Kiugmek
One who watches river
April 2004
A newsletter for Alaska river and ice observers

Please Note. . . .

RFC will be staffed weekends beginning April 24-25

Inside This Issue…

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Spring Breakup Outlook for Alaska

The flood potential from snowmelt and ice jams this spring breakup season is currently rated as average throughout Alaska. This forecast is based on current below normal to normal snowpack and ice thickness currently being reported over most of Alaska.

Ice - April 1 ice thickness data are available for a limited number of observing sites in Alaska. Measurements indicate that ice thickness is near normal or thinner than normal at most locations. All Yukon and Kuskokwim River ice measurements are near normal or thinner than normal. Thicker than normal ice is reported on the Koyukuk River. Freezing conditions developed late over much of Alaska. The rate of ice growth was inhibited by the insulation provided by snowfall soon after freezeup.

Snow - An analysis of the April 1 snowpack by the Natural Resources Conservation Service (NRCS) indicates near normal to below normal snowpack through most of Alaska. Measurements of above normal snowpack were reported in the upper Yukon, lower elevations on the northern Kenai Peninsula, Chugach mountains, and in the lower Yukon basin. There is still enough snow in most areas to produce significant snowmelt runoff peaks if subjected to a rapid warming pattern.

For more details on the April 1 snowpack, please refer to the various snow graph options at the APRFC web site at http://aprfc.arh.noaa.gov, or on the NRCS web site at http://ambcs.org by selecting snowpack reports or snowpack maps.

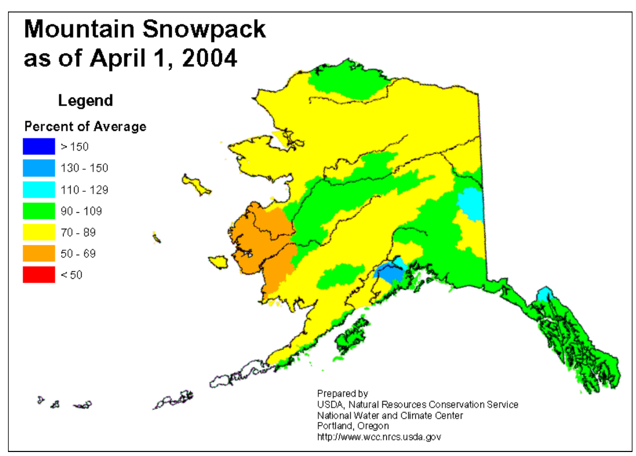
Weather - Most of Alaska was cooler than normal during March, but has returned to more seasonal temperatures in April. The greatest factor in determining the severity of breakup remains the weather during April and May. The spring outlook for the April through June period calls for a greater likelihood of above normal temperatures for all of Alaska except the North Slope. The latest forecasts

http://aprfc.arh.noaa.gov

Ice Thickness Measurements - A Useful Breakup Forecast Tool

by Eric Holloway

The ice thickness season is rapidly coming to a close. By the time you receive this newsletter, ice thickness values for the winter of 2003-2004 will have reached their theoretical maximum sometime between mid-March and early April. Perusal of ice thickness measurements taken around the state indicate that most readings were near normal or just slightly below normal. In a few instances, like Nenana and Lake Hood, much below average ice thickness values were recorded, and were most likely due to the heavy snowpack this year. Keep in mind that ice thickness is highly spatial in nature, *cont'd on Page 3*

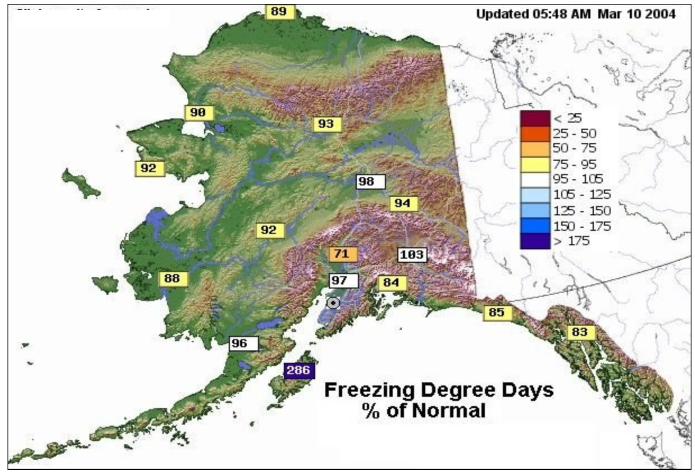


extending out 10 days into mid April indicate warmer than normal air temperatures over most of the state. Temperatures in the Tanana Valley and upper Yukon will likely be in the 40s which should melt a significant amount of low elevation snow. For more information on the outlooks for this spring, please refer to the Climate Prediction Center web site at http://www.cpc.ncep.noaa.gov/products/forecasts

The following table gives an estimate of flood potential for various locations around the state.
The table was created from our Spring Breakup Outlook dated April 16, 2004. Check our web site for most current product.
Snowmelt Runoff Volume….expected water volume from snowmelt during the melt season.
Flood Potential….the likelihood of flooding from snowmelt and/or ice jams.
The potential for minor flooding is not reflected in the table.
Average Breakup Dates are for the period 1970 through 2003 and are calculated for locations with at least five years of data.

River - Reach	Snowmelt Runoff Volume	Flood Potential	Average Breakup Date	No. of Years Record	Forecast Breakup Dates
Susitna River at Sunshine	Below	Below	05/03	14	04/27 - 05/02
Gakona River at Hwy	Below	Below	04/29	17	04/24 - 05/02
Chisana River at Northway	Average	Below	04/22	17	04/19 - 04/25
Tanana River at Nenana	Below	Below	05/02	29	04/26 - 05/03
Tanana River at Manley Hot Springs	Below	Below	05/04	11	04/29 - 05/06
Kuskokwim River at McGrath	Below	Below	05/08	15	05/02 - 05/09
Kuskokwim River at Crooked Creek	Below	Average	05/07	18	04/30 - 05/07
Kuskokwim River at Bethel	Below	Below	05/13	32	05/07 - 05/14
Yukon River at Eagle	Above	Below	05/06	24	05/03 - 05/09
Yukon River at Circle	Above	Average	05/10	21	05/07 - 05/13
Yukon River at Fort Yukon	Above	Below	05/11	21	05/08 - 05/13
Yukon River at Beaver	Above	Below	05/13	9	05/11 - 05/16
Yukon River at Tana-na	Above	Below	05/11	18	05/08 - 05/14
Yukon River at Ruby	Above	Below	05/13	20	05/09 - 05/1
Yukon River at Galena	Above	Average	05/13	20	05/10 - 05/16
Yukon River at Nulato	Above	Below	05/15	6	05/12 - 05/18
Yukon River at Mountain Village	Average	Below	05/20	16	05/16 - 05/24
Koyukuk River at Bettles	Below	Below	05/11	23	05/07 - 05/15
Koyukuk River Allaka-ket	Below	Below	05/12	17	05/08 - 05/16
Buckland River at Buckland	Below	Average	05/19	13	05/14 - 05/23
Kobuk River at Kobuk	Below	Average	05/17	24	05/14 - 05/20
Kobuk River at Ambler	Below	Below	05/19	20	05/13 - 05/19
Colville River at Colville	Below	Below	05/30	5	05/18 - 05/26

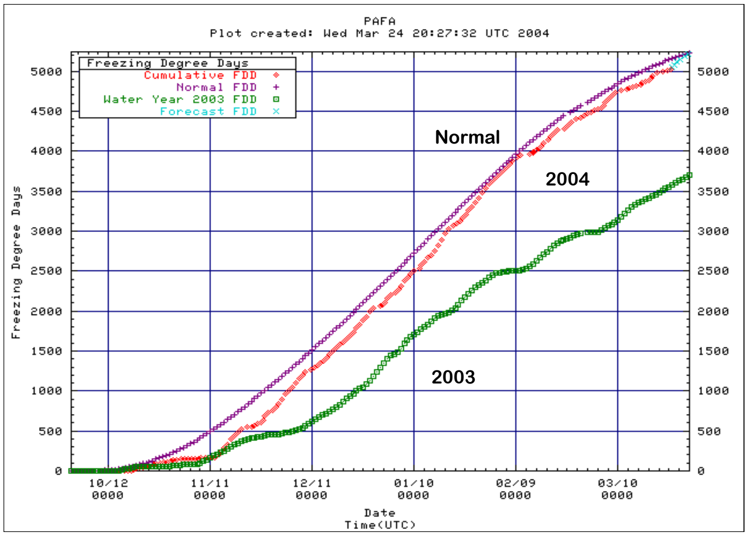
Ice Thickness Measurements...cont'd from Page 1 and must be taken in the same location on the river channel if long -term analysis is to be completed. Furthermore, turbulent eddies found with swift currents (usually found in the middle of the channel) tend to cause thinner ice than what will be found near the river's edge.



Ice thickness readings are a very valuable piece of information for forecasting breakup characteristics and may, in many cases, be inferred by using temperature and snow information. For instance, a cumulative seasonal total or a monthly average of freezing degree days can be used to infer unusually cold conditions and therefore greater ice growth. Freezing degree days (FRZDD) are defined as the number of degrees Fahrenheit the mean daily temperature is below 32 degrees. Above normal FRZDD are associated with below normal temperatures. Due to the insulating effect of snow, less ice growth can be expected with deeper snowpack.

Further investigation into the temperature pattern during the last 6 months using the FRZDD for Anchorage and Fairbanks indicates a much cooler pattern than last year and near normal seasonal totals. By looking at the steeper slopes of the lines, Anchorage (see Figure 1) battled with a couple of arctic outbreaks in November and December which bounced it above the average freezing degree day curve. This most likely led to greater ice growth early in the season before the insulating blanket of snow began to cover the ice surface. Lake Hood's ice thickness rose from 10 inches December 2nd to 18 inches on January 1st , but increased very little during the rest of the season. On the other hand, Fairbanks (see Figure 2) remained relatively warm through October and November, then cooled off to slightly below normal readings during December and January.

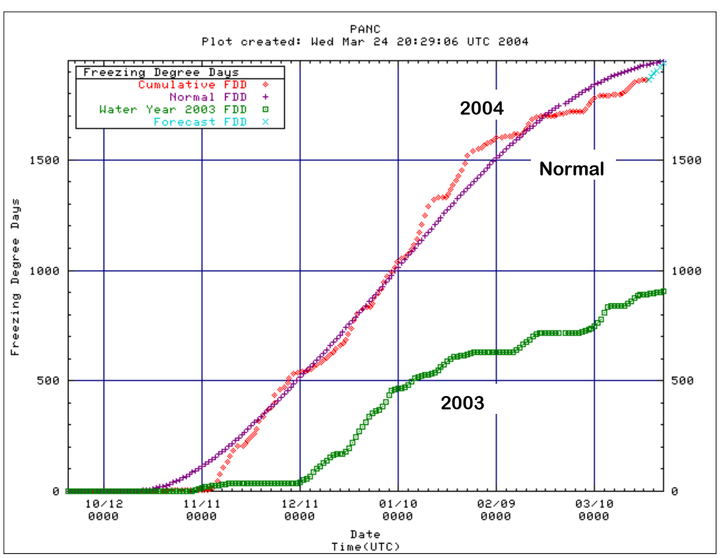
Figure 2 - Fairbanks



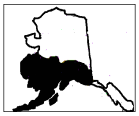
The unusually heavy snowpack over portions of the southcentral Alaska may have had a large influence on the amount of ice growth through the season. As of March 11, the Anchorage Weather Forecast Office reported 23 inches of snow on the ground and measured 94" of snowfall since July of last year, which was 35 inches above normal. Lake Hood ice thickness of 20 inches in early March was well below the average of 34 inches. However, the weather office in Fairbanks measured 19 inches of snow on the ground and 57 inches of snow since July 1, or 4.7 inches below normal. The nearby Smith Lake ice reading as of March 1st was 22 inches, just below the average of 25 inches.

All this leads me to believe, in the absence of above normal snowfall and with near normal cumulative freezing degree days, ice thickness values will likely be around normal or slightly below normal statewide. Where there is deeper than normal snowpack, ice thickness values will most likely be well below normal.

Figure 1 - Anchorage



HSA REPORTS



Anchorage Hydrologic Service Area
by John Papineau

PRECIPITATION (inches)										
	October		November		December		January		February	
Station	Total	% of Normal	Total	% of Normal	Total	% of Normal	Total	% of Normal	Total	% of Normal
Cordova	11.5	88%	4.94	64%	6.23	69%	3.27	49%	8.56	126%
Glennallen	0.31	35%	0.92	150%	0.61	66%	0.13	29%	0.72	135%
King Salm-on	2.72	131%	2.90	196%	0.77	56%	0.18	17%	0.33	77%
McGrath	1.29	92%	2.65	205%	0.42	30%	0.14	18%	0.81	123%
Seward	13.6	129%	2.12	33%	8.50	121%	1.74	27%	7.68	143%
Talkeetna	3.22	104%	0.93	54%	0.40	21%	0.23	18%	0.45	31%

TEMPERATURE (F)										
	October		November		December		January		February	
Station	Observed Avg. Temp	Departure from Normal	Observed Avg. Temp	Departure from Normal	Observed Avg. Temp	Departure from Normal	Observed Avg. Temp	Departure from Normal	Observed Avg. Temp	Departure from Normal
Cordova	46	+4.8	28	-1.6	30.7	+5.6	21	-2.2	34.5	+7.9
Glennallen	30	+2.6	8	+2.5	-2	+0.9	-19	-13	12	+8.8
King Salm-on	38	+5.1	28	+5.2	13	-3.4	9.2	-5.7	29	+14
McGrath	33	+8.1	14	+9.3	-10	-3.9	-5.4	+3.3	7.4	+10
Seward	44	+4.2	27	-3.4	27	+0.4	20	-5.1	33	-6.1
Talkeetna	42	+10.4	19	+2.3	18	+6.9	11.3	+1.4	29	+14.3

Juneau Hydrologic Service Area
by Michael Mitchell

The 2003 fall season started off wet and fairly warm across most of Southeast Alaska, but turned noticeably colder and a little drier by November. Central, southern and coastal Southeast Alaska all had well above normal rainfall amounts in September resulting from a series of large weather systems moving through the panhandle. Most stations received around 140 percent of normal rainfall; including Ketchikan, Pelican and Annex Creek which each received more than 20 inches of rain during the month. The 11.42 inches of rain that fell in Juneau was 170 percent of normal and made it the 5th wettest September on record. In spite of the wet weather no known flooding was reported. While most of Southeast Alaska was quite wet, Yakutat, on the northeast gulf, had well below normal rainfall, receiving about one half the normal for September. Temperatures ranged from 1.5 degrees above normal along the coast to 0.6 degrees below normal through the inner channels.

October, normally the wettest month for the panhandle, brought much drier and warmer weather to Southeast Alaska during 2003. The far north was the driest area, receiving around 50 percent of normal precipitation. These amounts increased to around 60 percent across the southcentral and to 80 percent across the southern panhandle. Even though monthly rainfall was below normal, a strong weather front moving across the area on the 25th and 26th resulted in minor small stream flooding in the southern panhandle and produced a 15 foot rise on the Stikine River with flow increasing from 30,000 to over 200,000 cfs in 48 hours. Temperatures were 1.5 to 4 degrees above normal for the month with the first frost and snowfall for the season not arriving until the last week of October.

Drier than normal weather continued across the northern panhandle in November with near to slightly above normal precipitation through the inner channels and along the southern outer coast. Yakutat continued its year long trend of below normal rainfall in November, receiving only 69 percent of normal precipitation. Five to nine inches of precipitation was observed through the inner channels, totals increased to between 9 and 17 inches along the southern outer coast. Although Ketchikan had near normal rainfall during the month, most of this, 10.20 inches, fell over a 48 hour period and produced minor small stream flooding. Between the 12th and 13th, Ward Lake rose 8 feet to flood a newly constructed park shelter, while debris floating down swollen Sawmill Creek damaged a foot bridge in Sitka. A change to cooler weather began in early November and continued through the month. Average temperatures were 1.5 to 3 degrees below normal, supporting abundant snow by month's end. Hyder was the snowiest location receiving over 60 inches, while the 25 inches that fell in Juneau was nearly a foot above normal.

In December, the jet stream took aim at Southeast Alaska and produced near normal rainfall in the south to record levels in the north. Above normal temperatures returned area wide. Haines and Skagway were the hardest hit areas, receiving 180 to 230 percent of normal precipitation during December. Haines Customs COOP site had their wettest month in its 15 year record. The 6.60 inches that fell in Skagway was the 4th wettest December on record and the wettest month since October of 1994. In spite of the abundant rainfall, no flooding was reported during the month. Central and southern Southeast Alaska also had above normal rainfall ranging between 100 and 133 percent of normal. Temperatures were 2 to 4 degrees above normal area wide in December. Because of this, snowfall

Juneau HSA - September 2003 - November 2003

Station	Avg. Temp (degrees F)	Departure from Normal (degrees F)	Precipitation (inches)	Dep from Normal (inches)	Percent of Normal	Snowfall (inches)	Dep from Normal (inches)
Annette Island	48.0	1.3	40.96	5.40	115	0.0	-3.7
Haines	39.4	1.4	16.72	-5.81	74	25.2	1.5
Haines Customs	36.3	na	11.55	na	na	16.3	na
Hyder	41.5	na	34.07	na	na	60.9	na
Juneau Airport	40.9	-0.2	22.07	2.59	113	24.9	10.8
Juneau NWS	39.8	na	28.05	na	na	32.5	na
Ketchikan	45.1	-1.2	51.62	-0.85	98	na	na
Pelican	43.7	na	53.81	na	na	25.7	na
Port Alexander	46.5	1.5	57.49	-4.60	93	1.6	na
Sitka	48.0	2.0	32.13	-0.71	98	na	na
Skagway Airport	42.0	0.1	7.49	-0.38	95	na	na
Skagway Power	39.6	na	8.92	na	na	8.4	na
Yakutat	40.6	0.1	33.59	-26.44	56	32.5	6.7

was below normal at most locations, with one major exception. The interior passes of Southeast Alaska boasted well above to record snow during December. Haines Customs, at an elevation of 800 feet, was the snowiest location with 94.8 inches during the month. Amounts dropped off to 40 or 50 inches in Haines and to 20 inches or less for the inner channels.

Precipitation across Southeast Alaska was highly variable in January, ranging from just 0.89 inches at Skagway to almost 30 inches at Ketchikan. Temperatures were a little below normal area wide. Ketchikan had the largest anomaly during the month, receiving 250 percent of normal rainfall. The majority of this rain, 25.59 inches, fell during a 14 day stretch and included 11 days when more than 1 inch fell and 2 days when more than 4 inches fell. Amazingly, no flooding was reported with this heavy rain. Precipitation amounts dropped off to between 5 and 9 inches across central and coastal panhandle. The Juneau area had minor urban flooding on the 14th when over 2 inches of rain fell on top of 3 inches of snow and ice. The far north had much below normal precipitation, with Skagway posting only 0.89 inches, or 41 percent of normal, for the month. Snowfall was also highly variable across the area in January. The Southern Panhandle received a normal 10 to 20 inches, snowfall increased to a slightly above normal 30 to 35 inches for the central inner channels, and to over 70 inches for interior passes. Canyon Island in Taku Inlet was the snowiest location, receiving 73.2 inches for the month with a maximum depth of snow on ground reaching 70 inches mid month.

The jet stream shifted into the central and northeast gulf in February. This brought much above normal precipitation to Northern Southeast Alaska while the Southern Panhandle enjoyed less than normal precipitation. Yakutat was the overall wettest location receiving 20.28, inches or 184 percent of

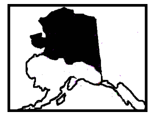
Juneau HSA - December 2003 - February 2004

Station	Avg. Temp (degrees F)	Departure from Normal (degrees F)	Precipitation (inches)	Dep from Normal (inches)	Percent of Normal	Snowfall (inches)	Dep from Normal (inches)
Annette Island	37.5	1.3	27.91	-1.20	96	21.7	-8.0
Haines	26.0	0.8	28.08	5.61	125	138.0	56.9
Canyon Island	22.6	na	24.27	na	na	150.7	na
Haines Customs	21.3	na	28.84	na	na	160.0	na
Hyder	27.0	na	20.87	na	na	107.2	na
Juneau Airport	30.7	4.2	17.47	4.74	137	48.9	-18.8
Juneau NWS	29.2	na	22.41	na	na	54.6	na
Ketchikan	35.1	1.7	57.05	17.28	143	na	na
Pelican	32.7	na	54.56	na	na	49.5	na
Port Alexander	37.5	3.6	53.60	3.50	107	12.4	na
Sitka	37.9	2.7	24.09	1.79	108	na	na
Skagway Airport	29.5	4.6	10.09	3.09	144	na	na
Skagway Power	27.5	na	12.54	na	na	35.1	na
Yakutat	30.1	2.5	47.77	7.75	119	81.4	-18.8

normal, for February. After 11.99 inches of precipitation, including 19.5 inches of snow in the first 9 days of the month, a warm and slow moving front moved over Yakutat and dropped an additional 3.23 inches on the 11th. This resulted in minor small stream flooding on Tawah Creek about a half mile from the Yakutat airport. Haines and Skagway also saw a wetter than normal month, with between 2.7 and 7.7 inches observed. The Southern Panhandle was drier than normal, receiving between 2.5 and 10.5 inches. Temperatures were well above normal area wide and averaged between 4 and 8 degrees above normal in the north and 1 to 4 degrees above normal in the south. This kept snowfall across the region much below normal. The 2.8 inches recorded at the Juneau airport was almost 16 inches below normal and the 5th lowest February snowfall total on record. Even the 25 inches observed in the interior passes was less than normal.

Fairbanks Hydrologic Service Area

by Ed Plumb



The winter of 2003-2004 began with record warm temperatures across much of northern Alaska as strong south flow brought summer time readings to the interior. Dry Creek in the upper Tanana Valley climbed to a sultry 76E F on October 2nd, setting a new October record high temperature for all of Alaska. The warm temperatures persisted throughout the month and resulted in very little snowfall because much of the precipitation which did fall came in the form of rain. Fairbanks had its lowest October snowfall in 50 years. This was not the case along the Arctic Coast though, where Barrow ended up receiving nearly 16 inches of snow, which resulted in the 4th snowiest October in over 80 years. The warm temperatures also led to a later than normal freeze-up of rivers.

As winter progressed, temperatures and precipitation remained well above normal into November. Periods of freezing rain plagued the central interior the first week of the month. Slightly colder air infiltrated into the region by the middle of the month. This finally allowed the precipitation to fall as snow for the remainder of the month. Snowfall totals ended up being over 3 times the normal amount across the central and western interior. Readings began to trend toward normal levels during December as the main jet stream moved south. This allowed colder, drier air to gradually settle in over northern Alaska. A brief cold snap in the northeast interior brought the coldest temperatures of the winter to the state, as the mercury plummeted to -60E F at Chandalar Lake in the Brooks Range.

When the beginning of the new year rolled around, temperatures contin-

TEMPERATURE (F)

Station	Oct		Nov		Dec		Jan		Feb		Mar	
	Observed Avg. Temp	Dep from Normal	Observed Avg. Temp	Dep from Normal	Observed Avg. Temp	Dep from Normal	Observed Avg. Temp	Dep from Normal	Observed Avg. Temp	Dep from Normal	Observed Avg. Temp	Dep from Normal
Barrow	24.0	1.1	2.8	4.5	-7.8	3.4	-8.3	5.1	-22.8	-5.0	-15.0	0.1
Eagle	31.0	7.4	4.8	2.9	-3.4	4.7	-25.1	-11.4	2.0	2.1	-0.7	-6.6
Fairbanks	32.0	6.9	9.6	6.5	-9.1	-2.6	-15.9	-5.8	1.1	4.7	6.0	-5.0
Galena	32.3	9.2	12.2	8.9	-8.1	-1.6	-13.5	-4.4	0.5	6.6	4.6	-0.4
Kotzebue	31.1	8.2	13.8	6.0	-0.6	0.3	-1.4	-0.4	-1.7	3.1	3.1	2.7
Nome	32.3	4.3	21.1	4.9	6.2	1.8	5.0	-0.8	7.9	4.6	9.2	2.6
Northway	27.6	6.0	2.6	6.0	-15.4	-0.4	-24.6	-5.5	1.6	11.3	4.4	-3.7

ued to fall and precipitation tapered off. By the end of January most areas in northern Alaska were colder and drier than normal. The exception was along the Arctic coast where warmer and wetter than normal conditions persisted through the month. The weather really flipped around in the upper Tanana Valley, as Dry Creek bottomed out at -59E F on the 19th of January...a far cry from the 76E F above zero in October.

During the month of February, the weather pattern was almost a perfect reverse of January's. Temperatures and snowfall shot to above normal levels south of the Brooks Range, while cold and dry conditions became established in the Arctic. Strong south winds pushed temperatures into the 40's north of the Alaska Range. Heavy snow blanketed the western interior where Galena picked up about 3 feet of new snow, roughly 4 times the normal amount for February. Cold and dry air moved back in over the entire state during the month of March.

PRECIPITATION (inches)

Station	OCT		NOV		DEC		JAN		FEB		MAR	
	Observed	Dep from Normal	Observed	Dep from Normal	Observed	Dep from Normal	Observed	Dep from Normal	Observed	Dep from Normal	Observed	Dep from Normal
Barrow	1.49	1.04	0.30	0.05	0.11	-0.05	0.08	-0.09	0.06	-0.09	0.20	0.03
Eagle	0.56	-0.46	0.74	0.03	1.30	0.57	0.67	0.19	0.81	0.36	0.78	0.48
Fairbanks	0.34	-0.56	1.68	0.88	0.59	-0.26	0.33	-0.14	0.33	-0.07	0.29	-0.08
Galena	1.74	0.56	1.25	0.35	1.11	0.17	0.16	-0.53	1.72	1.01	0.32	-0.37
Kotzebue	1.45	0.72	1.84	1.25	0.65	0.13	0.15	-0.28	0.52	0.20	0.06	-0.29
Nome	1.51	0.25	3.01	2.07	1.21	0.56	0.26	-0.55	0.36	0.16	0.49	-0.08
Northway	0.16	-0.37	0.92	0.61	0.39	0.10	0.23	-0.08	0.34	0.03	0.12	-0.05

SNOWFALL (inches)

Station	Sep		Oct		Nov		Dec		Jan		Feb	
	Observed	Dep from Normal	Observed	Dep from Normal	Observed	Dep from Normal	Observed	Dep from Normal	Observed	Dep from Normal	Observed	Dep from Normal
Barrow	15.9	9.2	8.3	4.9	3.7	1.2	1.9	-0.3	2.9	0.8	3.8	2.0
Eagle	3.5	-6.2	17.0	6.6	24.5	13.5	11.0	3.8	7.7	0.8	17.0	12.2
Fairbanks	2.6	-9.1	27.6	12.5	9.6	-5.3	8.5	-0.3	8.4	0.0	5.2	-1.2
Galena	7.0	-1.3	16.8	5.5	14.5	2.4	2.5	-5.9	35.4	26.6	6.5	-1.6
Kotzebue	4.6	-1.9	45.6	37.1	19.0	11.2	4.0	-2.1	12.0	7.0	1.9	-4.0
Nome	0.5	-4.3	17.5	6.6	22.2	13.8	3.4	-6.1	5.6	-0.3	7.4	0.2
Northway	2.9	-3.6	13.2	7.6	8.7	3.3	6.2	0.6	6.9	2.4	4.3	1.3

Weather Forecasting Goes Graphical

All three forecast offices in the state of Alaska are now producing their twice daily forecast products using the Integrated Forecast Processing System (IFPS). In short, the forecaster creates graphical images of a given weather element (temperatures, precipitation, winds, etc.), from which a software package produces a text product. For example, if the forecaster is working on the next day's high and low temperatures, they will draw contours of minimum temperatures on a base map, and draw the expected maximum temperatures on a different base map. The software then samples the base maps and inserts these sampled temperatures into a text product. Currently we are struggling a bit with getting the software to read the base maps in such a manner as to produce a meaningful zone forecast. For example, the Copper River Basin forecast zone stretches from about sea-level to 19,0000 ft. In a strict sense, the software should 'sample' a range of weather elements throughout the zone. The forecasted temperature range would in that case have to include all elevations. In order to circumvent this issue, the text forecast is produced from a limited number of sample points that are primarily restricted to lower elevations.

Although currently not available to the public in Alaska, the graphical forecast produced by the Juneau, Anchorage and Fairbanks Forecast Offices will be made available at some point in the future. This means that if you wanted to know the temperature at some remote part of the state, let's say at 4,000 ft in the St. Elias Range, the graphical forecast will display it. How good that forecasted temperature is going to be is questionable. The current generation of computer models that meteorologists rely on are very 'crude' when it comes to resolving the complex mountain/valley terrain that exists throughout much of our state. In short, we will be displaying forecast information for remote locations that could be highly dubious.

One of the primary reasons this technology was developed was to produce weather forecasts over the entire USA, not just at discreet points - like cities or towns - which we have focused on in the past. There are some pro's and con's to such an approach. Although the graphical images look impressive, it inherently assumes that the meteorologist has some skill in forecasting for all points throughout the area of interest! An additional motivation for the National Weather Service to adopt this new approach is in order to keep pace with commercial forecasting operations. You can view the graphical forecasts for the contiguous US at:

www.nws.noaa.gov/forecasts/graphical

Adventure to the Northern Hemisphere Pole of Cold
by Ed Plumb

Siberia in the winter? My friends and family thought I was nuts to leave Fairbanks in January for a destination that is considerably colder than Alaska and just as dark. What really blew them away is that I found three other weather fanatics that were interested in spending their precious time off to escort me into the depths of a Siberian winter. So off we went, to the most frigid region in the northern hemisphere and one of the coldest inhabited villages on the planet.

The driving factor for this trip was my fascination for how people have adapted to living in a climate that pushes the limit of human survival. This region in northeast Russia called Yakutia is not only the coldest area on the planet when you exclude Antarctica, it also experiences a more extreme variation in annual temperature than anywhere else in the world. There is nearly 110 degrees difference between the average January and July temperatures. For example, the average temperature in mid-January in Yakutsk, a city of about 250,000 people, is a frigid -45E F, while the average mid-January temperature in Fairbanks is a balmy -10E F. As for summertime readings, the average temperature in mid-July in Yakutsk is 65E F, which is approximately 2 degrees warmer than Fairbanks.

Wintertime temperatures in the village of Oimyakon, northeast of Yakutsk, make interior Alaska look like a tropical paradise. The normal high temperature in mid-January is -54E F while the normal overnight low is a bone chilling -63E F. Temperatures like this are what we in Alaska experience during an extreme cold spell, but over in Oimyakon this would be a typical winter day. These temperatures are roughly 50 degrees colder than the averages for Fairbanks in the middle of January. Oimyakon also claims to be the location which recorded the coldest temperature in the northern hemisphere, a bitter -96E F.

The only way to reach Oimyakon in the winter is to travel on what is known as the "Road of Bones." This is a rough track cut across the Siberian wilderness between Magadan and Yakutsk, which was built by prisoners sent into forced labor by Stalin. The road acquired this name because of all the lives that were lost to build a road through such an incredibly harsh environment. Much of the road travels through rugged mountains and across tundra which is only passable during the winter.

So how is life in Oimyakon? Well, surprisingly, its not much different from life here in Alaska. Many people have small wooden homes, live without running water, own televisions, grow vegetables in the summer, pick berries and hunt in the fall, and fish throughout the year. They also raise cattle and Yakut ponies for food and milk. There is also a river and weather observer taking daily observations at this remote outpost. For the inhabitants of this small village, living in this extremely cold climate isn't much different than here in Alaska, except that the thermostat is just turned down as low as it can go.

Valeri is the official weather and river observer in Oimyakon, Russia.

Eric Anderson Visits the APRFC
by Scott Lindsey

For a week and a half in March, the RFC hosted Dr. Eric Anderson. Dr. Anderson worked for many years as the Hydrologic Science Leader at the Hydrologic Laboratory, National Weather Service Headquarters in Silver Spring, Maryland. His expertise is in snow modeling and hydrologic model calibration, and during his visit he met individually with hydrologists at the RFC to give training and guidance in modeling Alaskan rivers. Eric helped with modeling the Situk River near Yakutat, and also gave assistance to hydrologists recalibrating the Mendenhall River in Juneau, the upper Tanana River, and Willow Creek on the Parks Highway.

One of the major challenges facing hydrologists in Alaska is the modeling of snow and glacier melt as a component of river flow. With little data available and almost no data available at higher elevations, understanding how temperatures vary from low elevation measurement stations to the high elevations where much of the melt takes place is a vital component to accurately modeling river flow. One of the topics discussed with Eric was the use of temperature measurements at various elevations from upper air stations in Alaska and also the use of historic meteorologic model data at various elevations. The addition of these data will help to define how the temperatures vary with height, and the improvement of the temperature estimates entered into the hydrologic models will result in improved ability to forecast glacier and snowmelt contributions to river flows. This will also be useful in extending the flow forecasts further into the future as part of the Advanced Hydrologic Prediction Services (AHPS).

Hydrologists Ben Balk and Dave Streubel at the Alaska Pacific River Forecast Center have proposed a new method to handle glacier modeling within the structure of the NWS River Forecast System. Currently, glaciers are modeled as a very thick snowpack with parameters that lump the snowmelt and glacial melt together. At the beginning of the melt season, the glacier field is entirely covered by snow and has characteristics of a snowpack. But as the aerial extent of the snowpack decreases through the melt season, portions of the glacier begin to be exposed, and the exposed portions have much different characteristics than the snow-covered portions. Ben and Dave have proposed modeling the glaciers as a dynamically changing area of snow-covered glacier and non-snow-covered glacier. By separating the two (exposed glacier and snow-covered glacier), more physically realistic parameters can be assigned to the respective areas of the glacier. The challenge is that the area of snow-covered glacier is continually shrinking through the summer, while the area of exposed ice glacier is growing at a proportional rate. Dr. Anderson helped to structure the modeling components to reflect this methodology, and further study will determine how much benefit there might be to this method.

The final area of assistance provided by Dr. Anderson will be to initiate efforts to calibrate the Koyukuk River basin down to Hughes. This is a huge tributary to the Yukon River in northwest Alaska, and several locations on the Koyukuk have experienced major floods in the recent past. Eric will begin to analyze the precipitation, temperature and streamflow network in the area, and with support and collaboration from RFC staff, will begin the difficult process of calibrating a hydrologic model for a river basin of 13400 mi^2 with very little data.