Kiugmek

One who watches river

October 2006

A newsletter for Alaska river and ice observers

Please Note. . . .

Don't forget to send in your Freeze-up Form.

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Alaska - Pacific
River Forecast Center
6930 Sand Lake Road
Anchorage, Alaska 99502-1845
http://aprfc.arh.noaa.gov
800-847-1739

Our last weekend staffing is scheduled to be October 28 - 29. For those of you continuing to take measurements in November or beyond, please hold your weekend measurements and give them to us on Mondays, or enter them on-line at http://aprfc.arh.noaa.gov. Web entry requires a password. Instructions and password can be obtained from any APRFC staff member.

End of 2006 Open Water Season

The 2006 open water season is coming to a close and we would like to take this opportunity to thank you for your assistance in taking water level readings and ask that you stop taking readings at your location when ice actually prevents you from making an accurate reading safely.

In addition to the water level measurement, we would appreciate any information you are able to provide us on the condition of the river and the formation of river ice. Please complete the enclosed River and Lake Freeze-up 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 freeze-up data for Alaska and is greatly appreciated.

The APRFC staff appreciates your cooperation during the past open water season and looks forward to working with you again next year.

A special thanks to those observers who phoned in additional readings during this season's rain events.

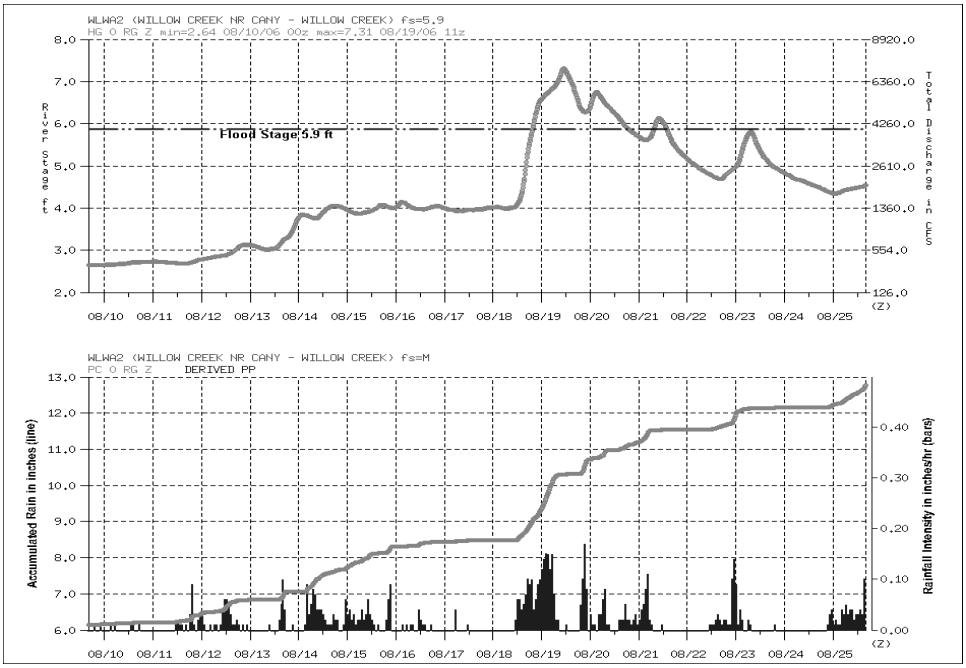
August Flooding in Southcentral Alaska

by Arleen Lunsford and Larry Rundquist

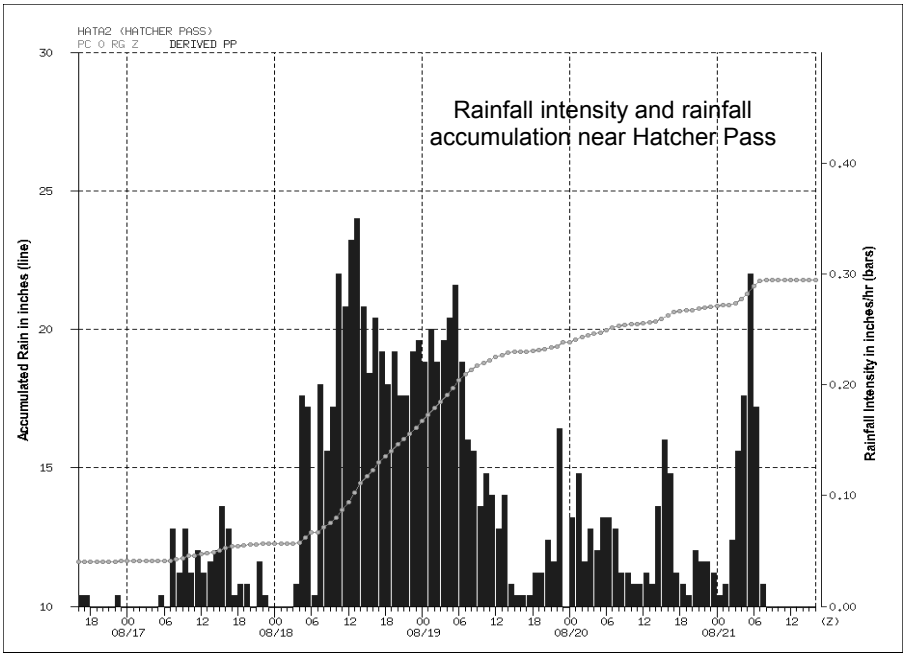
Wet was the word for August of 2006 in southcentral Alaska! After a relatively dry start, rain began falling during the second week of the month. By August 16 water levels were already elevated on Susitna basin and Anchorage bowl streams (see graphs at right), and meteorological models were indicating the possibility of significant rain in south-central Alaska beginning on the 18th.

On August 17 a large upper-level low pressure system settled over western interior Alaska, where it would remain for most of the next week as smaller lows rotated around it. These smaller lows came from Siberia, but were connected to Asian monsoonal moisture, indicating the possibility of heavy rains. On August 18-19 the first low (and associated rain) moved across *continued on Page 2*

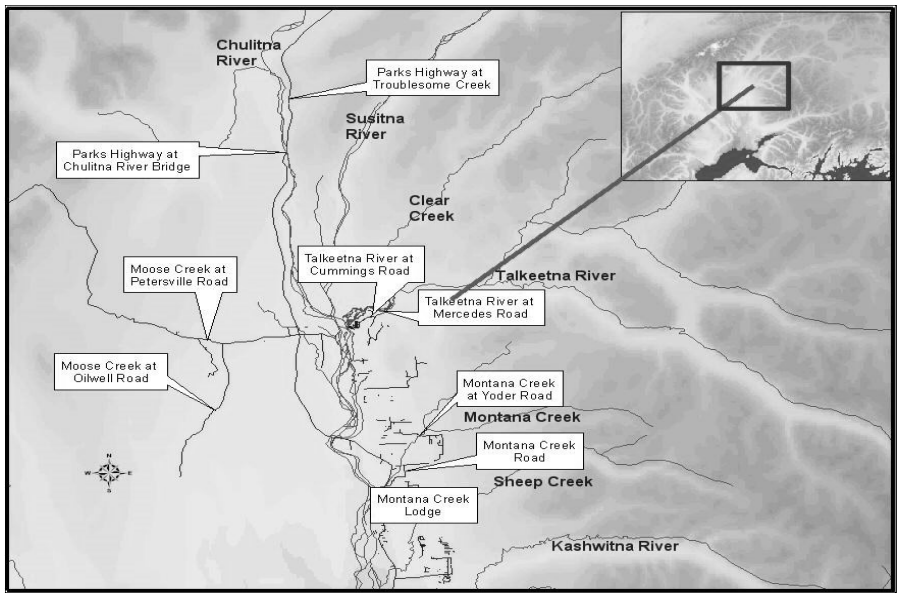
Water level and rainfall graphs at the USGS gage on Willow Creek in the canyon

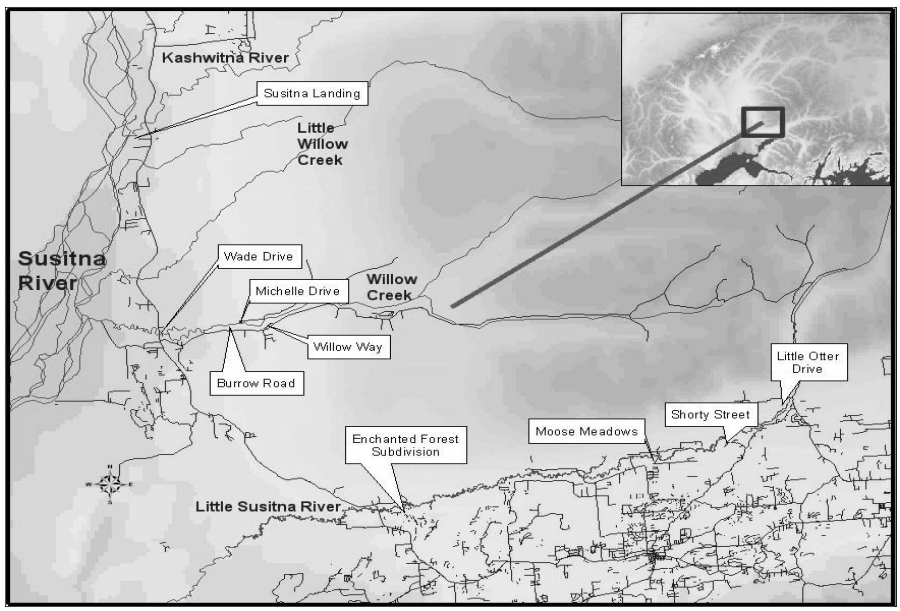


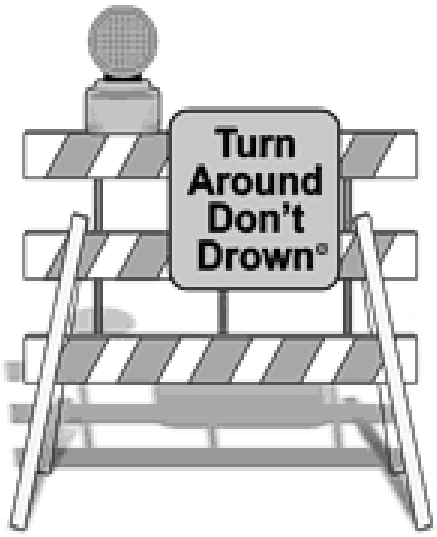
southern Alaska. Westerly to southwesterly winds with this system led to downsloping and relatively little rain in the western Susitna basin and enhancement of the rain in the eastern and northern Susitna Basin. Up to 6 inches of rain were reported in the eastern and northern Susitna basin on the 18th and nearly 9 inches accumulated over the two day period. Hourly rainfall intensities were as large as 0.40”/hr during the event. The graph at right shows rainfall totals at Hatcher Pass.



Streams rose quickly past flood stage in response to this heavy rain. Homes, cabins, and recreational areas were flooded or isolated along Moose Creek, Trapper Creek, Talkeetna River, Willow Creek, Montana Creek, Little Susitna River, and numerous small streams in the area. At least two houses were washed away, and an estimated 300 homes were flooded. Eleven homes were evacuated by dive teams in boats and rafts. Road washouts and closures or deteriorated road conditions were reported on bridges over Moose Creek and Montana Creek and numerous roads in the communities of Willow, Houston, Wasilla, Trappers Creek, and Talkeetna. At least 16 bridges in Mat-Su Borough required repair or safety inspections before being used. Additional small lows moved across southcentral Alaska during the next several days. These kept stream levels high and prolonged the flooding in many areas. The Governor of Alaska issued a disaster declaration for the flooded areas. (**See maps of impacted areas at left**).







Anchorage Hydrologic Service Area Report

Cordova Flood Assessment
by Scott McKim

Eric Holloway (River Forecast Center) and Scott McKim (Anchorage Weather Forecast Office) traveled to Cordova on August 23-24. Cordova and surrounding areas received over 10" of rain over a 16-day period, with a few daily totals of over 3.5". The purpose of the trip was to meet with locals to assess the extent of flooding, set up a datum and gage at the Eyak Lake outlet, and to determine action and flood stages for Eyak Lake and Eyak River.

Flooding of homes at the end of Olsen Road

New observer Clay Koplin leads Eric Holloway out onto his dock to point out a potential location for a staff gage

Eric and Scott spoke with town officials and residents about the flood's impacts in and around Eyak Lake and Eyak River. Many residences on the lake and along the river had their basements and crawlspaces flooded, as the water levels were over the river banks and a couple of feet above the lake's normal level. Flooding along the lake shore led to portions of Power Creek Road to wash out because of high lake levels and waves, and caused the municipal airport to close since its runways were underwater. Many locals observed that although the flooding was fairly severe, water levels were not as high as they were during the 1981 flood event. By the 24th the waters had receded and flooding was confined to yards and no structures were underwater.

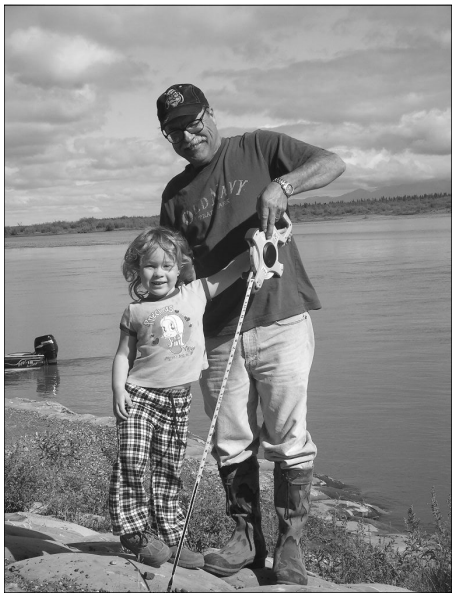
Resident Clay Koplin was recruited to take daily river measurements from the Eyak River Bridge on the Copper River Highway.

Fairbanks Hydrologic Service Area Report
by Ed Plumb

Tim Gavin checks his nets on the Buckland River

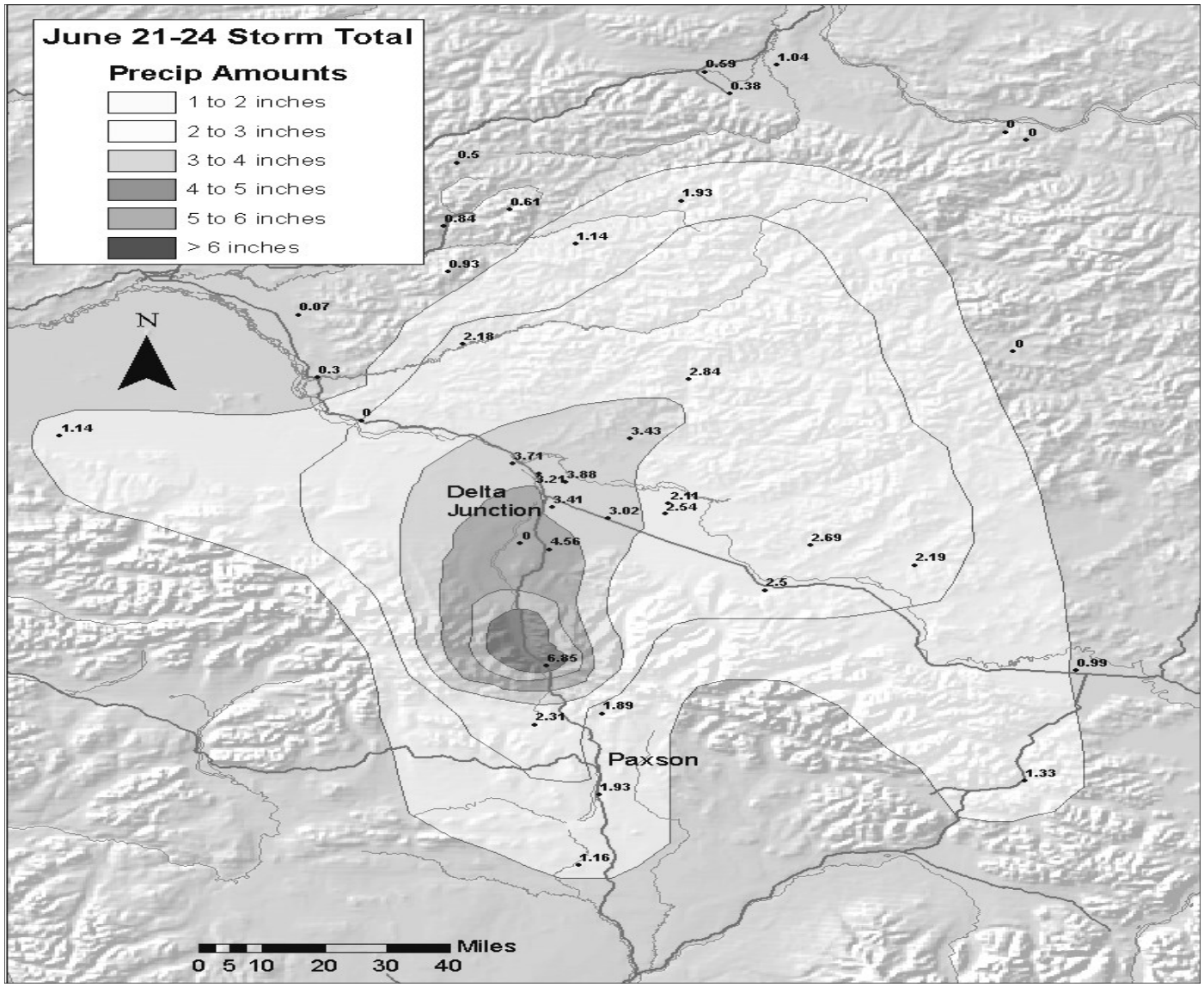
New River Observers in Northwest Alaska

Service Hydrologist Ed Plumb from the Fairbanks Weather Forecast Office traveled with staff from the Kotzebue Weather Service Office in August to set up two new river observers in Northwest Alaska. Steve Werle is now taking daily readings on the Noatak River at Noatak. Steve has been a National Weather Service cooperative weather observer for the past 10 years. Steve has now added river measurements to his repertoire. In the village of Buckland, Tim Gavin is measuring river levels on the Buckland River. We really appreciate Steve and Tim's help because they are the only river measurement points on the Noatak or Buckland Rivers.



Steve and his daughter on the banks of the Noatak River

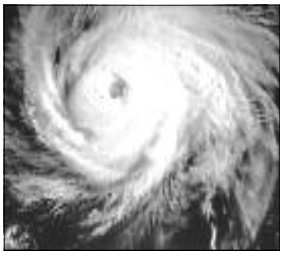
Richardson Highway Hit Hard by Flooding



Several heavy rain events in the Alaska Range over the summer resulted in some significant flooding along the Richardson Highway. Over a three day period in mid-June, between 4 to 7 inches of rain fell from Delta Junction to Paxson. Flash flooding of small streams spread debris over the road and completely washed it out in several locations. More rain a few days later brought streams to bankfull again and pushed more water across the highway. More heavy rain in August resulted in another round of flooding and mudslides along the highway.

Richardson Hwy washed out south of Delta Junction

Water flows over the Richardson Hwy at Donnelly Creek State Recreation Site



Extratropical Storms in Alaska

by Scott McKim

Typhoons that form in the western Pacific Ocean occasionally transition into extratropical storms and have significant effects on Alaskan weather. Within the past month, three separate ex-typhoons, Ioke, Shanshan, and Yagi, have brought wind, waves, and rain in notable proportions to Alaska.

Typhoons typically form in the equatorial Pacific during the summer and early autumn months, similarly to hurricanes in the Atlantic Ocean basin. The transition from tropical systems to extratropical systems is mainly a result of these typhoons moving north from the warm western tropical Pacific Ocean to colder sea surface temperatures. An extratropical cyclone is nothing more than a storm that has lost its tropical characteristics. As an upstream low pressure system approaches a decaying typhoon, usually in a region northeast of Japan, a transition to a powerful extratropical cyclone often occurs. These newly developed cyclones usually get caught in the upper level westerly winds over the North Pacific Ocean, often impacting the Aleutian Islands and mainland Alaska. Ex-typhoons act as conveyor belts of tropical moisture and dump large amounts of precipitation, especially in coastal mountain locations along the southcentral Alaska coast. Often times when ex-typhoons are impacting Alaska, satellite images depict large plumes of atmospheric moisture being tapped from southern latitudes stretching north to the storm center near Alaska.

Typhoons do not always transition into extratropical storms that impact Alaska and other northern latitudes. In fact, more often than not typhoons gradually weaken as they drift northward and end up decaying over the northern Pacific, losing much of their wind and rain in the process. Only when atmospheric conditions are suitable for re-strengthening do typhoons transition into extratropical systems and affect Alaska. When this does occur, wet and windy weather sets up for much of the southern half of Alaska. Interior regions of Alaska received over 16" of snow from an ex-typhoon in September of 1992. More recently, Yakutat and other southeastern Alaska locations received over 6" of rain in two days (27-28, September 2006) courtesy of ex-Typhoon Yagi. Coastal flooding resulting from strong on-shore wind often occurs when ex-typhoons impact Alaska.

To learn more about extratropical storms visit:
http://data.giss.nasa.gov/stormtracks/

High Water Level Reference Levels

by Larry Rundquist

The National Weather Service (NWS) establishes reference levels for high water conditions at most gaged locations in Alaska. The term used for the water level of a stream or lake at a gage is **stage**. High water terms used by the NWS include **bankfull stage**, **action stage**, and **flood stage** as defined below. It is recommended that you are aware of these levels for your gage. These reference levels are reevaluated when possible during high water events such as the August events in southcentral Alaska.

Washed out approach to bridge over
Troublesome Creek
on the Parks Hwy
August 2006

Since gages are sparse in Alaska, the stage measured at each gage is used as an index of water level characteristics upstream and downstream of the gage in addition to the status in the immediate vicinity of the gage. In many cases, there is only one gage on a stream system and thus the gage represents the water level characteristics in the entire stream basin. The gage is also often used to indicate the water level status of other streams or lakes in the general area that have similar characteristics to the gaged stream. Thus when we assign reference levels to a gage site, we must consider potential impacts in the area as well as those close to the site. The assignment of these stages thus includes the combined assessment of specific impacts and the frequency of occurrence of the event. The concept of using the frequency of occurrence of high water events to supplement the assessment of flood stages is based on the assumption that frequently occurring water levels such as the 2-year flood (50% chance of occurring in any year) will have few impacts in comparison to the expected impacts during an infrequent

continued on Page 6

event, such as a 100-year flood (1% chance of occurring in any year).

Bankfull Stage is an established gage height above which a rise in water surface will cause the stream or lake to overflow the lowest natural stream bank or exceed the predominant vegetation line on the banks. The bankfull stage on many streams is associated with the 2-year recurrence interval flood.

Action Stage is an established gage height that represents the level where the NWS or a partner/user needs to take some type of mitigation action in preparation for possible significant hydrologic activity. The type of action taken varies for each gage location, but often includes asking NWS observers to take more frequent gage readings. Gage symbols on the web site change to yellow when stages are above this level.

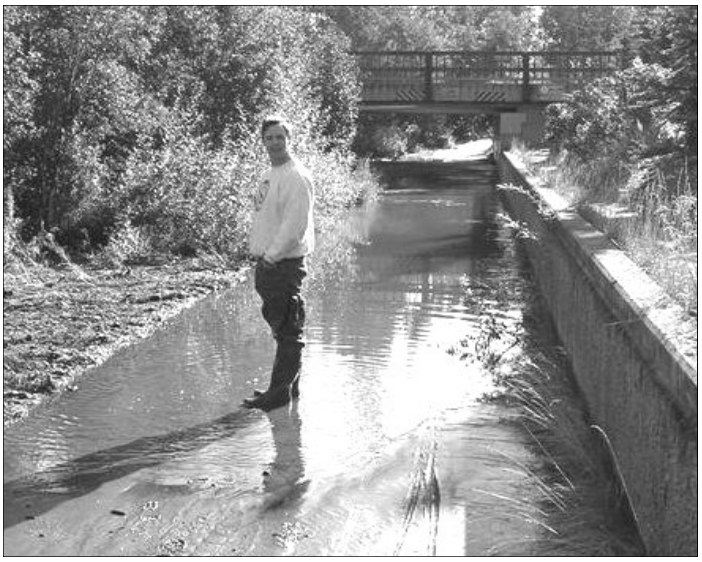
Flood Stage is an established gage height for a given location above which a rise in water surface level begins to create a hazard to lives, property, or commerce. The degree of impact is further defined by establishing levels for minor, moderate, and major flooding. The issuance of flood advisories or warnings is linked to flood stage. Gage symbols on the web site change to orange, red, or purple when stages are above this level.

Minor Flooding is defined to have minimal or no property damage, but possibly some public threat. In remote areas with few specific impacts, floods with 5 -10 year recurrence interval would be assumed to be causing minor flooding on streams in the area. Examples of conditions that would be considered minor flooding include:

- water over banks and in yards
- water overtopping roads, but not very deep or fast flowing
- water in campgrounds or on bike paths
- inconvenience or nuisance flooding

Minor flooding at Mile 31 of
Chena Hot Springs Road in Fairbanks
August 2003

- small part of the airstrip flooded, and aircraft can still land
- one or two buildings in low areas may be cut off or get a little water inside



A few inches of water from Campbell Creek causes minor flooding of the bike path at Old Seward Hwy
August 2006

Moderate Flooding is defined to have some inundation of structures and roads near the stream. Some evacuations of people and/or transfer of property to higher elevations may be necessary. In remote areas with few specific impacts, floods with 15-40 year recurrence interval would be assumed to be causing moderate flooding on streams in the area. Examples of conditions that would be considered moderate flooding include:

- several buildings flooded with minor or moderate damage
- various types of infrastructure rendered temporarily useless (i.e. fuel tanks cannot be reached due to high water, roads flooded that have no alternates, generator station flooded)

Water inundates the Montana Creek Campground located off the Parks Highway - an example of moderate flooding
August 2006

- personal property in low lying areas needs to be moved or it will get wet
- elders and those living in the lowest parts of the village are evacuated to higher ground
- access to the airstrip is cut off or requires a boat

Moderate flooding in the village of Emmonak on the Yukon River
May 2006

- water over the road is deep enough to make driving unsafe
- gravel roads likely eroded due to current moving over them
- widespread flooding, but not deep enough to float ice chunks through town
- water deep enough to make life difficult, normal life is disrupted and some hardship is endured
- airstrip closed
- travel is most likely restricted to boats

For several days, Delta residents traveled by canoe in order to reach their homes
May 2004

Major Flooding is defined to have extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations are necessary. In remote areas with few specific impacts, floods with 50-100 year recurrence interval would be assumed to be causing major flooding on streams in the area. Examples of conditions that would be considered major flooding include:

Bridge washed out over Deep Creek due to heavy rains
October 2002

Fuel tank topples due to breakup related flooding in the village of Hughes on the Koyukuk River
May 2003

The approach to the bridge over Montana Creek on the Parks Highway washed out
October 1986

- many buildings flooded, some with substantial damage or destruction
- infrastructure destroyed or rendered useless for an extended period of time
- multiple homes are flooded or moved off foundations
- everyone in threatened area is asked to evacuate
- National Guard units assist in evacuation efforts
- erosion problems are extreme
- the airstrip, fuel tanks, and the generator station are likely flooded

Read about the October 2006 rain events and their effects on Seward, Cordova, Valdez, and the Copper Basin in the Spring (April 2007) edition of Kiugmek.

Start of Ice Thickness Measurements

Those of you who measured ice thickness last year are requested to do so again this year. Please let us know if you need more forms or envelopes for this season. For those of you who have measured in the past but do not intend to this year, please contact us to get instructions on sending the valuable equipment back to us so that we can use it at another location.

We will enter your data into a database and use the data in a monthly analysis of snow and ice for forecasting breakup characteristics next spring. We would like you to make the measurement as close to the last day of each month as possible and mail the results to us. Be sure to include the date and location on the form. A phone call to our 800 number would also aid in the analysis process, or use the NWS Observers form on the Forms menu on the APRFC website to enter the information at: http://aprfc.arh.noaa.gov. The ice thickness measurements should be made in the same locations as in the past, preferably far enough from the shore line to prevent drilling in mud and not so far as to encounter strong currents. Before drilling the ice, measure the depth of the snow on top of the ice at that point and record the snow depth in inches. It is preferable to drill a new hole each time rather than use the previously drilled hole. Inaccuracies due to differences in heat transfer can occur at previously drilled holes.

Welcome New Observers

Eran Hood
Auke Lake at Auke Bay
April 2006

Caroline Stewart
Salmon River at Hyder
April 2006

Ray Dronenburg
Chisana River at Northway
Nabesna River near Northway
May 2006

Tim Gavin
Buckland River at Buckland
May 2006

Shelley Johnson
Chester Creek at Arctic Blvd.
June 2006

Robin Hammond
Fortymile River at Mosquito Fork
June 2006

Steve Werle
Noatak River at Noatak
August 2006

Clay Koplin
Eyak River at Cordova
August 2006

Michelle Travis
Resurrection River at Seward
October 2006

The Alaska-Pacific River Forecast Office staff thanks you for your river and weather observations this season.