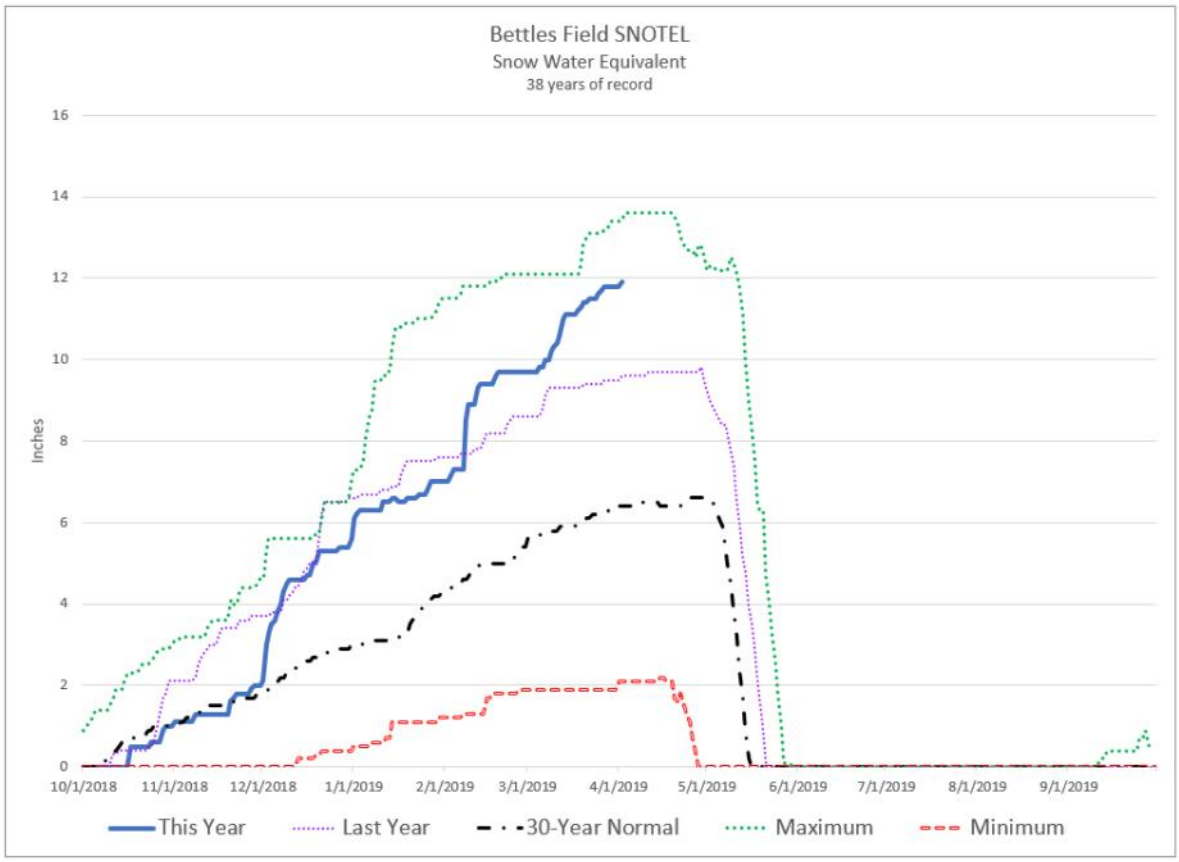
Inches Accumulated since October 1st

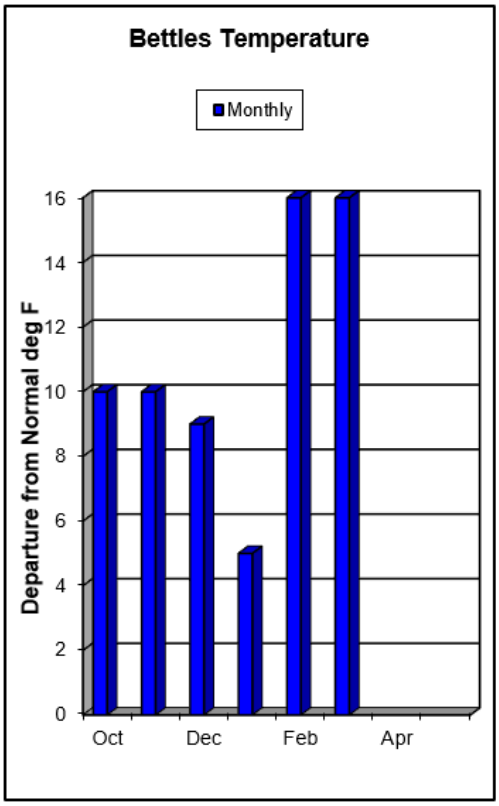
Site Name	Elev.	This Year	Last Year	1981-2010 Normal	% of Normal
Chisana	3320	3.2	5.5	---	---
Fairbanks F.O.	450	3.5	8.0	4.5	78%
Granite Crk	1240	1.6	5.1	4.1	39%
Kantishna	1550	4.9	13.7	4.6	107%
Little Chena Ridge	2000	4.9	9.0	5.4	91%
Nenana	415	3.9	5.7	---	---
Tok	1630	2.0	2.9	---	---
Upper Chena	2850	6.4	14.1	6.7	96%

Streamflow Forecasts



Western Interior Basins





Snowpack

Koyukuk

The Koyukuk valley remains a bright spot on Alaska's map if you love snow. Coldfoot SNOTEL now has its wettest snowpack in its 25-year history and the snowpack at Bettles SNOTEL is its highest since 1993 and second highest in its 38-year history. All measurement sites in this basin remain above normal, though a few appear to have started to melt out early.

Kuskokwim

The Kuskokwim basin now has mixed above and below normal snowpack. Warm temperatures have started meltout, but deep snow remains in some location. McGrath still retains above normal snowpack, but the sites near the western flank of the Alaska Range are near 80% of normal. The lower Kuskokwim, near Bethel, is largely devoid of snow.

Lower Yukon

The Lower Yukon has above normal snowpack. The new Galena AK SNOTEL site may have reached peak snowpack on March 23rd. Most snow sites in this area lost depth during the month of March

Western Interior Basins

Snowpack Data

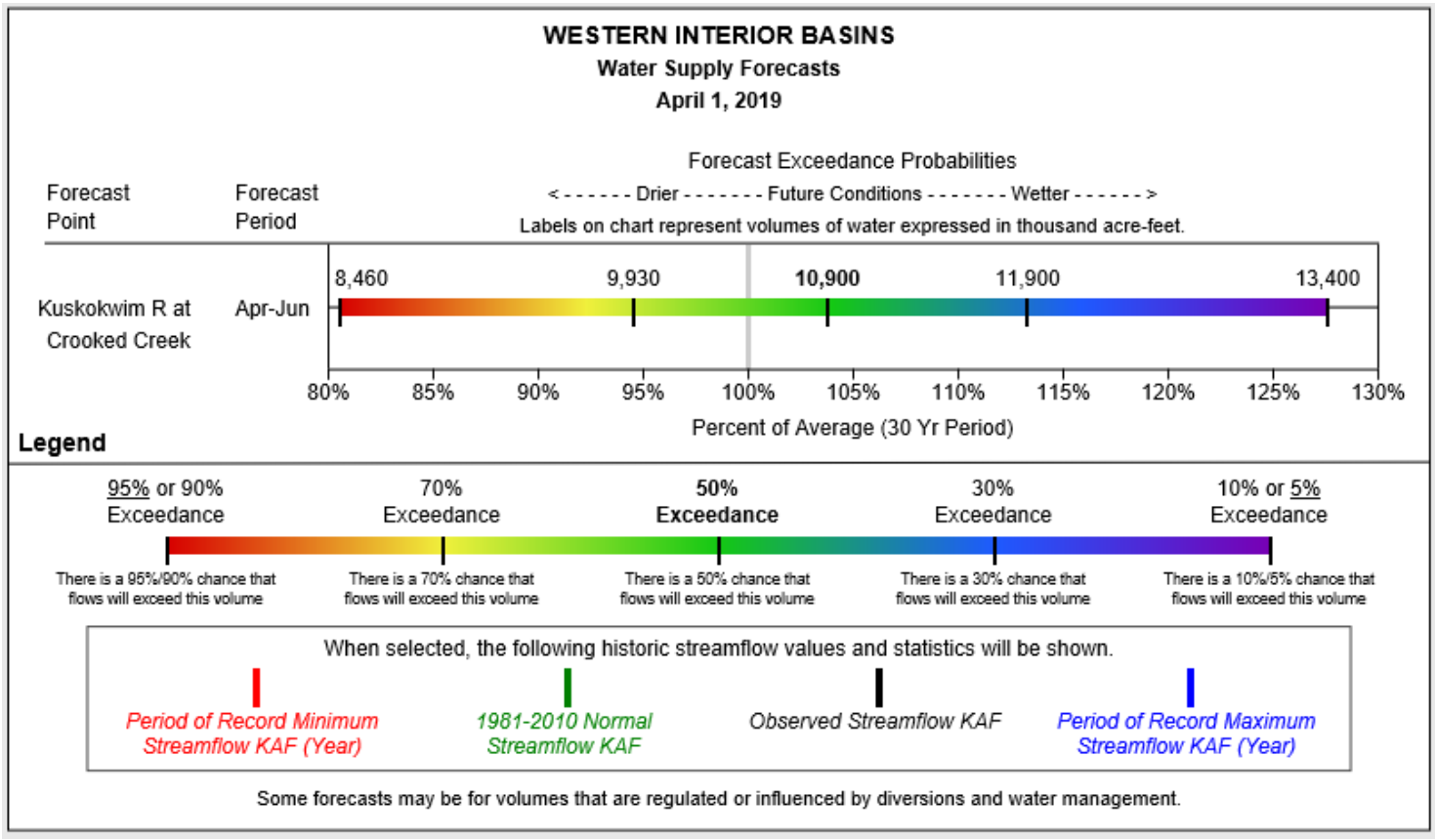
Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Koyukuk							
Bettles Field	640	43	34	---	11.8	9.5	6.4
Cloverleaf	170	25	33	---	7.7*	7.6	---
Coldfoot	1040	41	34	---	10.6	8.3	6.4
Colville Bend	170	29	33	---	8.1*	6.9	---
East Chalatna	430	25	36	---	7.4*	7.8	---
Gobblers Knob	2030	14	18	---	---	---	---
Huggins Creek	290	29	36	---	7.8*	8.7	---
Jr Slough	160	27	33	---	7.4*	7.4	---
Kaldoyeit	750	34	42	21	10.6*	10.3	4.2
Kanuti Chalatna	670	30	36	26	8.6*	9.8	5.3
Kanuti Kilolitna	550	36	26	22	10.1*	6.6	4.0
Minnkokut	580	34	45	34	12.0*	11.2	6.6
Nolitna	560	35	39	25	9.8*	10.5	5.3
Treat Island	190	27	---	---	7.7*	---	---
Kuskokwim							
Aniak	80	10	27	---	3.2*	7.6*	---
Mcgrath	340	22	27	27	6.6	5.1	5.6
Purkeypile Mine	2025	16	40	26	4.4	8.8	5.4
Telaquana Lake	1550	16	23	20	4.3	6.3	4.6
Telaquana Lake SNOTEL	1275	10	21	---	3.4	7.0	---
Lower Yukon							
Bullfrog	100	36	42	---	10.3*	10.5	---
Deer Creek	195	33	32	---	8.9*	7.7	---
Galena Ecological Site	128	20	24	---	5.2	4.3	---
Hozatka Lake	206	22	23	---	5.5*	---	---
Little Mud River	855	15	24	---	4.6*	5.0	---
Lower Nowitna River	205	21	27	---	6.0*	6.5	---
Middle Innoko	150	29	---	34	8.3*	---	7.7
Ninemile Island	140	41	39	---	10.9*	8.6	---
Pike Trap Lake	130	12	18	---	3.4*	4.4	---
Squirrel Creek	150	41	39	---	11.1*	8.7	---
Upper Innoko	180	27	39	32	7.7*	8.8	7.4
Wapoo Hills	220	41	48	36	12.3*	11.2	7.7
Yankee Slough	100	43	41	41	12.7*	10.1	9.4

**Estimate*

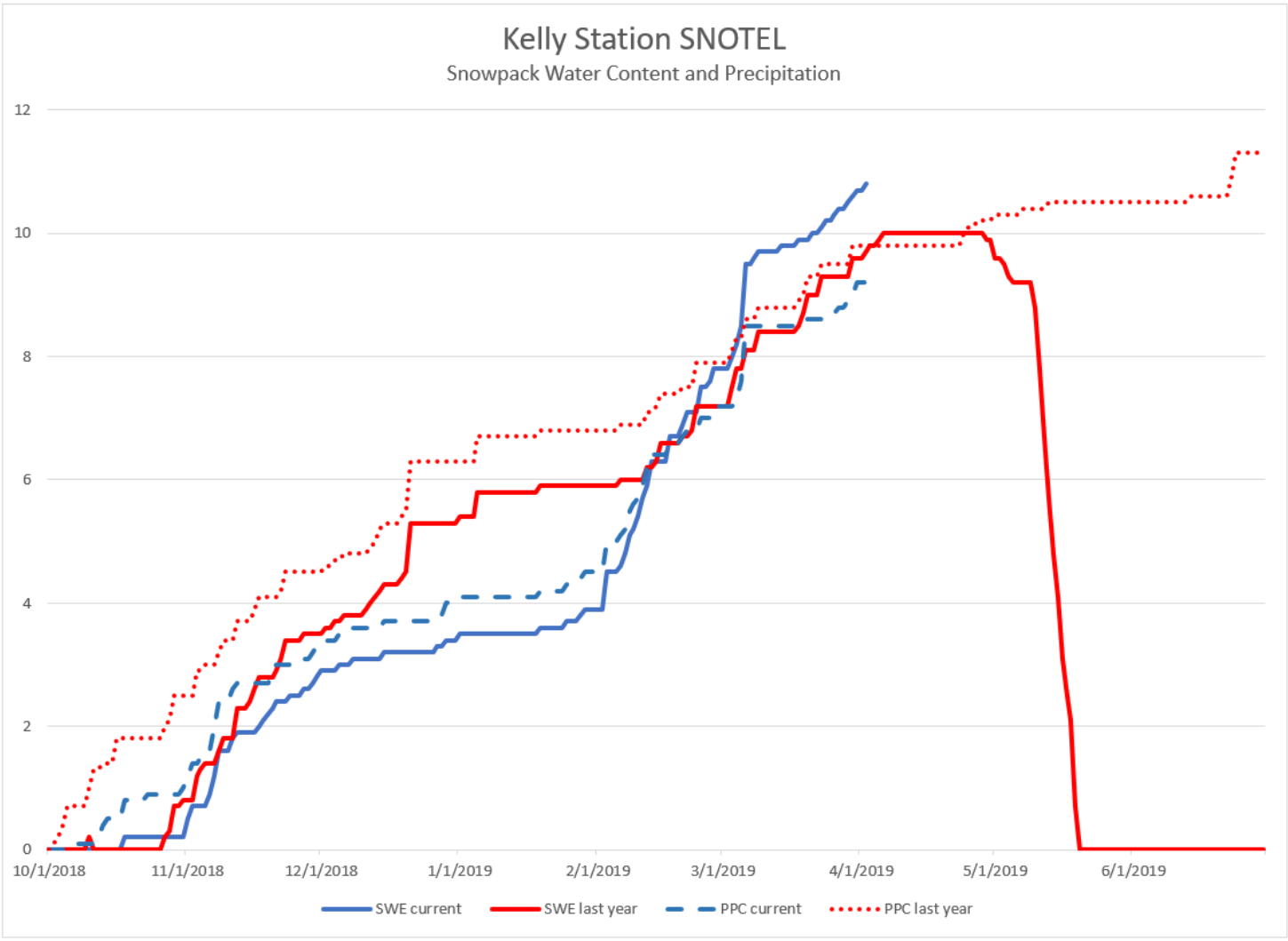
Precipitation

Site Name	Elev.	Inches Accumulated since October 1st			
		This Year	Last Year	1981-2010 Normal	% of Normal
Koyukuk					
Bettles Field	640	10.4	8.5	6.7	155%
Coldfoot	1040	11.3	7.6	6.3	179%
Gobblers Knob	2030	9.6	9.3	6.8	141%
Kuskokwim					
Aniak	80	9.3	12.0	---	---
Telaquana Lake	1275	6.8	10.9	---	---
Lower Yukon					
Hozatka Lake	206	6.0	7.4	---	---

Streamflow Forecasts



Arctic and Kotzebue Sound



Snowpack

Arctic

The Arctic had above normal amounts of precipitation this month. Like last month, it is likely that the storms which dumped snow on northwest Alaska also contributed snow to the western plains. This area has had above normal precipitation since the beginning of the winter, though snow depth sensors in this area don't reflect this.

Kotzebue

Northwest Alaska had much above normal precipitation during March. Kelly Station SNOTEL, along the Noatak, gained 3" of snow water content during March and is the highest it's been in its 7-year history.

Arctic and Kotzebue Sound

Snowpack Data

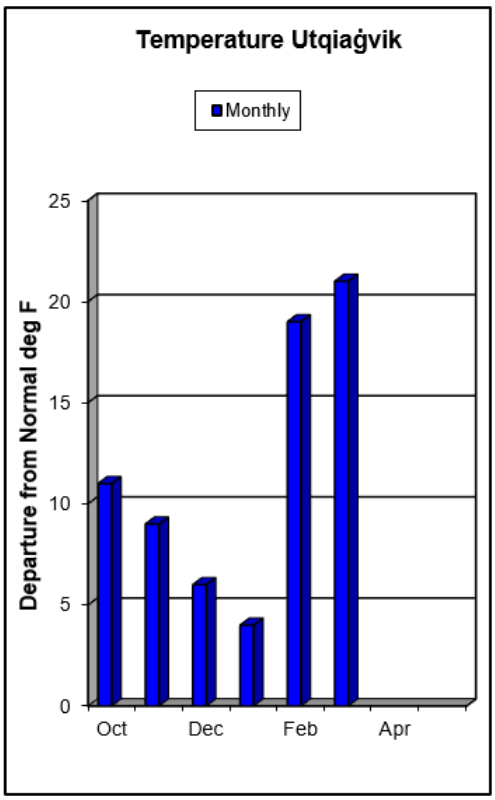
Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Atigun Pass	4800	49	53	---	---	---	---
Imnaviat Creek	3050	20	38	---	---	---	---
Kelly Station	310	35	40	---	10.7	9.6	---
Prudhoe Bay	30	10	20	---	---	---	---
Sagwon	1000	23	14	---	---	---	---

**Estimate*

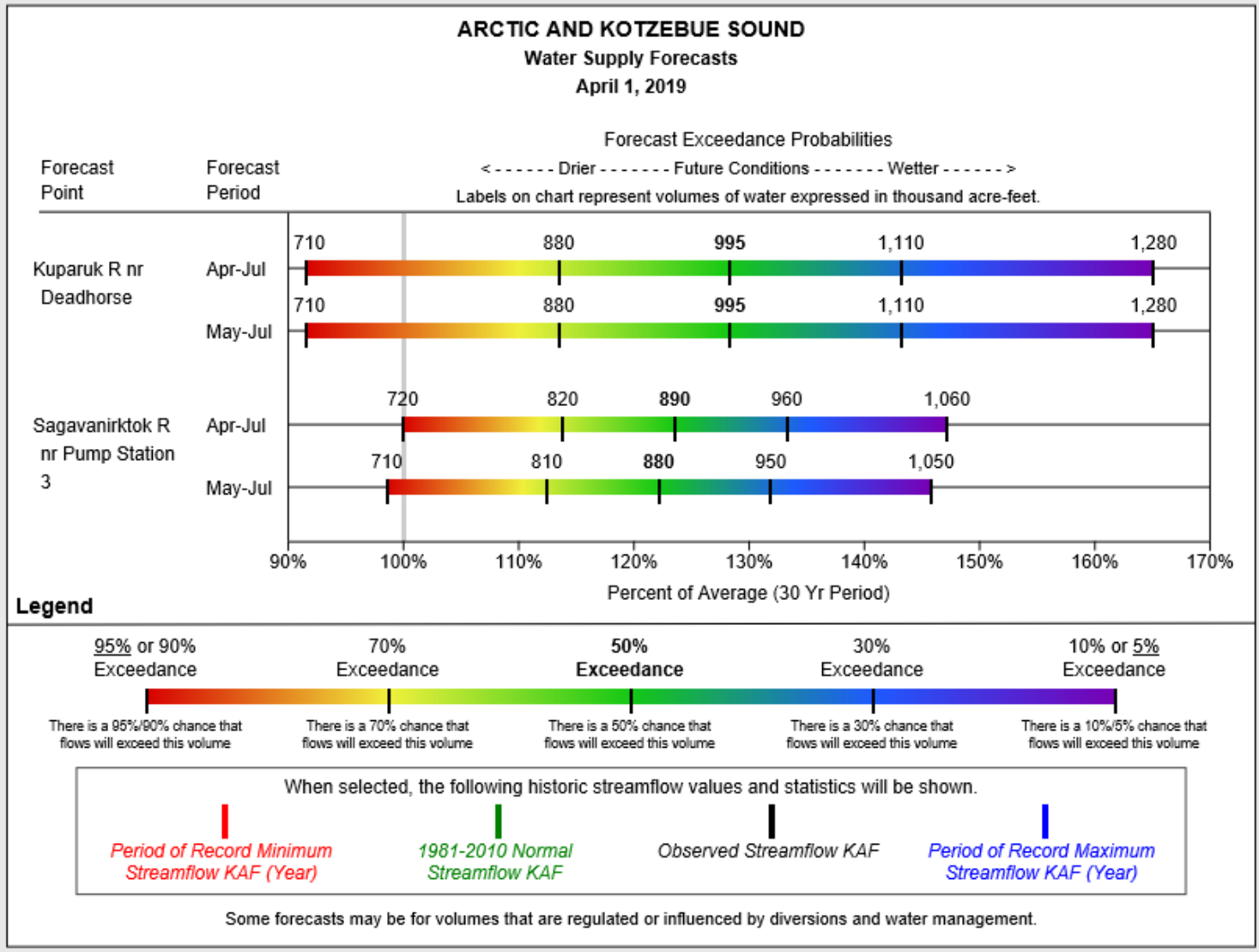
Precipitation

Inches Accumulated since October 1st

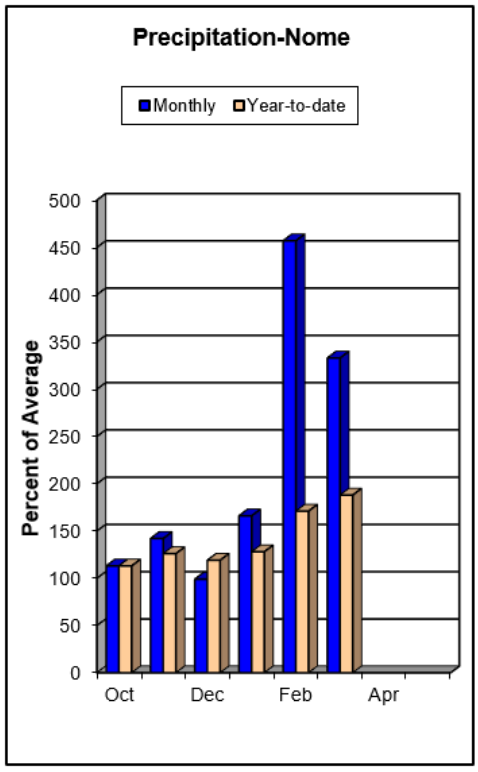
Site Name	Elev.	This Year	Last Year	1981-2010 Normal	% of Normal
Arctic					
Atigun Camp	3400	3.4	3.8	2.5	136%
Atigun Pass	4800	7.1	6.0	5.6	127%
Imnaviat Creek	3050	3.1	4.4	2.9	107%
Prudhoe Bay	30	2.9	4.5	3.5	83%
Sagwon	1000	3.0	3.4	3.0	100%
Kotzebue Sound					
Port Red Dog	50	6.8	11.2	3.5	193%
Red Dog Mine	950	10.6	7.7	4.3	245%
Kelly Station	310	9.2	9.8	---	---

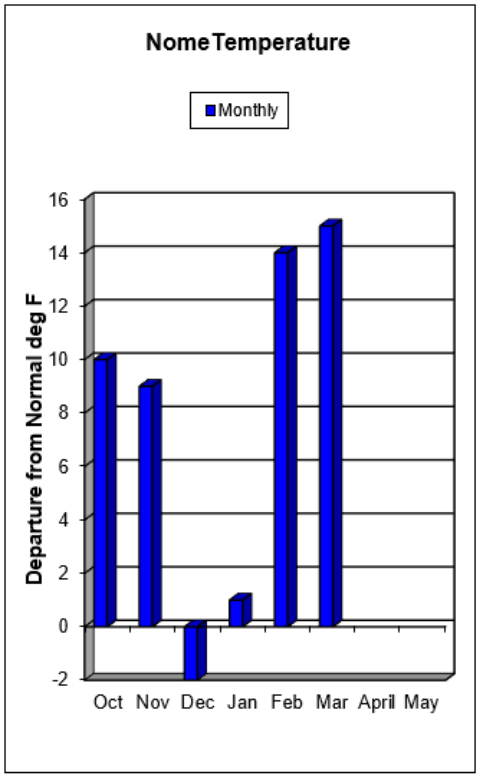


Streamflow Forecasts



Norton Sound/Y-K Delta/Bristol Bay





Snowpack

Western Alaska had much above normal precipitation for March. Sites on the Seward Peninsula gained snow during small storms throughout the month. Much of the snow along the lower Kuskokwim and in the low areas of Bristol Bay has melted out. However, there are reports of reports of deeper snowpack in concentrated areas in the Y-K Delta, near Hooper Bay.

Precipitation

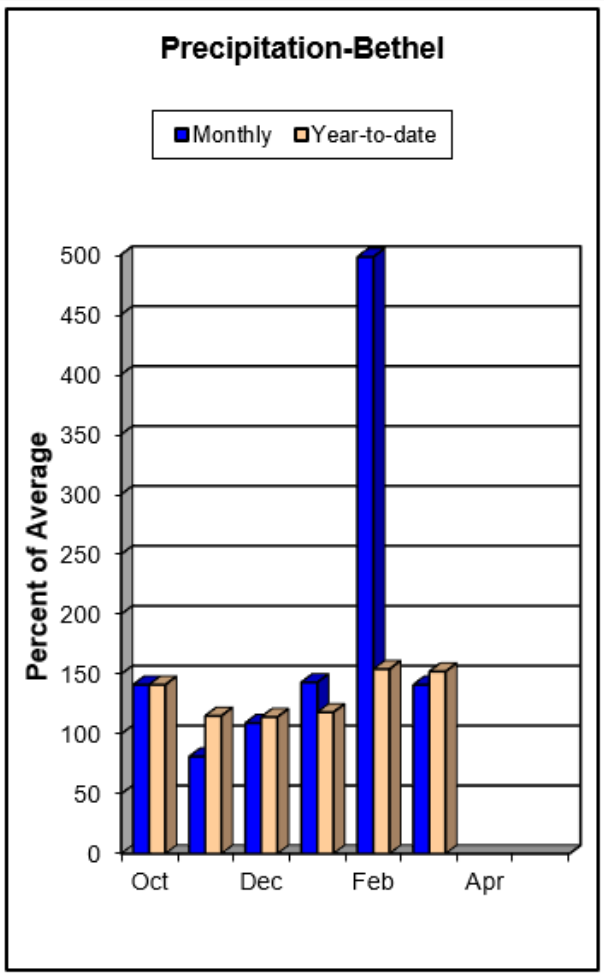
		Inches Accumulated since October 1st			
Site Name	**Elev.**	**This Year**	**Last Year**	**1981-2010 Normal**	**% of Normal**
Norton Sound					
Pargon Creek	100	8.0	8.4	5.9	136%
Rocky Point	250	6.7	7.2	5.4	124%

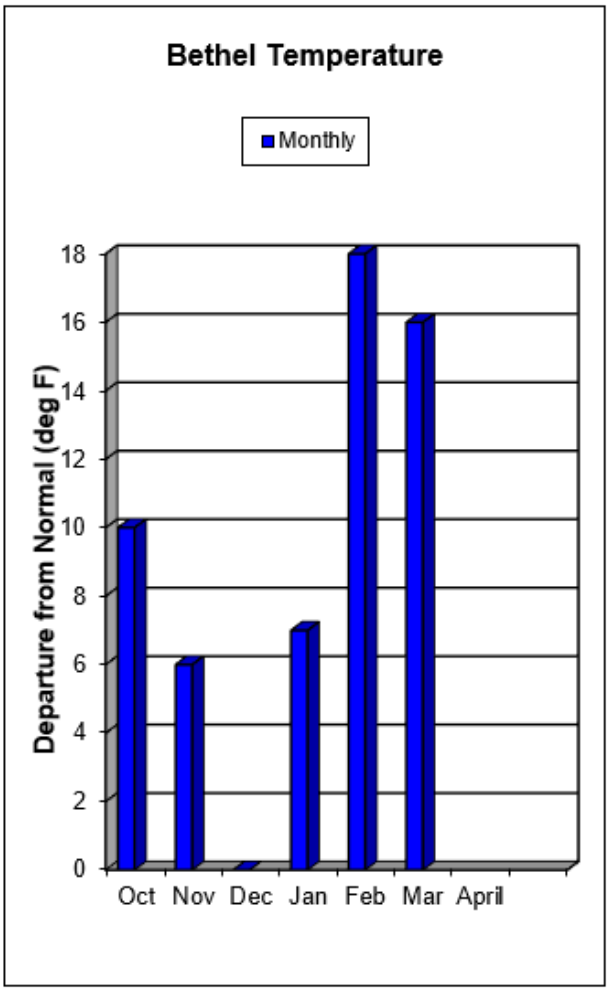
Norton Sound/Bristol Bay

Snowpack Data

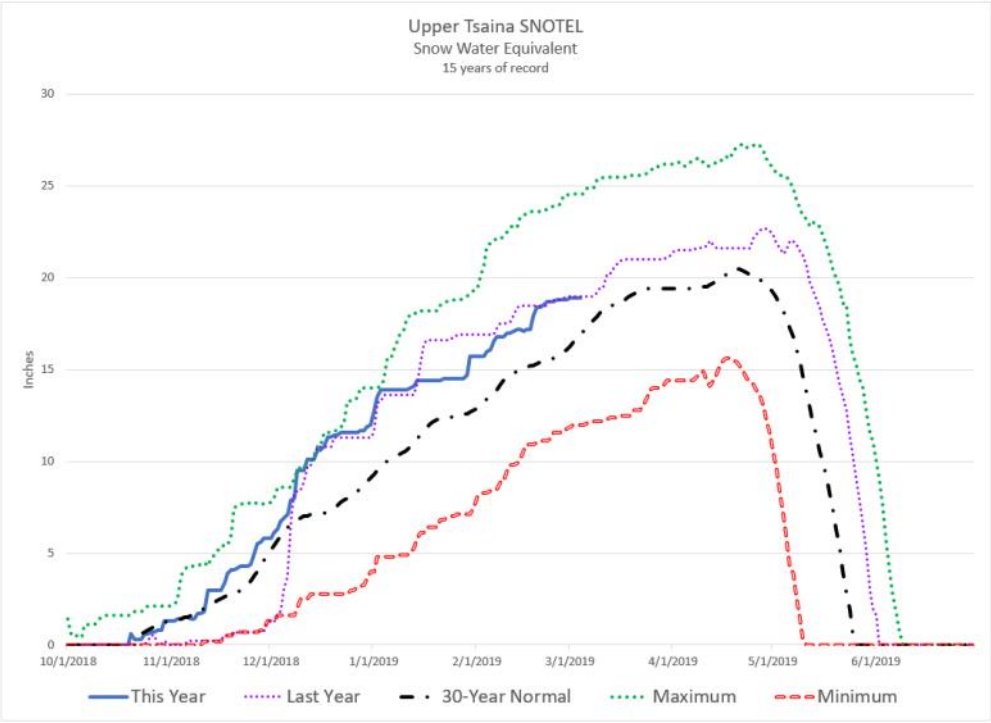
Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Norton Sound							
Johnsons Camp	25	41	35	---	---	---	---
Pargon Creek	100	24	27	---	5.2*	5.1*	---
Rocky Point	250	46	41	---	---	---	---

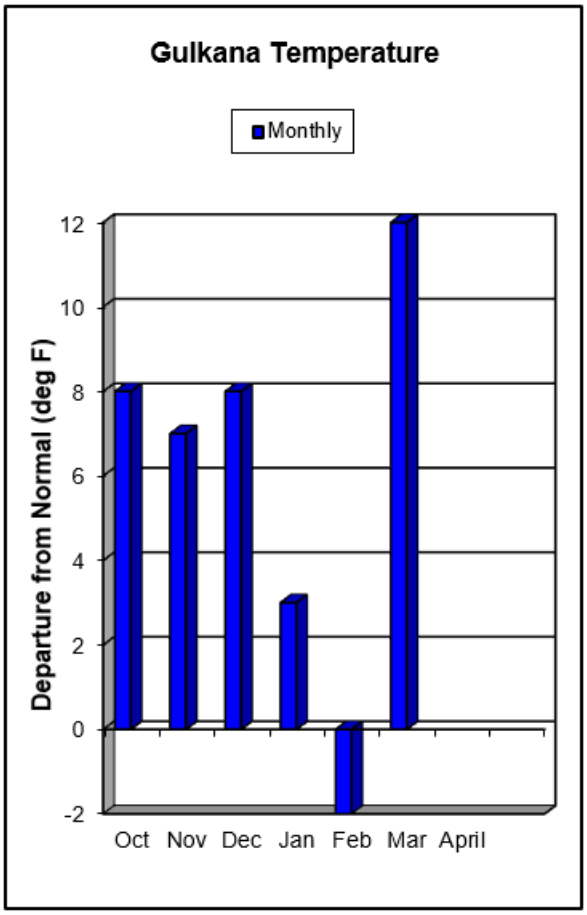
**Estimate*





Copper Basin





Snowpack

The snowpack in the Copper River Basin is still below normal and has started meltout early. Many sites lost snowpack over the month of March, a month when most sites are still gaining depth and water content. Kenny Lake and Tazlina snow courses have melted out and most valley floor sites are well below normal. The Gulkana River SCAN site started to melt out on March 16. Only higher elevation sites made any real gains in snowpack. The snow sites in the Chugach Range are near normal, and the Alaska Range sites are near to well below normal.

Copper Basin

Snowpack Data

Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Chistochina	1950	13	29	20	3.6	6.5	3.5
Chokosna	1550	0	13	15	0.0	2.3	3.8
Copper Center	1264	8	28	---	2.6	6.6	---
Dadina Lake	2160	12	34	28	3.3	7.8	6.3
Fielding Lake	3000	30	48	40	7.9	12.1	9.9
Fielding Lake	3000	30	43	---	7.4	10.5	---
Haggard Creek	2540	23	38	28	5.0	10.7	5.5
Kenny Lake School	1300	0	24	16	0.0	5.7	3.6
Little Nelchina	2650	15	30	26	3.1	6.9	5.2
Long Glacier	4820	30	53	---	9.9*	14.4	---
Lost Creek	3030	8	26	18	1.7	4.9	3.7
May Creek	1610	8	21		2.7	5.8	5.5
Mentasta Pass	2430	14	32	27	3.5	7.8	6.2
Monsoon Lake	3100	20	35	30	5.5*	7.7	6.4
Notch	2643	0	---	---	0.0	---	---
Paxson	2650	26	43	31	6.5	10.5	6.9
Sanford River	2280	10	30	28	3.2	7.9	6.0
St. Anne Lake	1990	8	31	23	2.3*	6.4	4.8
Tazlina	1250	0	24	14	0.0	6.4	3.8
Tolsona Creek	2000	12	28	22	3.0	6.1	4.2
Tsaina River	1650	47	60	56	15.4	18.6	17.0
Twin Lakes	2400	10	31	26	3.0*	7.5	6.4
Upper Tsaina River	1750	57	69	---	21.3	21.4	19.4
Worthington Glacier	2100	64	70	75	24.4	23.8	24.6

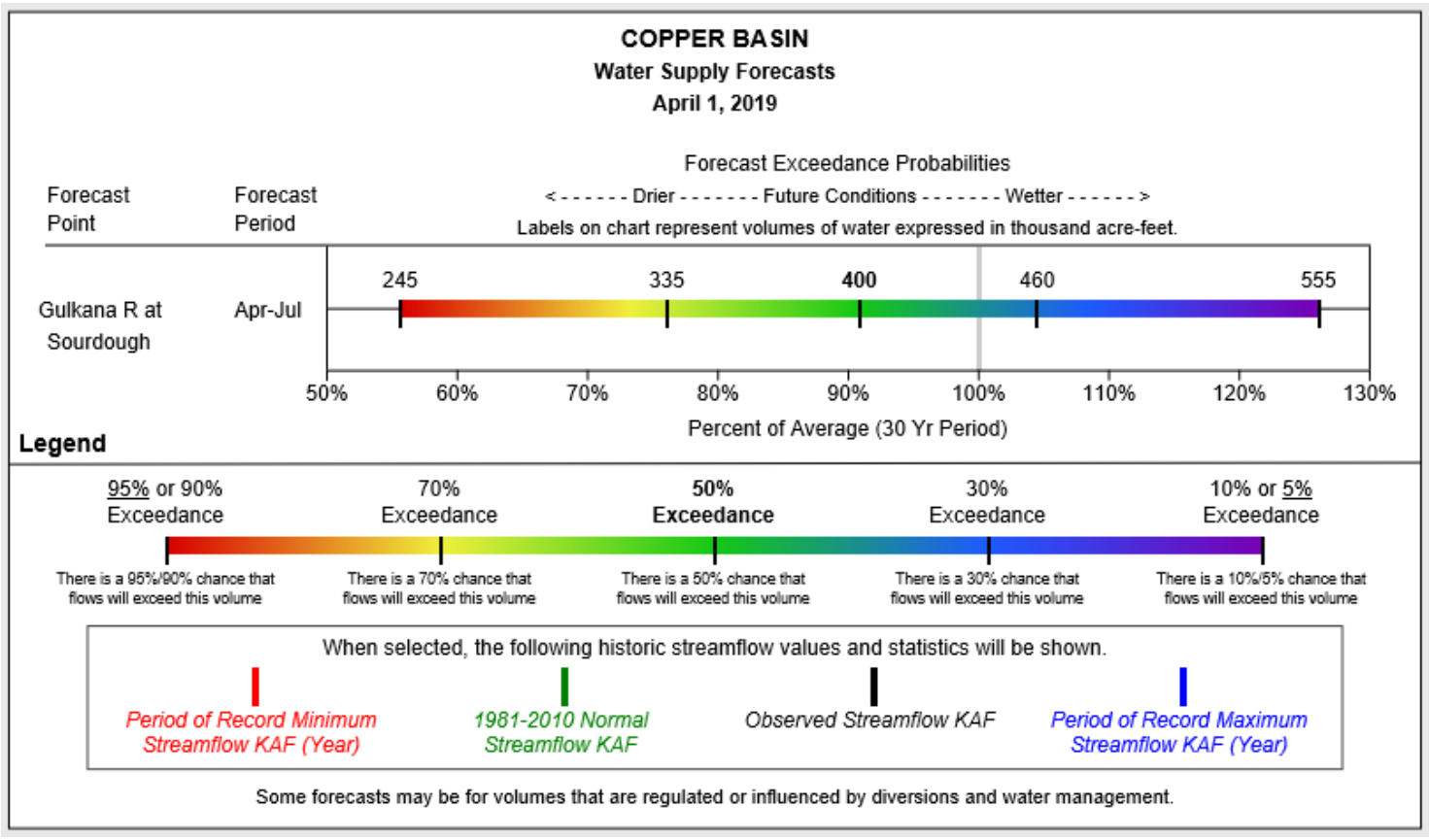
**Estimate*

Precipitation

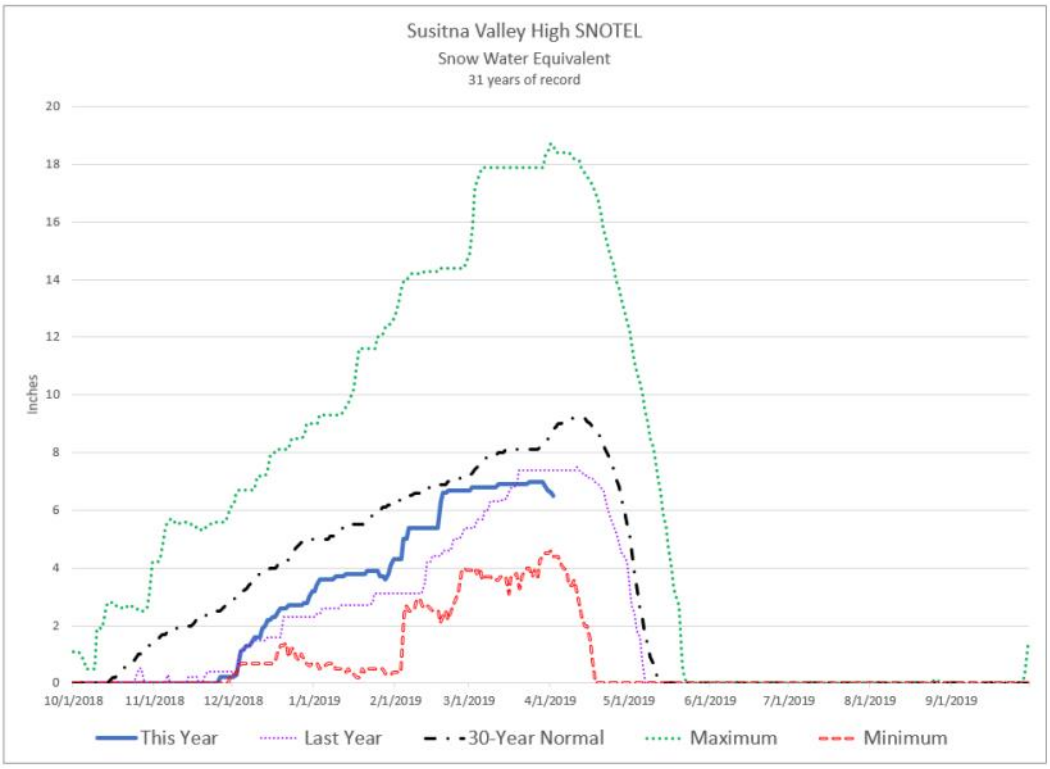
Inches Accumulated since October 1st

Site Name	Elev.	This Year	Last Year	1981-2010 Normal	% of Normal
May Creek	1610	6.0	11.5	6.1	98%
Upper Tsaina River	1750	33.1	25.9	27.0	123%

Streamflow Forecasts

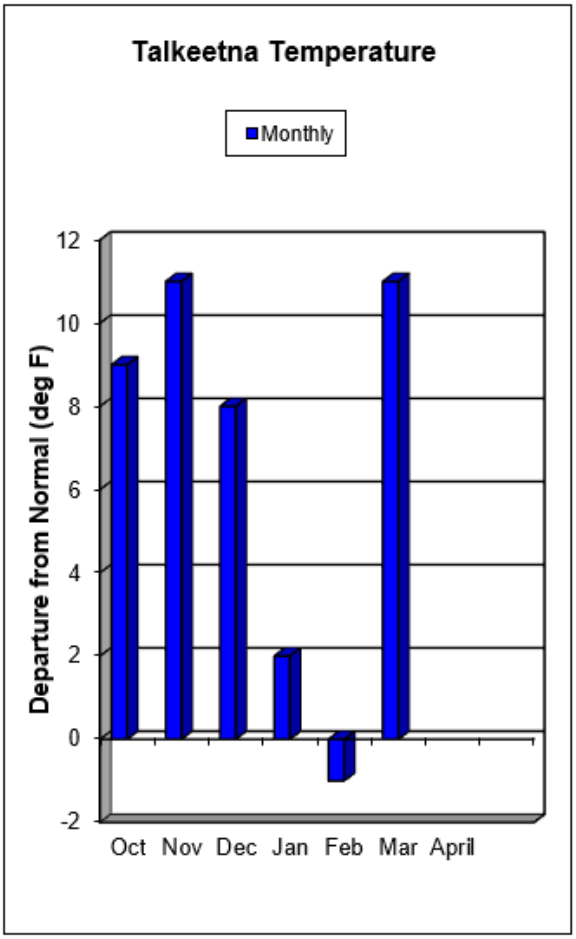


Matanuska—Susitna Basin



Snowpack

The Matanuska and Susitna basins received below normal precipitation during March. This combined with above normal temperatures caused most lower snowpacks to diminish. Only higher sites gained water content during the month, but many of these locations have started to melt out, as well. Barring major April snow storms, all SNOTEL sites have reached peak snowpack for the winter and have started to melt out 2-4 weeks ahead of schedule. Most of this region is reporting below normal snowpack. Only the area near the Alaska Range appears to be above normal.



Matanuska—Susitna Basin

Precipitation

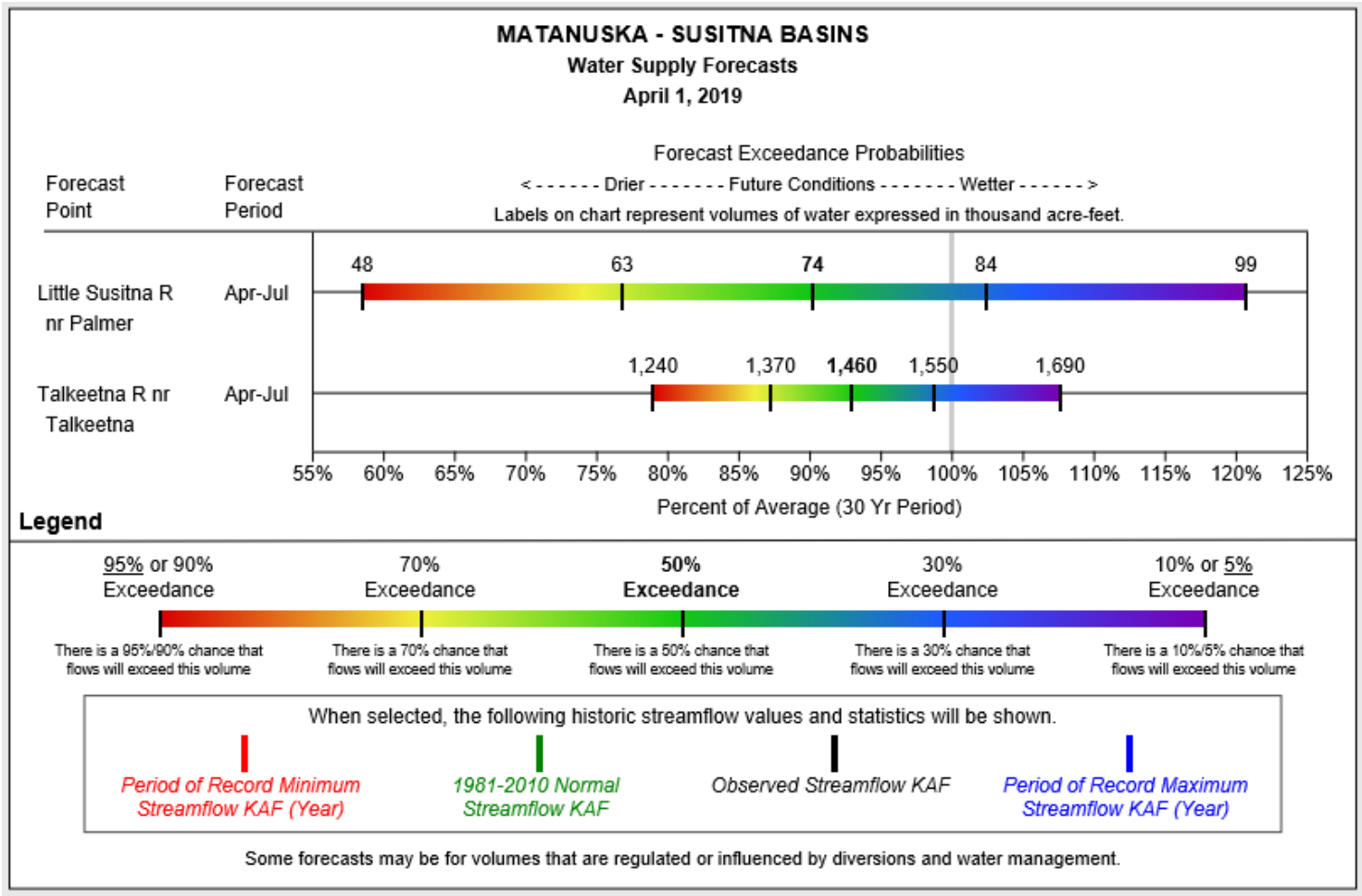
		Inches Accumulated since October 1st			
Site Name	**Elev.**	**This Year**	**Last Year**	**1981-2010 Normal**	**% of Normal**
Alexander Lake	160	20.3	14.8	---	---
Independence Mine	3550	17.3	23.7	15.3	113%
Monument Creek	1850	5.0	9.9	5.4	93%
Susitna Valley High	375	12.8	14.9	11.9	108%
Tokositna Valley	850	28.8	20.3	19.0	152%

Snowpack Data

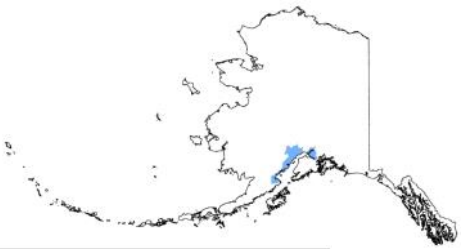
		Snow Depth (in)			**Water Content (in)**		
Site Name	**Elev.**	**Current**	**Last Year**	**1981-2010 Normal**	**Current**	**Last Year**	**1981-2010 Normal**
Alexander Lake	160	23	29	---	6.5	7.9	---
Archangel Road	2200	35	58	44	10.7	16.0	12.2
Birthday Pass	4020	68	105	---	22.5	34.4	---
Blueberry Hill	1200	36	50	48	12.7	13.4	13.5
Chelatna Lake	1450	27	29	45	8.4*	7.3	11.0
Curtis Lake	2850	16	27	25	3.7*	6.3	4.6
Denali View	700	26	40	40	8.8	11.0	12.1
Dunkle Hills	2700	39	39	---	13.3*	10.1	---
Dutch Hills	3100	80	63	75	29.4*	17.0	24.8
E. Fork Chulitna	1770	41	54	47	13.2	14.2	12.1
Fishhook Basin	3300	46	78	55	14.5	21.8	17.8
Fog Lakes	2120	20	36	24	5.0*	7.2	5.2
Horsepasture Pass	4300	32	29	30	7.6*	7.2	6.9
Independence Mine	3550	53	89	64	16.7	26.9	19.8
Independence Mine	3550	42	71	---	11.9	19.0	11.3
Lake Louise	2400	15	28	22	3.1	5.9	4.6
Little Susitna	1700	28	49	39	8.2	12.6	10.1
Monahan Flat	2710	23	34	34	7.2*	8.2	7.4
Monahan Flat	2710	24	34	---	---	---	---
Nugget Bench	2010	27	45	50	9.7*	11.7	14.6
Ramsdyke Creek	2220	51	59	64	19.4*	16.0	20.0
Sheep Mountain	2900	15	31	26	4.4	7.6	5.6
Square Lake	2950	19	28	21	4.6*	5.9	4.0
Susitna Valley High	375	21	27	---	6.6	7.4	8.6
Talkeetna	350	18	28	26	4.8	6.8	6.4
Tokositna Valley	850	39	48	---	14.3	13.2	12.4
Tyone River	2400	18	28	21	4.5*	6.2	5.0
Upper Oshetna River	3150	18	28	20	4.7*	6.4	4.6
Upper Sanona Creek	3100	19	---	28	4.9*	---	5.6
Willow Airstrip	200	25	30	28	6.9	5.9	6.9

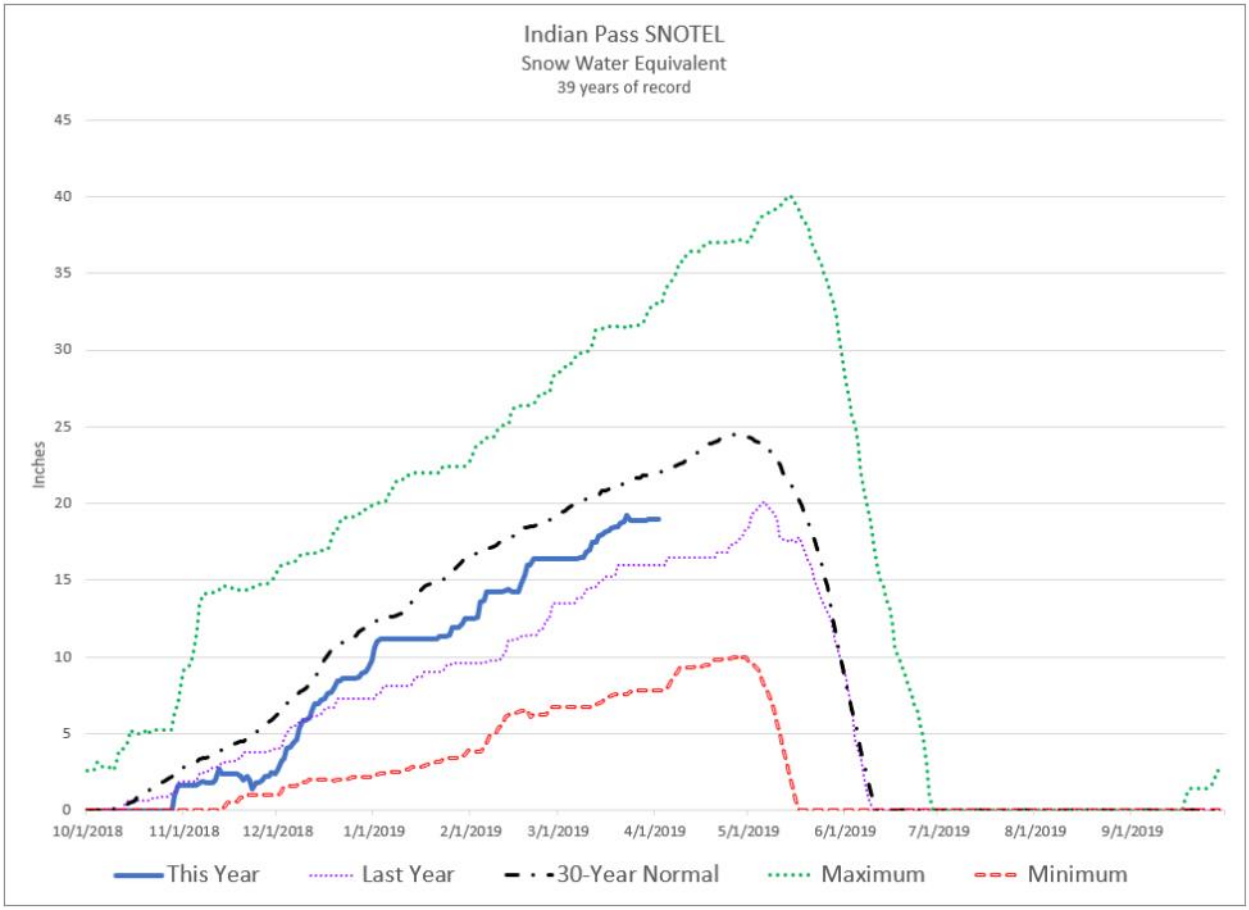
**Estimate*

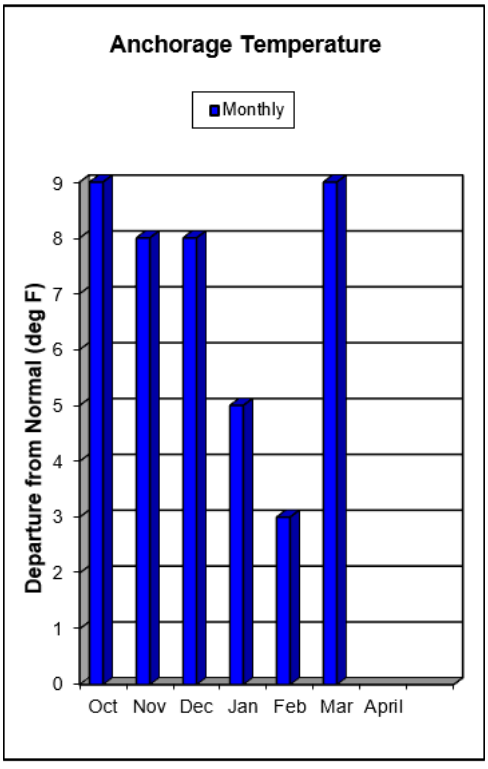
Streamflow Forecasts



Northern Cook Inlet







Snowpack

Above normal temperatures combined with below normal precipitation which fell on Cook Inlet in March, caused an early start to melt out. Barring additional major April storms, all snow sites in this area are either experiencing their earliest or second earliest peak snow dates, most of them 3-5 weeks ahead of schedule. Kinkaid Park lost more snow this March than any other March since 1998, and the Arctic Valley #1 snow course (the lowest Arctic Valley site) lost more snow this March than since 1965. Snowpack sites report between no snow and 86% of normal snowpack.

Northern Cook Inlet

Snowpack Data

Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Anchorage Hillside	2080	15	26	---	5.8	6.7	10.2
Arctic Ski Bowl	3000	21	39	40	7.1	11.4	12.8
Arctic Valley #1	500	0	12	14	0.0	2.9	3.6
Arctic Valley #2	1000	13	20	18	3.6	4.6	4.8
Arctic Valley #3	1450	13	26	28	4.7	6.1	7.2
Arctic Valley #4	2030	12	28	28	4.3	6.7	7.2
Indian Pass	2350	49	64	---	19.0	16.0	22.0
Kincaid Park	250	6	15	16	1.8	3.9	4.4
Moraine	2100	8	19	---	2.3	4.8	9.0
Mt. Alyeska	1540	37	53	---	14.7	14.7	32.5
Portage Valley	50	4	28	40	1.7	9.0	14.6
South Campbell Creek	1200	14	18	28	4.8	4.0	6.9

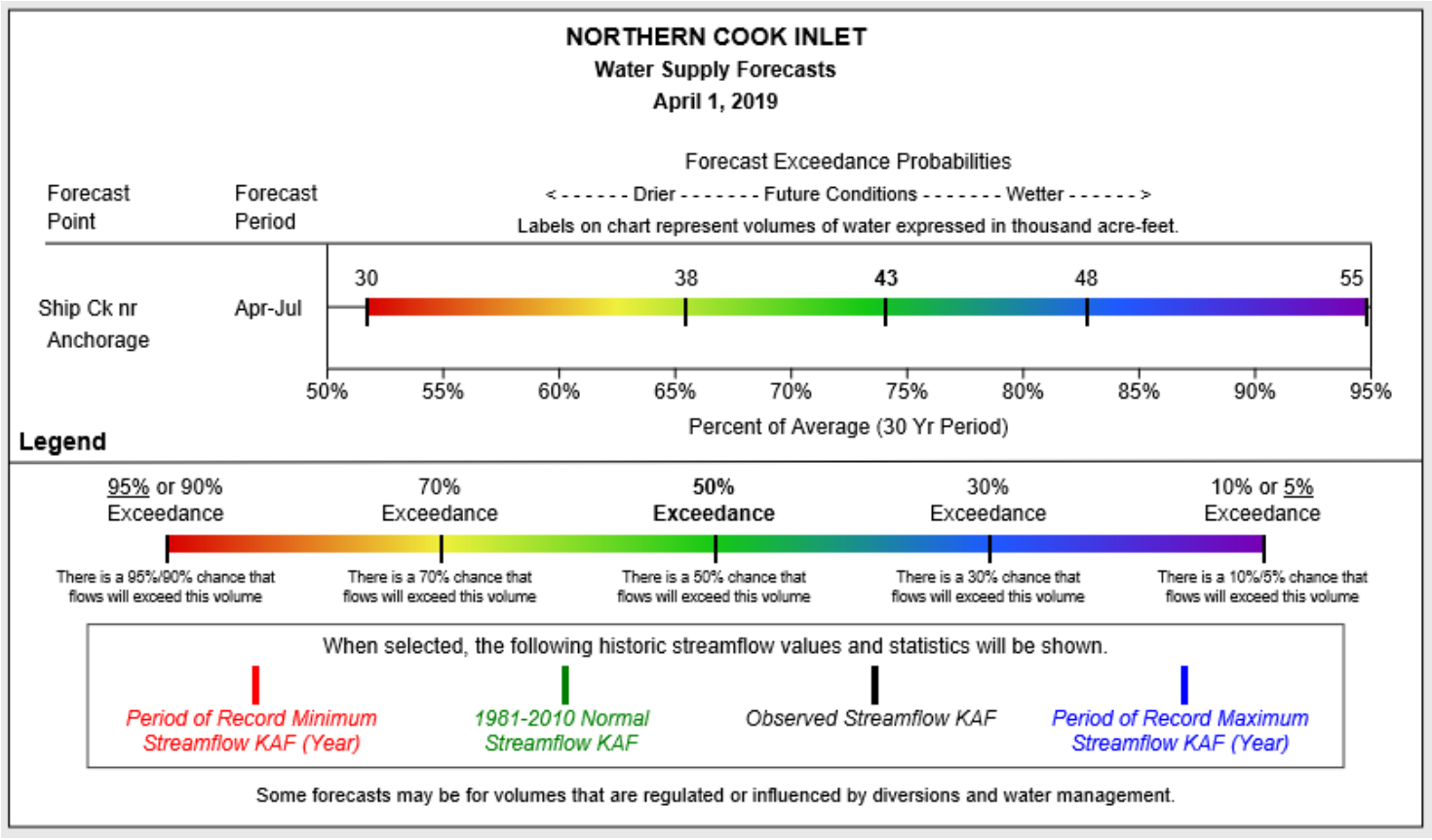
**Estimate*

Precipitation

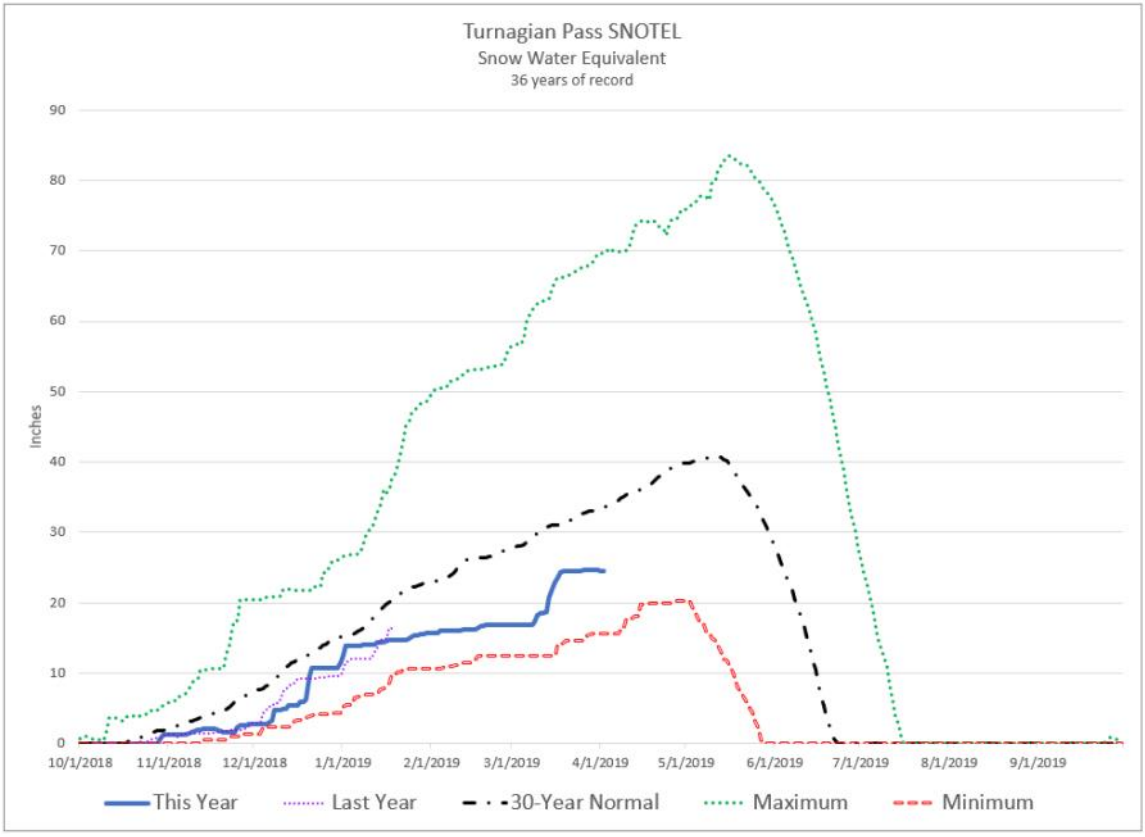
Inches Accumulated since October 1st

Site Name	Elev.	This Year	Last Year	1981-2010 Normal	% of Normal
Anchorage Hillside	2080	14.0	12.4	13.7	102%
Indian Pass	2350	24.9	25.3	25.4	98%
Moraine	2100	13.9	8.9	11.7	119%
Mt. Alyeska	1540	58.2	32.3	46.3	126%

Streamflow Forecasts

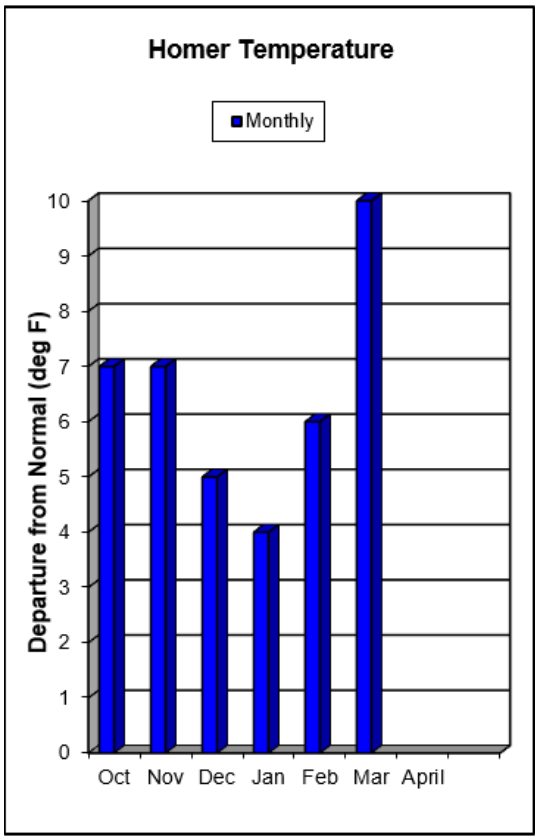


Kenai Peninsula



Snowpack

The precipitation patterns across the Kenai Peninsula in March were the opposite of what fell in February. The Cook Inlet side of the peninsula was drier while the Gulf side was deluged with copious amounts of precipitation. Because of warmer than normal temperatures, lower lying snowpacks were diminished by rain while higher elevation sites gained snowpack. Three snow courses lost more snow this last March than since 1984. Higher up, Turnagain Pass SNOTEL gained roughly 50 inches of snowdepth over a week near the beginning of the month and then was later rained on. Snowpack on the Kenai mostly ranges from melted out to around 80% of normal. The anomaly is Anchor River Divide, which is 118% of normal with 35" snow depth and 14.1" of water content.



Kenai Peninsula

Snowpack Data

Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Anchor River Divide	1653	36	44	---	14.1	12.6	11.9
Bertha Creek	950	34	34	53	11.9	9.2	16.6
Bridge Creek	1300	26	23	40	8.9	6.7	12.0
Cooper Lake	1200	33	28	---	11.5	9.8	14.0
Demonstration Forest	780	13	9	28	5.1	3.0	7.8
Eagle Lake	1400	26	32	42	9.0	9.2	11.9
Exit Glacier	400	26	28	51	8.7	8.6	18.2
Exit Glacier SNOTEL	400	26	30	---	9.8	8.8	18.4
Grandview	1100	37	54	---	15.4	14.3	32.0
Grouse Creek Divide	700	30	35	---	10.9	11.5	17.7
Indian Pass	2350	49	64	---	19.0	16.0	22.0
Jean Lake	620	0	8	15	0.0	2.4	3.3
Kachemak Creek	1660	28	26	---	12.2	8.5	---
Kenai Moose Pens	300	11	18	---	2.8	4.0	5.0
Kenai Summit	1390	29	34	48	10.0	9.8	14.8
Lower Kachemak Creek	1915	45	51	---	---	---	---
Mcneil Canyon	1320	20	26	---	6.0	6.8	10.6
Middle Fork Bradley	2300	47	53	---	---	---	---
Moose Pass	700	0	19	22	0.0	4.4	6.6
Mt. Alyeska	1540	37	53	---	14.7	14.7	32.5
Nuka Glacier	1250	52	44	88	25.3	16.2	34.6
Pass Creek	1200	20	26	33	6.0	6.6	9.0
Port Graham	300	0	---	---	0.0	3.0	8.7
Portage Valley	50	4	28	40	1.7	9.0	14.6
Resurrection Pass	2250	27	36	38	7.9	8.7	10.4
Snug Harbor Road	500	0	5	16	0.0	1.3	4.5
Summit Creek	1400	22	30	---	6.2	7.8	11.1
Turnagain Pass	1880	67	76	---	24.5	22.2	33.4

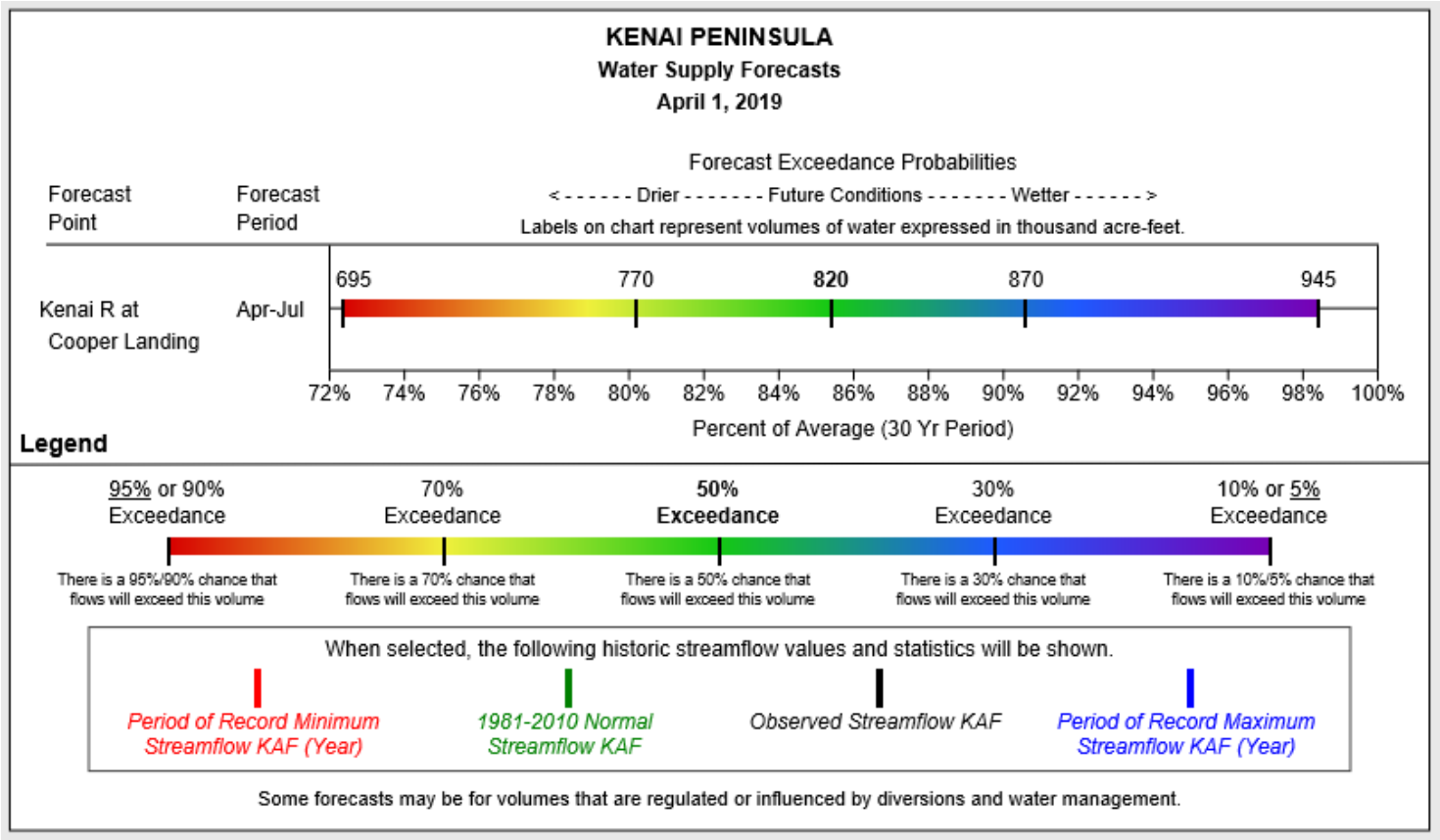
**Estimate*

Precipitation

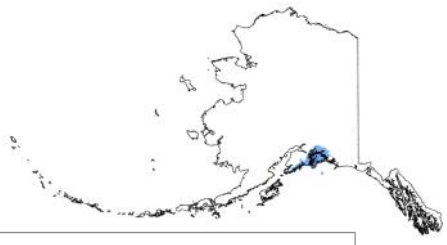
Inches Accumulated since October 1st

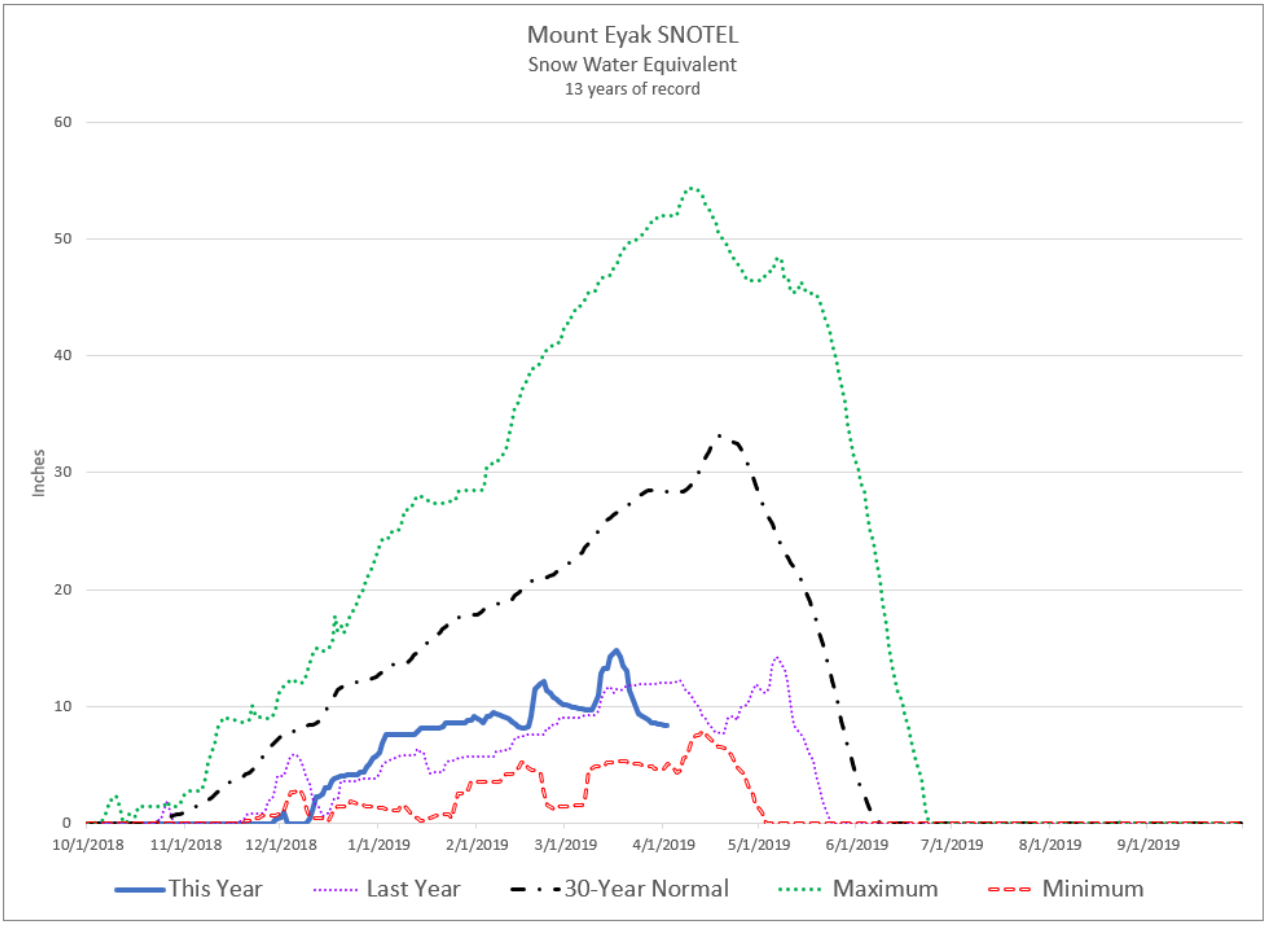
Site Name	Elev.	This Year	Last Year	1981-2010 Normal	% of Normal
Anchor River Divide	1653	23.2	17.6	16.9	137%
Cooper Lake	1200	38.9	20.7	25.2	154%
Grandview	1100	52.6	32.4	40.3	131%
Grouse Creek Divide	700	51.4	33.0	37.5	137%
Kachemak Creek	1660	63.6	40.8	37.7	169%
Kenai Moose Pens	300	10.2	8.4	8.2	124%
Mcneil Canyon	1320	20.0	14.2	16.6	120%
Middle Fork Bradley	2300	48.4	28.0	32.5	149%
Nuka Glacier	1250	74.0	45.5	54.3	136%
Port Graham	300	52.8	40.5	48.4	109%
Summit Creek	1400	22.5	16.1	15.8	142%
Turnagain Pass	1880	51.2	30.2	40.5	126%

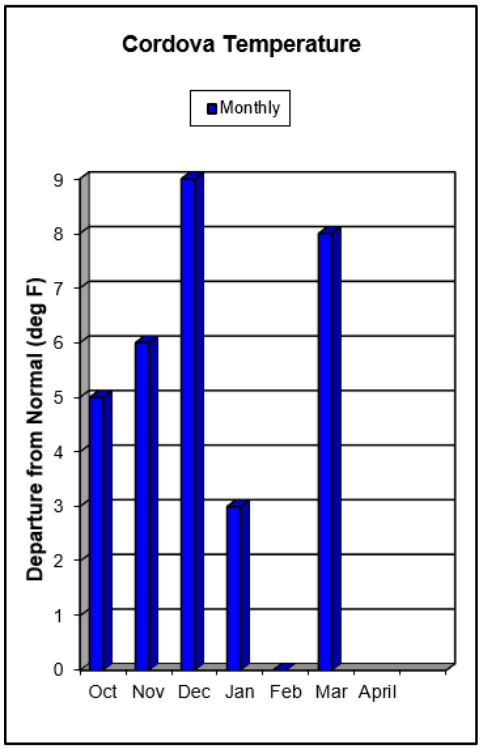
Streamflow Forecasts



Western Gulf – Prince William Sound







Snowpack

The Prince William Sound's March was soggy and warm. Sites in this region recorded either their wettest or second wettest March on record. Both Cooper Lake SNOTEL and Mt. Alyeska SNOTEL had their wettest March since 1988. However, because of the warmth of the month, much of this precipitation came as rain and depleted the lower elevations of snow cover. Valdez Snow Course lost more water content during this March than any other March in its 49-year record. However, much of the precipitation came as snow at higher elevations. Nicks Valley SNOLITE, above Thompson Pass, gained nearly 50" of snowdepth by March 19th.

Western Gulf — Prince William Sound

Snowpack Data

Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Exit Glacier	400	26	28	51	8.7	8.6	18.2
Exit Glacier SNOTEL	400	26	30	---	9.8	8.8	18.4
Grouse Creek Divide	700	30	35	---	10.9	11.5	17.7
Lowe River	600	37	42	50	12.8	12.7	17.0
Mt. Eyak	1405	26	31	---	8.4	12.0	28.4
Nicks Valley	4280	131	101	---	---	---	---
Nuka Glacier	1250	52	44	88	25.3	16.2	34.6
Tsaina River	1650	47	60	56	15.4	18.6	17.0
Upper Tsaina River	1750	57	69	---	21.3	21.4	19.4
Valdez	50	31	30	51	10.6	10.2	15.7
Worthington Glacier	2100	64	70	75	24.4	23.8	24.6

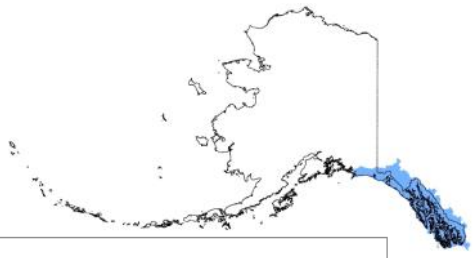
**Estimate*

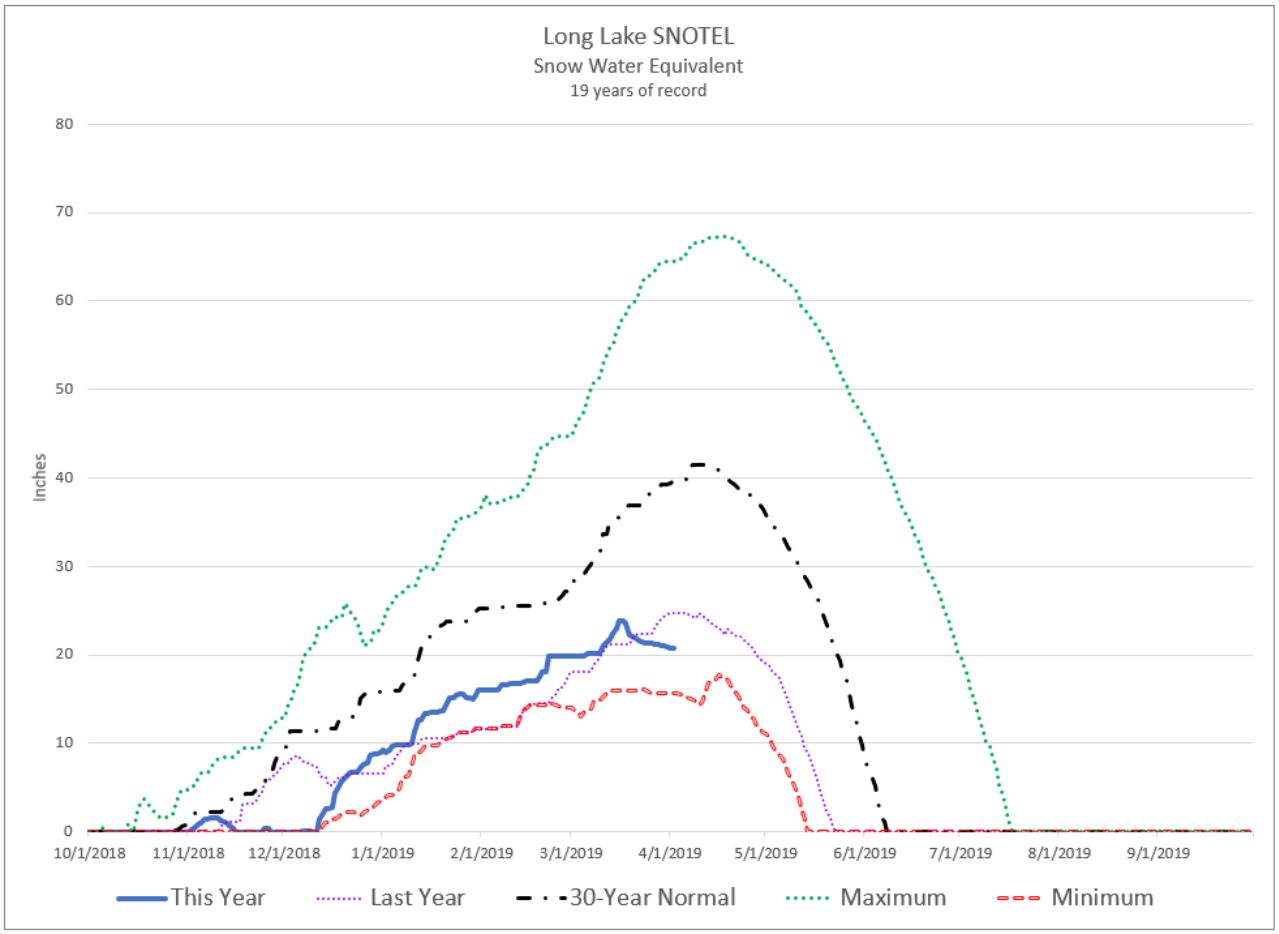
Precipitation

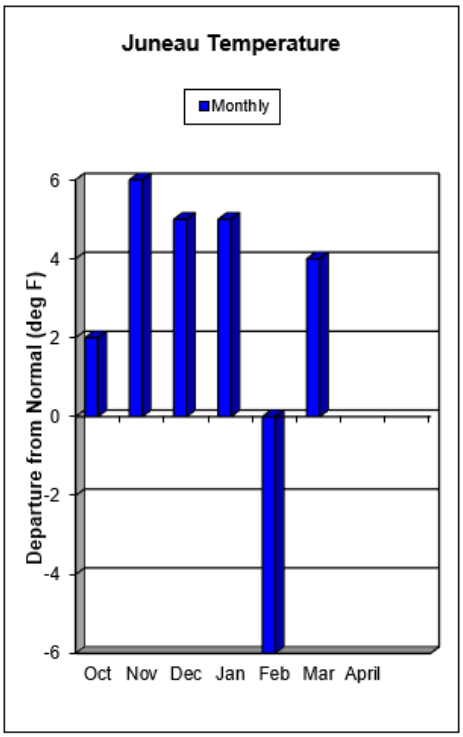
Inches Accumulated since October 1st

Site Name	Elev.	This Year	Last Year	1981-2010 Normal	% of Normal
Esther Island	50	118.3	77.5	80.5	147%
Grouse Creek Divide	700	51.4	33.0	37.5	137%
Mt. Eyak	1405	95.3	74.6	---	---
Nuchek	50	113.2	74.3	---	---
Nuka Glacier	1250	74.0	45.5	54.3	136%
Port Graham	300	52.8	40.5	48.4	109%
Seal Island	20	54.5	34.1	---	---
Strawberry Reef	30	59.1	40.8	---	---
Sugarloaf Mtn	550	55.8	43.4	40.5	138%
Tatitlek	50	59.3	41.8	40.0	148%

Southeast







Snowpack

Southeast had below normal precipitation during March and above normal temperatures. Low lying areas which had snow at the beginning of the month lost it by the end. The only snow course at or below 500' of elevation which reported any snow was the Speel River Snow Course, which had its third lowest reading in 54 years, after 2016 and 2015 and lost more snow between March 1st and April 1st than any other year on record. However, higher elevation sites, from Petersburg-north, were able to make minor gains in snowpack accumulation during the month.

Southeast

Snowpack Data

Site Name	Elev.	Snow Depth (in)			Water Content (in)		
		Current	Last Year	1981-2010 Normal	Current	Last Year	1981-2010 Normal
Cropley Lake	1650	34	42	83	12.8	12.7	30.4
Eagle Crest	1200	20	27	50	6.4	8.0	18.6
Fish Creek	500	0	10	11	0.0	2.8	2.7
Heen Latinee	2065	16	33	---	5.3	9.4	---
Institute Creek	1350	1	24	---	0.3*	7.8	---
Long Lake	850	53	66	---	20.8	24.7	39.4
Moore Creek Bridge	2250	30	29	65	10.6	7.5	21.3
Petersburg Reservoir	550	0	21	1	0.0	8.0	0.2
Petersburg Ridge, S.	1650	32	41	74	12.1	13.9	27.4
Rainbow Falls	500	0	2	---	0.0	0.5	---
Speel River	280	30	54	66	10.4	20.5	26.5
West Creek	475	0	12	---	0.0	3.5	---

**Estimate*

Precipitation Data

Site Name	Elev.	Inches Accumulated since October 1st			
		This Year	Last Year	1981-2010 Normal	% of Normal
Long Lake	850	79.9	71.0	97.7	82%
Heen Latinee	2065	36.5	32.0	---	---
Moore Creek Bridge	2250	25.1	23.6	27.4	92%

Streamflow Forecast

Forecast Point	Forecast Period	% of Average	Maximum(%)	Minimum(%)	50% Exceedance (KAF)	30yr Average (KAF)
Taiya River near Skagway	Apr-Jul	82	102	61	380	464

For further information contact:

NRCS Alaska web site: **www.nrcs.usda.gov/wps/portal/nrcs/main/ak/snow/**
NRCS Water and Climate Center web site: **http://www.wcc.nrcs.usda.gov/**
Alaska Meteor Burst Communication System (AMBCS) web site: **www.ambcs.org**

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