



APPENDIX K

KENAI PENINSULA BOROUGH
Office of Emergency Management

FLOOD-FORECASTING STREAM-GAGE PROGRAM

QUARTERLY REPORT

For the Period
April 1, 2004 - June 30, 2004

Steven A. Frenzel
and
R.L. Rickman

Water Resources Office

Alaska Science Center
4230 University Drive, Suite 201
Anchorage, Alaska 99508-4664



APPENDIX K

The flood-forecasting stream-gage program is designed to provide near real-time river stage and discharge data used by the Kenai Peninsula Borough and National Weather Service River Forecast Center to provide flood warning and flood watch information. Data collected at these gages are also used to determine the magnitude and frequency of floods, and can be used for numerous hydraulic and hydrologic applications. Current and historical data are available through the U.S. Geological Survey (USGS) web site: waterdata.usgs.gov/ak/nwis/ Data are archived by the USGS and published in our annual water data report.

This quarterly report briefly describes each flood-forecasting stream gage funded cooperatively between the Kenai Peninsula Borough and the USGS, and activities during the past three months. The flood-forecasting stream-gage program is supplemented with other stream gages funded by the USGS, U.S. Army Corps of Engineers, U.S. Forest Service, National Park Service, Municipality of Anchorage, and the Alaska Energy Authority. Gages that enhance the flood forecast network, which are funded by other sources, are listed in table 1 at the end of this report.

FLOOD FORECASTING STREAM GAGE DESCRIPTIONS:

Grouse Creek at Grouse Lake Outlet near Seward (USGS gaging station number 15237730)

Grouse Creek periodically overflows its banks resulting in road closure and damage to the Seward Highway. The creek is prone to rapid changes in stage. The gage is located on the right bank, 200 feet downstream from the Grouse Lake outlet, 0.2 mile upstream from the Seward Highway, and 7 miles north of Seward. Rainfall and river stage are measured every 15 minutes, and these data are transmitted via GOES satellite every 4 hours. Data can also be transmitted via phone modem.

Glacier Creek at Bruno Road near Seward (USGS gaging station number 15237900)

Glacier Creek is prone to flooding and transports a large amount of gravel and sand. Significant property damage occurred during the 1986 floods. The gage is located on the left bank, 25 feet upstream from the Bruno Road bridge, and 5.6 miles northeast of Seward. Rainfall and river stage are measured every 15 minutes and these data are transmitted via phone modem.

Anchor River near Anchor Point (USGS gaging station number 15239900)

This gage is located on the South Fork of the Anchor River. Periodic flooding has caused the intermittent closure of the Sterling Highway. The gage is located on the right bank at the Sterling Highway bridge (mile 161), 4.3 miles southeast of Anchor Point. Rainfall and river stage are measured every 15 minutes and these data are transmitted via GOES satellite every 4 hours.

Snow River near Seward (USGS gaging station number 15243900)

The Snow River basin contains several glaciers. Glacier-dammed lake outburst flooding is common, and has resulted in significant property damage along the Kenai River. The gage is located on the left bank, 0.5 mile downstream from the Alaska Railroad bridge, 3 miles upstream from the mouth at Kenai Lake, and 13.5 miles north of Seward. Rainfall and river stage are measured every 15 minutes and these data are transmitted via GOES satellite every 4 hours.

Kenai River at Cooper Landing (USGS gaging station number 15258000)

The Kenai River begins at the outlet to Kenai Lake. The upper reaches of the river receive heavy recreation use. Numerous homes line the banks of Kenai Lake and the Kenai River at Cooper Landing. The Sterling Highway crosses the Kenai River at several locations near Cooper Landing. Flooding has occurred as the result of heavy rainfall and glacier-dammed lake outbursts



APPENDIX K

from the Snow River basin. The gage is located on the right bank at the Sterling Highway bridge at the Kenai Lake outlet, 0.9 miles upstream from Bean Creek, and 0.9 mile east of Cooper Landing. Rainfall and river stage are measured every 15 minutes and these data are transmitted via GOES satellite every 3 hours.

Kenai River below Skilak Lake Outlet near Sterling (USGS gaging station number 15266100)

The Kenai River is an important fishery and probably has the most recreational use of any river in Alaska. Flooding from rainfall events and glacier-dammed lake outbursts is relatively common. The gage is located on the right bank, 3.5 miles downstream from Skilak Lake, and 7 miles southeast of Sterling. Rainfall and river stage are measured every 15 minutes, and these data are transmitted via GOES satellite every 4 hours. Data can also be transmitted via phone modem.

Kenai River below Mouth of Killey River near Sterling (USGS gaging station number 15266150)

The Killey River occasionally produces a large amount of inflow into the Kenai River. Flooding in 1995 resulted in significant property damage and bank erosion downstream. The gage is located on the right bank at Kenai Keys, 1.5 miles downstream from the Killey River, and 4.5 miles southeast of Sterling. Rainfall and river stage are measured every 15 minutes, and these data are transmitted via GOES satellite every 4 hours. Data can also be transmitted via phone modem.

ACTIVITIES DURING THIS QUARTER

1. The fact sheet, *Floods on the Kenai Peninsula, Alaska, October and November 2002* has been published and is available at "<http://pubs.water.usgs.gov/fs2004-3023>". The fact sheet lists rainfall at 17 locations, and peak stage, peak discharge, and 100-year flood discharges for 20 streams.
2. We experienced equipment failure at Anchor River near Anchor Point (15239900) during break-up in April. Luckily, break-up was mild during the period the gage was not functioning. Faulty instruments were replaced. We also experienced some instrument problems at Grouse Creek near Seward (15237730) in May. These problems have been resolved. The orifice for the Snow River near Seward (15243900) gage has been relocated about 300 ft. upstream because of changes in the river channel. Stage data is available, but discharge data is not, pending development of a new stage-discharge rating. We will have the new rating in place by late summer. Orifice burial problems continue to occur at the Kenai River below Killey River (15266150) gage. We will install a second orifice or a submersible transducer sometime in July.
3. Stream flow during April and May in the Kenai River was significantly higher than the long-term median stream flow. Stream flow for the same period was below the long-term median at Grouse Creek.
4. Stage, precipitation, and discharge data for the 2004 water year have been entered into the USGS computer data base (ADAPS).

WORK PLANNED FOR NEXT QUARTER

1. Replace the orifice or install a non-submersible pressure transducer at Kenai River below Killey River.



APPENDIX K

2. Develop the new stage-discharge rating for Snow River near Seward.
3. Continue to make discharge measurements to verify the stage-discharge ratings. Survey all gage elevation reference marks to ensure gage datum is maintained.
4. Data will continue to be entered into the USGS data base (ADAPS) and be made available via the internet.

Table 1. Stream gages within the Kenai Peninsula Borough, funded by other sources, which enhance the flood forecast network.

Station number	Station name	Data type ¹ and telemetry	Funded by	Remarks
15236900	Wolverine Creek near Lawing	Stage, discharge, air temperature, rainfall; transmitted via GOES satellite every 4 hours	U.S. Geological Survey	A good indicator of snow melt and rainfall runoff from a heavily glaciated maritime basin
15238600	Spruce Creek near Seward	Stage, discharge, rainfall; data transmitted via cell phone	U.S. Army Corps of Engineers	Cell phone has marginal reliability
15238648	Upper Nuka River near Park Boundary near Homer	Stage, discharge, air temperature, precipitation (including snow); transmitted via GOES satellite every 4 hours	Alaska Energy Authority and USGS	Precipitation/ runoff is similar to Harding ice field. Past flooding has occurred because of rapid snowmelt during September and October rainfall events
15238990	Upper Bradley River near Nuka Glacier near Homer	Stage, discharge, air temperature; transmitted via GOES satellite every 4 hours	Alaska Energy Authority and USGS	A good indicator of snowmelt and rainfall events in the Kenai Mountains
15239050	Middle Fork Bradley River near Homer	Stage, discharge, air temperature, rainfall; transmitted via GOES satellite every 4 hours	Alaska Energy Authority and USGS	A good indicator of snowmelt and rainfall events in the Kenai Mountains.
15239070	Bradley River near Tidewater near Homer	Stage, discharge, air temperature, rainfall; transmitted via GOES satellite every 4 hours	Alaska Energy Authority	A good indicator of snow melt and rainfall events in the Kenai Mountains
15261000	Cooper Creek at Mouth near Cooper Landing	Stage, discharge, water temperature; transmitted via GOES satellite every 4 hours	Municipality of Anchorage and USGS	A good indicator of snow melt and rainfall events in the Kenai Mountains near Cooper Landing
15266300	Kenai River at Soldotna	Stage, discharge, water temperature; transmitted via GOES satellite every 4 hours	U.S. Army Corps of Engineers	A critical part of the Kenai River flood forecast network
15271000	Sixmile Creek near Hope	Stage, discharge, air temperature, rainfall; transmitted via GOES satellite every 4 hours	U.S. Forest Service	A good indicator of snow melt and rainfall events in the northern Kenai Mountains
15294700	Johnson River above Lateral Glacier near Tuxedni Bay	Stage, discharge, rainfall; transmitted via GOES satellite every 4 hours	National Park Service	The only stream gage within the Kenai Peninsula Borough located on the west side of Cook Inlet

¹ Recording interval is 15 minutes.