Kiugmek

One who watches river

April 2006

A newsletter for Alaska river and ice observers

Please Note. . . .

RFC will be staffed weekends beginning April 29-30

Inside This Issue…

RFC Phone: 800-847-1739
WFO FAI: 800-378-7341
WFO JNU: 907-790-6824

Alaska - Pacific
River Forecast Center
6930 Sand Lake Road
Anchorage, Alaska 99502-1845
http://aprfc.arh.noaa.gov

Circles indicate areas across the state with radar coverage

The Importance of NOTHING
by Scott Lindsey

One of the important numbers that we get in the RFC from our river and weather observers is the number “Zero”, as in zero precipitation. An understanding of the precipitation pattern is one of the vital pieces of information the hydrologists need in order to accurately forecast what the water levels will do on various rivers around the state. In many places in the lower 48 states there are dense automated rain gage networks, which are complemented by the Doppler Radar, and the combination of these two data sources gives a very accurate picture of where precipitation is falling, where it is not falling, and how much precipitation there is over a given period of time.

However, as in most things, Alaska is not like the lower 48 states. We have a very sparse network of automated weather stations, and the radar coverage in Alaska has a number of problems when it comes to estimating precipitation. For one thing, we would need to have 25 – 35 radars (we have 7) to cover the entire state with the same density that exists down south. A second problem, and one that we share with the western states, is the presence of some rather sizable mountain ranges that prevent the radar beam from seeing the atmosphere behind the mountains and gathering the kind of data that we need to collect in order to estimate precipitation. A third problem is due to our high latitude and the fact that 6 of our 7 radars are located on the coast, we seldom see the types of severe weather that the radar captures so well in the lower 48. Also, cooler temperatures lead to the formation of melting ice crystals or “bright bands” at relatively low levels above the ground, which mislead the radar into thinking that heavy precipitation is occurring when in reality we are getting our more typical light rain showers.

We do have a decided advantage over the lower 48. And that advantage lies in our observers, who do so much to fill in the data gaps that automated sites and radar are unable to plug. Many of our observers have some type of rain gage. Those who do not have a rain gage and would like one, please let us know and, as we are able, we will supply a rain gage *that you can install, read, and report daily rainfall in addition to your river measurements.

For those who have rain gages, we want to emphasize that every day that there is no precipitation, we need to know. Rainfall totals of 0 are as important to us as every other rainfall total! It helps us to figure out the areal extent of rainfall that does occur, and sometimes alerts us to events such as a glacier-dammed lake outburst. When no rainfall has occurred and a glacial stream starts to rise sharply, we know that there has to be another explanation for that behavior. So remember, when you call in an observation, or enter it through the web, and you know that there was zero precipitation, please pass that information on to us. It helps to make what can be a very fuzzy picture come into a little better focus for us here at the RFC.

*These gages are plastic cylinders that need to be placed, if possible, in a place where the rainfall is relatively undisturbed as it enters the ***continued on Page 2**

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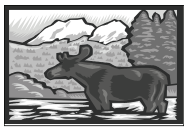
cylinder. That means it should be some distance from trees and buildings that might shield it from measuring accurately. The cylinder has a smaller 1" diameter cylinder inside it that is marked off in hundreths of an inch. One inch of rainfall would completely fill the inner cylinder. Less than one inch of rainfall will partially fill the inner cylinder, and examples of readings from the cylinder might be numbers such as 0.41 inches or 0.76 inches. If more than an inch is received, the overflow goes into the larger cylinder, and the way to measure that amount would be to use the inner cylinder to measure what is in the outer. If you started with a full inner cylinder, that is one inch, and if you emptied the inner cylinder and then completely filled it two more times and the third time it filled to 0.25 inches, your total rainfall would be 3.25 inches. It is important to read the precipitation at about the same time each day if possible. If you are gone for a few days with no one to take your readings for you, record the accumulated amount for the elapsed time since you last read the gage. When you call that observation in to the River Forecast Center or the Fairbanks Weather Forecast Office, let the person you talk to know that it was a precipitation total for the number of days you have been gone. If you report through the web, put a comment in the remarks area noting the precipitation total and number of days the precipitation was collected over.

Observer Comments Go World Wide

Observer comments will now go to the world wide web. A new feature has been added to our website that allows users to search a database of comments provided by you - our river and ice observers.

Comments of particular interest to users would include conditions of river or lake ice during the breakup and freezeup process, type and amount of debris in the river, river or lake conditions following a heavy rain event, any flooding issues, etc.

Check it out by following this link:
http://aprfc.arh.noaa.gov/php/rivnotes/searchnotes.php



In addition to observer comments being posted on our website, pilot reports (or PIREPS) that contain river conditions during the breakup process will be included in the database thanks to private pilots and several air taxi services located across the state that are participating in our River Watch Program (see Page 3 for more information about the program).

Please Get Crest Stage Readings
by Larry Rundquist

We frequently get requests for the stage data that you collect for us on Alaskan rivers. One of the standard analyses that hydrologists perform is called a flood frequency analysis, which results in a statistical distribution of flood data used in the design of airports and other facilities. For example, designers may set the level of the runway at the 50-year flood level, which means that there is a 2 percent (1/50) chance each year that the runway will be flooded.

The data that are needed to perform flood frequency analysis at a given location are the highest flow or stage that is reached in each year that records are available. The minimum number of years of data for an acceptable statistical analysis is 10 years. If we do not have the peak stage of the year in our records, then the entire year will not be available for inclusion in the flood frequency analysis. Thus it is very important to try to capture the highest stage each year. However, it is more important that you take all necessary precautions to protect your safety when collecting observations during periods of high water. Two issues complicate the ability of our observers to record the peak stage - missing the peak and the presence of ice.

Since few of our observers have the ability to sit at the measurement point for 24 hours per day waiting for the river to crest, it is not uncommon for the crest to occur between readings. The best way to document the crest in this situation is to be very observant when the water levels are high. What you should be looking for is evidence of high water marks that indicate that the water level was recently higher than its current level. The most obvious high water mark is wet soil, but other indications include leaves, seeds, small sticks, or any other materials that were floating on the surface at the waters edge that were left behind when the water level dropped. You should take into account any expected wave action that might occur at your site that may have caused higher marks and then estimate the vertical distance above your current reading. This would be your estimate of the peak stage for the event. If you are taking readings one or more times per day, the vertical distance to the high water marks should be quite small. Remember that you will usually be asked to collect additional paid readings when the water is high, but do not hesitate to ask us if we want additional readings, since we may not think of it when you call.

It is tougher to capture the crest stage when it occurs during breakup with ice in the river or on the banks. Our general guidance is to do the best that you can to estimate the peak water level, as long as you do so safely. Most likely, this will require marking and making notes on high water marks for tying into the stage measurements after the ice has gone away.

Please Get Crest Stage Readings cont'd

One common and very difficult situation occurs at slope profile gauge sites on our large rivers when ice chunks get pushed up onto the bank during breakup and the peak water level occurs when the breakup front passes the village. Try to observe and take notes of the maximum water level near the slope profile location by looking into gaps between ice chunks or how far down below the top of the ice the water level reaches. After the water level drops below the ice pushed up on the bank, measure and record the vertical distance from the estimated peak water level to the bank at that location and mark the bank with a nail or large rock. After the ice chunks melt away, measure down the slope profile to the point on the profile that corresponds to the level of the nail or rock that marked the bank. Report that slope profile value and the estimated distance above that value for the high water level. Each situation will be different and you will have to adapt to the conditions that you have at your location. If you need to mark the high water levels at a location upstream or downstream of your gauge site, try to ensure that the mark will remain until we can survey the mark in on our next site visit. This high water mark should be documented on the flood data sheet that can be found on our web page at:

http://aprfc.arh.noaa.gov/forms/flood_data_sheet.pdf

We would appreciate any efforts that you can make to gather annual peak water levels, but we repeat that your safety is more important than this measurement.

...A Note About Breakup Information…

We request your assistance in obtaining information on breakup on rivers and lakes in your area for the 2006 season. We would appreciate it if you would complete the enclosed River and Lake Breakup Information Form to the best of your knowledge and return the form to us. If you have any comments, please put them in the remarks area. Your help contributes to a more complete record of breakup data for Alaska and is greatly appreciated.

Use the link below to view the progress of breakup on rivers across Alaska. The breakup map will be updated as information becomes available. Please call us with information for your location.

http://aprfc.arh.noaa.gov/data/maps/brkup_map.html

Welcome New Observer

We have one new river and ice thickness observer to welcome since the Fall 2005 edition of Kiugmek - Joan Medbery. Joan signed on to take river readings on both Moose Creek and Kroto Creek in the Susitna Valley last September. Joan takes ice thickness measurements on Amber Lake in addition to the daily river readings. Joan and her husband Ray are also cooperative weather observers for the Anchorage Weather Forecast Office.

River Watch Program

The National Weather Service monitors ice breakup conditions throughout Alaska to assess flood threats and navigational hazards.

Supplemental aerial observations from aircraft flying at lower altitudes can significantly enhance the spatial and temporal coverage of information on ice characteristics.

http://aprfc.arh.noaa.gov/resources/rivwatch/rwpindex.php

To view the River Watch Program Presentation go to:
http://aprfc.arh.noaa.gov/resources/rivwatch/rwptrain.htm

Send an ice report or digital photo via e-mail to:
nws.ar.aprfc@noaa.gov

River Watch Program contacts:

Larry Rundquist - Anchorage - phone 266-5152
larry.rundquist@noaa.gov

Brad Sipperly - Fairbanks - phone 458-3708
brad.sipperly@noaa.gov

Ed Plumb - Fairbanks - phone 458-3714
edward.plumb@noaa.gov

Spring Breakup Outlook for Alaska

The flood potential from snowmelt and ice jams this spring breakup season throughout Alaska is currently rated as average. This forecast is based on ice thickness reports, observed snowpack, and long range temperature forecasts.

Ice - April ice thickness data is available for a limited number of observing sites in Alaska. Measurements indicate that ice thickness is normal or below normal at most locations. The noted exceptions are the Tanana river basin where ice thickness is 100-145% of normal and the middle Yukon river at Nulato where the ice is 123% of normal thickness.

Snow - an analysis of the April 1 snowpack indicates below normal snowpack throughout much of southern mainland Alaska and the Southeast panhandle. Portions of the Yukon territory, the upper and middle Yukon basin, and the the Koyukuk river basin have average snowpacks. The Talkeetna mountains and the Susitna valley have 55-75% of normal snowpacks whereas last year these same areas had snowpacks well over 150% of normal. Even with below normal snowpacks if temperatures remain cool for most of April there is enough snow in most areas to produce significant snowmelt runoff peaks if subjected to a rapid warming pattern in late April or early May.

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 under snowpack reports or snowpack maps.

Weather - the greatest factor in determining the severity of breakup remains the weather during April and May. Weather models suggest a broad trough remaining in place over the eastern Bering Sea and gulf of Alaska through the third week in April. Cloudy weather and cool temperatures for much of mainland Alaska will be associated with this trough. Colder than normal temperatures could delay the melting of the snowpack and the decay of the river ice. The 90-day outlook for April through June calls for a greater likelihood of above normal temperatures across western Alaska. The threat of snowmelt and ice jam flooding will depend on the timing and rate of change from below normal to above normal temperatures. For more information on the outlooks for this spring please refer to the Climate Prediction Center web site at

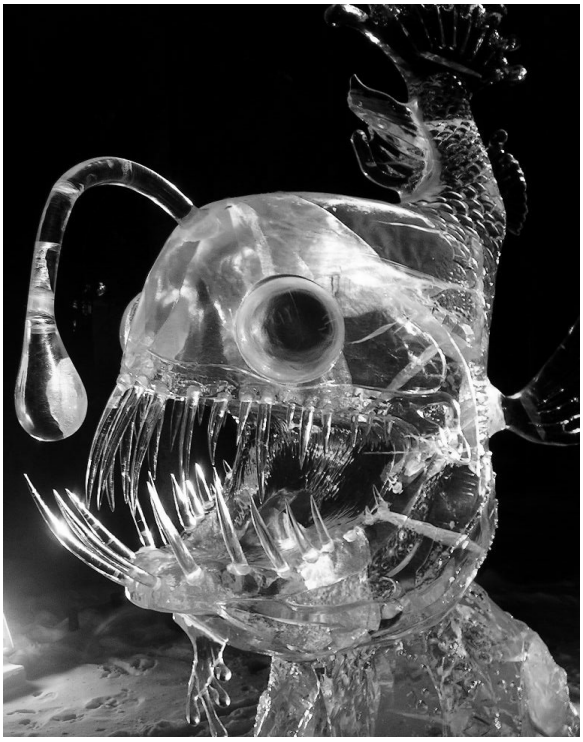
http://www.cpc.ncep.noaa.gov

The Interior Alaska Ice Factory

by Ed Plumb

You would have been in heaven if you were an ice sculptor living in interior Alaska this past winter. Lake ice ranged from 5 to 10 inches thicker at the end of this winter compared to last year. Many lakes measured by the Fairbanks weather forecast office had nearly 4 feet of ice cover around April 1st. The significant ice growth can be attributed to the combination of several colder than normal months and below normal snowfall throughout the winter.

After a warm October with scant snowfall over portions of the interior, temperatures dropped as November arrived. Below zero readings along with very little snow cover to insulate interior lakes from the frigid weather resulted in considerable ice growth early in the winter. Temperatures warmed again in December but additional snowfall during the month was scarce. This flip-flop cycle of a warm month followed by a cold month continued through the winter. January was especially cold with temperatures remaining below zero for much of the month. Fairbanks' average temperature of -22 F resulted in the coldest January since 1971. Ice growth increased by 10 inches or more at many sites in the Fairbanks area during January. Warm weather arrived again in February and was immediately followed by a cool March. It is interesting to note that the temperature in Fairbanks rose above freezing only once in the month of March (on the 31st). Fairbanks just missed having the first March since 1916 with the temperature remaining below freezing for the entire month.



This "ice fish" sculpture was one of many unique entries in the 2006 World Ice Art Championships held each March in Fairbanks. Go to http://www.icealaska.com/ to view more images.

The following table gives an estimate of flood potential for
various locations around the state and basin runoff volumes .
The table was created from our Spring Breakup Outlook dated April 7, 2006.
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 2005 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 DATE
Southeast Panhandle	Below				
Kenai River	Below				
Matanuska River	Below	Low			
Susitna River	Below				
Gold Creek		Low			
Sunshine		Low	05/02	16	04/29-05/04
Yentna River	Below	Low			
Copper River Basin	Below				
Gakona River		Low	04/29	19	04/24-05/02
Gulkana River		Low	04/28	17	04/23-05/01
Chena River	Below				
Chena Lakes Project		Low			
Fairbanks		Low	04/25	20	04/22-04/29
Tanana River	Below				
Northway		Low	04/22	19	04/19-04/26
Salcha		High			
Fairbanks		Low	04/29	7	04/26-05/02
Nenana		Low	05/02	32	04/27-05/03
Manley		Low	05/03	15	04/29-05/06
Kuskokwim River (Upper)	Below				
Nikolai		Low-Mod	04/23	20	04/19-04/27
McGrath		Moderate	05/07	31	05/02-05/09
Kuskokwim River (Lower)	Below				
Stony River		Low-Mod	05/06	17	04/30-05/08
Sleetmute		Moderate	05/04	17	04/29-05/06
Red Devil		Moderate	05/06	19	05/01-05/08
Crooked Creek		Moderate	05/07	20	05/01-05/08
Aniak		Moderate	05/07	22	05/02-05/10
Kalskag		Low-Mod	05/07	16	05/03-05/10
Tuluksak		Low-Mod	05/09	13	05/05-05/12
Akiak		Low-Mod	05/10	19	05/06-05/13
Bethel		Low-Mod	05/12	34	05/07-05/14
Yukon River (Upper)	Average				
Eagle		Low-Mod	05/05	26	05/02-05/08
Circle		Mod-High	05/10	23	05/07-05/13
Fort Yukon		Moderate	05/10	23	05/07-05/14
Beaver		Low	05/12	10	05/09-05/15
Stevens Village		Low	05/14	9	05/11-05/17
Rampart		Low	05/14	10	05/11-05/17

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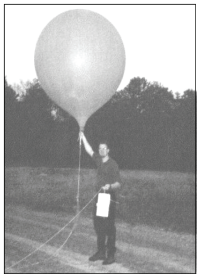
RIVER - REACH	SNOWMELT RUNOFF VOLUME	FLOOD POTENTIAL	AVERAGE BREAKUP DATE	NO. OF YEARS RECORD	FORECAST BREAKUP DATE
Yukon River (Middle)	Average				
Tanana		Low	05/10	20	05/07-05/13
Ruby		Low	05/12	22	05/09-05/15
Galena		Moderate	05/12	23	05/09-05/15
Koyukuk		Moderate	05/13		05/10-05/16
Nulato		Moderate	05/14	9	05/11-05/17
Kaltag		Low	05/14	29	05/11-05/17
Anvik		Low	05/18	17	05/15-05/21
Yukon River (Lower)	Below				
Holy Cross		Low	05/16	17	05/13-05/19
Russian Mission		Low-Mod	05/15	20	05/13-05/19
Pilot Station		Low-Mod	05/17	8	05/14-05/20
Mountain Village		Low	05/19	17	05/16-05/22
Alakanuk/Emmonak		Mod-High	05/22	22	05/19-05/25
Koyukuk River	Average				
Bettles		Low	05/10	25	05/06-05/14
Allakaket		Low-Mod	05/11	20	05/08-05/14
Hughes		Low-Mod	05/12	19	05/09-05/15
Seward Peninsula	Below				
Buckland River	Below				
Buckland		Moderate	05/18	14	05/13-05/23
Kobuk River	Below				
Kobuk		Moderate	05/17	25	05/14-05/21
Shungnak		Low	05/19	15	05/15-05/22
Ambler		Low	05/18	22	05/15-22
Noatak River	Below				
Noatak		Low	05/20	11	05/15-05/23
Brooks Range	Below				
North Colville River					
at Umiat		Low	05/24	9	05/20-05/28
at Colville		Low	05/31	7	05/27-06/04
Arctic Coastal	Below				

OPEN HOUSE

The Anchorage Weather Forecast Office is hosting an Open House on Saturday, April 22 from 8:00 a.m. to 4:00 p.m. Tour the Forecast Office, the River Forecast Center, and the Alaska Aviation Weather Unit. Weather Spotter Training will be held at 10:30 a.m. Plan to arrive by 2:30 p.m. to watch the Upper Air Balloon launch at 3:00 p.m. Light refreshments will be available. Address: 6930 Sand Lake Road, near the corner of Raspberry and Sand Lake Road.



Meteorologist ready to launch the balloon after attaching a radiosonde instrument package.

Earth Day Hundreds of children from the Anchorage School District are expected to participate in Earth Day activities at the Anchorage Weather Forecast Office on April 24.

Careers in Science will be held in conjunction with Earth Day. Participating agencies include NOAA's National Marine Fisheries, the NOAA Corps, and the West Coast & Alaska Tsunami Warning Center. The Alaska Sea Life Center will have representatives on hand as well as ALPAR (Alaskans for Litter Prevention and Recycling), Saltwater Inc., the Environmental Protection Agency, the Campbell Creek Science Center, and more.