UNPUBLISHED REPORT

GLACIER CREEK SECOND YEAR DATA REPORT

ALASKA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND AND WATER
ALASKA HYDROLOGIC SURVEY

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ENVIRONMENTAL CONSERVATION

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GLACIER CREEK
SECOND YEAR DATA REPORT

This report documents work completed under an ADEC-administered Section 319 Water Quality Grant. All data and results included were completed during the State of Alaska fiscal years 2001 and 2002 that extended from July 1, 2000 to June 30, 2002. Work completed under the terms of the grant was the collection of streamflow and water quality data at Glacier Creek near Girdwood.

Glacier Creek is located in South Central Alaska approximately 40 miles southeast of Anchorage, and has approximately 62 square mile drainage. The town of Girdwood with a full-time population of 1500, and the Alyeska Ski Resort are the major developments in the Glacier Creek drainage. Glacier Creek and its primary tributaries Virgin, California, and Crow Creeks have been identified by the Alaska Department of Environmental Conservation (ADEC) as high priority waters for protection. The U.S. Geological Survey (USGS) both maintained a continuous gage site on Glacier Creek for the period of 1965-1978, as well as collecting miscellaneous water quality data for the period of 1956-1986.

Since the USGS discontinued the Glacier Creek data collection, the population of the Girdwood area has tripled, and the Alyeska Ski Resort has undergone major expansion including the construction of a large luxury hotel. Future developments now include plans for the construction of a full 18-hole golf course, and the Municipality of Anchorage anticipates that the population of the Girdwood area will more than double in the next ten to twelve years.

Precipitation in the Glacier Creek drainage is high, with a mean annual snowfall at the top of the Alyeska Ski Resort of 587 inches (48.92 feet). During the 2000-2001 season, Alyeska Resort measured precipitation at 160% of normal at the top of the ski resort at 939 inches (78.25 feet). Resulting mean annual flows for Glacier Creek are correspondingly high for a drainage of its size. During the 2001-2002 season snowfall was 606 inches, close to the mean annual snowfall.

This data collection project, the results of which are reported here, re-establishes a continuous stream-gage recording site and collects water quality data at a location near the USGS historic site. The objective of this data collection is to begin the evaluation of the real or potential changes in runoff due to basin development that may have occurred to Glacier Creek since the end of the USGS data collection. This data may also serve as a basis to help assess what future development impacts may be on the Glacier Creek drainage.

Installation and Servicing Description

The location of the stream gage installation at Glacier Creek was near the same site used by the USGS for their continuous recording gage site maintained for the years 1965-1978. The site for the installation of both the recording instruments and discharge cross sections is located a few hundred feet downstream of the Alaska Railroad bridge. Permits were obtained from the Heritage Land Bank for completion of the installation on their property. Appendix I in the First Year Data Report presents photos of the installation and site.

Installed recording instruments include two Dryden Instrumentation R2 data loggers housed in a watertight instrument shelter. Redundancy of instrumentation was included to reduce the possibility of data loss due to instrumentation malfunction. The data loggers were linked to two INW pressure transducers and Great Lakes electrodless conductivity probes. The initial installation of all equipment was completed 08/02/00. A single additional temperature probe was added to the on 10/11/00. As discussed on page 4, the originally installed conductivity sensors did not function properly. Consequently on October 16, 2001, an entirely new set of instruments was installed. All probes were mounted on concrete blocks specifically designed for installation of the probes. Each block, designated the upstream and downstream block respectively, was located in a deep part of the channel adjacent to the bank to minimize cable lead length and facilitate installation, service, and retrieval.

Servicing and downloading of data from the site was completed on roughly a monthly basis. Site visits usually included a download of all recorded data; a discharge measurement at a monumented cross section; a site survey tying elevational data to known datum points; and use of a Hydrolab Quanta multi-parameter water quality instrument to verify recorded conductivity and temperature data, and document other water quality parameters. Appendix A is the data summary spreadsheet that lists all site visits, and measurements completed. Appendix B gives trip reports for each site visit, including discharge notes, survey notes, data download notes, and all other site documentation and comments. At the time of the fourth site visit (see Appendix B, page b12) a complete site survey was made including referencing known datum elevations to allow for correlation with historic USGS data.

Streamflow Data

Stage discharge relations were developed from 25 measurements made over the course of the project. During the high flows of mid-June 2001, the channel configuration changed resulting in a shift to the rating curves. Therefore, a revised rating curve was developed for the second year of the project to reflect the channel change. Figure 1 shows the graph and equation for the First Year Data Report, while Figure 2 gives the graph and equation of the Second Year Data Report.

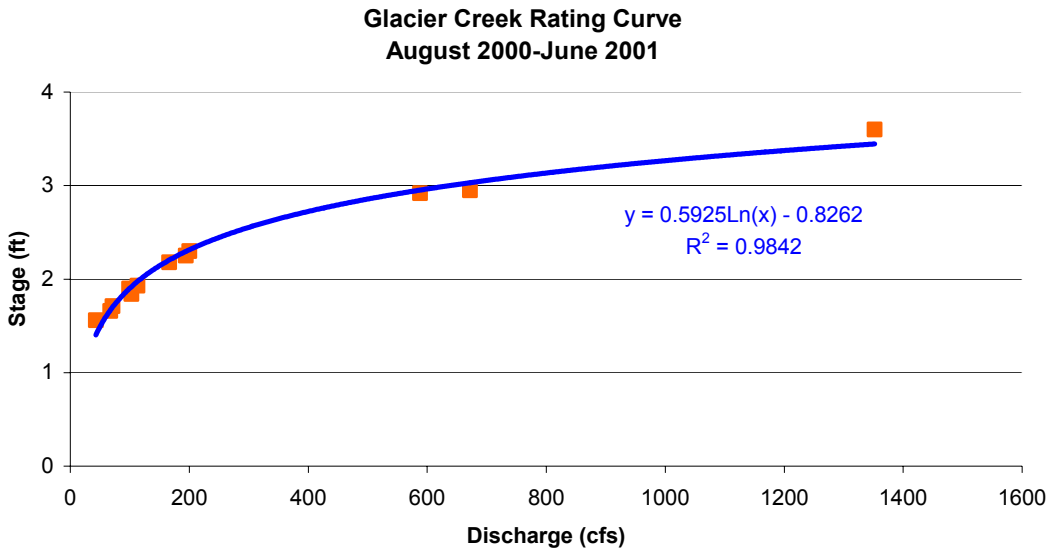


Figure 1: First year stage-discharge relation (rating) curve.

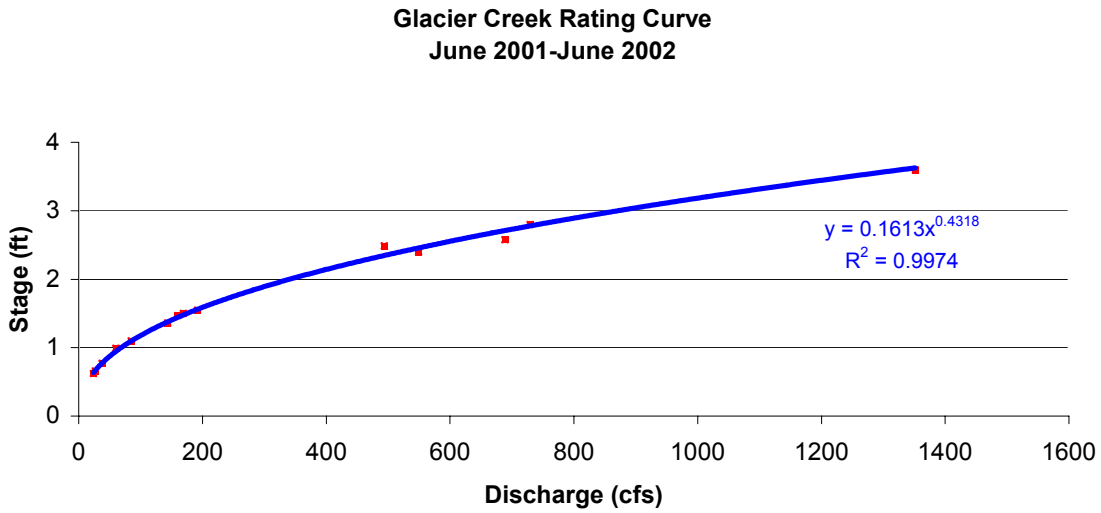


Figure 2: Second year stage-discharge relation (rating) curve.

The red squares represent the point discharge measurements at corresponding stages, and the blue lines are the best-fit curves through the points that result in the stage-discharge relationship. Both rating curves were developed using stage data from the upstream sensor, because this sensor had a marginally better stage-discharge correlation. Data from the downstream sensor is presented in Appendix C.

Appendix C lists all daily average stage data for both sites, and the calculated daily average discharges using the equations above. Figure 3 below is the hydrograph, or graphical representation of all discharge data collected during the period of record. The line in blue is the calculated discharge from the upstream R2 stage recorder, and the red squares are the point discharge measurements made at the time of each servicing trip. Thus on days when the stage is increasing or decreasing there is likely to be an apparent discrepancy between measured and calculated discharge.

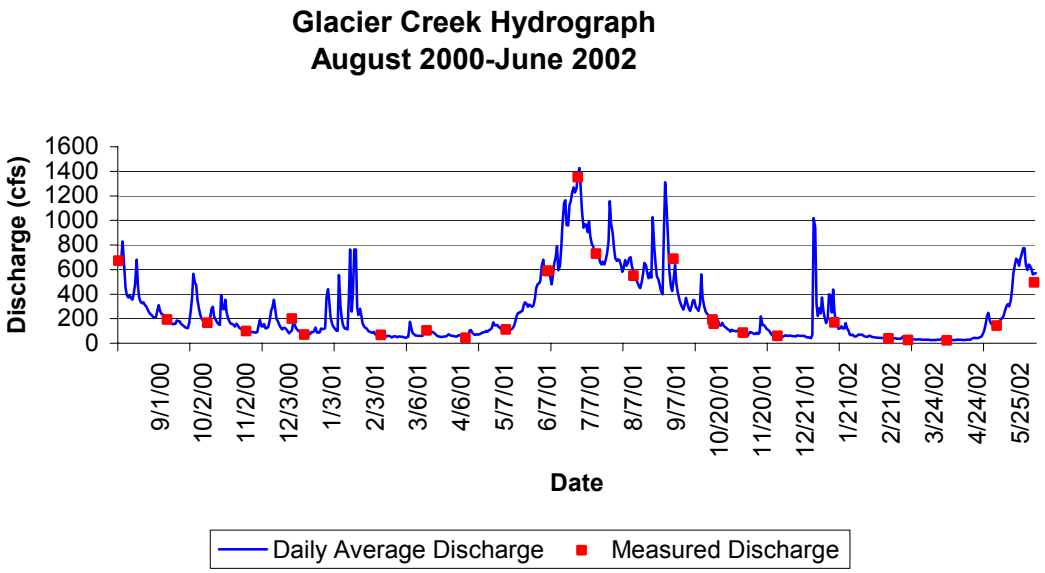


Figure 3: Glacier Creek hydrograph.

Maximum discharge during the project period was recorded at 1488 cubic feet per second (cfs) occurring on 06/27/01, while minimum discharge was 25 cfs occurring from 04/01//02 to 04/05/02. Average discharge over the 22-month project data collection period is 257 cfs. The Glacier Creek hydrograph shows typical south-central Alaska streamflow conditions, with one exception. Streamflow is highest during periods of maximum snowmelt in June, then has a secondary peak during the wet fall months. In addition, Girdwood can experience periods during the winter when large low-pressure systems from the Gulf of Alaska bring warm, wet weather to the area resulting in increased snowmelt and winter high flows in Glacier Creek. During a 48-hour period on Dec. 26-27, 2001, Girdwood received 8.6 in. of rain while temperatures were in the 40's. The rain combined with low to mid-elevation snowmelt produced a mid-winter increase in flow from 70 cfs to 1000 cfs in one day.

The USGS reports a 13-year record with a mean annual average of 264 cfs. The data collected during this project period is near long-term average discharge conditions previously collected by the USGS. In the period of record available form the USGS, mean annual flows varied from a low of 173 cfs to a high of 345 cfs.

Water Quality Data

One of the initial goals of this data collection project was the collection of continuous recorded conductivity data. Unfortunately, due to continual instrumentation problems, no reliable continuous recording of conductivity data was available during the first 14 months of the project. Despite numerous efforts to apply calibration factors, the data collected from the conductivity probes failed to correlate with verifiable/calibrated data measured with the Hydrolab Quanta water quality instrument. New conductivity and stage sensors were installed Oct. 16, 2001, and accurate, reliable data has been collected since that time. Figure 4 is a graph of daily average conductivity data versus streamflow collected since Oct. 16, 2001. The blue line represents average daily discharge, the red line average daily specific conductance, and the green squares the Hydolab Omnidata specific conductance filed measurements.

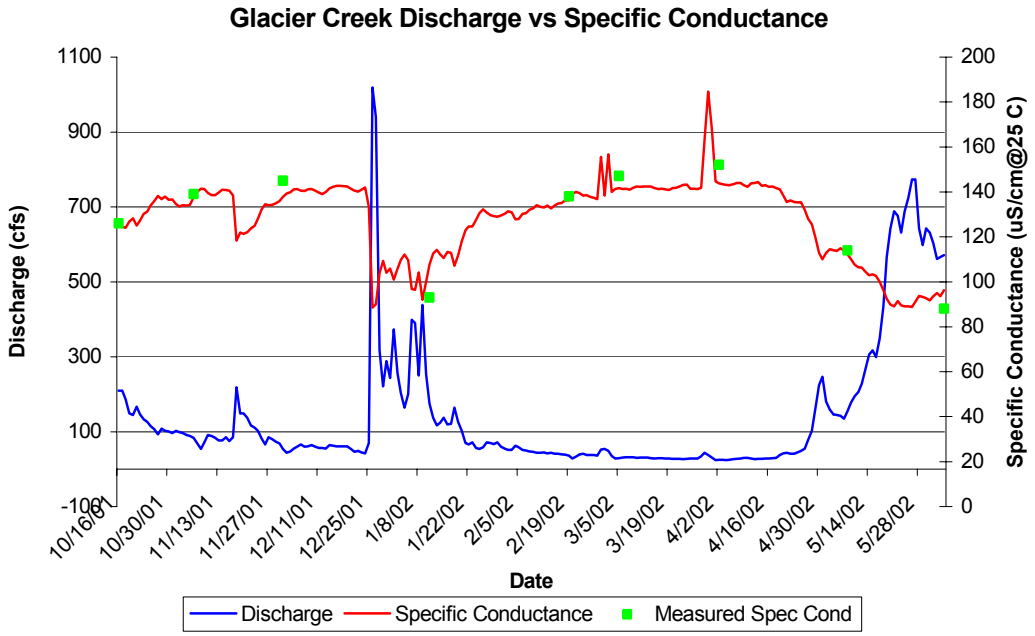


Figure 4: Specific conductance versus discharge.

Average daily specific conductance data recorded during this project period (June 7, 2001 to June 4, 2002) resulted in a maximum specific conductance of 185 µS/cm @25°C; a minimum of 89 µS/cm @ 25°; and a mean of 127 µS/cm @ 25°C. These values are similar to historic specific conductance data collected by the U.S. Geological Survey. Over a period of 30 years (1956 to 1986) the USGS collected 58 readings and measured a maximum specific conductance of 156 µS/cm @ 25°C; a minimum of 68 µS/cm @ 25°C; and a mean of 113 µS/cm @ 25°C.

In Glacier Creek specific conductance is inversely proportional to discharge (see Fig. 4 above). The relationship is particularly noticeable during precipitation events in November and January, and during the onset of the snowmelt period in late April. It is interesting to note that there is a drop in discharge and a corresponding rise in specific conductance after snowmelt ends and before glacial melting begins in early June. This represents a cool, dry period in early June.

Contrary to the overall relationship, small spikes in specific conductance correspond to very small spikes in discharge in mid-March and mid-April. A likely scenario is a high tide event, accompanied by high winds. Tidal water moves into Glacier Creek, thereby creating a ponding effect. As a result, stage and conductivity sensor readings show a small, sharp increase of short duration. Figure 4 also plots specific conductance sensor readings and Hydrolab Quanta measurements. The relationship between sensor readings and Quanta measurements is good, with a correlation coefficient is 0.98.

Use of the Hydrolab Quanta followed strict recommendations, and Quality Assurance Project Plan established at the outset of the project (see First Year Data Report). The QAPP specified pre-and post-calibration of the instrument for each site visit (see Appendix D, Calibration Record). Data collected by the Hydrolab Quanta is therefore considered accurate and reliable. Stream temperatures are shown in Figure 5 below, and follow typical Alaska seasonal temperature patterns.

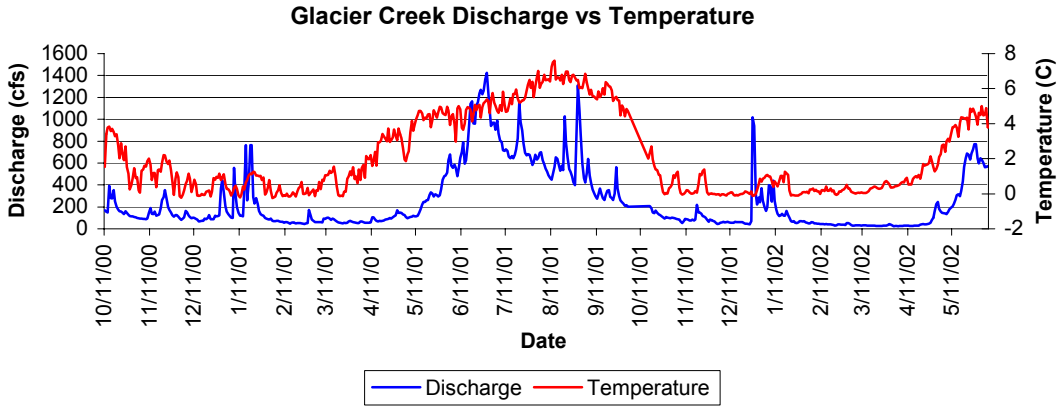


Figure 5: Discharge and temperature.

Results and Discussion

Streamflow data collected during the data collection period plots in expected patterns (see Figures 1 & 2) and yields prediction equations with a high statistical probability of accurately calculating discharge from recorded stage data. Streamflow data are considered accurate and reliable for the entire collection period with the possible exception at highest tide where pooling may slightly affect stage readings (see Appendix B, page B43, site visit coordinated with high tide event). No ice was observed in the channel that would materially effect the stage discharge relation.

Mean flow during the project period of record (257 cfs) approximated the long-term mean flow recorded by the USGS (264 cfs). The general flow pattern for the data collection period (see Figure 3) shows an expected recession from late summer through late winter, with notable spikes due to precipitation or runoff due to warm periods in January, and a rapid rise as break-up occurs in spring. Base flow for the winter of this data collection period is in the 25-45 cfs range.

Specific conductance data collected and recorded by the sensor/recorder array during the first 14 months of the project data collection period is considered unreliable and inaccurate, and excluded from analysis. Specific conductance data collected after October 2001 is accurate. Data measured by the Hydrolab Quanta was verified by pre- and post-calibration procedures that authenticate the accuracy and reliability of those points of data. Based on stream discharge and specific conductance data collected during this project period, no noticeable impacts from urban development or urban runoff on Glacier Creek are evident.

Appendices D, F, G and H in the First Year Data Report are the historic discharge and water quality data available for Glacier Creek, including specific conductance. Initial indications are that under flow conditions that approximate long-term averages, both discharge and specific conductance values are near historic values, and follow a seasonal pattern that suggest there has been little impact to Glacier Creek from the development in the Girdwood area. This should be considered a preliminary analysis based on less than two years of data collection.

Future Directions

This report summarizes the second and final year of the Section 319 grant that funded this data collection project. The following are areas of the project that need further definition and attention:

- Completion of discharge correlations with historic USGS records.
- On-site measurement of specific conductance with the Hydrolab Quanta during winter high flows, and break-up high flows to document possible effects of surface runoff from Girdwood area development.
- Further definition of flow and water quality under both higher and lower flow conditions allowing for more statistically significant correlation with existing USGS historic data.

AHS hydrologists will continue monitoring Glacier Creek in an effort to compile a statistically longer period of record that can be used in planning for Girdwood's future.

APPENDIX A. Glacier Creek Data Summary Spreadsheet

APPENDIX A
GLACIER CREEK DATA SUMMARY SPREADSHEET

	DATE	ACTUAL 8/2/00	CORRECTED VISIT 1	NOTES	ACTUAL 9/6/00	CORRECTED VISIT 2	NOTES	ACTUAL 10/5/00	CORRECTED VISIT 5	NOTES	ACTUAL 11/2/00	CORRECTED VISIT 7	NOTES	ACTUAL 12/5/00	CORRECTED VISIT 8	NOTES
1	H.I.#1	5.65			5.05											
2	H.I. #2	5.05			5.40											
3	BM 1: (Railroad Bolt)	4.92	26.19		4.53	26.19		4.17	26.19		4.13	26.19		4.05	26.19	
4	BM 2: (Concrete foundation)	5.30	25.81		4.89	25.83		4.56	25.80		na	na		4.44	25.80	
5	BM 3: (Top Shelter Post)	5.85	25.26		5.47	25.25		5.10	25.26		na	na		4.98	25.26	
6	TP 1: (Turning point)	5.98	25.13													
7	REW (@Gage)	11.31	18.76		12.70	18.02		12.44	17.92		12.67	17.66		12.20	18.04	
8	Top Upstream Block (DOS)	NA	15.95	NOTE 8	14.78	15.94		14.36	16.00	NOTE 5	14.34	15.98		14.23	16.01	
9	Top Downstream Block (DOS)	NA	15.66	NOTE 8	14.80	15.92		14.44	15.92	NOTE 6	14.42	15.90		14.30	15.94	
10	Depth over block (DOB) upper	2.90			1.90			1.93		NOTE 5	1.65			2.01		
11	Depth over block (DOB) lower	3.10			2.00			2.00		NOTE 6	na			2.11		
12	REW Elevation (@ X Section)	11.52	18.55		12.85	17.87		12.83	17.73		12.78	17.54		12.43	17.81	
13	R2 VALUE, UPPER	2.95			2.25			2.18			1.90			2.30		
14	R2 VALUE, LOWER	3.20			2.29			2.18			1.86			2.20		
15	Measured DOS UPPER	2.90			2.02		NOTE 2	1.93			1.65			2.01		
16	Measured DOS LOWER	3.10			2.10		NOTE 3	2.00			na			2.11		
17	Discharge	672.00			194.00		NOTE 1	166.00			99.10			200.00		
18	Average Velocity	4.63			2.78			2.61			2.15			2.84		
19	Channel width	98.00			90.00			74.00			57.00			90.00		
20	Channel area	145.00			69.90			63.50			46.20			70.30		
21	Water Temperature (R1 sensor)	6.40			5.85			3.92			0.90			0.64		
22	Water Temperature (R2/sensor)										0.80			0.40		
23	pH	7.30			7.70			6.72			7.24			7.37		
24	Conductivity (Quanta)	82.00			119.00			136.00			136.00			99.00		
25	Conductivity, R2 upper	NA			NA			137.00		NOTE 7	132.00		NOTE 9	107.00		
26	Conductivity, R2 lower	NA			NA			147.00		NOTE 7	88.00		NOTE 9	36.00		
27	DO	12.50			11.88			12.17			15.26			15.00		
28	% Saturation	102.10			NA			92.80			96.60			101.00		

NOTE 1: 09/06/00 discharge completed twice, once with pygmy, & once with AA. Results were coroborative, one resulting in 192 cfs, and other 196. Numbers reported above represent average of two measurements.
NOTE 2:DOS (depth over sensor) measured on orange dot top of block, sensor several inches deeper.
NOTE3: DOS measured on top of block, upstream side of pipe.
NOTE 4: After 9/6/00 servicing only a single instrument site was needed due to brush removal, no HI or TP needed.
NOTE 5: Measure on orange dot, which is upstream of pipe, most shoreward corner of block. Before 10/05/00 measurment location may have varied
NOTE 6: Measure upstream of pipe, most downhill corner. Before 10/05/00 measurement location may have varied
NOTE 7: Applied correction factor of 1.698
NOTE 8: Elevation determined from difference between surveyed water surface at sensor and measured DOS
NOTE 9: Applied correction factor of 1.863

APPENDIX A
GLACIER CREEK DATA SUMMARY SPREADSHEET

	DATE	ACTUAL 12/14/00	CORRECTED VISIT 9	NOTES	ACTUAL 2/7/01	CORRECTED VISIT 10	NOTES	ACTUAL 3/12/01	CORRECTED VISIT 11	NOTES	ACTUAL 4/9/01	CORRECTED VISIT 12	NOTES	ACTUAL 5/8/01	CORRECTED VISIT 13	NOTES
1	**H.I.#1**															
2	**H.I. #2**															
3	**BM 1: (Railroad Bolt)**	4.62	**26.19**		4.40	**26.19**		4.04	**26.19**		4.09	**26.19**		3.90	**26.19**	
4	**BM 2: (Concrete foundation)**	4.99	**25.82**		4.78	**25.81**		4.42	**25.81**		4.47	**25.81**		4.29	**25.80**	
5	**BM 3: (Top Shelter Post)**	5.49	**25.32**		5.32	**25.27**		4.97	**25.26**		5.02	**25.26**		4.84	**25.26**	
6	**TP 1: (Turning point)**															
7	**REW (@Gage)**	13.21	**17.60**		13.15	**17.44**		12.57	**17.66**		12.94	**17.34**		12.37	**17.72**	
8	**Top Upstream Block (DOS)**	14.86	**16.95**		14.57	**16.02**		14.22	**16.01**		14.27	**16.02**		14.08	**16.01**	
9	**Top Downstream Block (DOS)**	14.73	**16.08**		14.43	**16.16**		14.03	**16.20**		14.08	**16.20**		13.90	**16.19**	
10	**Depth over block (DOB) upper**	**1.71**			**1.68**			**NA**			**NA**			**NA**		
11	**Depth over block (DOB) lower**	**1.78**			**1.75**			**NA**			**NA**			**NA**		
12	REW Elevation (@ X Section)	13.32	17.49		13.22	17.37		12.65	17.58		13.04	17.24		12.49	17.60	
13	**R2 VALUE, UPPER**	**1.71**			**1.66**			**1.84**			**1.56**			**1.93**		
14	**R2 VALUE, LOWER**	**1.78**			**1.63**			**1.82**			**1.50**			**1.86**		
15	**Measured DOS UPPER**															
16	**Measured DOS LOWER**															
17	Discharge	71.00			67.30			103.00			43.00		NOTE 15	113.00		
18	**Average Velocity**	**1.83**			**1.38**			**1.73**			**1.08**			**1.83**		
19	**Channel width**	**50.50**			**59.00**			**65.00**			**52.00**			**63.00**		
20	**Channel area**	**38.80**			**48.80**			**59.50**			**39.70**			**61.90**		
21	**Water Temperature** (Quanta)	**0.06**			**0.49**			**1.51**			**0.82**			**3.89**		
22	**Water Temperature** (R2/sensor)	**0.10**			**0.40**			**1.40**			**0.60**			**3.60**		
23	**pH**	**7.15**			**7.15**			**7.24**			**7.19**			**7.26**		
24	Conductivity (Quanta)	129.00			115.00			99.00			127.00			105.00		
25	Conductivity, R2 upper	NA		NOTE 10	NA			NA			NA			NA		
26	Conductivity, R2 lower	133.00		NOTE 11	140.00		NOTE 12	101.00		NOTE 13	178.00		NOTE 14	152.00		NOTE 16
27	**DO**	**15.19**			**13.60**			**13.00**			**14.50**			**13.70**		
28	**% Saturation**	**101.70**			**95.00**			**93.00**			**100.90**			**102.70**		

NOTE 10: Equipment malfunction in recorder
NOTE 11: Conductivity value recorded after recallibration
NOTE 12: Initial conductivity reading on first scan was 140. After removal of silt from probe the conductivity scan was 117.
NOTE 13: Initial conductivity reading on first scan was 101. After removal of silt from probe the conductivity scan was 110.
NOTE 14: Initial conductivity reading on first scan was 178. After removal of silt from probe the conductivity scan was 171.
NOTE 15: Substantial "stringy algal growth" on bed of creek, unseen before. May cause some elevation of stage through slowing of velocity. Check for consistency when completing stage discharge relation..
NOTE 16: Initial conductivity reading on first scan was 152. After removal of silt from probe the conductivity scan was 146.

APPENDIX A
GLACIER CREEK DATA SUMMARY SPREADSHEET

	DATE	ACTUAL 6/7/01	CORRECTED VISIT 14	NOTES	ACTUAL 6/28/01	CORRECTED VISIT 15	NOTES	ACTUAL 7/11/01	CORRECTED VISIT 16	NOTES	ACTUAL 8/7/01	CORRECTED VISIT 17	NOTES	ACTUAL 9/5/01	CORRECTED VISIT 18	NOTES
1	H.I.#1															
2	H.I. #2															
3	BM 1: (Railroad Bolt)	4.08	26.19		4.05	26.19		4.14	26.19		4.16	26.19		4.15	26.19	
4	BM 2: (Concrete foundation)	4.47	25.80		4.44	25.80		4.53	25.80		4.54	25.81		4.53	25.82	
5	BM 3: (Top Shelter Post)	5.02	25.25		4.97	25.27		5.08	25.25		5.08	25.27		5.07	25.27	
6	TP 1: (Turning point)															
7	REW (@Gage)	11.63	18.64		10.90	19.34		11.77	18.56		12.12	18.23		12.02	18.32	
8	Top Upstream Block (DOS)	14.26	16.01		NA	#VALUE!	NOTE 18	NA	#VALUE!	NOTE 18	NA	#VALUE!	NOTE 18	NA	#VALUE!	NOTE 18
9	Top Downstream Block (DOS)	NA	#VALUE!	NOTE 17	NA	#VALUE!	NOTE 18	NA	#VALUE!	NOTE 18	NA	#VALUE!	NOTE 18	NA	#VALUE!	NOTE 18
10	Depth over block (DOB) upper				NA		NOTE 18	NA		NOTE 18	NA		NOTE 18	NA		NOTE 18
11	Depth over block (DOB) lower				NA		NOTE 18	NA		NOTE 18	NA		NOTE 18	NA		NOTE 18
12	REW Elevation (@ X Section)	11.75	18.52		11.17	19.07		12.01	18.32		12.31	18.04		12.20	18.14	
13	R2 VALUE, UPPER	2.92			3.60			2.80		NOTE 19	2.40			2.58		
14	R2 VALUE, LOWER	2.80			3.95			3.12		NOTE19	2.70			2.85		
15	Measured DOS UPPER															
16	Measured DOS LOWER															
17	Discharge	588.00			1352.00			729.00			549.00			689.00		
18	Average Velocity	4.14			5.75			4.89			4.16			4.75		
19	Channel width	98.00			104.00			82.00			77.50			98.00		
20	Channel area	142.00			232.00			149.00			132.00			145.00		
21	Water Temperature (Quanta)	4.00			5.40			4.57			6.47			6.01		
22	Water Temperature (R2/sensor)	3.70			5.10			4.40			6.30			5.80		
23	pH	7.53			7.74			7.64			7.58			7.57		
24	Conductivity (Quanta)	82.00			71.00			80.00			83.00			95.00		
25	Conductivity, R2 upper	NA			NA			NA			NA			NA		
26	Conductivity, R2 lower	147.00		NOTE 17	108.00			143.00			146.00			154.00		
27	DO	13.44			12.50			12.67			12.31			11.97		
28	% Saturation	103.30			100.10			99.20			100.40			98.30		
29	River Forcast page reported stage	25.73			26.75			25.78			25.5			25.4		

NOTE 17: Water levels too high to locate downstream block accurately, nor to clean sensor.
NOTE 18: Water levels too high to locate blocks
NOTE 19: Channel shifting, changing flow patterns. Appears that lower block may be less impacted suggesting that the R2 value for the lower block is better under high flow conditions.

APPENDIX A
GLACIER CREEK DATA SUMMARY SPREADSHEET

	DATE	ACTUAL 10/3/01	CORRECTED VISIT 19	NOTES	ACTUAL 10/16/01	CORRECTED VISIT 20A	NOTES NOTE 20	ACTUAL 10/16/01	CORRECTED VISIT 20B	NOTES NOTE 20	ACTUAL 11/6/01	CORRECTED VISIT 21	NOTES	ACTUAL 12/1/01	CORRECTED VISIT 22	NOTES
1	H.I.#1															
2	H.I. #2															
3	BM 1: (Railroad Bolt)	4.16	26.19		4.08	26.19		4.08	26.19		4.06	26.19		4.38	26.19	NOTE 26
4	BM 2: (Concrete foundation)	4.55	25.80		4.46	25.81		NA	#VALUE!		4.45	25.80				
5	BM 3: (Top Shelter Post)	5.09	25.26		5.02	25.25		NA	#VALUE!		4.99	25.26		5.32	25.26	
6	TP 1: (Turning point)															
7	REW (@Gage)	13.07	17.28		13.06	17.21		13.11	17.16		13.42	16.83		13.87	16.70	
8	Top Upstream Block (DOS)	14.39	15.96		14.27	16.00		14.27	16.00	NOTE 21	14.28	15.97		14.59	15.98	
9	Top Downstream Block (DOS)	14.74	15.61		14.66	15.61		14.51	15.61	NOTE 21	14.51	15.59		14.85	15.57	
10	Depth over block (DOB) upper															
11	Depth over block (DOB) lower															
12	REW Elevation (@ X Section)	13.16	17.19		13.21	17.06		NA	#VALUE!		13.52	16.73		13.93	16.64	
13	R2 VALUE, UPPER	1.55			1.47			1.23	1.47	NOTE 22	0.86	1.1		0.75	0.99	
14	R2 VALUE, LOWER	1.71			1.63			1.55	1.63	NOTE 23	1.16	1.24		1.03	1.11	
15	Measured DOS UPPER															
16	Measured DOS LOWER															
17	Discharge	192.00			160.00			NA			85.40			60.20		
18	Average Velocity	2.57			2.44			NA			1.76			1.39		
19	Channel width	52.00			51.00			NA			47.00			44.00		
20	Channel area	74.80			65.60			NA			48.60			43.40		
21	Water Temperature (Quanta)	4.93			1.37			NA			0.09			-0.06		
22	Water Temp (R2/sensor/DOWN)	4.80			1.20			2.30			0.30			0.10		
23	Water Temp (R2/sensor/UP)	NA			NA			2.60			0.10			0.00		
24	pH	7.64			7.48			NA			7.67			7.38		
25	Conductivity (Quanta)	121.00			126.00			NA			139.00			145.00		
26	Conductivity, R2 upper	NA			NA			106.00	123	NOTE 24	107.00	139		107.00	139	
27	Conductivity, R2 lower	179.00			176.00			117.00	125	NOTE 25	117.00	136		119.00	140	
28	DO	12.50			13.31			NA			14.40			NA		NOTE 27
29	% Saturation	100.50			95.70			NA			99.80			NA		NOTE27
30	River Forcast page reported stage				23.7						23.3					

NOTE 20: All recorders and sensors replaced effective 10/16/01. Visit 20A is prior to removal of initial sensors, visit 20B is after removal of initial sensors and installation of new sensors.
NOTE 21: Sensors replaced as of 10/16/01, visit 20B. Correction factor applied to downstream block of -0.15 to account for different position of block. No correction factor needed on upstream block.
NOTE 22: Due to higher location of sensor on block, a correction factor of .24 must be added to R2 UPPER block values for all future visits.
NOTE 23: Due to higher location of sensor on block, a correction factor of .08 must be added to R2 LOWER block values for all future visits.
NOTE 24: Power curve correction factor applied to recorded R2 data value after offset of 11 added
NOTE 25: Power curve correction factor applied to recorded R2 data value no offset added
NOTE 26: No actual measurement on BM1 & BM2 were done due to icy conditions. Value listed here is estimate based on BM 3 shot
NOTE 27: DO measurement considered unreliable on this date due to failtur to post calibrate.

APPENDIX A
GLACIER CREEK DATA SUMMARY SPREADSHEET

	DATE	ACTUAL 1/11/02	CORRECTED VISIT 23	NOTES	ACTUAL 2/19/02	CORRECTED VISIT 24	NOTES	ACTUAL 3/6/02	CORRECTED VISIT 25	NOTES	ACTUAL 4/2/02	CORRECTED VISIT 26	NOTES	ACTUAL 5/8/02	CORRECTED VISIT 27	NOTES
1	**H.I.#1**															
2	**H.I. #2**															
3	**BM 1: (Railroad Bolt)**	4.32	**26.19**		7.14	**26.19**	NOTE 28	7.63	**26.19**	NOTE 28	4.65	**26.19**		4.02	**26.19**	
4	**BM 2: (Concrete foundation)**	4.70	**25.81**								5.03	**25.81**		4.41	**25.80**	
5	**BM 3: (Top Shelter Post)**	5.25	**25.26**		8.07	**25.26**		8.56	**25.26**		5.58	**25.26**		4.95	**25.26**	
6	**TP 1: (Turning point)**															
7	**REW (@Gage)**	13.30	**17.21**		16.83	**16.50**		17.47	**16.35**		14.49	**16.35**		13.13	**17.08**	
8	**Top Upstream Block (DOS)**	14.53	**15.98**		17.34	**15.99**		17.87	**15.96**		14.88	**15.96**		14.24	**15.97**	
9	**Top Downstream Block (DOS)**	14.80	**15.56**		17.58	**15.60**		18.10	**15.57**		15.11	**15.58**		14.47	**15.59**	
10	**Depth over block (DOB) upper**				**0.29**			**0.40**								
11	**Depth over block (DOB) lower**				**0.74**			**0.75**								
12	**REW Elevation (@ X Section)**	13.39	17.12		16.89	**16.44**		17.52	16.30		14.51	16.33		13.22	16.99	
13	**R2 VALUE, UPPER**	**1.26**	1.5		**0.53**	0.77		**0.42**	0.66		**0.38**	0.62		**1.12**	1.36	
14	**R2 VALUE, LOWER**	**1.51**	1.59		**0.79**	0.87		**0.68**	0.76		**0.65**	0.73		**1.37**	1.45	
15	**Measured DOS UPPER**															
16	**Measured DOS LOWER**															
17	Discharge	**169.00**			**38.30**			**27.00**			**24.00**			**144.00**		
18	**Average Velocity**	**2.25**			**0.93**			**0.72**			**0.68**			**2.13**		
19	**Channel width**	**53.00**			**47.00**			**46.50**			**46.00**			**52.00**		
20	**Channel area**	**75.00**			**41.20**			**37.60**			**35.10**			**67.60**		
21	**Water Temperature** (Quanta)	**0.48**			**0.20**			**-0.03**			**0.78**			**3.25**		
22	**Water Temp** (R2/sensor/DOWN)	**0.50**			**0.50**			**0.10**			**0.80**			**3.30**		
23	**Water Temp** (R2/sensor/UP)	**0.70**			**0.40**			**0.20**			**0.80**			**3.40**		
24	**pH**	**7.10**			**8.00**			**7.80**			**8.07**			**7.85**		
25	Conductivity (Quanta)	**93.00**			**138.00**			**147.00**			**152.00**			**114.00**		
26	Conductivity, R2 upper	83.00	109		105.00	134		110.00	142		114.00	143		101.00	114	
27	Conductivity, R2 lower	92.00	106		116.00	136		120.00	142		125.00	143		111.00	113	
28	**DO**	13.60			13.22			13.10			14.20			12.95		
29	**% Saturation**	**99.50**			**93.70**			**87.80**			**98.00**			**96.10**		
30	River Forcast page reported stage															

NOTE 28: Ni actual measurement was made on BM1 or BM2 due to heavy snow. Value entered into BM1 cell above was backcalulated from known difference between BM1 & BM3. No heave of BM3 has been apparent in any previous measurments.

APPENDIX A
GLACIER CREEK DATA SUMMARY SPREADSHEET

	DATE	ACTUAL 6/4/02	CORRECTED VISIT 28	NOTES	ACTUAL	CORRECTED VISIT ??	NOTES	ACTUAL	CORRECTED VISIT ??	NOTES	ACTUAL	CORRECTED VISIT ??	NOTES	ACTUAL	CORRECTED VISIT ??	NOTES
1	H.I.#1															
2	H.I. #2															
3	BM 1: (Railroad Bolt)	4.06	26.19													
4	BM 2: (Concrete foundation)	4.45	25.80													
5	BM 3: (Top Shelter Post)	4.99	25.26													
6	TP 1: (Turning point)															
7	REW (@Gage)	12.09	18.16													
8	Top Upstream Block (DOS)	NA	#VALUE!													
9	Top Downstream Block (DOS)	NA	#VALUE!													
10	Depth over block (DOB) upper	NA														
11	Depth over block (DOB) lower															
12	REW Elevation (@ X Section)	12.25	18.00													
13	R2 VALUE, UPPER	2.25	2.49													
14	R2 VALUE, LOWER	2.41	2.49													
15	Measured DOS UPPER															
16	Measured DOS LOWER															
17	Discharge	494.00														
18	Average Velocity	4.15														
19	Channel width	82.00														
20	Channel area	119.00														
21	Water Temperature (Quanta)	4.41														
22	Water Temp (R2/sensor/DOWN)	4.50														
23	Water Temp (R2/sensor/UP)	4.60														
24	pH	8.07														
25	Conductivity (Quanta)	88.00														
26	Conductivity, R2 upper	90.00	97													
27	Conductivity, R2 lower	98.00	95													
28	DO	12.97														
29	% Saturation	101.70														
30	River Forcast page reported stage															

UNPUBLISHED REPORT

APPENDIX B. Glacier Creek Streamgage Trip Reports

Glacier Creek Streamgage
Trip Report
08/02/00
First Site Visit (Installation)

Staff participating: Stan Carrick, Mark Inghram, Roy Ireland, and Mary Maurer

Weather Conditions: Overcast, windy (high wind warning issued by Weather Service along Turnagain Arm), drizzle to steady rain during the day, temperature in the high 50's..

Tidal Conditions:

Accomplishments:

- Installation of a dual recorder/sensor stage recorder and conductivity measuring equipment. Equipment installed included two electronic recording instrument shelters on a single steel post concreted into the right bank of Glacier Creek at a distance approximately 100 to 150 feet downstream of the Alaska Railroad Bridge. Electronic recorders are R2 units manufactured by Dryden Instrumentation in Anchorage, INW pressure transducers, and Great Lakes 3625e2t electrodless conductivity probes.
- Establishment of a standard cross section for discharge measurements located approximately 50 to 75 feet downstream from the instrument shelter. A discharge measurement was completed using a Price AA meter and Aquacalc recorder. Velocity and flow conditions were sufficiently high as to require the measurement to be completed largely from a boat secured to a tag line stretched across Glacier Creek. Measured discharge was recorded at 672 cfs.
- Completion of a suite of water quality measurements. Using a new Hydrolab Quanta water temperature was recorded at 6.37C; specific conductance at 82uS/cm @25C; DO at 12.5 mg/l; TDS at 0.1g/l. Due to a broken part in the Quanta, an older Hydrolab 4041 was used to measure pH at 7.3.
- Completion of an abbreviated site survey (due to time constraints). Established a local benchmark and to that was correlated elevations of the top of the instrument shelter, sensor levels, and water levels at both the sensor locations and discharge cross section.
- Made contact with the most immediate property owner/resident to the installation. He agreed to contact us if any tampering of the installation occurred, or if some change in flow conditions or bank stability was noted. Contact is Mr. George (Joe) Hanson at 783-2816

Issues for Next Site Visit:

- Completion of more extensive site survey tying in known elevations from the Seward Highway Bridge. Through coordination with known elevations (MSL) it may be possible to tie into older USGS data.
- Stickers for instrument shelters identifying operators and purpose of installation.
- Assembly of cable to specifically adapt to discharge cross section (use with come-along).
- Creation of note forms specifically for Glacier Creek data collection
- Location of second anchor on right edge to allow for possible use of come-along.
- Paint to locate benchmarks.

State of Alaska
Dept. of Natural Resources
Div. of Geological & Geophysical Surveys

Meas. No. 1

WATER RESOURCE INVESTIGATIONS

Comp. by

DISCHARGE MEASUREMENT NOTES

Checked by

Sta. No. 1

GLACIER CREEK @ GIRDWOOD

Date 8/2, 19 2000 Party MC SC

Width 98 Area 145 Vel. 4.63 G. H. Disch. 672.00

Method Meter No. secs. 20 G. H. change in hrs. Susp.

Method coef. 0.6 Hor. angle coef. Susp. coef. Meter No.

Type of meter A-A

Date rated for rod, other.

Meter ft. above bottom of weight.

Spin before meas. after

Meas. plots % diff. from rating

Wading, cable, ice, (boat) upstr., downstr., side bridge feet, mile, above, below gage, and

Check-bar, found

changed to at

Correct

Levels obtained

GAGE READINGS

Time		Recorder	Inside	Outside
1400	2.1	3.1		
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated (excellent (2%)), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section

Flow Weather CLOY, LT. RAIN

Other Air 55 °F@

Gage Water °F@

Record removed Intake flushed U

Observer

Control

Remarks X-SECTION APPROX. 200 FT. DOWNSTREAM OF AK. RAILROAD TRESTLE

G. H. of zero flow ft.

8-768

River at—

Angle coef. factor	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW	151										
2	150		1.8	.6	53	40	2.9				
3	145		2.3	|	84	40	4.6				
4	140		2.4	|	106	40	5.7				
5	135		2.3	|	106	|	5.8				
6	130		2.4	|	106	|	5.8				
7	125		2.4	|	109	|	5.9				
8	120		2.1	|	98	|	5.3				
9	115		1.6	|	93	|	5.1				
10	110		1.4	|	89	|	4.8				
11	105		1.2	|	84	|	4.5				
12	100		1.2	|	77	|	4.2				
13	95		1.1	|	75	|	4.1				
14	90		1.2	|	76	|	4.1				
15	85		1.1	|	73	|	4.0				
16	80		1.0	|	68	|	3.7				
17	75		1.0	|	57	|	3.1				
18	70		1.0	|	52	|	2.8				
19	65		.90	|	55	|	2.0				
20	60		.80	|	46	↓	2.5				
21	55		.40	↓	9	42	.48				
LEW	53										
					Q	=	672.00				
					V	=	4.63				
					W	=	98				
					A	=	145				

.0 .10 .20 .30 .40 .50 .60 .70 .75

UNPUBLISHED REPORT

STATE OF ALASKA, DEPT. OF NATURAL RESOURCES
DIVISION OF MINING, LAND & WATER
ALASKA HYDROLOGIC SURVEY
550 W 7TH AVE., SUITE 900A
ANCHORAGE, AK 99501-3577

Phone: (907)269-8640 Fax: (907)269-8947

UNPUBLISHED REPORT

WATER QUALITY FIELD NOTES - SURFACE WATER

Location: Glacier Creek Collected by: M. Manrer, R. Ireland

Date: 8/2/00 Station: Q probe depth at AHS gaging station Time: 2:30 PM

Method of Collection: grab

Weather: light rain, high overcast, breezy Elevation: _____ Discharge: 672 (cfs)

Hydrolab QUANTA

Temperature: Water: 6.7 °C; Air: ___ °C; pH: ___ (Hydrolab Model ___); pH: 7.3 (← meter) Hydrolab 4041

Conductivity: Uncorrected: 82 umhos @25°C Slope Corrected: _____ umhos ~~@ 25°C~~

Dissolved oxygen: 12.5 mg/l 102.1 % saturation Turbidity: _____ NTU

Barometric pressure Hg: _____ mm or 31.00 in. Hydrolab batt. 4.3 v.

TDS 0.1 g/L

Aklalinity: Sample Size: _____ ml; H_2SO_4 _____ N (factor _____) Instruments: _____

Titer added (digits) pH Temp (°C) Calculations

Depth at probe = 2.8 ft at upstream probe
Depth at probe = 3.1 ft. at downstream probe

Hydrolab 4041 12 volts

K = 103/94/74

Wet Temp: 2.9 ← ??? Erroneous reading

D.O. 14.8 mg/L

Beckman meter: 6.4 °C water Temp.

Verifies that QUANTA readings correctly and Hydrolab 4041 reading erroneously

Analysis:					
Bottle:	field-filtered, untreated	field-filtered, acidified	unfiltered, well-mixed	unfiltered, acidified	
volume (ml):					
preserved with:					

Comments: _____

UNPUBLISHED REPORT

Site: GLACIER CR (GIRDWOOD) Date: 8/2/00 Time: 1500

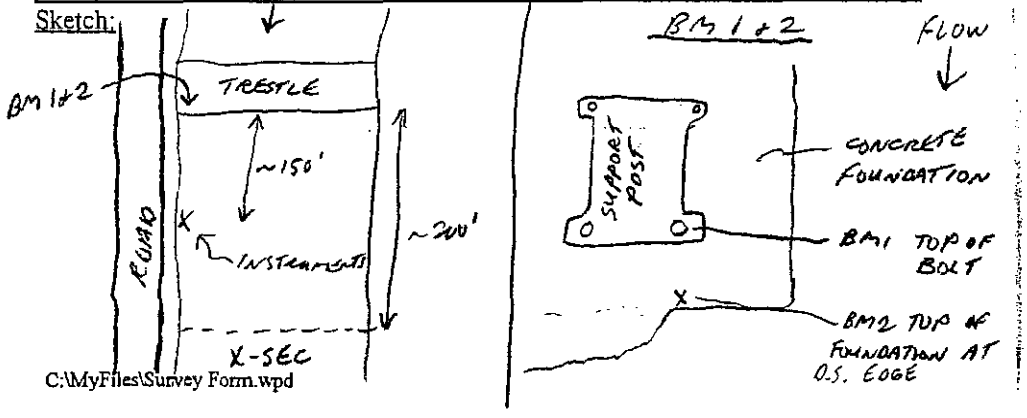
Party: SC MI RI MM Weather: CLOUDY, RAIN

Temp: 55

#1 = 5.65
Instrument height: #2 = 5.05 D.O.S. Staff Gage: GU = 2.9 GD = 3.1 ARB DATUM ELEV.
#1 #2

√	Location	Top	Middle	Bottom	∠°	
	Bm1: RAILROAD BOLT (TOP)		4.92			100'
	Bm2: CONCRETE FOUNDATION		5.30			99.62
	Bm3: TOP POST		5.85	4.81		99.07
	Bm4: TOP ROAD		5.98			
	LEoW @ x sect:					
	REoW @ x sect:			11.52		~~92.56~~ 92.32
	LEoW @ recorder:					
	REoW @ recorder:			11.31		~~92.35~~ 92.1
	LEoW upstream:					
	REoW upstream:					
	LEoW downstream:					
	REoW downstream:					
	Top of sensor rebar:					
	Top of sensor					
	Water @ sensor					
	Bottom @ sensor					

Sketch:



UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
09/06/00
Second Site Visit (maintenance)

Staff participating: Stan Carrick, Mark Inghram,

Weather Conditions: Overcast, occasional drizzle, temperature 45 to 50.

Tidal Conditions: Low tide approximately 2 hours prior to discharge measurement.

Accomplishments:

- Completion of two discharge measurements at the established discharge cross section. The first measurement was made using a Pygmy meter, and the second using a Price AA meter. Results of the two measurements were 196 and 192 cfs respectively. Two measurements were completed was as a check on the relative accuracy of the two meters under flow conditions encountered. Results are considered corroborative and within measurement error, and an average of the two measurements (194 cfs) will be used in calculating a stage discharge relation.
- Serviced both recording instruments. Both appeared to be operating correctly. No batteries were replaced as they checked out with adequate voltage. Internal and external desiccants were changed. All data were downloaded.
- A site survey was completed correlating stage and sensor elevations to a local benchmark on the Alaska Railroad Bridge abutment. The bolt used as a benchmark was more clearly identified with orange paint. A more complete survey correlating all elevations to a known benchmark was not done. The reason for postponing the more complete survey was a verbal assurance received from a ADOT personnel (Jeff Brown, 269-0450) that he would provide elevational data for the benchmark on the Seward Highway bridge spanning Glacier Creek.
- Completion of water quality sampling using the Hydrolab Quanta. Two measurements were completed, one immediately adjacent to the instrument /sensor location, and a second at the discharge cross section. Using the Hydrolab Quanta (data at the sensor location) water temperature was recorded at 5.91C; specific conductance at 119uS/cm; DO at 11.58 mg/l; and pH at 7.75. Some possible discrepancies have been noted between conductivity values measured with the Quanta, and those from the sensors. It is likely some correction will need to be made to the values recorded by the instrument. Discrepancies could also be due to a malfunctioning conductivity probe.

Issues for Next Site Visit:

- Completion of more extensive site survey tying in known elevations from the Seward Highway Bridge. Ideally, ADOT will provide elevational data. Through coordination with known elevations (MSL) it may be possible to tie into older USGS data.
- Note unique number on monument on the Seward Highway Bridge.
- Ready site for winter access. This should include staking and flagging as needed.
- Further editing of note forms specifically for Glacier Creek data collection
- Possible calibration of instrument/conductivity meter to correlate with values being measured with the Quanta.
- A single survey instrument site, eliminating the need for a turning point, could likely be located with some additional clearing of brush.

State of Alaska
Dept. of Natural Resources
Div. of Geological & Geophysical Surveys

WATER RESOURCE INVESTIGATIONS

Meas. No. 2

Comp. by

Checked by

DISCHARGE MEASUREMENT NOTES

Sta. No. 1

GLACIER CREEK NR. GIRDWOOD

Date 9/6, 19 00 Party MJ SC

Width ____ Area ____ Vel. ____ G. H. ____ Disch. ____

Method ____ No. secs. ____ G. H. change ____ in ____ hrs. Susp. ____

Method coef. ____ Hor. angle coef. ____ Susp. coef. ____ Meter No. ____

Type of meter PIGMY ~~AA~~ (AQUACALC)

Date rated ____ for rod, other.

Meter ____ ft. above bottom of weight.

Spin before meas. ____ after ____

Meas. plots ____ % diff. from rating ____

(Wading) cable, ice, boat, upstr., downstr., side bridge ____ feet, mile, above, below gage, and ____

Check-bar, found ____

changed to ____ at ____

Correct ____

Levels obtained ____

GAGE READINGS

Time		Recorder	Inside	Outside
1000	P.OS.			
	64			1.90
	68			2.10
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated excellent (2%), (good) (5%), fair (8%), poor (over 8%), based on following conditions: Cross section ____

Flow ____ Weather CLDY, LT. RAIN OVERNIGHT

Other ____ Air 50 °F@ ____

Gage ____ Water ____ °F@ ____

____ Record removed ____ Intake flushed U

Observer ____

Control ____

Remarks ____

G. H. of zero flow ____ ft.

S-768

River at—

Angle coefficient	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW	152		-0-		-0-			-0-			
2	150		1.55	.6	86	41		2.1			
3	147.5		1.70	.6	111	40		2.7			
4	145.0		1.60	.6	118	40		2.9			
5	142.5		1.40	.6	142	40		3.5			X .00R
6	140.0		1.60	.6	146	40		3.6			X .00R
7	137.5		1.60	.6	146	40		3.6			X
8	135.0		1.60	.6	144	40		3.5			X
9	132.5		1.60	.6	149	40		3.7			X
10	130.0		1.45	.6	149	40		3.7			X
11	127.5		1.45	.6	139	40		3.4			X
12	125.0		1.30	.6	131	40		3.3			X
13	122.5		1.30	.6	125	40		3.1			X
14	120.0		1.15	.6	114	40		2.8			
15	117.5		1.00	.6	112	40		2.8			
16	115.0		0.85	.6	100	40		2.5			
17	112.5		0.95	.6	108	40		2.7			
18	110.0		0.80	.6	90	40		2.2			
19	107.5		0.65	.6	89	40		2.2			
20	105.0		0.65	.6	88	40		2.2			
21	100.0		0.45	.6	76	40		1.90			
22	95.0		0.35	.6	61	41		1.5			
23	90.0		0.20	.6	44	40		1.1			
24	80.0		0.18	.6	24	40		0.6			
25	70.0		0.15	.6	22	41		0.6			
26	62.0		-0-		-0-			-0-			
			Q	=	196.00						
			V	=	2.82						
			W	=	90.0						
			A	=	69.6						

.00R = OUT OF RANGE

UNPUBLISHED REPORT

State of Alaska
Dept. of Natural Resources
Div. of Geological & Geophysical Surveys

WATER RESOURCE INVESTIGATIONS

Meas. No. 3

Comp. by

Checked by

DISCHARGE MEASUREMENT NOTES

Sta. No. 1

Date 09/06 2000 Party SC, MI

Width ____ Area ____ Vel. ____ G. H. ____ Disch. ____

Method ____ No. secs. ____ G. H. change ____ in ____ hrs. Susp. ____

Method coef. ____ Hor. angle coef. ____ Susp. coef. ____ Meter No. ____

GAGE READINGS				
Time		Recorder	Inside	Outside
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter ____

Date rated ____ for rod, other.

Meter PRICE & AQUACALC ft. above bottom of weight.

Spin before meas. ____ after ____

Meas. plots ____ % diff. from rating ____

Wading, cable, ice, boat, upstr., downstr., side bridge ____ feet, mile, above, below gage, and ____

Check-bar, found ____ changed to ____ at ____

Correct ____

Levels obtained ____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section ____

Flow ____ Weather DRIZZLE ~45°F

Other ____ Air ____ °F@ ____

Gage ____ Water ____ °F@ ____

Record removed ____ Intake flushed ____

Observer ____

Control ____

Remarks ____

G. H. of zero flow ____ ft.

Rite in the Rain WEATHERPROOF   S-76B   J. L. DARLING CORP. TACOMA WASH U.S.A.

River at—

	Angle coefficient	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	Adjusted for hor. angle or	Area	Discharge
1	REW	152		-0-		-0-			-0-			
2		150		1.55	.60	36	40		2.0			
3		147.5		1.65	.60	47	40		2.6			
4		145.0		1.60	.60	51	41		2.8			
5		142.5		1.50	.60	59	40		3.2			
6		140.0		1.70	.60	63	41		3.4			
7		137.5		1.70	.60	66	41		3.6			
8		135.0		1.60	.60	63	41		3.4			
9		132.5		1.60	.60	67	40		3.7			
10		130.0		1.45	.60	65	40		3.6			*
11		127.5		1.50	.60	63	40		3.4			
12		125.0		1.30	.60	59	40		3.2			*
13		122.5		1.25	.60	58	40		3.1			*
14		120.0		1.20	.60	51	41		2.7			*
15		117.5		1.00	.60	48	40		2.6			*
16		115.0		0.90	.60	44	40		2.4			*
17		112.5		0.95	.60	48	40		2.6			*
18		110.0		0.80	.60	45	41		2.4			*
19		107.5		0.70	.60	35	41		1.9			*
20		105.0		0.60	.60	34	40		1.9			*
21		100.0		0.45	.60	32	41		1.7			*
22		95.0		0.30	.60	20	41		1.1			*
23		90.0		0.20	.60	14	41		0.8			*
24		80.0		0.18	.60	11	43		0.6			
25		70.0		0.15	.60	9	43		0.5			
26	LEW	62.0		-0-		-0-			-0-			

Q = 192.0
V = 2.74
W = 90.0
A = 70.2

* OUT OF METER RANGE

UNPUBLISHED REPORT

Glacier Creek Dataloggers Date: 09/06 Time: 12:40PM

Party: SC, MI

Weather: DRIZZLE 45°F / OVERCAST Temp:

	Glacier Upstream	Glacier Downstream
Capture filename	GU090600.CAP	GD 090600.CAP
Logging active?	ACTIVE	ACTIVE
Battery	12.8	12.7
Memory left %	78% OF 32K	78% OF 32K
Bytes used	6712	6704
Started	08/02/00	08/02/00
Record interval	3600	3600
Scan interval	3600	3600
Journal normal?	YES	YES
Scan reading (depth and conduct.)	2.25 / 51	2.294 / 76
Manual measurement	1.90'	2.0'
Dump number of records/all	ALL	ALL
Purge (save 900 records)	SAVED 500	SAVED 500
External battery--replace?	NO	NO
Internal battery--replace?	NO	NO
Replace desiccants?	YES	YES
Check wiring & connections?	YES	YES
Status check--O.K.?	ACTIVE	ACTIVE
Notes:	12.7 VOLTS 87%	12.6 VOLTS 87% MEMORY AFTER "DUMP"

UNPUBLISHED REPORT

Glacier Creek Survey **Date:** 9/6/00 **Time:**

Party: TM / SC

Weather: CLOUDY, DRY (LT RAIN OVERNIGHT) **Temp:** 50

Location	Top	Middle (1st)	Bottom (2nd)	Angle	Elevation	
HI		5.05	5.40			
BM 1, Top RR Bridge Bolt		4.53				
BM 2, Top Concrete Bridge Foundation		4.89				
BM 3, Top Instrument Post		5.47	5.17			
BM 4, Top Seward Hwy. Bridge Pavement						
REW @ Gage			12.40			
2.02 D.O.S. Top of Upstream Block			14.48			ON ORANGE POST
2.10 D.O.S. Top of Downstream Block			14.50			UPSTREAM OF PIPE
REW @ X-Section			12.55			
LEW @ X-Section						

Notes/Sketch:

LEVEL SITE 1: LEVEL LOCATED ON DOWNSTREAM END OF DIKE REPAIR, SIDE AWAY FROM CREEK

LEVEL SITE 2: IMMEDIATELY UPSLOPE OF INSTRUMENT SHELTER ≈ 12' DISTANCE

Hydrolab Measurements:

Location @ DISCHARGE X-SEC Time 1215

Barometric Pressure Battery

Temp 5.85 °C Conductivity 0.119 µS/cm

D.O. 11.88 mg/l pH 7.61 → 7.70

Notes: 5 MIN. FOR pH, NO GUARD, HELD @ 0.5 FT. DEPTH IN FLOW

@ GAGE SITE: T = 5.91 C = 0.119 D.O. = 11.58 pH = 7.74 → 7.75
QUIET WATER
~ 1.0 FT DEPTH FOR 5 MIN.

Glacier Creek Streamgage
Trip Report
09/20/00
Third Site Visit (conductivity check)

Staff participating: Roy Ireland, Mark Inghram,

Weather Conditions: High overcast to clear, temperature 45 to 50.

Tidal Conditions:

Accomplishments:

- Purpose of this visit was to recheck conductivity measurements using the Quanta and compare that with the values being recorded by the R2. Previous visits have called into question discrepancies between conductivity data being recorded, and what has been measured using the Quanta. With only two points of comparison (the initial installation trip on 08/02/00 and the second trip on 09/06/00) it was not conclusive that a problem existed. Data collected at this site visit seem to confirm that a calibration problem exists on the conductivity probes. Specific conductance on the Quanta was measured at 131 uS/cm, whereas the probes read 82 uS/cm and 63 uS/cm at the upper and lower sites respectively.
- No discharge measurements were completed, nor planned. We were in the vicinity completing work on another project, and stopped at the Glacier Creek site for the exclusive purpose of checking the inconsistencies noted with the conductivity data.
- All recorded data was downloaded.
- The monument on the Seward Highway bridge crossing Glacier Creek was checked for a unique number. No unique number was visible.

Issues for Next Site Visit:

- Completion of more extensive site survey tying in known elevations from the Seward Highway Bridge. The value of the monument on the Seward Highway Bridge has been provided by DOT.
- Ready site for winter access. This should include staking and flagging as needed.
- Further editing of note forms specifically for Glacier Creek data collection
- Possible calibration of instrument/conductivity meter to correlate with values being measured with the Quanta.
- A single survey instrument site, eliminating the need for a turning point, could likely be located with some additional clearing of brush.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 9/20/00 Time: 1:30 pm Party: MI RI

Weather: PCLDY, CRY Temperature: ~50 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt						
BM 2, top concrete bridge foundation						
BM 3, top instrument post						
REW @ gage						
Top of upstream block, orange dot						
Top of downstream block, upstream of pipe						
REW @ x-section						
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

NO SURVEY, JUST CONDUCTIVITY CHECK

HYDROLAB NOTES

Location: @ GAGE SITE Date: 9/21/.. Time: 1:30pm

Battery: 9.3 V Temp.: 5.96 C pH: ~~7.97~~ 7.49 (POST CALIBRATION ADJUSTMENT)

Conductivity: 131 uS/cm DO: 13.08 mg/l %Saturation: 97.7

Notes: SALIN = 0.06

GLACIER UPPER GAGE; 2.02', CONDUCTIVITY: 82 uS/cm

GLACIER LOWER GAGE: 2.00', CONDUCTIVITY: 63 uS/cm

Glacier Creek Streamgage
Trip Report
09/26/00
Fourth Site Visit
Conductivity Check & Full Site Survey

Staff participating: Stan Carrick, Mark Inghram,

Weather Conditions: Partly cloudy, heavy rains previous 3 days.

Tidal Conditions:

Accomplishments:

- Purpose of this visit was to again recheck conductivity measurements using the Quanta and compare that with the values being recorded by the R2. Previous visits have called into question discrepancies between conductivity data being recorded, and what has been measured using the Quanta. Specific conductance on the Quanta was measured at 103 uS/cm, whereas the probes read 41 uS/cm and 57 uS/cm at the upper and lower sites respectively.
- Water Quality measurements using the Quanta were also completed on California Creek approximately 150 feet above the confluence with Glacier Creek and on Glacier Creek approximately 75 feet above the confluence with California Creek. These data are listed in the files.
- A complete site survey was completed, tying in known datum elevations on the Seward Highway Bridge with elevations readily accessible at the gage site. Elevation of the new local benchmark, a prominent bolt on the ARR bridge abutment, was determined to be 26.19 feet MSL. Top of the instrument shelter was determined at 25.26 feet MSL. All future survey data will be tied to ARR bridge abutment bolt, and previous data will also be corrected to that elevation datum.
- No discharge measurements were completed, nor planned. The specific purpose of this site visit was checking discrepancies noted in conductivity data, and a site survey to correlate current data with known datum elevations.

Issues for Next Site Visit:

- Ready site for winter access. This should include staking and flagging as needed.
- Regular monthly site service, including discharge, water quality, and data downloading.
- Possible calibration of instrument/conductivity meter to correlate with values being measured with the Quanta. James Dryden of Dryden Instrumentation will be consulted prior to the next service trip to check on corrective actions for questionable conductivity data.

Full site survey (ties in known datum at Seward Hwy bridge)
9/26/00
S. Carrick, M. Inghram

TARGET	OBSERVED	CORRECTED
Monument, Seward Hwy Bridge.	3.2	30.77
Turning point, foresight	10.11	23.86
Turning point, backsight	6.42	23.86
Bolt ARR, NEW BENCHMARK	4.09	**26.19**
Concrete, ARR	4.47	25.81
REW, gage	11.63	18.65
Top instrument shelter	5.02	25.26
Upstream block	14.29	15.99

NOTES: 1)Downstream block was not surveyed due to high water & turbidity.
2)All *previous and future elevations should be tied to the* 26.19 ' elevation determined for the ARR bolt new benchmark.
3)Elevation of 30.77 ft at Seward Hwy bridge provided by Jeff Brown of ADOT&PF.

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 09/26/00 Time: 0945 Party: S.C., M.T

Weather: P. CLDY, RAIN PREVIOUS 3 DAYS Temperature: ~45° F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt						
BM 2, top concrete bridge foundation						
BM 3, top instrument post						
REW @ gage						
Top of upstream block, orange dot						
Top of downstream block, upstream of pipe						
REW @ x-section						
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch): FULL SITE SURVEY, TIE INTO KNOWN DATUM @ SEWARD HWY BRIDGE

INSTRUMENT SITE #1

MONUMENT, SEWARD HWY BR	3.2
TURNING POINT, FORESIGHT	10.11

INSTRUMENT SITE #2

TURNING POINT, BACKSIGHT	6.42
BOLT, ARR BRIDGE (NEW BM)	4.09
CONCRETE, ARR BRIDGE	4.47
REW, GAGE	11.63
TOP INSTRUMENT SHELTER	5.02
UPSTREAM BLOCK	14.29

HYDROLAB NOTES

Location: SENSOR SITE, GLACIER CRK Date: 09/26/00 Time: 10:30

Battery: 4.1 V Temp.: 5.6 C pH: 7.45

Conductivity: 0.103 uS/cm DO: 12.20 mg/l %Saturation: 96.7

SALINITY: 0.05

Notes: GLACIER CRK, UPSTREAM OF CALIFORNIA CRK CONFLUENCE

TEMP: 5.39°C pH: 7.6

CONDUCTIVITY: 0.103

D.O. 12.60 @ 98.5% SATURATION

BATTERY: 4.2 V

CALIFORNIA
~~GLACIER~~ CREEK (nr Girdwood) SURVEY NOTES

Date: 09/26/00 Time: 1045 Party: S.C., M.I

Weather: CLOUDY, RAIN PREVIOUS 3 DAYS Temperature: 42/5° F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt						
BM 2, top concrete bridge foundation						
BM 3, top instrument post						
REW @ gage						
Top of upstream block, orange dot						
Top of downstream block, upstream of pipe						
REW @ x-section						
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: CALIF. CRK, @ 150' ABOVE GLACIER CR Date: 09/26/00 Time: 1045

Battery: 4.0 V Temp.: 6.17 C pH: 7.46

Conductivity: 0.103 uS/cm DO: 11.84 mg/l %Saturation: 95.2

SALINITY: 0.05

Notes:

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 09/26/00 Time: 1100 Party: S.C., MI

Weather: P. CLDY, RAIN PREVIOUS 3 DAYS Temperature: ~45°

Stream Conditions: NOTABLY HIGHER THAN PREVIOUS VISIT, TURBID

	Glacier Upstream	Glacier Downstream
Capture filename		
Battery		
Logging active?	YES	YES
Memory left		
Bytes used		
Started		
Record/Scan intervals		
Scan reading (depth and conductivity)	2.83 (DEPTH) 41.00 (COND)	2.95 (DEPTH) 57.00 (COND)
Manual measurement		
Journal		
Dump number of records/all		
Purge (save 800)		
External battery--replace?		
Internal battery--replace?		
Replace desiccants?	YES	YES
Wiring/connections O.K.?		
Final scan		
Final status		

Notes: SERVICE LIMITED TO INSTRUMENT SCAN ONLY. PURPOSE OF SITE VISIT TO CHECK DISCREPENCIES IN CONDUCTIVITY VALUES BEING COLLECTED BY THE PROBES, AND VALUE MEASURED BY HYDROLAB QUANTA.

Glacier Creek Streamgage
Trip Report
10/05/00
Fifth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram,

Weather Conditions: .Overcast, near 40

Tidal Conditions: Near low tide

Accomplishments:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 166 CFS. The measurement was completed using standard wading techniques with a pygmy meter, top setting, and Aquacalc No problems were encountered conducting the discharge measurement. The sensors and recorders appeared to be corking correctly. The scan of the R2 showed a depth of 2.18 feet at both upstream and downstream sensors; depth was measured at 1.93 and 2.0 feet to the top of the block containing the sensors. For future reference, the upstream block should be measured at the upstream shoreward side, and the downstream block at the upstream corner downhill side. A survey was also completed..
- A site survey was completed. Data reconfirmed known elevational relations between datum elevations and reference marks. Stage was measured at 17.92 feet at the gage site.
- Flagging and staking were added to facilitate relocation of the discharge site under winter conditions.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 3.92C; pH at 6.72; specific conductance at 136uS/cm @25C; DO at 12.17 mg/l at 92.8% saturation.
- Conductivity sensors were relocated within the sensor block to allow for greater exposure to flow. This was done in an attempt to assess problems encountered with discrepancies between values recorded with the sensor/R2 array and those of the Hydrolab Quanta. Using a temperature correction factor of 1.698, the conductivity's measured prior to sensor relocation was 108uS/cm and 130uS/cm (upstream and downstream respectively). After relocation of the sensors, and application of the same temperature correction factor the conductivity was measured at 137uS/cm and 147uS/cm (upstream and downstream respectively). The composite average of the conductivity measurements appears to have improved after the relocation. It is likely conductivity data collected by the sensor/R2 array prior to this date (10/05/00) is unreliable and should be excluded from inclusion in and data analysis.

Issues for Next Site Visit:

- Regular monthly site service, including discharge, water quality, and data downloading.
- Continued reevaluation of conductivity values. Further adjustments of the R2 may be needed to provide temperature correction for conductivity

State of Alaska
Dept. of Natural Resources
Div. of Geological & Geophysical Surveys

WATER RESOURCE INVESTIGATIONS

Meas. No. _____
Comp. by _____
Checked by _____

DISCHARGE MEASUREMENT NOTES

Sta. No. _____
GLACIER CREEK MEASUREMENT #3
Date 10/05, W00 Party SC, MI
Width _____ Area _____ Vel. _____ G. H. _____ Disch. 166.00
Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____
Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

GAGE READINGS

Time		Recorder	Inside	Outside
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter RICOH
Date rated _____ for rod, other.
Meter _____ ft. above bottom of weight.
Spin before meas. _____ after _____
Meas. plots ____ % diff. from rating _____
Wading, cable, ice, boat, upstr., downstr., side
bridge _____ feet, mile, above, below
gage, and _____
Check-bar, found _____
changed to _____ at _____
Correct _____
Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____
Flow _____ Weather OVERCAST 1240'
Other _____ Air ~40 °F@ _____
Gage _____ Water _____ °F@ _____
_____ Record removed _____ Intake flushed U
Observer _____
_____
Control _____
_____
Remarks INLET NEAR LOW TIDE
_____
_____
_____
G. H. of zero flow _____ ft.

.0 .10 .20 .30 .40 .50 .60

River at—

Angle coefficient	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge	
RENIN	152											.80
2	150		1.50	.6	84	40		2.1				.85
3	147.5		1.45	↓	99	40		2.4				
4	145.0		1.50		106	40		2.6				.90
5	142.5		1.40		110	40		2.7				
6	140.0		1.55		141	40		3.5			* (**)	.92
7	137.5		1.55		130	40		3.2			* (**)	.94
8	135.0		1.55		130	40		3.2			* (**)	
9	132.5		1.55		133	40		3.3			* (**)	.95
10	130.0		1.40		137	40		3.4			(**)	.97
11	127.5		1.55		113	40		2.8			*	.98
12	125.0		1.30		108	40		2.7				.99
13	122.5		1.35		102	40		2.5				
14	120.0		1.10		105	40		2.6				
15	117.5		1.05		98	40		2.4				1.00
16	115.0		0.80		106	40		2.6				
17	112.5		0.85		106	40		2.6				
18	110.0		0.65		103	40		2.5				.99
19	107.5		0.60		70	40		1.7				.98
20	105.0		0.60		78	40		1.9				.97
21	102.5		0.45		68	40		1.7				.96
22	100		0.50		60	40		1.5				
23	95		0.30		44	41		1.1				.94
24	90		0.10		26	40		0.7				.92
25	85		0.10		14	40		0.4				.90
LEW 26	78		-0-									
			Q		166.00							.85
			V		2.61							
			W		74.0							
			A		63.5							.80

.0 .10 .20 .30 .40 .50 .60 .70 .75

* WARNING, OUT OF DEPTH RANGE (**) WARNING OUT OF VELOCITY RANGE

UNPUBLISHED REPORT

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 10/5/00 Time: 1030 Party: MJ SC

Weather: CLOUDY, LT. RAIN OVERNIGHT Temperature: 40 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.17				26.19'msl
BM 2, top concrete bridge foundation		4.56				
BM 3, top instrument post		5.10				25.26' msl
REW @ gage		12.44				
Top of upstream block, orange dot		14.30				
Top of downstream block, upstream of pipe		14.44				
REW @ x-section		12.63				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

4.72, CONCRETE ABUTMENT @ LEW

HYDROLAB NOTES

Location: @ GAGE Date: 10/5/00 Time: 1035

Battery: 9.2 V Temp.: 3.92 C pH: 6.72 (6.6 INITIALLY)

Conductivity: 136 uS/cm DO: 12.17 mg/l %Saturation: 92.8

Notes: F

- UP. PROBE NOT PROTRUDING BEYOND OPENING OF PIPE
- DOWN " " " " " "

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 10/5/00 Time: 1015 Party: MJ SC

Weather: CLDY, LT RAIN OVERNIGHT Temperature: 40 °F

Stream Conditions: WATER CLEAR, FLOW DOWN SINCE LAST WEEK

	Glacier Upstream	Glacier Downstream
Capture filename	GL UP 1005	GL DN 1005
Battery	12.7 V	12.6 V
Logging active?	YES	YES
Memory left	70 % 32K	70 % OF 32K
Bytes used	9544	9552
Started	8/2/00 1414	8/2/00 1409
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	2.18/64 OK	2.18/77
Manual measurement 2.12 UP / 2.4 DOWN @ SENSORS	1.93 @ DOT, UP SIDE SHOREWARD	2.0 @ UPSTR. CORNER DOWNHILL
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	YES SAVE 800	YES SAVE 800
External battery--replace?	NO	NO
Internal battery--replace?	8.9 V OK NO	NO 8.8 V OK
Replace desiccants?	YES	YES
Wiring/connections O.K.?	✓	✓
Final scan	OK 2.18/81	OK 2.17/87
Final status	OK	OK
Notes:	COND. SWITCH @ 2.0%/°C	COND SWITCH @ 2.0%/°C

2.0 vs 1.65

- FOR SCAN ABOVE, FIRST SET OF DATA IS PRIOR TO MOVING PROBE

- UPSTR, PROBE ~5" FROM ROCK FACE, DOWN. PROBE HAS BETTER FLOW

Glacier Creek Streamgage
Trip Report
10/11/00
Sixth Site Visit
Conductivity check/correction, temperature probe

Staff participating: Roy Ireland, Mark Inghram,

Weather Conditions: .Overcast, high 30's

Tidal Conditions:

Accomplishments:

- Primary purpose of this site visit was the addition of a temperature probe to the sensor/recorder array. The probe itself was added to the upstream block sensors using a series of cable ties to secure it to the retrieval cable. The probe was attached to the downstream R2 data recorder.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 4.08C; pH at 7.45; specific conductance at 122uS/cm @25C; DO at 12.21 mg/l at 93.5% saturation.
- Completion of water quality measurements using the Hydrolab Quanta on both California Creek above the confluence with Glacier Creek, and on Glacier Creek above the confluence with California Creek. See file for data.
- No discharge measurement was made.
- Conductivity temperature correction calibration within the instrument shelter was changed from 2 degree to a 0 degree correction per recommendations from James Dryden of Dryden Instrumentation. Before the changes the upper and lower conductivity scans reported 83 uS/cm and 42 uS/cm. Using a correction factor for 4C water temperature of 1.693, the resulting corrected conductivity measurements were 140 uS/cm and 71 uS/cm at the upper and lower sites respectively. After the change of internal temperature correction from 2 degree to 0 degree was made the upper and lower sites recorded 78uS/cm and 38uS/cm respectively. Applying the same correction factor of 1.693 results in corrected conductivity measurements of 132uS/cm and 64uS/cm respectively at the upper and lower sites. The upper site recorded conductivity value is only 8% higher than the measurement made with the Quanta; while the lower site is 48% lower than the Quanta measurement.

Issues for Next Site Visit:

- *Regular monthly site service, including discharge, water quality, and data* downloading.
- Continued reevaluation of conductivity values. Further adjustments of the R2 may be needed to provide temperature correction for conductivity. Some additional relocation or reorientation of the sensors may still be needed. A tool for the purpose of twisting the sensors within the housing to orient the hole in the sensor with the flow of the river should be included.
- WD-40 or equivalent for lubrication of locks

UNPUBLISHED REPORT

File: c:\Projects\Glacier Creek\Sensor changes 101100.txt 10/12/0, 9:49:18AM

Glacier R2 upper
Before change: 2.216 ft 83 Micros~ (2 degree correction)
After changes: 2.213 ft 78 Micros~ (0 degree correction)

Glacier R2 lower
Before change: 2.190 ft 42 Micros~ (2 degree correction) (none
After changes: 2.190 ft 38 Micros~ (0 degree correction) 3.90

Quanta
(none) ft 122 Micros~ (25 degree correction) 4.02

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
11/02/00
Seventh Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram,

Weather/Channel Conditions: .Fog, 3-4" snow, 25°F, no ice in channel

Tidal Conditions:

Accomplishments:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 99 CFS. Measurement was completed using standard wading techniques with a pygmy meter, top setting rod, and Aquacalc. No problems were encountered. The sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 1.90 and 1.86 at the upstream and downstream blocks respectively. Depth over sensor at the upstream block was measured at 1.65 feet, no measurement was made of depth over the downstream sensor.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at .9°C; pH at 7.24; specific conductance at 136uS/cm @25C; DO at 15.26 mg/l at 96.6% saturation.
- Completion of a series of 6 conductivity and temperature measurements across the discharge cross section at 10 foot intervals. See file for data.
- A site survey was completed. Due to snow/ice conditions shots on reference marks were not taken. Stage was measured at 17.54 feet.
- Conductivity measurements at the upstream sensor block are within 3% of those measured with the Quanta. That is within acceptable range. Conductivity measurements at the downstream sensor block are off by over 35% from those measured with the Quanta. That large of a discrepancy is beyond acceptable. The conductivity probe at the lower block site was again pulled farther from its protective housing and rotated in an attempt to assess why the data collected by that probe is so far off. After relocation of the probe, the conductivity was again scanned and recorded at 102uS/cm. That relocation improved the recorded value to approximately a 25% error with reference to the values collected by the Quanta, but still outside of an acceptable range.

Issues for Next Site Visit:

- Regular monthly site service, including discharge, water quality, and data downloading.
- Continued reevaluation of conductivity values at the downstream sensor block
- Some beaver activity in the immediate vicinity was noticed. A few lengths of chain to attach to exposed cable may provide protection from possible beaver damage.
- A large plastic bag to cover instrument shelter.

State of Alaska
Dept. of Natural Resources
Div. of Geological & Geophysical Surveys

WATER RESOURCE INVESTIGATIONS

Meas. No. _____
Comp. by _____
Checked by _____

DISCHARGE MEASUREMENT NOTES

Sta. No. _____

GLACIER CREEK NR GIRDWOOD

Date 11/2, 1990 Party MI SC

Width _____ Area _____ Vel. _____ G. H. _____ Disch. 99.10

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

Type of meter PYGMY

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots ____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____ changed to _____ at _____

Correct _____

Levels obtained _____

GAGE READINGS

Time		Recorder	Inside	Outside
140				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow NO ICE Weather FOG / RAIN

Gager _____ Air 25 °F@ _____

Gage _____ Water _____ °F@ _____

_____ Record removed _____ Intake flushed _____

Observer _____

_____

Control _____

_____

Remarks _____

_____

_____

G. H. of zero flow _____ ft.

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River at—

Angle coefficient	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
										TEMP	CONDUCT.
(1)	[illegible]										
REW 2	153.0		0								
3	150		1.20		66	40	1.65			1.18	0.136
4	147.5		1.25		81	40	2.01				
5	145		1.25		91	40	2.25				
6	142.5		1.15		84	40	2.08				
7	140		1.3		114	40	2.81			1.19	0.136
8	137.5		1.35		113	40	2.78				
9	135		1.20		108	40	2.63				
10	132.5		1.30		94	40	2.31				
11	130		1.10		108	40	2.66			1.18	0.136
12	127.5		1.10		93	40	2.28				
13	125		1.05		95	40	2.34				
14	122.5		0.95		86	40	2.12				
15	120		0.75		89	40	2.20			1.19	0.136
16	117.5		0.70		84	40	2.06				
17	115		0.60		72	40	1.78				
18	112.5		0.55		66	41	1.62				
19	110		0.45		41	40	1.02			1.19	0.136
20	107.5		0.38		35	41	0.87				
21	105		0.30		34	40	0.86				
22	102.5		0.15		15	42	0.38				
23	100		0.20		12	40	0.32			1.46	0.139
LEW	96.0		0								
							Q	=	99.10		
							$\bar{V}$	=	2.15		
							A	=	46.2		
							W	=	57		

UNPUBLISHED REPORT

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 11/2/00 Time: 1040 Party: MM SC

Weather: FOG, 3-4" SNOW Temperature: 25

Stream Conditions: CLEAR, LOW, WINTER CONDITIONS NO ICE

	Glacier Upstream	Glacier Downstream
Capture filename	G11200	GD11200
Battery	12.6	12.6
Logging active?	YES	YES
Memory left	53%	83%
Bytes used	14936	5260
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	1.90 71	1.86 / 47 / 0.8
Manual measurement	UB ON ORANGE SPOT 1.65	
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	~~800~~ 400	SAVE 800
External battery--replace?	OK	NO 12.6V
Internal battery--replace?	8.9 OK	NO 8.8V
Replace desiccants?	YES	YES
Wiring/connections O.K.?	✓	✓
Final scan	OK	OK
Final status	OK	OK
Notes:		MIXED CON. PROBE PARA. TO FOG EXTENDED NOW READING 55

DNE: ADT*

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 11/2/00 Time: 1040 Party: @ MI SC

Weather: FOG, @ 3-4" SNOW Temperature: 25 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.13				
BM 2, top concrete bridge foundation						
BM 3, top instrument post						
REW @ gage		12.665				
Top of upstream block, orange dot		14.34				
Top of downstream block, upstream of pipe		14.24				
REW @ x-section		12.78				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE SITE Date: 11/2/00 Time: 1030

Battery: 4.24 V Temp.: 0.90° C pH: 7.29

Conductivity: 0.136 uS/cm DO: ~~14.81~~ 15.26 mg/l %Saturation: ~~[illegible]~~ 96.6

Notes: SALINE: 0.06

GLACIER CREEK CONDUCTIVITY CROSS SECTION DATA
LOCATION CORROSPONDS TO DISCHARGE CROSS SECTION
11/2/00

LOCATION (FT)	DEPTH (FT)	TEMPERATURE	CONDUCTIVITY
150	1.20	1.18	0.136
140	1.30	1.19	0.136
130	1.10	1.18	0.136
120	0.75	1.19	0.136
110	0.45	1.19	0.136
100	0.20	1.46	0.139

NOTE: Data at 100' station questionable due to shallow depth.

Glacier Creek Streamgage
Trip Report
12/05/00
Eighth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram,

Weather/Channel Conditions: .Drizzle, overcast, ≅35°F, no ice in channel

Tidal Conditions:

Accomplishments:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 200 CFS. Measurement was completed using standard wading techniques with a pygmy meter, top setting rod, and Aquacalc. No problems were encountered. The sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 2.30 and 2.20 at the upstream and downstream blocks respectively. Depth over sensor at the upstream block was measured at 2.01 feet, and 2.11 feet at the lower downstream block.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 0.6°C; pH at 7.37; specific conductance at 99uS/cm @25C; DO at 15.0 mg/l at 101% saturation.
- A site survey was completed. Stage was measured at 17.81 feet.
- Conductivity measurements at the upstream sensor block are within 8% of those measured with the Quanta. That is within acceptable range. Conductivity measurements at the downstream sensor block are off by over 60% from those measured with the Quanta. That large of a discrepancy is beyond acceptable. Conductivity data from the downstream sensor block should be considered invalid.

Issues for Next Site Visit:

- Regular monthly site service, including discharge, water quality, and data downloading.
- Possible relocation of the discharge cross section site to a point 20 to 30 feet further upstream than the current location. The current location has a side channel that may or may not be active dependent upon flow. The slightly upstream sight does not have the side channel issue.

State of Alaska
Dept. of Natural Resources
Div. of Geological & Geophysical Surveys

WATER RESOURCE INVESTIGATIONS

Meas. No. _____
Comp. by _____
Checked by _____

DISCHARGE MEASUREMENT NOTES

Sta. No. _____
GLACIER CRK @ GIRDWOOD
Date 12/05/99 19__ Party CARRICK INGHAM
Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____
Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____
Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. PYGMY

GAGE READINGS

Time		Recorder	Inside	Outside
1200				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter _____
Date rated _____ .... for rod, other.
Meter _____ ft. above bottom of weight.
Spin before meas. _____ after _____
Meas. plots .... % diff. from rating _____
Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____
Check-bar, found _____ changed to _____ at _____
Correct _____
Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____
Flow _____ Weather DRIZZLE, ~35°F
Other _____ Air _____ °F@ _____
Gage _____ Water _____ °F@ _____
_____ Record removed _____ Intake flushed U
Observer _____
_____
Control _____
_____
Remarks _____
_____
_____
G. H. of zero flow _____ ft.

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River at—

Angle coefficient	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or _____	Area	Discharge
RCK	153										
2	150.0		1.50	.6	89	40	2.2				
3	147.5		1.55	↓	100	40	2.45				
4	145.0		1.65		121	40	2.90				
5	142.5		1.60		139	40	3.40				
6	140.0		1.50		146	40	3.6				
7	137.5		1.55		147	40	3.6				
8	135.0		1.50		151	40	3.7				
9	132.5		1.60		149	40	3.7				
10	130.0		1.50		138	40	3.4				
11	127.5		1.50		135	40	3.3				
12	125.0		1.30		142	40	3.5				
13	122.5		1.40		124	40	3.1				
14	120.0		1.10		117	40	2.9				
15	117.5		1.05		121	40	3.0				
16	115.0		0.95		116	40	2.8				
17	112.5		1.00		103	40	2.5				
18	110.0		0.75		103	40	2.5				
19	107.5		0.70		87	40	2.1				
20	105.0		0.70		90	40	2.2				
21	100.0		0.55		79	40	1.9				
22	95.0		0.30		50	41	1.2				
23	90.0		0.20		40	40	1.0				
24	85.0		0.15		28	41	0.7				
25	80.0		0.10		14	42	0.4				
26	75.0		0.10		0	NA	0				
27	70.0		0.10		17	42	0.4				
28	65.0		0.15		5	45	0.1				
EM 29	63.0		0		-	-	-				
			Q: 200.00				W: 90				
			V: 2.84				A: 703				

UNPUBLISHED REPORT

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 12/5/00 Time: 1100 Party: SC MI

Weather: CLDY, WARM, SOME RAIN LAST 24HR Temperature: ~38

Stream Conditions: NO SNOW/ICE, HIGHER STAGE THAN 11/7/00, REL. CLEAR

	Glacier Upstream	Glacier Downstream
Capture filename	GU12500	GD 12500
Battery	12,7	12.5 V
Logging active?	~~YES~~	YES
Memory left	70% OF 32	59% OF 32
Bytes used	9520	13180
Started	8/2/00	10/11/00
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	2.3 / 57	2.2 / 19 / 0.4°C
Manual measurement	2.01	2.11
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	~~YES~~-600	YES - 600
External battery--replace?	NO OK	NO OK
Internal battery--replace?	8.9V OK	8.8 V OK
Replace desiccants?	~~YES~~	YES
Wiring/connections O.K.?	✓	✓
Final scan	2.3 / 58 OK	2.2 / 19 / 0.5
Final status	OK 85% LEFT	OK 81% LEFT
Notes:		

SENSORS OUT + OK

GLACIER CREEK (nr Girdwood) SURVEY NOTES

UNPUBLISHED REPORT

Date: 12/5/00 Time: 1115 Party: SC MJ

Weather: CLDY, SPRINKLES Temperature: ~38 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.05				26.19'msl
BM 2, top concrete bridge foundation		4.44				
BM 3, top instrument post		4.98				25.26' msl
REW @ gage		12.20				
Top of upstream block, orange dot POS 2.01		14.23				
Top of downstream block, upstream of pipe POS 2.11		14.30				
REW @ x-section		12.43				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: GLACIER CR. @GAGE Date: 12/5/00 Time: 1115

Battery: 4.5 V Temp.: 0.64 C pH: 7.37

Conductivity: 0.099 uS/cm DO: 15.0 mg/l %Saturation: 101.0

Notes: SAL. 0.04 → VS. 0.107 FOR PROBE

Glacier Creek Streamgage
Trip Report
12/14/00
Ninth Site Visit
Maintenance

UNPUBLISHED REPORT

Staff participating: Stan Carrick, Roy Ireland, Mary Maurer

Weather/Channel Conditions: clear, dry, 28-30°F, no ice in channel

Tidal Conditions: high tide at about !0:15 a.m.,

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 71 CFS. Measurement was completed using standard wading techniques with a pygmy meter, top setting rod, and Aquacalc. No problems were encountered. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 1.71 ft and 1.78 ft at the upstream and downstream blocks respectively. Depth over block at the upstream block was measured at 1.7 ft, and 1.6 ft at the downstream block. The water level was 0.5 ft lower than nine days ago during our last visit, and the channel was 40 ft narrower.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 0.1°C; pH at 7.15; specific conductance at 129 uS/cm @25C; DO at 15.2 mg/l at 102% saturation.
- A site survey was completed. Stage was measured at 17.49 ft.
- Field calibration of the two conductivity sensors was attempted. The upstream sensor calibration was unsuccessful because of problems with the sensor data transmitter. The manufacturer will be consulted for solutions to the problem. The downstream sensor did calibrate properly and was functioning normally with a reading of 134 uS/cm @25°C versus 129 uS/cm @25°C with the Hydrolab Quanta.
- Prior to making this site visit 9 verbal approval was obtained from Tim Stevens of ADEC to use this date visit in lieu of a January visit. This approval was sought due to unexpectedly high costs of multiple extra site visits to deal with conductivity probe problems.
- Visual estimates were that tidal influence at 10-1030am was approximately 50 yards downstream from discharge cross section. High tides of the year are approximately 2.5 ft higher than at the time of this site visit. At those higher levels it is likely to effect both the instrument reading and discharge cross section site.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Attempt to repair and calibrate the upstream conductivity sensor and check the status of the downstream sensor.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

State of Alaska
Dept. of Natural Resources
Div. of Geological & Geophysical Surveys

WATER RESOURCE INVESTIGATIONS

Meas. No. _____
Comp. by _____
Checked by _____

DISCHARGE MEASUREMENT NOTES

Sta. No. _____

GLACIER CR @ GIRDWOOD

Date 12/14 19 80 Party SC MA

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

Type of meter PYGMY/AOMA

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots ____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____ changed to _____ at _____

Correct _____

Levels obtained _____

GAGE READINGS

Time		Recorder	Inside	Outside
1400	GD	1.7		
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather CLR

Other _____ Air 30 °F@ _____

Gage _____ Water 0.1 °F@ _____

_____ Record removed _____ Intake flushed U L _____

Observer _____

Control _____

Remarks GRAVITY FLOW

WATER CLEAR

G. H. of zero flow _____ ft.

Rite in the Rain WEATHERPROOF

S—768

J. J. DARLING CORP. TACOMA, WASH. U.S.A.

1405 hrs. start River at—

Angle coefficient	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
	REW 152.5		1								
	150		1.1		57	41	1.4				
	147.5		1.1		74	40	1.8				
	145.0		1.1		79	41	1.9				
	142.5		1.1		83	40	2.0				
	140.0		1.05		88	40	2.2				
	137.5		1.1		92	40	2.3				
	135.0		1.05		100	40	2.5				
	132.5		1.05		94	40	2.3				
	130.0		1.05		86	40	2.1				
	127.5		1.0		87	40	2.1				
	125.0		0.85		82	40	2.0				
	122.5		0.90		64	40	1.6				
	120.0		0.70		54	41	1.3				
⊙	117.5		0.50		63	41	1.5				
	115.0		0.50		49	41	1.2				
	112.5		0.50		27	41	0.67				
	110.0		0.30		39	40	0.97				
	107.5		0.25		21	40	0.54				
	105.0		0.20		19	41	0.48				
	102.5		0.15		10	40	0.27				
	LEW 102.0										
		50.5					1.83			38.8	71.0
	1435 hrs. end										

UNPUBLISHED REPORT

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 12/14/00 Time: 10:30 Party: RI SC MM

Weather: CLEAR, DRY LAST FEW DAYS Temperature: 25-30

Stream Conditions: LOW + CLEAR

	Glacier Upstream	Glacier Downstream
Capture filename		
Battery	12.5 V	
Logging active?	Y	Y
Memory left	75 %	79 %
Bytes used		
Started		
Record/Scan intervals		
Scan reading (depth and conductivity)	1.71 / 34 / -0.1	1.78 / 64
Manual measurement	1.7	1.6
Journal	OK	OK
Dump number of records/all		
Purge (save 800)	NO	NO
External battery--replace?	YES	
Internal battery--replace?	NO	NO
Replace desiccants?	OK	OK
Wiring/connections O.K.?	OK	OK
Final scan		
Final status		
Notes:		

Q = 71.00 cfs $\bar{V}$ = 1.83 W = 50.5 A = 38.8

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 12/14/00 Time: 1020 Party: SC RA MM

Weather: CLR, DRY LAST FEW DAYS Temperature: 28-30 F

Location	Top	Middle ~~2nd Site~~ (10:20 / 14:20)		Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.62				26.19'msl
BM 2, top concrete bridge foundation		4.99				
BM 3, top instrument post		5.49				25.26' msl
REW @ gage		13.36	13.21			
Top of upstream block, orange dot		14.86				~0.0.s = 1.70
Top of downstream block, upstream of pipe (Flow)		14.73				~0.0.s. = 1.6
REW @ x-section		13.41	13.32			
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

- HIGH TIDE @ 10-10:30 AM, TIDAL INFLUENCE TO APPROX. 50 YDS. DOWN FROM X-SEC.

QUANTA FIELD CALIBRATED: 445 READS 441
70 READS 74

HYDROLAB NOTES

Location: GLACIER CR @ GIRD. Date: 12/14/00 Time: 1100

Battery: 9.4 V Temp.: 0.06 C pH: 7.15 (7.44)

Conductivity: 129 uS/cm DO: 15.19 (14.07) mg/l %Saturation: 101.7

Notes: - CALIFORNIA CREEK @ 1235
T = 0.21
D.O. = 13.67 @ 95.1 % SAT.
COND = 132
pH = 7.16

- GLACIER CR. ABOVE BRIDGE @ 1300
T = 0.09
D.O. = 13.95 @ 95.5 % SAT.
COND = 127
pH = 7.52

QW NEAR GLACIER CREEK GAGE, 12/14/00 @1235

	TEMP	pH	CONDUC	DO	%SAT
CALIFORNIA CREEK	0.21	7.16	132	13.67	95.1
GLACIER CREEK ABOVE CALIFORNIA CREEK	0.09	7.52	127	13.95	95.5
GLACIER CREEK AT GAGE	0.06	7.15	129	15.19	101.7

Glacier Creek Streamgage
Trip Report
02/07/01
Tenth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Overcast, 30°F, no ice in channel

Tidal Conditions: high tide at about 8:00 a.m.

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 67.3 CFS. Measurement was completed using standard wading techniques with a pygmy meter, top setting rod, and Aquacalc. No problems were encountered. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 1.66 ft and 1.63 ft at the upstream and downstream blocks respectively. Depth over block at the upstream block was measured at 1.68 ft, and 1.75ft at the downstream block.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 0.49°C; pH at 7.15; specific conductance at 115 uS/cm @25C; DO at 13.6 mg/l at 95% saturation.
- A site survey was completed. Stage was measured at 17.37 ft.
- The downstream conductivity probe was scanned on arrival, and returned a value of 140. That is more than 20% higher than the value for conductivity measured by the Hydrolab Quanta. The probe was examined, and what appeared to be silt was found to have accumulated on the surface. The silt was removed. After cleaning the probe of silt the scan of the probe resulted in a value of 117, which is very close to the value measured with the Hydrolab Quanta. Our speculation is that the accumulation of silt is likely responsible for the increased conductivity value at the first scan.
- Values for cross sectional area and width of the measured channel are unexpectedly high in comparison with previous measurements.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Attempt to repair and calibrate the upstream conductivity sensor and check the status of the downstream sensor.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 2/7/01 Time: _____ Party: SC MI

Weather: P.CLDY Temperature: 30–32

Stream Conditions: CLR & LOW

	Glacier Upstream	Glacier Downstream
Capture filename	GLUP0207	GLDN0207
Battery	12.5 V	12.5 V
Logging active?	YES	YES
Memory left	47% of 32K	34% of 32
Bytes used	17080	21360
Started	8/2/00	10/11/00
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	1.66 / -27*	1.63 / 140 / 0.4
Manual measurement	1.68 O.K.	1.75 ?
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	SAVE 600	600
External battery--replace?	NO	NO
Internal battery--replace?	9.8 V NO, O.K.	NO
Replace desiccants?	YES	YES
Wiring/connections O.K.?	OK	OK
Final scan	OK	OK
Final status	OK. 85% LOG	OK 81% LEFT
Notes:	COND. PROBE & SYSTEM NOT FUNCTIONING	20% BATT SWITCH

* 117 AFTER CLEANING PROBE

Q = 67.30

GLACIER CREEK (nr Girdwood) SURVEY NOTES

UNPUBLISHED REPORT

Date: 2/7/01 Time: 1105 Party: SC AJ

Weather: P CLOUDY Temperature: 30-32 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.40				26.19'msl
BM 2, top concrete bridge foundation		4.78				
BM 3, top instrument post		5.32				25.26' msl
REW @ gage		13.15				
Top of upstream block, orange dot		14.57				
Top of downstream block, upstream of pipe		14.43				
REW @ x-section		13.22				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

* TOP OF CLAMP, DOWNSTREAM BLOCK

D.O.S., DOWNSTREAM 1.75

D.O.S., UPSTREAM 1.68

HYDROLAB NOTES

Location: GLACIER CR. GAGE SITE Date: 2/7/01 Time: 1640

Battery: 4.3 V Temp.: 0.49 C pH: 7.15

Conductivity: 115 uS/cm DO: 13.60 mg/l %Saturation: 95.0

Notes: SALIN. 0.05

Q = 67.30

DISCHARGE MEASUREMENT NOTES

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. _____

GLACIER CRK NR. RR BRIDGE

Date 02/07/01 ~~19~~ Party S, Cu, M I

Width _____ Area _____ Vel. _____ G. H. _____ Disch. 67.30

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. PYGMY

Type of meter PYGMY / AQUACALC

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots _____ % diff. from rating _____

(Wading), cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

GAGE READINGS				
Time		Recorder	Inside	Outside
1200		1.66		
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather OVERCAST

Other _____ Air 29 °F@ _____

Gage _____ Water 32 °F@ _____

_____ Record removed _____ Intake flushed U

Observer _____

Control _____

Remarks _____

G. H. of zero flow _____ ft.

River at—

Angle coefficient	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW	1.63										
2	1.50		1.2	.6	36	41		0.89			
3	147.5		1.35	↓	40	41		0.99			
4	145.0		1.35	↓	58	40		1.45			
5	142.5		1.50		57	40		1.42			
6	140.0		1.35		73	41		1.79			
7	137.5		1.30		69	40		1.70			
8	135.0		1.15		73	40		1.81			
9	132.5		1.10		69	40		1.71			
10	130.0		1.05		63	41		1.55			
11	127.5		0.90		66	40		1.62			
12	125.0		0.95		70	40		1.73			
13	122.5		1.00		55	41		1.35			
14	120.0		0.90		55	40		1.37			
15	117.5		0.95		57	40		1.42			
16	115.0		0.85		50	40		1.24			
17	112.5		0.65		52	40		1.30			
18	110.0		0.55		34	41		0.85			
19	107.5		0.50		19	41		0.49			
20	105.0		0.33		25	42		0.62			
21	102.5		0.20		22	40		0.56			
22	100.0		0.15		20	41		0.51			
LEW	9.4										
			0		67.30						
			A		48.8						
			↓		1.38						
			W		59.0						

.0 .10 .20 .30 .40 .50 .60 .70 .75

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
03/12/01
Eleventh Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Overcast, rain, ≅35°F, no ice in channel

Tidal Conditions: high tide at about 9:30 a.m. (32.9 ft)

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 103.00 CFS. Measurement was completed using standard wading techniques with a pygmy meter, top setting rod, and Aquacalc. No problems were encountered. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 1.84 ft and 1.82 ft at the upstream and downstream blocks respectively. No depth over block measurements were made.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 1.51°C; pH at 7.24; specific conductance at 99 uS/cm @25C; DO at 13.0 mg/l at 93% saturation.
- A site survey was completed. Stage was measured at 17.58 ft.
- The downstream conductivity probe was scanned on arrival, and returned a value of 101. That is only 2% higher than the value for conductivity measured by the Hydrolab Quanta. As with the previous visit the probe was examined and what appeared to be silt was found to have accumulated on the surface. The silt was removed. After cleaning the probe of silt the scan of the probe resulted in a value of 110, or 11% higher thatn the value measured with the Hydrolab Quanta. The silt accumulation does seem to have some effect on the conductivity values, however the effects at this site visit appear to be the reverse of the effects at the last site visit.
- Timing of this site visit was designed to coordinate with a +32.9 foot high tide occurring at Sunrise @ 9:30 am. A series of 12 temperature, conductivity, and salinity measurements were made, starting from above the California Creek confluence, and proceeding downstream to point 90-100 feet downstream of adjacent cross street. Generally, backwater effects do impact the stream at the instrument site, but saltwater effects were not noticeable above a point roughly 90 to100 feet upstream from the adjacent cross street. Detailed notes available.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Attempt to repair and calibrate the upstream conductivity sensor and check the status of the downstream sensor.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 3/12/01 Time: 1200 Party: SC MJ

Weather: LT RAIN Temperature: 40's

Stream Conditions: CLR, LOW

	Glacier Upstream	Glacier Downstream
Capture filename	GU031201	GD031201
Battery	12.5	12.5V OK
Logging active?	YES	YES
Memory left	65%	57%
Bytes used	11152	13980
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	1.84 -26	1.82 101 @2%
Manual measurement		1.82 1100 2%
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300 92% USE	90% USE 300
External battery--replace?	NO	NO
Internal battery--replace?	8.90K	8.8 OK
Replace desiccants?	✓	✓
Wiring/connections O.K.?	✓	✓
Final scan	OK	✓
Final status	OK	✓
Notes:		

@ 1.9°C
BEFORE CLEAN
AFTER CLEAN

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 3/12/01 Time: 1330 Party: SC MI

Weather: RAIN Temperature: 40 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.04				26.19'msl
BM 2, top concrete bridge foundation		4.42				
BM 3, top instrument post		4.97				25.26' msl
REW @ gage		12.57				
Top of upstream block, orange dot		14.22				
Top of downstream block, upstream of pipe TOP STRAP		14.03				
REW @ x-section		12.65				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

~ HI NOTE.

11.7 (11.8) 9.3

HYDROLAB NOTES

Location: @ GAGE Date: 3/12/01 Time: 1230

Battery: 4.2 V Temp.: 1.51 C pH: 7.24

Conductivity: 99 uS/cm DO: 13.0 mg/l %Saturation: 93.0

Notes:

SAL = 0.04

HIGH TIDE GLACIER CREEK QW PROFILE, 03/12/01

TIME	TEMP (°F)	CONDUCTIVITY (uS/cm@25° F)	SALINITY (PSS)	APPROX LOCATION	NOTES
3/12/01 9:50 AM	1.12	98	0.04	75' upstream AK RR bridge, above California Creek confluence	
3/12/01 9:53 AM	1.15	98	0.04	10' upstream of AK RR bridge, at California Creek confluence	
3/12/01 9:54 AM	1.14	98	0.04	10' downstream of AK RR bridge	
3/12/01 9:56 AM	1.15	99	0.04	Approx .5 distance from bridge to instrument shelter	
3/12/01 9:58 AM	1.15	99	0.04	@ instrument shelter	
3/12/01 9:59 AM	1.15	99	0.04	@discharge x-section site	
3/12/01 10:01 AM	1.16	99	0.04	approx 60' downstream of discharge x-section @ "beaver tree"	
3/12/01 10:02 AM	1.16	99	0.04	@"gate", 90' approx downstream of previous site	
3/12/01 10:04 AM	1.16	107	0.05	@"driveway", approx 90' downstream of previous site	
3/12/01 10:06 AM	1.17	115	0.05	Approx 90' downstream of previous site	conductivity value "erratic)
3/12/01 10:10 AM	1.17	1112	0.56	@ "cross street"	
3/12/01 10:14 AM	0.93	23700	14.76	Approx 90'-100' downstream of previous site @ cottonwood logs	

High tide of 32.9' on 03/12/01 occurred @ 9:00AM in Anchorage, & 9:30AM at Sunrise.

OBSERVED TIDAL RECESSION AT INSTRUMENT SHELTER SITE

TIME	ELEVATION (FT)
3/12/01 9:30 AM	18.53
3/12/01 9:35 AM	18.43
3/12/01 9:50 AM	18.26
3/12/01 9:58 AM	17.85
3/12/01 1:30 PM	17.66

UNPUBLISHED REPORT

3/12/01 HIGH TIDE @ 9:00 AM ANCH, 9:30 @ SUNRISE +323

	I	COND.	SAL.	SITE
0950	1.12	98	0.04	75' ABOVE TRESTLE BRIFF.
0953	1.15	98	0.04	@ BRIDGE UP. SIDE
0954	1.14	98	0.04	@ BRIDE DOWN SIDE
0956	1.15	99	0.04	1/2 WAY BRIDGE TO GAGE SITE
0958	1.15 (pH 6.96)	99 (DO 13.10, 92.5%)	0.04	@ GAGE SITE
0959	1.15	99	0.04	@ X-SEC
1001	1.16	99	0.04	~60' DOWN FR. X-SEC @ BEAVER TREE
1002	1.16	99	0.04	@ GATE ~90' FROM PREV. SITE
1004	1.16	107	0.05	~90' DOWN FROM PREV. @ DRIVEWAY
1006	1.17	ERRATIC 115	0.05	~90' DOWN FROM PREVIOUS
* 1010	1.17	1112	0.56	" " @ STREET "
1014	0.93	23,700	14.76	90-100 DOWN @ BIG COTTONWOOD LOGS ABOVE ROAD

WATER LEVEL UP ~2" NGS 0935

5" DROP SINCE 0935 → 0958

1020 WATER @ GAGE ~1' LOWER THAN 0935

LAST SIGN OF SILT ON BED ~25' DOWNSTREAM OF GATE

tate of A..ska TRANSCRIBED NOTES
ept. of Natural Resources
lv. of Geological & Geophysical Surveys

ATER RESOURCE INVESTIGATIONS

Meas. No. .....
Comp. by .....
Checked by .....

DISCHARGE MEASUREMENT NOTES

ta. No. .....
GLACIER CREEK
)ate 03/12/01 19..... Party CARRICK, INGRAM
Width ..... Area ..... Vel. ..... G. H. ..... Disch. .....
Method ..... No. secs. ..... G. H. change ..... in ..... hrs. Susp. .....
Method coef. ..... Hor. angle coef. ..... Susp. coef. ..... Meter No. .....
Type of meter PRICE

GAGE READINGS				
Time		Recorder	Inside	Outside
2:45				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Date rated ..... for rod, other.
Meter ..... ft. above bottom of weight.
Spin before meas. ..... after .....
Meas. plots ..... % diff. from rating .....
Wading, cable, ice, boat, upstr., downstr., side bridge ..... feet, mile, above, below gage, and .....
Check-bar, found ..... changed to ..... at .....
Correct .....
Levels obtained .....

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section .....
Flow ..... Weather CLOUDS/RAIN
Other ..... Air 35°F@ .....
Gage ..... Water .....°F@ .....
..... Record removed ..... Intake flushed U .....
Observer .....
.....
Control .....
.....
Remarks .....
.....
.....
G. H. of zero flow ..... ft.

S-768

River at—

Angle coef.	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REM	153		0		—	—		—			
2	150		1.40		51	40		1.26			
3	147.5		1.55		52	40		1.30			
4	145.0		1.45		71	40		1.76			
5	142.5		1.70		78	41		1.90			
6	140.0		1.55		81	40		2.10			
7	137.5		1.50		89	40		2.18			
8	135.0		1.35		91	40		2.24			
9	132.5		1.30		84	40		2.10			
10	130.0		1.25		88	40		2.18			
11	127.5		1.05		88	40		2.18			
12	125.0		1.10		91	41		2.22			
13	122.5		1.10		73	41		1.79			
14	120.0		1.10		71	41		1.74			
15	117.5		1.10		69	40		1.70			
16	115.0		1.00		72	40		1.78			
17	112.5		0.85		68	40		1.69			
18	110.0		0.70		34	41		0.84			
19	107.5		0.70		36	41		0.89			
20	105.0		0.50		41	40		1.03			
21	102.5		0.40		39	40		0.98			
22	100.0		0.30		40	40		1.00			
23	95.0		0.20		26	41		0.65			
24	90.0		0.10		0	0		0			
LEW 25	88.0		0		0	0		0			
			Q =	103	CFS						
			V =	1.73	FPS						
			W =	65.00	FT						
			A =	59.50	FT²						

.0 .10 .20 .30 .40 .50 .60 .70 .75

UNPUBLISHED REPORT

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
04/09/01
Twelfth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Clear, no precip past 24 hrs, ≅32°F, no ice in channel

Tidal Conditions: high tide at about 9:20 a.m. (32.7 ft)

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 43.00 CFS. Measurement was completed using standard wading techniques with a pygmy meter, top setting rod, and Aquacalc. No problems were encountered. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 1.56 ft and 1.50 ft at the upstream and downstream blocks respectively. No depth over block measurements were made. This is the low flow measurement of record. A substantial growth of a "stringy algal growth" was on the bed of the channel. It is possible that growth may effect the stage discharge relation. Once the data is plotted, data from this date should be examined to check if it is consistent with expectations.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 0.82°C; pH at 7.19; specific conductance at 127 uS/cm @25C; DO at 14.5 mg/l at 100.9% saturation.
- A site survey was completed. Stage was measured at 17.24 ft.
- The downstream conductivity probe was scanned on arrival, and returned a value of 178. That is 40% higher than the value for conductivity measured by the Hydrolab Quanta. As with the previous visit the probe was examined and what appeared to be silt and algae was found to have accumulated on the surface. The probe was cleaned. After cleaning the probe of silt the scan of the probe resulted in a value of 171, or 35% higher that the value measured with the Hydrolab Quanta.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES UNPUBLISHED REPORT

Date: 4/9/01 Time: 0935 Party: SC MI

Weather: CLR, DRY LAST 24 HRS Temperature: 30

Stream Conditions: CLR & LOW HIGH TIDE 32.4 @ 0910 THIS SITE

	Glacier Upstream	Glacier Downstream
Capture filename	GU040901.CSV	GD040901.CSV
Battery	12.4V	12.4V
Logging active?	YES	YES
Memory left	75% OF 32K	76% 32K
Bytes used	7752	9690
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	1.56 -26	1.50 178 0.6 ← BEFORE CLEAN AFTER CLEAN: 1.49 171 0.7 2% COND. SWITCH
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	SAVE 300 92%	300 90% KEEP
External battery--replace?	NO OK	NO
Internal battery--replace?	8.9V OK	8.9 OK
Replace desiccants?	YES BOTH	YES
Wiring/connections O.K.?	OK	OK
Final scan	OK 1.54 -2C	OK
Final status	OK	OK
Notes:		

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 4/9/01 Time: 1010 Party: SC MI

Weather: CLR DRY Temperature: 32 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.09				26.19'msl
BM 2, top concrete bridge foundation		4.47				
BM 3, top instrument post		5.02				25.26' msl
REW @ gage		12.99				
Top of upstream block, orange dot		14.265				
Top of downstream block, ~~upstream of pipe~~ TOP STAKES		14.08				
REW @ x-section		13.04				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE SITE Date: 4/9/01 Time: 1010

Battery: 4.3 V Temp.: 0.82 C pH: 7.19

Conductivity: 127 uS/cm DO: 14.5 mg/l %Saturation: 100.9

Notes: SAL = 0.06

IN WATER ~ 30 MIN PRIOR TO READING

State of Alaska
Dept. of Natural Resources
Div. of Geological & Geophysical Surveys

WATER RESOURCE INVESTIGATIONS

Meas. No. _____
Comp. by _____
Checked by _____

DISCHARGE MEASUREMENT NOTES

Sta. No. _____

GLACIER CRK NEAR GIRDWOOD

Date 04/09/01, 19____ Party S.C., M.I.

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

GAGE READINGS

Time		Recorder	Inside	Outside
10:50				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter RICKY / AQUACALC

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots ____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____ changed to _____ at _____

Correct _____

Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather CLEAR, NO PRECIP PREVIOUS 24 HRS

Other _____ Air ≈32° °F@ _____

Gage _____ Water 6 °F@ _____

_____ Record removed _____ Intake flushed U

Observer _____

_____

Control _____

_____

Remarks HIGH TIDE OF 32.7' @ ≈ 9:20 AM

SUBSTANTIAL "STAINING" ALGAL GROWTH" ON CREEK BED MAY

EFFECT STAGE DISCHARGE RELATION. CHECK PLOT LOCATION ON

STAGE DISCHARGE PLOT.

G. H. of zero flow _____ ft.

Rite in the Rain WEATHERPROOF

S-768

J. L. DARLING CORP. TACOMA, WASH. U.S.A.

River at—

Angle coefficient	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
	.0	.10	.20	.30	.40	.50	.60				.75
LEW	152										
	150		1.05	.6	33	40		0.83			.80 .85
	147.5		1.10	↓	31	40		0.78			
	145.0		1.20		47	41		1.16			.90
	143.0		1.25		53	41		1.31			
	141.0		1.35		58	41		1.42			.92
	139.0		1.20		64	40		1.59			
	137.0		1.10		49	41		1.21			.94
	135.0		1.00		56	41		1.37			.95
	132.5		1.00		53	40		1.31			.97
	130.0		1.00		54	40		1.35			.98
	127.5		0.80		50	41		1.23			.99
	125.0		0.70		50	40		1.24			
	122.5		0.80		37	41		0.92			
⊙	120.0		0.80		36	41		0.89			1.00
	117.5		0.80		41	41		1.01			
	115.0		0.60		17	40		0.44			
	112.5		0.50		26	42		0.64			.99
	110.0		0.35		13	41		0.34			.98
	107.5		0.30		11	42		0.29			.97
	105.0		0.20		8	46		0.20			.95
LEW	100.0										
											.90
											.85
			Q = 43.00 CFS								.80
			V = 1.08 FPS								
			W = 52 FT								
			A = 39.7 FT²								.81
											.82
											.83
	.0	.10	.20	.30	.40	.50	.60	.70	.75		

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
05/08/01
Thirteenth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Clear, no precip past 24 hrs, ≅45°F, no ice in channel

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 113.00 CFS. Measurement was completed using standard wading techniques with a pygmy meter, top setting rod, and Aquacalc. No problems were encountered. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 1.90 ft and 1.86 ft at the upstream and downstream blocks respectively. No depth over block measurements were made.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 3.89°C; pH at 7.26; specific conductance at 105 uS/cm @25C; DO at 13.7 mg/l at 102.7% saturation.
- A site survey was completed. Stage was measured at 17.60 ft.
- The downstream conductivity probe was scanned on arrival, and returned a value of 152. That is 45% higher than the value for conductivity measured by the Hydrolab Quanta. As with the previous visit the probe was examined and what appeared to be silt and algae was found to have accumulated on the surface. The probe was cleaned. After cleaning the probe of silt the scan of the probe resulted in a value of 146, or 39% higher that the value measured with the Hydrolab Quanta.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 5/8/01 Time: 1020 Party: SC MI

Weather: P CLDY Temperature: 45

Stream Conditions: CLR, LOW

	Glacier Upstream	Glacier Downstream
Capture filename	GU050801	GL 050801
Battery	12.5 V	12.4V
Logging active?	YES	YES
Memory left	75% of 32	69% of 32
Bytes used	7968	9960
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	1.928 / -25	1.86 / 152 / 3.6 °C
Manual measurement	1.9 OK	2.0
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save ~~800~~ 300)	92% USED	90% USED
External battery--replace?	NO	NO
Internal battery--replace?	9.0 V OK	8.8 V OK
Replace desiccants?	YES	YES
Wiring/connections O.K.?	OK	OK
Final scan	OK	OK
Final status	OK	OK

AFTER CLEANING C=146

Notes: 2% CHNG ON CONDUCTIVITY

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 05/08/01 Time: 1340 Party: SC. MJ

Weather: P Cldy - Sunny Temperature: 45 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		3.90				26.19'msl
BM 2, top concrete bridge foundation		4.29				
BM 3, top instrument post		4.835				25.26' msl
REW @ gage		12.37				
Top of upstream block, orange dot		14.08				
Top of downstream block, ~~upstream of pipe~~ Top of Sand		13.90				
REW @ x-section		12.49				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE Date: 5/8/01 Time: 1045

Battery: 4.2V V Temp.: 3.89 C pH: 7.26

Conductivity: 105 uS/cm DO: 13.7 mg/l %Saturation: 102.7

Notes: SAL = 0.05

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. _____ GLACIER CRK

Date 05/08 20 01 Party SC, MI

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. sects. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

GAGE READINGS

Time		Recorder	Inside	Outside
11:30	AM			
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter _____

Date rated _____ for rod, other.

Meter PYGMY ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots ____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather CLEAR TO HIGH CLOUDS

Other _____ Air 45 °F@ _____

Gage _____ Water _____ °F@ _____

_____ Record removed _____ Intake flushed U L

Observer _____

Control _____

Remarks _____

G. H. of zero flow _____ ft.

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River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW	152										
2	150		1.45	.6	54	40		1.34			
3	147.5		1.60	|	55	40		1.36			
4	145.0		1.60	↓	74	40		1.82			
5	142.5		1.70		80	40		1.97			
6	140.0		1.60		90	41		2.20			
7	137.5		1.60		96	40		2.36			
8	135.0		1.45		99	40		2.44			
9	132.5		1.30		92	40		2.26			
10	130.0		1.30		93	40		2.30			
11	127.5		1.10		90	40		2.27			
12	125.0		1.10		84	40		2.07			
13	122.5		1.20		79	40		1.96			
14	120.0		1.10		77	40		1.90			
15*	117.5		1.15		77	40		1.91			
16	115.0		1.05		77	40		1.90			
17	112.5		0.85		69	40		1.71			
18	110.0		0.80		44	40		1.10			
19	107.5		0.75		48	40		1.20			
20	105.0		0.50		41	40		1.02			
21	102.5		0.50		47	41		1.16			
22	100.0		0.35		40	40		1.00			
23	95.0		0.30		5	58		0.11			
LEW	89		-0-								
			Q =		113.9						
			V =		1.83						
			W =		63						
			A =		61.9						

* OUT OF METER RANGE

UNPUBLISHED REPORT

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
06/07/01
Fourteenth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Overcast, precip in past 24 hrs, ≅50°F, no ice in channel

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 588.00 CFS, the second highest flow measurement made to date. Measurement was completed from a boat held in place with a cable strung across the channel, with a Price AA meter, top setting rod, and Aquacalc. No problems were encountered. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 2.92 ft and 2.80 ft at the upstream and downstream blocks respectively. No depth over block measurements were made.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 4.0°C; pH at 7.53; specific conductance at 82 uS/cm @25C; DO at 13.44mg/l at 103.3% saturation. A second pH reading using a Beckman meter was made due to indications of problems with the Quanta. The Beckman readings were discarded due to poor calibration results in the field.
- A site survey was completed. Stage was measured at 18.52 ft. Turbidity prevented a survey elevation measurement on the downstream block.
- The downstream conductivity probe was scanned on arrival, and returned a value of 147. That is 77% higher than the value for conductivity measured by the Hydrolab Quanta. Neither visual inspection of the probe, nor any cleaning of the probe was possible due to high water and turbidity. The discrepancy between the values measured by the Quanta and the dedicated probe continue to enlarge. Replacement of the conductivity probes should be done.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES UNPUBLISHED REPORT

Date: 6/7/01 Time: 1000 Party: SC MI

Weather: OVERCAST, RAIN PAST 24 HRS Temperature: ~50

Stream Conditions: VISIBILITY ~1' DEPTH, HIGH + FAST, BUT NOT OVER GRAVEL BAR

	Glacier Upstream	Glacier Downstream
Capture filename	G4 060701	GD060701
Battery	12.5V	12.9V
Logging active?	YES	YES
Memory left	75%	68%
Bytes used	8160	10190
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	2.92 / -26	2.8 / 147 / 3.7
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	YES 300, 92% LEFT	YES, 300, 91% LEFT
External battery--replace?	OK	OK
Internal battery--replace?	8.9V OK	8.9V OK
Replace desiccants?	YES	YES
Wiring/connections O.K.?	✓	✓
Final scan	2.9 / -26	2.8 / 148 / 3.8
Final status	OK	
Notes:		20% CAKE ON COND.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 6/7/01 Time: 1030 Party: SC MI

Weather: PCLDY, WARM UP, BUT NOT TOO TERRIBLE Temperature: ~50 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.08				26.19'msl
BM 2, top concrete bridge foundation		4.47				
BM 3, top instrument post		5.02				25.26' msl
REW @ gage		11.63				
Top of upstream block, orange dot		14.26				
Top of downstream block, upstream of pipe						
REW @ x-section		11.75				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE Date: 6/7/01 Time: 1030

Battery: 3.9 V Temp.: 4.0 C pH: 7.53

Conductivity: 82 uS/cm DO: 13.44 mg/l %Saturation: 103.3

SAL 0.04

Notes: BECKMAN : CALIB TEMP

7: 7.07 STRM = 4.4

9: 10.13 STRM = 4.6

STREAM : 8.83

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____
Comp. by _____
Checked by _____

Sta. No. _____ GLACIER CR.

Date 6/7/ 20 01 Party MC SC

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. sects. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

GAGE READINGS				
Time		Recorder	Inside	Outside
1120		2.9		
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter A-A AQUA

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots _____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____ changed to _____ at _____

Correct _____

Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather PCLDY RAIN PAST 24 HRS

Other _____ Air 55 °F

Gage _____ Water _____ °F

_____ Record removed _____ Intake flushed U L

Observer _____

Control _____

Remarks _____

G. H. of zero flow _____ ft.

S–768

River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in sec.	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
RBH 1	152		0		—	—	—	—			
2	150.0		2.3	.6	49	40		2.68			
3	147.5		2.6		69	41		3.72			
4	145.0		2.6		64	40		3.48			
5	142.5		2.6		86	40		4.70			
6	140.0		2.5		98	40		5.31			
7	137.5		2.4		103	40		5.58			
8	135.0		2.3		93	40		5.06			
9	132.5		2.2		91	40		4.95			
10	130.0		2.2		96	40		5.23			
11	127.5		2.1		92	40		4.98			
12	125.0		2.0		95	40		5.13			
13	122.5		2.0		94	40		5.12			
14	120.0		1.8		91	40		4.92			
15	117.5		1.8		92	40		5.00			
16	115.0		1.8		88	40		4.80			
17	112.5		1.6		87	40		4.72			
18	110.0		1.65		84	40		4.54			
19	107.5		1.50		77	41		4.14			
20	105.0		1.50		68	40		3.68			
21	102.5		1.50		77	40		4.17			
22	100.0		1.30		68	40		3.70			
23	95.0		1.10		60	40		3.25			
24	90.0		1.00		66	40		3.58			
25	85.0		0.90		56	40		3.05			
26	80.0		0.80		54	40		2.95			
27	75.0		0.65		49	41		2.64			
28	70.0		0.85		50	40		2.74			
29	65.0		0.90		41	41		2.21			
30	60.0		0.75		41	40		2.24			
31	55.0		0.30		10	44		0.52			
LEW 32	54.0		-0-		—	—		—			

Q = 588.0
W = 4.14
W = 98
A = 142

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
06/28/01
Fifteenth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Sunny, no precip in past 24 hrs, ≅70°F, no ice in channel

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 1352 CFS, the highest flow measurement made to date. Measurement was completed from a boat held in place with a cable strung across the channel, with a Price AA meter, top setting rod, and Aquacalc. Due to high flow velocities a cable fitting snapped, requiring some infield adaptation and repair. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 3.6 ft and 3.95 ft at the upstream and downstream blocks respectively. No depth over block measurements were made due to high water and turbidity.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 5.4°C; pH at 7.74; specific conductance at 71 uS/cm @25C; DO at 12.5mg/l at 100.1% saturation. This was the first use of the Quanta following its return to Hydrolab for repair of the pH sensor.
- A site survey was completed. Stage was measured at 19.07 ft, more than .5 ft higher than any previous stage record. Turbidity prevented a survey elevation measurement of either block.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 6/28/01 Time: 1120 Party: SC MJ

Weather: CLR, RAIN SHOWER LAST NIGHT Temperature: 65

Stream Conditions: HIGH & TURBID (LOWS IN 50's HIGH 70's LAST WEEK)

	Glacier Upstream	Glacier Downstream
Capture filename	GU 062801	GD062801
Battery	12.5V	12.4V
Logging active?	YES	YES
Memory left	79%	75%
Bytes used	6490	8050
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	3.6	3.95 / 108 / 5.1
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300 92%	300 90%
External battery--replace?	NO	NO
Internal battery--replace?	YES 9.3V	YES 9.3V
Replace desiccants?	~~YES~~	YES
Wiring/connections O.K.?	✓	✓
Final scan	3.55 OK	3.9 / 120 / 5.2
Final status	OK	OK
Notes:		

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 6/28/01 Time: 1145 Party: SC MI

Weather: SUNNY, 70°, RAIN SHOWER OVERNIGHT Temperature: ~70 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.05				26.19'msl
BM 2, top concrete bridge foundation		4.44				
BM 3, top instrument post		4.97				25.26' msl
REW @ gage		11.90				
Top of upstream block, orange dot		~				
Top of downstream block, upstream of pipe		—				
REW @ x-section		11.17				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE Date: 6/28/01 Time: 1145

Battery: 4.6 V Temp.: 5.4 C pH: 7.74

Conductivity: 71 uS/cm DO: 12.5 mg/l %Saturation: 100.1

Notes: SAL = 0.03

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. GLACIER CREEK

Date 06/28/ 2001 Party CARRICK, JANSHIAN

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

Type of meter PRICE

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots _____ % diff. from rating _____

Wading, cable, ice, (boat,) upstr., downstr., side

bridge _____ feet, mile, above, below

gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

GAGE READINGS

Time		Recorder	Inside	Outside
1210				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section LIKELY HIGH FLOW CORRECTED. USED

Flow _____ Weather WARM (75°FT), NO RAIN FOR PREVIOUS DAYS

Other _____ Air _____ °F@ _____

Gage _____ Water _____ °F@ _____

_____ Record removed _____ Intake flushed U

Observer _____

Control _____

Remarks RIVER FORECAST CENTER STAGE = 26.75

G. H. of zero flow _____ ft.

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.0 .10 .20 .30 .40 .50 .60 .70 .75

River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	Adjusted for hor. angle or	Area	Discharge
RON 1	152		0	.6							
2	150		3.00		59	40		5.22			
3	147.5		3.30		102	40		5.56			
4	145.0		3.40		106	40		5.74			
5	142.5		3.40		111	40		5.99		LESS STATION 6	
ADD 6	140.0		3.60		135	40		7.32		Q = 1820	
6 7	137.5		3.80		144	40		7.84		W = 5.7	
7 8	135.0		3.80		140	40		7.61		W 104	
8 9	132.5		3.60		132	40		7.19		A 214	
9 10	130.0		3.50		127	40		6.90			
10 11	127.5		3.50		117	40		6.36	CORRECTED, NSD.		
11 12	125.0		4.00		127	40		6.90	OMITTED STATION 6		
12 13	122.5		3.90		134	40		7.26			
13 14	120.0		3.70		119	40		6.47		Q = 1352	
14 15	117.5		3.30		98	40		5.31		V = 5.75	
15 16	115.0		3.30		117	40		6.36		W = 104	
16 17	112.5		3.00		109	40		5.90		A = 232	
17 18	110.0		2.70		110	40		5.95			
18 19	107.5		2.50		106	40		5.75			
19 20	105.0		2.40		95	40		5.18			
20 21	102.5		2.20		95	40		5.15			
21 22	100.0		1.80		90	40		4.90			
22 23	95.0		1.60		87	40		4.73			
23 24	90.0		1.10		66	40		3.58			
24 25	85.0		0.75		40	41		2.16			
25 26	80.0		0.35		43	40		2.36			
26 27	75.0		0.40		55	41		2.97			
27 28	70.0		0.60		55	40		3.00			
28 29	65		1.40		76	41		4.10			
29 30	60		1.30		93	40		5.08			
30 31	55		0.70		17	42		0.90			
31 32	50		0.50		6	42		0.33			

.0 .10 .20 .30 .40 .50 .60 .70 .75

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
07/11/01
Sixteenth Site Visit
Maintenance

UNPUBLISHED REPORT

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Light rain in past 24 hrs, ≅60°F.I

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 729 CFS. Measurement was completed from a boat held in place with a cable strung across the channel, with a Price AA meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 2.80 ft and 3.12 ft at the upstream and downstream blocks respectively. No depth over block measurements were made due to high water and turbidity.
- The channel cross sectional profile appears to have changed, causing greater velocities turbulence in the vicinity of the stage sensors. Further, it appears that under stage conditions as of the date of this visit that the upstream sensor is likely experiencing more turbulence of flow, suggesting that the lower block sensor may be more accurate. On the opposite left bank the development of a more pronounced side channel is also evicent.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 4.57°C; pH at 7.64; specific conductance at 80 uS/cm @25C; DO at 12.67mg/l at 99.2% saturation. This was the first use of the Quanta following its return to Hydrolab for repair of the pH sensor.
- A site survey was completed. Stage was measured at 18.32 ft. Turbidity prevented a survey elevation measurement of either block.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 5/11/01 Time: 1600 Party: SC MS

Weather: CLDY LT RAIN Temperature: 50

Stream Conditions: MOD HI

* USE DOWNSTREAM DATA,

	Glacier Upstream	Glacier Downstream
Capture filename	G4051101	GD051101
Battery	12.4	12.3
Logging active?	✓	✓
Memory left	84 %	81 %
Bytes used	4888	6110
Started	—	—
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	2.8 1-26	3.12/143/4.4
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300	300
External battery--replace?	OK NO	OK NO
Internal battery--replace?	OK 9.2V	OK 9.2V
Replace desiccants?	YES	YES
Wiring/connections O.K.?	✓	✓
Final scan	OK	OK
Final status	✓	✓
Notes:		

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 7/11/01 Time: 1015 Party: SC MJ

Weather: LT RAIN Temperature: 52 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.14				26.19'msl
BM 2, top concrete bridge foundation		4.53				
BM 3, top instrument post		5.08				25.26' msl
REW @ gage		11.77				
Top of upstream block, orange dot						
Top of downstream block, upstream of pipe						
REW @ x-section		12.01				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: GAGE Date: 7/11/01 Time: 1015

Battery: 4.5 V Temp.: 4.57 C pH: 7.69

Conductivity: 80 uS/cm DO: 12.67 mg/l %Saturation: 99.2

SAL = 0.04

Notes: RAIN LAST 24 HRS. BUT WITH COOLER TEMPS SO LESS SNOWMELT

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. _____
GLACIER CRK NR GIRDWOOD

Date 02/11/01 20 ____ Party CARLUCCI/INGRAM

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

Type of meter PRICE

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots ____ % diff. from rating _____

(Wading), cable, ice, (boat), upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

GAGE READINGS

Time		Recorder	Inside	Outside
1030		3.12		
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather DRIZZLE/RAIN - LIGHT BREEZE

Other _____ Air _____ °F@ _____

Gage _____ Water _____ °F@ _____

_____ Record removed _____ Intake flushed U

Observer _____

Control _____

Remarks BOAT MEASUREMENTS

RFC STAGE = 25.28

G. H. of zero flow _____ ft.

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River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or ____	Area	Discharge
REW	152		0	6							
2	150		2.30	4	46	41		1.13		2.51	
3	147.5		2.60		52	40		1.29		2.87	
4	145.0		2.60		72	40		1.77		3.94	
5	142.5		2.80		83	40		2.04		4.55	
6	140.0		3.10		103	40		2.53		5.66	
7	137.5		3.30		123	40		3.75	6.74		
8	135.0		3.40		123	40		7.04			
9	132.5		3.40		119	40		6.58			
10	130.0		3.30		116	40		6.41			
11	127.5		2.80		134	40		7.57			
12	125.0		3.60		129	40		7.13			
13	122.5		3.50		130	40		7.13			
14	120.0		3.50		92	40		5.06			
15	117.5		2.80		66	41		3.59			
16	115.0		2.60		88	40		4.83			
17	112.5		2.40		79	40		4.34			
18	110.0		2.00		60	40		3.33			
19	107.5		1.60		59	40		3.25			
20	105.0		1.10		50	41		2.74			
21	102.5		0.75		36	41		1.97			
22	100.0		0.60		28	40		1.56			
23	95.0		0.50		20	41		1.11			
24	90.0		-0-		—		—				
25	75.0		-0-		—		—				
26	70.0		0.60		22	42		1.18			
27	65.0		0.80		31	40		1.71			
28	60.0		0.80		34	40		1.88			
LEW 29	55.0		-0		-0-						
			729								
		Q =	789*			W	82				
		V =	4.89*			A	149				

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
08/07/01
Seventeenth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Overcast, no rain in past 24 hrs, ≅60°F.I

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 549 CFS. Measurement was completed from a boat held in place with a cable strung across the channel, with a Price AA meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 2.40 ft and 2.7 ft at the upstream and downstream blocks respectively. No depth over block measurements were made due to high water and turbidity.
- The channel cross sectional profile appears to have continued to change On the opposite left bank the development of a more pronounced side channel is also evident, with an approximately 21 foot wide dry bar between the channels.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 6.47°C; pH at 7.58; specific conductance at 83 uS/cm @25C; DO at 12.31mg/l at 100.4% saturation.
- A site survey was completed. Stage was measured at 18.04 ft. Turbidity prevented a survey elevation measurement of either block.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Possible replacement of conductivity probes.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 8/7/01 Time: 1136 Party: SC MJ

Weather: P Cldy Temperature: 60s 65

Stream Conditions: A LT LOWER THAN LAST VISIT

	Glacier Upstream	Glacier Downstream
Capture filename	GU080701	GD080701
Battery	12.4V	12.3V
Logging active?	YES	YES
Memory left	76% of 32K	70% of 32K
Bytes used	7592	9500
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	2.4 / -26	2.7 / 146 / 6.3
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300 92% left	300 90% left
External battery--replace?	NO	NO
Internal battery--replace?	9.3V OK.	9.2V OK
Replace desiccants?	YES	YES
Wiring/connections O.K.?	OK	OK
Final scan	2.4 / -26	OK
Final status	OK	OK
Notes:		

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 8/7/81 Time: _____ Party: SC MI

Weather: P Cldy Temperature: 60-65 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.16				26.19'msl
BM 2, top concrete bridge foundation		4.54				
BM 3, top instrument post		5.08				25.26' msl
REW @ gage		12.12				
Top of upstream block, orange dot						
Top of downstream block, upstream of pipe						
REW @ x-section		12.31				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE Date: 8/7/81 Time: 1145

Battery: 4.5 V Temp.: 6.47 C pH: 7.58

Conductivity: 83 uS/cm DO: 12.31 mg/l %Saturation: 100.4

SAL = 0.04

Notes:

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. ....
Comp. by ....
Checked by ....

Sta. No. GLACIER CRK

Date 08/07 20 01 Party CARRICK INGHRAM

Width .... Area .... Vel. .... G. H. .... Disch. ....

Method .... No. secs. .... G. H. change .... in .... hrs. Susp. ....

Method coef. .... Hor. angle coef. .... Susp. coef. .... Meter No. ....

GAGE READINGS			
Time	Recorder	Inside	Outside
12:35			
Weighted M. G. H.			
G. H. correction			
Correct M. G. H.			

Type of meter ....
Date rated .... for rod, other.
Meter PRICE ft. above bottom of weight.
Spin before meas. .... after ....
Meas. plots .... % diff. from rating ....
Wading, cable, ice, boat, upstr., downstr., side bridge .... feet, mile, above, below gage, and ....
Check-bar, found ....
changed to .... at ....
Correct ....
Levels obtained ....

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section ....

Flow .... Weather OVERCAST, NO RAIN
Other .... Air .... °F@ 60°
Gage .... Water .... °F@ ....
.... Record removed .... Intake flushed ....
Observer ....
Control ....
Remarks DISTINCT AND CHANNEL, LEW
NFC [illegible] 25.3?

G. H. of zero flow .... ft.

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	Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	Velocity At point	Velocity Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW	1	152		0	.6	—	—		—			
	2	150		2.10	V	33	41		1.77			
	3	147.5		2.30		38	40		2.08			
	4	145.0		2.30		48	40		2.62			
	5	142.5		2.50		59	40		3.20			
	6	140.0		2.80		87	40		4.72			
	7	137.5		3.15		102	40		5.52			
	8	135.0		3.20		101	40		5.50			
	9	132.5		3.30		101	40		5.50			
	10	130.0		3.30		104	40		5.67			
	11	127.5		2.70		127	40		6.87			
	12	125.0		3.00		120	40		6.52			
	13	122.5		3.90		117	40		6.35			
	14	120.0		3.50		76	41		4.10			
	15	117.5		3.00		46	40		2.53			
	16	115.0		2.30		66	40		3.61			
	17	112.5		2.10		72	40		3.90			
	18	110.0		1.55		52	40		2.83			
	19	105.0		0.75		29	40		1.60			
	20	100.0		0.40		11	41		0.61			
	21	95.0		0.30		11	43		0.57			
	22	91		-0-								
	23	74		-0-								
	24	70		0.25		-0-	-		-0-			
	25	65		0.50		16	40		0.89			
	26	60		0.60		13	42		0.72			
LEW	27	57.5		-0-		-						
				Q	=	549.0						
				V	=	4.16						
				W	=	77.5						
				A	=	132.0						

UNPUBLISHED REPORT

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
09/05/01
Eighteenth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: High Overcast, rain in past 3 days, ≅55°F.I

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 689 CFS. Measurement was completed from a boat held in place with a cable strung across the channel, with a Price AA meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working correctly. The scan of the R2's showed a depth of 2.58 ft and 2.85 ft at the upstream and downstream blocks respectively. No depth over block measurements were made due to high water and turbidity.
- The channel cross sectional profile appears to have continued to change On the opposite left bank the development of a more pronounced side channel is also evident, no dry bar existed at this site visit due to the higher stage.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 6.01°C; pH at 7.57; specific conductance at 95 uS/cm @25C; DO at 11.97mg/l at 98.3% saturation.
- A site survey was completed. Stage was measured at 18.14 ft. Turbidity prevented a survey elevation measurement of either block.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Possible replacement of conductivity probes.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 9/5/01 Time: 1125 Party: SL MH

Weather: CLDY Temperature: 50

Stream Conditions: HIGH, CRAZY, RAIN LAST 3 DAYS

	Glacier Upstream	Glacier Downstream
Capture filename	GU090501	GD090501
Battery	12.4 V	12.2 V
Logging active?	Y	Y
Memory left	75%	69%
Bytes used	7968	9950
Started		
Record/Scan intervals	60-60	60-60
Scan reading (depth and conductivity)	2.58 / 29	2.85/159/5.8
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	
Purge (save 800)	Y 300 92% LAST	Y 300 90%
External battery--replace?	OK	OK
Internal battery--replace?	9.2 V OK	9.2 V OK
Replace desiccants?	Y	Y
Wiring/connections O.K.?	✓	✓
Final scan	OK	OK
Final status	OK	OK
Notes:		

RIVER FORECAST STAGE 25.4

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 9/05/01 Time: 14:15 Party: SC M.

Weather: P CLOUDY, RAIN LAST 3 DAYS Temperature: 55 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.15				26.19'msl
BM 2, top concrete bridge foundation		4,525				
BM 3, top instrument post		5.07				25.26' msl
REW @ gage		12.02				
Top of upstream block, orange dot						
Top of downstream block, upstream of pipe						
REW @ x-section		12.20				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: GLACIER CR @ GAGE Date: 9/05/01 Time: 1145

Battery: 4.9 V Temp.: 6.01 C pH: 7.57

Conductivity: 95 uS/cm DO: 11.97 mg/l %Saturation: 98.3

Notes: SALIN = 0.04

NO PRECALIBRATION - DONE

UNPUBLISHED REPORT

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. ____
Comp. by ____
Checked by ____

Sta. No. Glacier Crk
Date 09/05 2001 Party Carrick Ingram
Width ____ Area ____ Vel. ____ G. H. ____ Disch. ____
Method ____ No. secs. ____ G. H. change ____ in ____ hrs. Susp. ____
Method coef. ____ Hor. angle coef. ____ Susp. coef. ____ Meter No. ____

GAGE READINGS				
Time		Recorder	Inside	Outside
12:21				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter Price
Date rated ____ for rod, other.
Meter ____ ft. above bottom of weight.
Spin before meas. ____ after ____
Meas. plots ____ % diff. from rating ____
Wading, cable, ice, boat, upstr., downstr., side bridge ____ feet, mile, above, below gage, and ____
Check-bar, found ____ changed to ____ at ____
Correct ____
Levels obtained ____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section ____
Flow ____ Weather Rain previous 24 hrs, 72 hrs
Other ____ Air 53° °F@ ____
Gage ____ Water ____ °F@ ____
Record removed ____ Intake flushed ____
Observer ____
Control ____
Remarks Ref [illegible] 25.43
C. H. of zero flow ____ ft.

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River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	Velocity At point	Velocity Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW	153		-0-								
2	150		2.3	.6	42	41		2.27			
3	147.5		2.4	↓	58	40		3.16			
4	145.0		2.75		62	40		3.36			
5	142.5		2.6		78	40		4.26			
6	140.0		2.7		106	40		5.78			
7	137.5		2.9		115	40		6.25			
8	135.0		2.9		129	40		6.98			
9	132.5		3.0		123	40		6.69			
10	130.0		2.9		126	40		6.85			
11	127.5		2.2		131	40		7.10			
12	125.0		2.8		122	40		6.63			
13	122.5		3.2		123	40		6.69			
14	120.0		3.1		113	40		6.16			
15	117.5		2.9		80	40		4.32			
16	115.0		2.6		97	40		5.29			
17	112.5		2.4		95	40		5.18			
18	110.0		2.2		72	40		3.94			
19	107.5		2.1		54	40		2.95			
20	105.0		1.7		74	40		4.03			
21	102.5		1.3		68	40		3.39			
22	100.0		1.0		50	41		2.71			
23	95.0		0.6		16	42		0.86			
24	90.0		0.4		12	41		0.65			
25	75.0		0.3		21	44		1.07			
26	65.0		0.3		14	41		0.77			
LEW	55.0		-0-								
			Q	=	689						
			V	=	4.75						
			W	=	98						
			A	=	145						

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
10/03/01
Nineteenth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: High Overcast, drizzle, ≅40-43°F, I

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 192 CFS. Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locatons, with a Price AA meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working. The scan of the R2's showed a depth of 1.56 ft and 1.71 ft at the upstream and downstream blocks respectively. No depth over block measurements were, however survey shots on the blocks were completed.
- The channel cross sectional profile appears to have continued to change On the opposite left bank all previously noted side channels are filled in. The channel thalweg has moved out away more from the right bank.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 4.93°C; pH at 7.64; specific conductance at 121 uS/cm @25C; DO at 12.50mg/l at 100.5% saturation.
- A site survey was completed. Stage was measured at 17.19 ft. Turbidity prevented a survey elevation measurement of either block.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Possible replacement of conductivity probes.
- Possible movement of the discharge cross-section to a site 20-30 ft upstream.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 10/3 Time: 1030 Party: SC M,

Weather: CLDY, LT RAIN Temperature: 45

Stream Conditions: CLEAR, HIGH

	Glacier Upstream	Glacier Downstream
Capture filename	GU100301	GD100301
Battery	12.3	12.2
Logging active?	Y	Y
Memory left	75%	70%
Bytes used	7768	9700
Started		—
Record/Scan intervals	-1.55 / 38	360 / 3600
Scan reading (depth and conductivity)	↓ ↓	1.71 / 179 / 4.8
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300	300
External battery--replace?	NO	NO
Internal battery--replace?	NO 9.2V	NO 9.2V
Replace desiccants?	X	X
Wiring/connections O.K.?	OK	OK
Final scan	OK	OK
Final status	OK	OK
Notes:		

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 10/3/01 Time: 1100 Party: SC M.

Weather: LT RAIN, Temperature: 45 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.16				26.19'msl
BM 2, top concrete bridge foundation		4.55				
BM 3, top instrument post		5.09				25.26' msl
REW @ gage		13.07				
Top of upstream block, orange dot		14.39				
Top of downstream block, TOP ~~upstream of pipe~~ STAKE		14.74				
REW @ x-section		13.16				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE Date: 10/3/01 Time: 10:45

Battery: 4.4 V Temp.: 4.93 C pH: 7.64

Conductivity: 121 uS/cm DO: 12.5 mg/l %Saturation: 100.5

Notes: TOP STAKE

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. _____

GLACIER CRK

Date 10/29/03 20 01 Party CARLSON / TOUSSAINT

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. secs. _____ G. H. change _____ In _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

GAGE READINGS

Time		Recorder	Inside	Outside
11:15AM				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter PRICE

Date rated _____ for rod, other.

Meter PRICE ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots _____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather OVERCAST, DRIZZLE, WIND 10-40 SW

Other _____ Air _____ °F@ _____

Gage _____ Water _____ °F@ _____

_____ Record removed _____ Intake flushed U

Observer _____

_____

Control _____

_____

Remarks STAGE REMARKABLY DOWN FROM PREVIOUS VISIT.
DISCHARGE COMPLETED BY WADING

_____

G. H. of zero flow _____ ft.

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.0 .10 .20 .30 .40 .50 .60 .70 .75

River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in sec.	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or ____	Area	Discharge	
RBM	152		0		-0	-0						
2	150		1.25	.6	14	43		0.73				.05
3	147.5		1.50	.4	29	40		1.60				
4	145.0		1.70		31	40		1.71				
5	142.5		1.50		40	40		2.20				.10
6	140.0		1.50		52	40		2.85				.12
7	137.5		1.50		57	40		3.11				.14
8	135.0		1.50		64	40		3.49				
9	132.5		1.80		66	41		3.57				.16
10	130.0		1.90		63	41		3.39				.17
11	127.5		1.95		64	40		3.50				.18
12	125.0		1.90		65	40		3.53				.20
13	122.5		2.30		67	40		3.63				
14	120.0		2.20		30	41		1.63				
15	117.5		1.70		35	41		1.88				1.00
16	115.0		1.50		44	41		2.37				
17	112.5		1.30		43	41		2.32				
18	110.0		1.10		42	41		2.27				.91
19	107.5		1.00		30	40		1.65				.16
20	105.0		0.60		26	41		1.39				.07
21	102.5		0.35		13	42		0.69				.06
LEW 22	100.0		-0.		-0.	-0-						.11
				Q	192							.22
				V	2.57							.20
				W	52							
				A	74.8							.25
												.30

.0 .10 .20 .30 .40 .50 .60 .70 .75

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
10/16/01
Twentieth Site Visit
Sensor/Recorder Replacement

Staff participating: Stan Carrick, Roy Ireland, Mark Inghram

Weather/Channel Conditions: Clear, no precip previous 48 hrs, ≅ 30°F

Tidal Conditions: na

Accomplishments & Issues:

- All sensors and recorders were changed. The purpose of the change was the continued problems encountered with the conductivity probes. There have been no problems with the pressure transducers. All sensors and recorders were changed rather than the conductivity probes alone because it was deemed easier to switch all instrumentation rather than a field change of only the conductivity probes alone. This complete switch allowed for all instrumentation to be preconfigured in an office setting, and installed as a single unit in the field. In order to reestablish elevations surveys were completed before and after instrumentation installation, these are recorded as visit 20A and 20B respectively.
- Discharge measurement on Glacier Creek was completed. Flow was measured at 160 CFS. Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locatons, with a Price AA meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 1.47 ft and 1.63 ft at the upstream and downstream blocks respectively prior to intrumentaion switch, and 1.23 and 1.55 after instrumentation switch.
- A correction factor of –0.15' was measured and applied to the downstream block position to account for the new placement. No correction factor needed to be applied to the upstream block position.
- A correction factor still needs to be added to account for the new sensor location on the blocks. This correction factor is estimated at 4" (.33').
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 1.37°C; pH at 7.48; specific conductance at 126 uS/cm @25C; DO at 13.31mg/l at 95.7% saturation
- Field calibration of all sensors in standards completed and sensors appeared to be operating correctly. Upon submersion of the sensors in the stream values appeared somewhat questionable, however this will not be confirmed until after application of temperature correction factor. Temperature correction factors to apply to conductivity data collected by sensor arrays unavailable at time of installation. These factors will be applied to data at the time of the next servicing visit.
- A site survey was completed. Stage was measured at 17.06 ft.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Measure correction factor for higher sensor position on block.
- Additional 2 locks for new instrument shelters.

UNPUBLISHED REPORT

VISIT 20A

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 10/16/01 Time: 1100 Party: RI MJ SC

Weather: SUNNY Temperature: 30's

Stream Conditions: CLEAR, LOW

	Glacier Upstream	Glacier Downstream
Capture filename	GU101601	GL 101601
Battery		
Logging active?	Y	Y
Memory left		
Bytes used		
Started		
Record/Scan intervals		
Scan reading (depth and conductivity)	1.471	1.628 / 176 / 1.2
Manual measurement	OK	OK
Journal		
Dump number of records/all		
Purge (save 800)		
External battery--replace?		
Internal battery--replace?		
Replace desiccants?		
Wiring/connections O.K.?		
Final scan		
Final status		
Notes:		

PULLED INSTRUMENTS, REPLACED WITH NEW SYSTEMS

UNPUBLISHED REPORT

VIST 203

NEW INSTRUMENTS 10/16/01

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 10/16/01 Time: 14:30 Party: RI, MI, SC

Weather: 40° SUNNY Temperature:

Stream Conditions: CLR, DRIPPING

	Glacier Upstream	Glacier Downstream
Capture filename	GU101601	GD101601
Battery	NEW 12.3V	NEW 12.5V
Logging active?	Y	YES
Memory left	100 %	86% of 32K
Bytes used	0	
Started	10/16/01	10/16/01 1430
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	2.6'/1.23/106	2.3'/1.55'/117 *
Manual measurement	DEPTH OK	DEPTH OK
Journal	OK	OK
Dump number of records/all	—	—
Purge (save 800)	—	—
External battery--replace?	—	—
Internal battery--replace?	—	—
Replace desiccants?	NEW	NEW
Wiring/connections O.K.?	OK	OK
Final scan	2.6'/1.23'/105	2.4'/1.55'/117
Final status	OK	OK

Notes:

* CONDUCTIVITY VALUES ARE NOT TEMPERATURE CORRECTED

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 10/16/01 Time: 11:?? Party: SC RI MJ

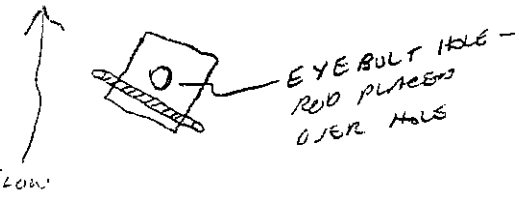
Weather: SUNNY, CLOUDS Temperature: 25-35 F

Location	Top	20A OLD SENSORS Middle	20B NEW SENSORS 2nd Site	Bottom	Angle	Elevation	
HI							
BM 1, top RR bridge bolt		4.08				26.19'msl	
BM 2, top concrete bridge foundation		4.46					
BM 3, top instrument post		5.02				25.26' msl	
REW @ gage		13.06	13.11				
Top of upstream block, orange dot		14.27	14.27			14.14	TOP PVC
Top of downstream block, upstream of pipe		14.66	14.51			14.77	TOP CENTER OF BLOCK
REW @ x-section		13.21					
LEW @ x-section							
REW @ bridge							
BM Seward Highway bridge						30.77' msl	

Notes (over for sketch): NEW RECORDING INSTRUMENTS & SENSORS INSTALLED

DOWNSTREAM BLOCK SURVEY:

VISIT 20A (1ST COLUMN) OLD INST. ARRAYS
VISIT 20B (2ND COLUMN) NEW INST ARRAYS



HYDROLAB NOTES

Location: @ GAGE Date: 10/16/01 Time: 1130

Battery: 4.3 V Temp.: 1.37 C pH: 7.48

Conductivity: 126 uS/cm DO: 13.31 mg/l %Saturation: 95.7% SAL = 0.06

Notes: THERMOMETER TEMP = 1.8°C @ 1400 HR. *

NEW SENSORS

				QUANTA
UPSTREAM	IN	70 STANDARD	= 3.5°/44	IN 70 STANDARD = 3.5°/72
"	"	STREAM	= 1.9°/105	IN STREAM = 1.65°/125
DOWNSTREAM	IN	70 STANDARD	= 3.5°/52	
"	"	STREAM	= 2.5°/116	

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. _____ GLACIER CREEK

Date 10/16 20 01 Party SC, MT

Width 51 Area 65.6 Vel. 2.44 G. H. _____ Disch. 160.0

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

Type of meter AA

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots _____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

GAGE READINGS

Time		Recorder	Inside	Outside
1310				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather _____

Other _____ Air _____°F@ _____

Gage _____ Water _____°F@ _____

_____ Record removed _____ Intake flushed U

Observer _____

Control _____

Remarks CLEAR, NO PRECIP FORECAST 48+ HRS

G. H. of zero flow _____ ft.

S–768

River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or ____	Area	Discharge
BEW 1	152		-0-		-0	-0					
2	150		1.1	.6	13	41		0.72			
3	147.5		1.45	↓	31	41		1.69			
4	145.0		1.35		31	41		1.71			
5	142.5		1.25		41	40		2.27			
6	140.0		1.20		50	41		2.72			
7	137.5		1.20		57	41		3.11			
8	135.0		1.40		60	40		3.30			
9	132.5		1.45		64	40		3.52			
10	130.0		1.50		64	41		3.49			
11	127.5		1.60		64	41		3.50			
12	125.0		1.80		65	41		3.56			
13	122.5		2.15		60	40		3.29			
14	120.0		2.00		28	40		1.55			
15	117.5		1.45		29	41		1.58			
16	115.0		1.40		37	41		2.02			
17	112.5		1.25		42	41		2.29			
18	110.0		1.05		30	40		1.67			
19	107.5		0.90		25	41		1.35			
20	105.0		0.55		19	40		1.07			
21	102.5		0.35		10	41		0.52			
LEW 22	101.0		-0-		-0-	-0-					
				Q	160.0						
				V	2.44						
				W	51						
				A	65.6						

UNPUBLISHED REPORT

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
11/06/01
Twenty First Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Clear, no precip previous 48 hrs, ≅ 25°F

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 85.40 CFS. Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locations, with a Price AA meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 0.86 ft and 1.16 ft at the upstream and downstream blocks respectively. After application of the correction factor to account for sensor movement at the 20th site visit the corrected values were 1.10 and 1.24 ft respectively.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 0.09°C; pH at 7.67; specific conductance at 139 uS/cm @25C; DO at 14.40mg/l at 99.8% saturation.
- A site survey was completed. Stage was measured at 16.73 ft.
- Visual inspection of the discharge data indicates channel shifting is continuing to occur. Channel now appears deeper and narrower than in past visits. Further analysis will be needed to determine if a correction factor can be applied to continue existing stage discharge relationship, or if a different stage discharge relation will need to be developed in order to account for the channel shifting.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Measure depth over sensor.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 11/6/01 Time: 1030 Party: SC MI

Weather: SUNNY, CLR Temperature: 26

Stream Conditions: CLR & LOW

	Glacier Upstream	Glacier Downstream
Capture filename	G411060.1	GD110601
Battery	12.5 V	12.4 V
Logging active?	Y	Y
Memory left	84% 32K	71% 32K
Bytes used	5010	9160
Started	10/16/01	10/16/01
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	0.3°C/0.86'/107	0.1'C/1.16'/117
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300	300
External battery--replace?	NO	NO
Internal battery--replace?	NO	NO
Replace desiccants?	NO	NO
Wiring/connections O.K.?	OK	OK
Final scan	OK	OK
Final status	OK	OK
Notes:		

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

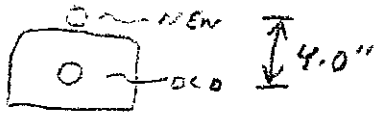
Date: 11/6/01 Time: 1100 Party: SC MJ

Weather: CLR SUNNY Temperature: 26 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.06				26.19'msl
BM 2, top concrete bridge foundation		4.45				
BM 3, top instrument post		4.99				25.26' msl
REW @ gage		13.42				
Top of upstream block, orange dot		14.28				
Top of downstream block, ~~upstream of pipe~~ TOP STRAP		14.51				
REW @ x-section		13.52				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

~4.0" OLD TRANS. TO NEW TRANS.



RFC STAGE = ~23.3

HYDROLAB NOTES

Location: @ GAGE Date: 11/6/01 Time: 1100

Battery: 4.3 V Temp.: 0.09 C pH: 7.67

Conductivity: 139 uS/cm DO: 14.40 mg/l %Saturation: 91.8

Notes:

UNPUBLISHED REPORT

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Meas. No. ....
Comp. by ....
Checked by ....

Discharge Measurement Notes

Sta. No. ________ GLACIER CRK

Date 11/06 20 01 Party S.C., M.T.

Width .... Area .... Vel. .... G. H. .... Disch. 85.40

Method .... No. secs. .... G. H. change .... in .... hrs. Susp. ....

Method coef. .... Hor. angle coef. .... Susp. coef. .... Meter No. ....

GAGE READINGS				
Time		Recorder	Inside	Outside
11:10	UP	0.86		
	DN	1.16		

Weighted M. G. H. ....
G. H. correction ....
Correct M. G. H. ....

Type of meter A.A.
Date rated .... for rod, other.
Meter .... ft. above bottom of weight.
Spin before meas. .... after ....
Meas. plots .... % diff. from rating ....
Wading, cable, ice, boat, upstr., downstr., side bridge .... feet, mile, above, below gage, and ....
Check-bar, found .... changed to .... at ....
Correct ....
Levels obtained ....

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section ....
Flow .... Weather ....
Other .... Air .... °F@ ....
Gage .... Water .... °F@ ....
.... Record removed .... Intake flushed ....
Observer ....
Control ....

Remarks CLEAR ~ 12" SNOW ON GROUND. NO PRECIP PREVIOUS 48 HRS ~ 35°F

G. H. of zero flow .... ft.

S-76B

River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	Velocity At point	Velocity Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW 1	151		-0-								
2	150		0.95	.6	8	41		0.45			
3	147.5		1.10	″	21	42		1.11			
4	145.0		1.00	″	21	42		1.13			
5	142.5		0.95		27	40		1.49			
6	140.0		0.85		32	40		1.77			
7	137.5		0.90		35	41		1.92			
8	135.0		1.05		37	40		2.04			
9	132.5		1.10		42	40		2.32			
10	130.0		1.25		45	41		2.45			
11	127.5		1.30		48	40		2.66			
12	125.0		1.40		49	40		2.69			
13	122.5		1.80		47	40		2.58			
14	120.0		1.60		25	41		1.37			
15	117.5		1.10		30	42		0.97			
16	115.0		1.05		27	40		1.50			
17	112.5		0.90		26	41		1.42			
18	110.0		0.70		30	42		0.97			
19	107.5		0.50		14	43		0.74			
20	105.0		0.30		6	41		0.34			
LEW	104		-0-		-0-						

Q: 85.40
V: 1.76
W: 47
A: 48.6

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
12/06/01
Twenty Second Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: High clouds, no precip previous 48 hrs, very light snow/fog, ≅ 5°F

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 60.20 CFS. Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locatons, with a Pygmy meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 0.75 ft and 1.03 ft at the upstream and downstream blocks respectively. After application of the correction factor to account for sensor movement at the 20th site visit the corrected values were 0.99 and 1.11 ft respectively.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at -0.06°C; pH at 7.38; specific conductance at 145 uS/cm @25C.
- DO data collected from the Hydrolab Quanta was discarded due to failure of post calibration procedures.
- A site survey was completed. Stage was measured at 16.64 ft.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Measure depth over sensor.
- Orange snow stake for instrument shelter.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 12/6/01 Time: 1140 Party: MJ + SC

Weather: CLDY, LT. SNOW Temperature: 10

Stream Conditions: SOME ICE ON BANKS, COLD SNAP 10 DAYS OR SO

	Glacier Upstream	Glacier Downstream
Capture filename	64120601	60120601
Battery	12.3 V	12.3
Logging active?	Y	Y
Memory left	68%	68%
Bytes used	10200	10200
Started	10/16/01	8/10/01
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	0.1°C / 0.75 / 107	0°C / 1.03 / 119
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300	300
External battery--replace?	N	N
Internal battery--replace?	N 8.7V	N 8.7V
Replace desiccants?	N OK	N OK
Wiring/connections O.K.?	✓	✓
Final scan	OK	✓
Final status	OK	✓
Notes:		

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 12/6/01 Time: 1120 Party: MT [illegible]

Weather: CLOUDY, LT SNOW Temperature: ~10 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt						26.19'msl
BM 2, top concrete bridge foundation						
BM 3, top instrument post		5.315				25.26' msl
REW @ gage		13.87				
Top of upstream block, orange dot		14.59				
Top of downstream ~~block~~, STRAP upstream of pipe		14.85				
REW @ x-section		13.93				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):
TOP STRAP UP BLOCK 14.41

HYDROLAB NOTES

Location: @ GAGE Date: 12/6/01 Time: 1120

Battery: 4.2 V Temp.: -0.06 C pH: 7.38

Conductivity: 145 uS/cm DO: 10.99 mg/l %Saturation: 71.3

Notes: 0.45 FT.

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. _____
GLACIER CR.

Date 12/06 20 81 Party S.C., M I

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

GAGE READINGS

Time		Recorder	Inside	Outside
1114				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter PYGMY

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots ____ % diff. from rating _____

(Wading), cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather _____

Other _____ Air _____ °F@ _____

Gage _____ Water _____ °F@ _____

_____ Record removed _____ Intake flushed U _____

Observer _____

_____

Control _____

_____

Remarks COLD, CLR PREVIOUS WEEK 40°F

_____

_____

G. H. of zero flow _____ ft.

S-768

TRANSECT 2

River mi—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or _____	Area	Discharge
RIM											
1	151			.6							
2	150		0.8	↓	4	60S		0.09			
3	147.5		1.0		30	41		0.74			
4	145.0		0.9		33	41		0.82			
5	142.5		0.8		44	40		1.10			
6	140.0		0.75		48	40		1.19			
7	137.5		0.80		54	40		1.34			
8	135.0		0.95		63	40		1.56			
9	132.5		1.00		76	40		1.98			
10	130.0		1.10		75	40		1.86			
11	127.5		1.25		89	40		2.18			
12	125.0		1.35		88	40		2.16			
13	122.5		1.70		84	40		2.08			
14	120.0		1.50		37	40		0.92			
15	117.5		1.05		41	40		1.02			
16	115.0		1.00		53	40		1.31			
17	112.5		0.85		37	41		0.90			
18	110.0		0.55		35	40		0.87			
19	108		0.5		18	40		0.47			
LEW	107		-0-		-0	-0-		-0-			
						Q	100.2				
						Y	1.39				
						W	44				
						A	434				

UNPUBLISHED REPORT

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
01/11/02
Twenty Third Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Overcast, very light snow, ≅25°F

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 169.00 CFS. Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locations, with a Pygmy meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 1.26 ft and 1.51 ft at the upstream and downstream blocks respectively. After application of the correction factor to account for sensor movement at the 20th site visit the corrected values were 1.50 and 1.59 ft respectively.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 0.48°C; pH at 7.10; specific conductance at 93 uS/cm @25C; DO at 13.60mg/l at 99.5% saturation.
- A site survey was completed. Stage was measured at 17.12 ft.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Measure depth over sensor.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 1/11/02 Time: 12:10 Party: SC

Weather: Clear - Pcldy Temperature: ~30 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.32				26.19'msl
BM 2, top concrete bridge foundation		4.70				
BM 3, top instrument post		5.25				25.26' msl
REW @ gage		13.30				
Top of upstream block, orange dot		14.53				
Top of downstream block, upstream of pipe		14.80				
REW @ x-section		13.39				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE Date: 1/11/02 Time: 1110

Battery: 4.2 V Temp.: 0.48 C pH: 7.1

Conductivity: 0.093 uS/cm DO: 13.6 mg/l %Saturation: 99.5

Notes: SAL = 0.04

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 1/11/02 Time: 1030 - 1115 Party: SC MS

Weather: CLDY - PCLDY, WARM & WET THE LAST 10 DAYS Temperature: 30°F

Stream Conditions: CLR & HIGHER

	Glacier Upstream	Glacier Downstream
Capture filename	G401102	GD01102
Battery	12.3	12.3
Logging active?	Y	Y
Memory left	64%	64%
Bytes used	11630	11641
Started	—	—
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	0.7°C / 1.26' / 83	0.5°C / 1.51' / 92
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300	300
External battery--replace?	NO	NO
Internal battery--replace?	YES 9.2V	YES 9.2V
Replace desiccants?	INSIDE	INSIDE
Wiring/connections O.K.?	✓	✓
Final scan	✓	✓
Final status	✓	✓
Notes:		

STAGE UP ~3.0' ON 12/26 - 12/27/01

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. _____
GLACIER CREEK

Date 01/11 20 002 Party SC, MI

Width _____ Area _____ Vel. _____ G. H. _____ Disch. 169.00

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

GAGE READINGS				
Time		Recorder	Inside	Outside
11:30				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter PYGMY

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots ____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather CLOT. PCLDY

Other _____ Air 30 °F@ _____

Gage _____ Water 0.5 °F@ _____

_____ Record removed _____ Intake flushed _____

Observer _____

_____

Control _____

_____

Remarks SNOWCAT'S, VERY LIGHT SNOW, ~ 20-25°F

_____

_____

G. H. of zero flow _____ ft.

S—768

.0 .10 .20 .30 .40 .50 .60 .70 .75

River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or ____	Area	Discharge
RBM	152		-0-	.6							
2	150		1.15	↓	22	42		0.68			
3	147.5		1.45		43	41		1.06			
4	145.0		1.70		50	40		1.24			
5	142.5		1.80		66	41		1.62			
6	140.0		1.80		100	40		2.47			
7	137.5		1.90		120	40		2.95			
8	135.0		1.90		130	40		3.20			
9	132.5		2.0		135	40		3.31			
10	130.0		1.80		127	40		3.12			
11	127.5		2.0		128	40		3.15			
12	125.0		1.90		124	40		3.05			
13	122.5		2.10		131	40		3.20			
14	120.0		1.70		60	40		1.48			
15	117.5		1.20		92	40		2.25			
16	115.0		1.20		67	41		1.64			
17	112.5		1.10		68	41		1.66			
18	110.0		0.95		63	40		1.56			
19	107.5		1.00		50	40		1.24			
20	105.0		0.90		47	40		1.17			
21	102.5		0.45		30	41		0.75			
22	100.0		0.15		5	49		0.13			
LEW	99.0		-0-								
						Q:	169				
						V:	2.25				
						W:	53				
						A:	75				

.0 .10 .20 .30 .40 .50 .60 .70 .75

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
02/19/02
Twenty Fourth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Clear, no precip. previous 24 hrs, ≅25°F

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 38.30 CFS. To date this measurement represents the low flow of record. Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locations, with a Pygmy meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 0.53 ft and 0.79 ft at the upstream and downstream blocks respectively. After application of the correction factor to account for sensor movement at the 20th site visit the corrected values were 0.77 and 0.87 ft respectively.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 0.20°C; pH at 8.00; specific conductance at 138.00 uS/cm @25C; DO at 13.22mg/l at 93.7% saturation.
- A site survey was completed. Stage was measured at 16.44 ft., lowest of any previous site visit values.
- A minor amount of floating ice/snow was in the channel, and some snow had been pushed into the channel by a loader removing snow from the road. The location of the loader pushed snow in the channel was between the sensor location and discharge cross section, immediately in line with the Hanson driveway. The location and amount of snow pushed into the channel is not likely to have been sufficient to effect either the instrument site or discharge site. The floating snow and ice was so minor to be of no concern.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Measure depth over sensor. Double check D.O.S. at downstream block where there was a possible discrepancy.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 2/19/02 Time: _____ Party: SC [illegible]

Weather: PCLOY Temperature: 20 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		N/A				26.19'msl
BM 2, top concrete bridge foundation		N/A				
BM 3, top instrument post		8.07				25.26' msl
REW @ gage		16.83				
Top of upstream block, orange dot		17.34				
Top of downstream block, STRAP upstream of pipe		17.58				
REW @ x-section		16.89				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

0.29 TOP STRAP GU D.O.S.

0.74 " " GO D.O.S.

HYDROLAB NOTES

Location: @ GAGE Date: 2/19/02 Time: 1045

Battery: 4.4 V Temp.: 0.20 C pH: 8.00

Conductivity: 138 uS/cm DO: 13.22 mg/l %Saturation: ~~13.22~~ 93.7

Notes: SAL: 0.06

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 2/19/02 Time: 1015 Party: SC MA

Weather: PCLDY Temperature: 20

Stream Conditions: LOW, CLR, LITTLE ICE

	Glacier Upstream	Glacier Downstream
Capture filename	GU02190Z.CAP	GD02190Z.CAP
Battery	12.2 V	12.2
Logging active?	Y	Y
Memory left	61%	61%
Bytes used	12350	12370
Started	10/16/01	8/4/01
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	0.4/0.53/105	0.5/0.79/116
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300	300
External battery--replace?	NO	N
Internal battery--replace?	NO 9.1 V	N 9.1 V
Replace desiccants?	OK	OK
Wiring/connections O.K.?	✓	✓
Final scan	OK	OK
Final status	OK	OK
Notes:		

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. ________
Comp. by ________
Checked by ________

Sta. No. ________ GLACIER CR. @ GIRDWOOD

Date 2-19 20 02 Party MJ SC

Width ____ Area ____ Vel. ____ G. H. ____ Disch. ____

Method ____ No. secs. ____ G. H. change ____ in ____ hrs. Susp. ____

Method coef. ____ Hor. angle coef. ____ Susp. coef. ____ Meter No. ____

GAGE READINGS				
Time		Recorder	Inside	Outside
1130				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter PYGMY / AG44A

Date rated ____ for rod, other.

Meter ____ ft. above bottom of weight.

Spin before meas. ____ after ____

Meas. plots ____ % diff. from rating ____

(Wading), cable, ice, boat, upstr., downstr., side bridge ____ feet, mile, above, below gage, and ____

Check-bar, found ____

changed to ____ at ____

Correct ____

Levels obtained ____

Measurement rated excellent (2%), (good (5%)), fair (8%), poor (over 8%), based on following conditions: Cross section ____

Flow ____ Weather P. CLDY

Other ____ Air 20 °F@ ____

Gage ____ Water ____ °F@ ____

____ Record removed ____ Intake flushed ____

Observer ____

Control ____

Remarks VERY MINOR FLOATING ICE/SNOW.

G. H. of zero flow ____ ft.

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River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	Velocity At point	Velocity Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW 1	151		-0-	.6							
2	150		0.55		-0-						
3	147.5		0.80		10	43		0.26			
4	145.0		1.00		13	41		0.31			
5	142.5		1.15		22	41		0.56			
6	140.0		1.10		36	41		0.90			
7	137.5		1.10		46	41		1.13			
8	135.0		1.10		53	41		1.30			
9	132.5		1.20		52	40		1.30			
10	130.0		1.15		54	40		1.34			
11	127.5		1.30		54	41		1.33			
12	125.0		1.30		51	40		1.26			
13	122.5		1.40		53	40		1.32			
14	120.0		1.00		33	40		0.83			
15	117.5		0.55		17	41		0.44			
16	115.0		0.55		31	40		0.78			
17	112.5		0.50		25	40		0.64			
18	110.0		0.35		19	41		0.48			
19	107.5		0.35		15	42		0.38			
20	105.0		0.25		13	40		0.35			
LEW 21	134.3		-0-		-0-						

Q 38.37
V 0.93
W 47
A 41.2

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
03/05/02
Twenty Fifth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram, Joe Klein (ADF&G)

Weather/Channel Conditions: Clear, no precip. previous 24 hrs, ≅5-10°F

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 27.00 CFS. To date this measurement represents the low flow of record (eclipsing the previous visit 24 record low). Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locations, with a Pygmy meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 0.42 ft and 0.68 ft at the upstream and downstream blocks respectively. After application of the correction factor to account for sensor movement at the 20th site visit the corrected values were 0.66 and 0.76 ft respectively.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at -0.30°C; pH at 7.80; specific conductance at 147.00 uS/cm @25C; DO at 13.10mg/l at 87.8% saturation.
- A site survey was completed. Stage was measured at 16.30 ft., lowest of any previous site visit values.
- Some ice was present near the banks. The ice was removed in a roughly 20 foot diameter radius from both the instrumentation site and the discharge site to minimize the possible effects to the collection of data. It was our opinion that the effects of the ice would not be significant to the data collected, and hence not impact the stage discharge relation.
- Joe Klein, hydrologist with ADF&G, accompanied to observe and discuss techniques.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Measure depth over sensor. Double check D.O.S. at downstream block where there was still a possible discrepancy.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 3/5/02 Time: 1130 Party: SC mi

Weather: sunny, dry Temperature: 10 - 20 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt						26.19'msl
BM 2, top concrete bridge foundation						
BM 3, top instrument post		8.56				25.26' msl
REW @ gage		17.47				
Top of upstream block, orange dot		17.87				
Top of downstream block, upstream of pipe		18.10				
REW @ x-section		17.52				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

DOS 0.75 DOWNSTREAM

DOS 0.40 UPSTREAM

HYDROLAB NOTES

Location: @ GAGE Date: 3/5/02 Time: 1130

Battery: 4.3 V Temp.: -0.03 C pH: 7.8

Conductivity: 147 uS/cm DO: 13.10 mg/l %Saturation: 87.8

SAL: 0.06

Notes:

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 3/5/02 Time: 1100 Party: SC MI

Weather: CLR + DRY LAST 3 DAYS Temperature: 10-20

Stream Conditions: CLR, LOW, SOME SHORE ICE

	Glacier Upstream	Glacier Downstream
Capture filename	GU030502	GD030502
Battery	12.1	12.0 V
Logging active?	Y	Y
Memory left	80%	80%
Bytes used	6370	6350
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	0.2'/0.42'/110	0.1'/0.58'/120
Manual measurement	0.4 OK	0.7 OK
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300 90%	300
External battery--replace?	N	N
Internal battery--replace?	9.9 V OK	9.0 V OK
Replace desiccants?	OK	OK
Wiring/connections O.K.?	✓	✓
Final scan	0.2/0.42/109	0.1'/0.59/120
Final status	OK	OK
Notes:		

UNPUBLISHED REPORT

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. ....
Comp. by ....
Checked by ....

Sta. No. Glacier Creek

Date 23/05 20 52 Party SC, M.I., Joe Klein

Width .... Area .... Vel. .... G. H. .... Disch. ....

Method .... No. secs. .... G. H. change .... in .... hrs. Susp. ....

Method coef. .... Hor. angle coef. .... Susp. coef. .... Meter No. ....

GAGE READINGS				
Time		Recorder	Inside	Outside
11:46				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter ....
Date rated .... for rod, other.
Meter .... ft. above bottom of weight.
Spin before meas. .... after ....
Meas. plots .... % diff. from rating ....
Wading, cable, ice, boat, upstr., downstr., side bridge .... feet, mile, above, below gage, and ....
Check-bar, found ....
changed to .... at ....
Correct ....
Levels obtained ....

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section ....

Flow .... Weather [illegible]

Other .... Air ....°F@ ....

Gage .... Water ....°F@ ....

.... Record removed .... Intake flushed ....

Observer ....

Control ....

Remarks ....

G. H. of zero flow .... ft.

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Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	Velocity At point	Velocity Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW 1	151			6							
2	150		0.5		0	0					
3	147.5		0.7		2	65		0.06			
4	145.0		1.0		13	41		0.34			
5	142.5		1.1		19	42		0.47			
6	140.0		1.05		29	42		0.71			
7	137.5		1.00		35	41		0.87			
8	135.0		1.06		37	41		0.91			
9	132.5		1.10		40	40		1.00			
10	130.0		1.05		36	42		0.87			
11	127.5		1.20		46	41		1.14			
12	125.0		1.20		41	40		1.03			
13	122.5		1.30		40	41		0.99			
14	120.0		0.95		27	40		0.69			
15	117.5		0.50		12	42		0.31			
16	115.0		0.50		21	40		0.54			
17	112.5		0.40		20	41		0.50			
18	110.0		0.25		15	42		0.37			
19	107.5		0.30		7	47		0.17			
LEW 20	104.5		-0-		-0-						

Q 27.0
V .72
W 46.5
A 37.6

Glacier Creek Streamgage
Trip Report
04/02/02
Twenty Sixth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram, Laura Eldred (DEC)

Weather/Channel Conditions: Clear, no precip. previous 24 hrs, ≅20°F

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 24.00 CFS. To date this measurement represents the low flow of record (eclipsing the previous visit 25 record low). Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locations, with a Pygmy meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 0.38 ft and 0.65 ft at the upstream and downstream blocks respectively. After application of the correction factor to account for sensor movement at the 20th site visit the corrected values were 0.62 and 0.7 ft respectively.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 0.78°C; pH at 8.07; specific conductance at 152.00 uS/cm @25C; DO at 14.20mg/l at 98.0% saturation.
- A site survey was completed. Stage was measured at 16.33 ft., 0.03 ft higher than the previous stage measured at the 25th site visit when the discharge was measured at 3 cfs higher.
- Some ice was present near the banks. The ice was removed in a roughly 20 foot diameter radius from both the instrumentation site and the discharge site to minimize the possible effects to the collection of data. It was our opinion that the effects of the ice would not be significant to the data collected, and hence not impact the stage discharge relation.
- Laura Eldred with DEC accompanied to observe and discuss techniques.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 4/2/02 Time: 1100 Party: MJ SC

Weather: SUNNY, DRY Temperature: ~20 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.65				26.19'msl
BM 2, top concrete bridge foundation		5.03				
BM 3, top instrument post		5.58				25.26' msl
REW @ gage		14.49				
Top of upstream block, orange dot		14.88				
Top of downstream block, ~~upstream of pipe~~ TOP STRAP		15.11				
REW @ x-section		14.51	(14.49?)			
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch):

HYDROLAB NOTES

Location: @ SENSORS Date: 4/2/02 Time: 1100

Battery: 9.3 V Temp.: 0.78 C pH: 8.07

Conductivity: 152 uS/cm DO: 14.20 mg/l %Saturation: 98.0

SALINITY = 0.1 %

Notes:

ALGAE FILAMENTS ALL OVER STREAMBED, SENSORS, CABLES, ETC.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 4/2/02 Time: 1030 Party: SC MR

Weather: CLR, DRY Temperature: 20

Stream Conditions: CLR, LOW

	Glacier Upstream	Glacier Downstream
Capture filename	G4040202	GD040202
Battery	12.1	12.0
Logging active?	X	Y
Memory left	70%	70
Bytes used	9710	9720
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	0.8'/0.38'/114	0.8'/0.65'/125
Manual measurement	0.37 O.K.	0.67 O.K.
Journal	OK	OK
Dump number of records/all	ALL	
Purge (save 800)	300	
External battery--replace?	NO	NO
Internal battery--replace?	9.0V NO	9.1 NO
Replace desiccants?	NO	NO
Wiring/connections O.K.?	✓	✓
Final scan	✓ OK	OK
Final status	OK	OK ✓
Notes:	LOTS OF ALGAE GROWTH SOME FROZE ICE	

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____
Comp. by _____
Checked by _____

Sta. No. _____
GLACIER CRK

Date 04/02 2002 Party SC, MT

Width 46.0 Area 35.1 Vel. 0.68 G. H. _____ Disch. 24.0

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

Type of meter PYGMY

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots _____ % diff. from rating _____

Wading, cable, ice, boat, upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____ changed to _____ at _____

Correct _____

Levels obtained _____

GAGE READINGS

Time		Recorder	Inside	Outside
1130				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather CLEAR / ± 20°F

Other _____ Air _____ °F@ _____

Gage _____ Water _____ °F@ _____

_____ Record removed _____ Intake flushed U

Observer _____

_____

Control _____

_____

Remarks CLEAR COLD PERIOD. MINOR ICE ON SIDES OF CHANNEL FORMED

_____

G. H. of zero flow _____ ft.

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River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in sec. ends	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or _____	Area	Discharge
RBW	151		-0-	6							
2	150		0.35	↓	0	-		0			
3	147.5		0.70		3	56		0.08			
4	145.0		0.95		12	46		0.28			
5	142.5		1.05		15	40		0.39			
6	140.0		1.00		25	42		0.61			
7	137.5		1.00		32	40		0.80			
8	135.0		1.00		38	41		0.94			
9	132.5		1.10		38	40		0.95			
10	130.0		1.00		38	41		0.94			
11	127.5		1.05		46	40		1.15			
12	125.0		1.15		39	41		0.96			
13	122.5		1.25		37	41		0.93			
14	120.0		0.80		21	41		0.53			
15	117.5		0.45		14	42		0.35			
16	115.0		0.50		21	312		0.52			
17	112.5		2.30		100	41		0.46			
18	110.0		0.25		10	44		0.25			
19	107.5		0.25		3	40		0.10			
LBW	105		-0-		-0-	-0-					
				Q	24.0						
				V	0.68						
				W	46.0						
				A	35.1						

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
05/08/2002
Twenty Seventh Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Clear, light precip. previous 24 hrs, ≅45°F

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 144.00 CFS. Measurement was completed by wading the channel, with a tag line cable across the channel to locate station locations, with a Price AA meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 1.12 ft and 1.37 ft at the upstream and downstream blocks respectively. After application of the correction factor to account for sensor movement at the 20th site visit the corrected values were 1.36 and 1.45 ft respectively.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 3.25°C; pH at 7.85; specific conductance at 114.00 uS/cm @25C; DO at 12.95mg/l at 96.1% saturation.
- A site survey was completed. Stage was measured at 16.99 ft.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 5/8/02 Time: 1200 Party: SC M,

Weather: PCLDY, LT RAIN YESTERDAY Temperature: 45-50 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation	
HI							
BM 1, top RR bridge bolt		4.02				26.19'msl	
BM 2, top concrete bridge foundation		4.41					
BM 3, top instrument post		4.95				25.26' msl	
REW @ gage		13.13					D.O.S.
Top of upstream block, orange dot		14.24					~1.1 O.K.
Top of downstream block, ~~upstream of pipe~~ TUP STRAP		14.47					~1.29 O.K.
REW @ x-section		13.22					
~~LEW @ x-section~~ TUP STRAP U.S. BLK		14.04					
REW @ bridge							
BM Seward Highway bridge						30.77' msl	

Notes (over for sketch):

HYDROLAB NOTES

Location: @ GAGE Date: 5/8/02 Time: 1100

Battery: 4.3 V Temp.: 3.25 C pH: 7.85

Conductivity: 114 uS/cm DO: 12.95 mg/l %Saturation: 96.1

TDS = .0.1

Notes:

SAME CONDUCTIVITY AS APRIL TRIP, XSECT Q IS APPROX 5 TIMES WHAT IT WAS A MONTH PRIOR

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 5/8/02 Time: 1050 Party: SC MI

Weather: PCLDY, LT. RAIN YESTERDAY Temperature: 45

Stream Conditions: CLEAR, HIGHER

	Glacier Upstream	Glacier Downstream
Capture filename	GU050802	GD050802
Battery	12.0	12.0
Logging active?	Y	Y
Memory left	64%	64%
Bytes used	11630	11610
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	3.4°C / 1.12' / 101	3.3°C / 1.37' / 111
Manual measurement		
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300	300
External battery--replace?	NO	NO
Internal battery--replace?	9.1 V OK	9.2 V OK
Replace desiccants?	NO OK	NO OK
Wiring/connections O.K.?	OK	OK
Final scan	✓	✓
Final status	✓	✓
Notes:		

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. ____
Comp. by ____
Checked by ____

Sta. No. ____ GLACIER CRK

Date 05/08 20 02 Party SC, MI

Width ____ Area ____ Vel. ____ G. H. ____ Disch. 144.0

Method ____ No. secs. ____ G. H. change ____ in ____ hrs. Susp. ____

Method coef. ____ Hor. angle coef. ____ Susp. coef. ____ Meter No. ____

GAGE READINGS				
Time		Recorder	Inside	Outside
11:25				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter PRICE

Date rated ____ for rod, other.

Meter ____ ft. above bottom of weight.

Spin before meas. ____ after ____

Meas. plots ____ % diff. from rating ____

(Wading), cable, ice, boat, upstr., downstr., side bridge ____ feet, mile, above, below gage, and ____

Check-bar, found ____ changed to ____ at ____

Correct ____

Levels obtained ____

Measurement rated excellent (2%), (good (5%)), fair (8%), poor (over 8%), based on following conditions: Cross section ____

Flow ____ Weather LIGHT RAIN PREVIOUS DAY

Other ____ Air 45 °F@ ____

Gage ____ Water ____ °F@ ____

____ Record removed ____ Intake flushed ____

Observer ____

Control ____

Remarks ____

G. H. of zero flow ____ ft.

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Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	Velocity At point	Velocity Mean in vertical	Adjusted for hor. angle or	Area	Discharge
REW	152										
2	150		1.10		7	51		0.32			
3	147.5		1.30		16	41		0.89			
4	145.0		1.60		32	42		1.18			
5	142.5		1.60		32	41		1.75			
6	140.0		1.60		45	41		2.46			
7	137.5		1.65		58	41		3.17			
8	135.0		1.65		58	41		3.15			
9	132.5		1.70		57	40		3.15			
10	130.0		1.70		56	40		3.09			
11	127.5		1.85		53	40		2.92			
12	125.0		1.85		54	41		2.96			
13	122.5		2.00		52	40		2.87			
14	120.0		1.55		23	41		1.27			
15	117.5		1.10		30	41		1.67			
16	115.0		1.10		34	40		1.38			
17	112.5		0.90		26	40		1.45			
18	110.0		0.90		22	42		1.18			
19	107.5		0.86		16	41		0.89			
20	105.0		0.75		19	42		1.02			
21	102.5		0.40		11	41		0.61			
LEW	100.0		-0-		-0-	-0-					

Q 144.0
V 2.13
W 52
A 67.6

UNPUBLISHED REPORT

UNPUBLISHED REPORT

Glacier Creek Streamgage
Trip Report
06/04/2002
Twenty Eigth Site Visit
Maintenance

Staff participating: Stan Carrick, Mark Inghram

Weather/Channel Conditions: Clear, light drizzle. previous 24 hrs, ≅55°F

Tidal Conditions: na

Accomplishments & Issues:

- Discharge measurement on Glacier Creek was completed. Flow was measured at 494.00 CFS. Measurement was completed using an inflatable boat as the stage and velocities were too high for wading the channel A tag line cable across the channel to locate station locations and hold the boat steady, with a Price AA meter, top setting rod, and Aquacalc. The stage sensors and recorders appeared to be working, both before and after instrumentation switch. The scan of the R2's showed a depth of 2.25 ft and 2.41 ft at the upstream and downstream blocks respectively. After application of the correction factor to account for sensor movement at the 20th site visit the corrected values were 2.49 and 2.49 ft respectively.
- Completion of a suite of water quality measurements. Using a Hydrolab Quanta water temperature was recorded at 4.41°C; pH at 8.07; specific conductance at 88.00 uS/cm @25C; DO at 12.97mg/l at 101.7% saturation.
- A site survey was completed. Stage was measured at 18.00 ft.

Issues for Next Site Visit:

- Routine discharge measurement, instrument maintenance, and water quality check.
- Recharged 12V battery
- Further "brushing" for survey

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) SURVEY NOTES

Date: 6/4/02 Time: _____ Party: MJSC

Weather: CLOUDY, OCC. DRIZ Temperature: 50 F

Location	Top	Middle	2nd Site	Bottom	Angle	Elevation
HI						
BM 1, top RR bridge bolt		4.06				26.19'msl
BM 2, top concrete bridge foundation		4.45				
BM 3, top instrument post		4.99				25.26' msl
REW @ gage		12.09				
Top of upstream block, orange dot		N/A				
Top of downstream block, upstream of pipe		n/a				
REW @ x-section		12.25				
LEW @ x-section						
REW @ bridge						
BM Seward Highway bridge						30.77' msl

Notes (over for sketch): WATER TOO DEEP FOR BLOCK SURVEY

HYDROLAB NOTES

Location: @ GAGE Date: 6/4/02 Time: 1040

Battery: 4.1 V Temp.: 4.41 C pH: 8.07

Conductivity: 48 uS/cm DO: 12.97 mg/l %Saturation: 101.7

Notes: TDS (SAL) = 0.1

UNPUBLISHED REPORT

GLACIER CREEK (nr Girdwood) DATALOGGER FIELD NOTES

Date: 6/9/02 Time: 1040 Party: MJ SC

Weather: CLDY OCC DRIZZ Temperature: ~50

Stream Conditions: STAGE HIGHER BUT WATER NOT TOO TURBID

	Glacier Upstream	Glacier Downstream
Capture filename	GU060402	GD060402
Battery	12.0V	10.9 V
Logging active?	Y	Y
Memory left	70%	70%
Bytes used	9480	9480
Started		
Record/Scan intervals	60/60	60/60
Scan reading (depth and conductivity)	4.6'/2.25'/90	4.5'/2.4'/98
Manual measurement	OK ~2.2	OK ~2.4
Journal	OK	OK
Dump number of records/all	ALL	ALL
Purge (save 800)	300 90% LEFT	300 90% LEFT
External battery--replace?	NO OK	NO OK
Internal battery--replace?	9.1 V OK	9.1 V OK
Replace desiccants?	OK	OK
Wiring/connections O.K.?	✓	✓
Final scan	OK	OK
Final status	OK	OK
Notes:		

NEED RECHARGED 12V BAT NEXT TRIP

State of Alaska
DNR/DMLW
Alaska Hydrologic Survey

Discharge Measurement Notes

Meas. No. _____

Comp. by _____

Checked by _____

Sta. No. _____

GLACIER CRK

Date 8/6/04 20 02 Party SC LT

Width _____ Area _____ Vel. _____ G. H. _____ Disch. _____

Method _____ No. secs. _____ G. H. change _____ in _____ hrs. Susp. _____

Method coef. _____ Hor. angle coef. _____ Susp. coef. _____ Meter No. _____

GAGE READINGS				
Time		Recorder	Inside	Outside
1145				
Weighted M. G. H.				
G. H. correction				
Correct M. G. H.				

Type of meter PRICE

Date rated _____ for rod, other.

Meter _____ ft. above bottom of weight.

Spin before meas. _____ after _____

Meas. plots _____ % diff. from rating _____

Wading, cable, ice, (boat), upstr., downstr., side bridge _____ feet, mile, above, below gage, and _____

Check-bar, found _____

changed to _____ at _____

Correct _____

Levels obtained _____

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%), based on following conditions: Cross section _____

Flow _____ Weather OVERCAST, LT DRIZZLE

Other _____ Air 55 °F@ _____

Gage _____ Water _____ °F@ _____

_____ Record removed _____ Intake flushed U

Observer _____

Control _____

Remarks _____

G. H. of zero flow _____ ft.

S—768

River at—

Station	Dist. from initial point	Width	Depth	Observation depth	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	Adjusted for hor. angle or	Area	Discharge
RBK	151										
2	150		2.1		31	41		1.68			
3	147.5		2.5		47	41		2.53			
4	145.3		2.4		51	41		2.75			
5	142.5		2.4		61	40		3.32			
6	140		2.6		80	40		4.65			
7	137.5		2.70		99	40		5.36			
8	135.2		2.55		101	40		5.48			
9	132.5		2.55		97	40		5.26			
10	130.0		2.50		102	40		5.55			
11	127.5		2.45		104	40		5.64			
12	125.0		2.50		90	40		4.89			
13	122.5		2.60		95	40		5.18			
14	120.0		2.60		91	40		4.97			
15	117.5		2.15		66	40		3.59			
16	115.4		1.90		87	40		4.72			
17	112.5		1.90		86	40		4.64			
18	110.0		1.85		65	40		3.58			
19	107.5		1.85		72	40		3.98			
20	105.0		1.80		59	40		3.24			
21	102.5		1.45		53	40		2.84			
22	100.0		1.00		38	41		2.06			
23	97.5		0.80		32	41		1.72			
24	95.0		0.60		27	40		1.45			
25	92.5		0.30		14	41		0.76			
LEW	89.0										
				Q	494.0						
				A	411.5						
				W	62.0						
				M	119.0						

UNPUBLISHED REPORT

APPENDIX C. Glacier Creek Data

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
8/2/00	672	3.28	740	3.02	646			82	
8/3/00		3.31	771	3.06	690				
8/4/00		3.42	901	3.17	829				
8/5/00		3.23	689	3	625				
8/6/00		3.02	513	2.81	456				
8/7/00		2.92	445	2.72	392				
8/8/00		2.9	433	2.69	373				
8/9/00		2.91	439	2.72	392				
8/10/00		2.88	421	2.68	367				
8/11/00		2.84	398	2.66	355				
8/12/00		2.95	465	2.74	406				
8/13/00		3.04	527	2.84	479				
8/14/00		3.25	709	3.05	679				
8/15/00		3.02	513	2.82	463				
8/16/00		2.84	398	2.68	367				
8/17/00		2.76	356	2.62	332				
8/18/00		2.75	351	2.61	327				
8/19/00		2.75	351	2.62	332				
8/20/00		2.72	336	2.58	311				
8/21/00		2.69	322	2.56	301				
8/22/00		2.62	292	2.51	277				
8/23/00		2.55	265	2.45	251				
8/24/00		2.5	247	2.42	238				
8/25/00		2.47	236	2.4	231				
8/26/00		2.42	220	2.35	212				
8/27/00		2.42	220	2.35	212				
8/28/00		2.41	217	2.35	212				
8/29/00		2.57	272	2.49	268				
8/30/00		2.67	313	2.58	311				
8/31/00		2.56	268	2.48	263				
9/1/00		2.49	243	2.42	238				
9/2/00		2.48	240	2.41	234				
9/3/00		2.42	220	2.36	216				
9/4/00		2.39	211	2.33	205				
9/5/00		2.33	194	2.28	189				
9/6/00	194	2.31	189	2.26	183			119	

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
9/7/00		2.29	183	2.24	177				
9/8/00		2.24	171	2.2	165				
9/9/00		2.2	162	2.16	155				
9/10/00		2.22	166	2.18	160				
9/11/00		2.2	162	2.17	157				
9/12/00		2.3	186	2.27	186				
9/13/00		2.29	183	2.25	180				
9/14/00		2.28	181	2.25	180				
9/15/00		2.21	164	2.18	160				
9/16/00		2.17	155	2.14	150				
9/17/00		2.13	146	2.1	140				
9/18/00		2.09	138	2.06	131				
9/19/00		2.06	133	2.03	125				
9/20/00		2.04	129	2.02	123				
9/21/00		2.22	166	2.19	163				
9/22/00		2.52	254	2.48	263				
9/23/00		2.74	346	2.68	367				
9/24/00		3.07	550	2.94	565				
9/25/00		2.96	471	2.86	495				
9/26/00		2.94	458	2.83	471				
9/27/00		2.73	341	2.66	355				
9/28/00		2.53	257	2.51	277				
9/29/00		2.41	217	2.4	231				
9/30/00		2.32	191	2.32	202				
10/1/00		2.25	173	2.25	180				
10/2/00		2.19	159	2.19	163				
10/3/00		2.14	149	2.15	152				
10/4/00		2.1	140	2.11	142				
10/5/00	166	2.19	159	2.19	163			136	
10/6/00		2.3	186	2.3	195				
10/7/00		2.53	257	2.52	281				
10/8/00		2.55	265	2.55	296				
10/9/00		2.35	200	2.36	216				
10/10/00		2.26	176	2.28	189				
10/11/00		2.21	164	2.22	171				1.52
10/12/00		2.15	151	2.17	157				3.42

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
10/13/00		2.13	146	2.14	150				3.78
10/14/00		2.77	361	2.72	392				3.84
10/15/00		2.51	250	2.52	281				3.58
10/16/00		2.51	250	2.51	277				3.7
10/17/00		2.68	318	2.66	355				3.53
10/18/00		2.44	227	2.45	251				3.28
10/19/00		2.3	186	2.32	202				3.4
10/20/00		2.21	164	2.24	177				2.75
10/21/00		2.15	151	2.18	160				2.02
10/22/00		2.14	149	2.17	157				2.89
10/23/00		2.11	142	2.14	150				2.3
10/24/00		2.05	131	2.08	136				1.92
10/25/00		2.15	151	2.18	160				2.69
10/26/00		2.08	136	2.12	145				1.52
10/27/00		2.02	125	2.05	129				1.14
10/28/00		1.96	115	1.99	117				0.24
10/29/00		1.94	112	1.97	113				0.49
10/30/00		1.95	114	1.98	115				0.85
10/31/00		1.91	107	1.95	109				1.45
11/1/00		1.88	103	1.92	104				0.89
11/2/00	99	1.86	100	1.9	101			136	0.95
11/3/00		1.83	96	1.88	97				0.2
11/4/00		1.81	93	1.85	92				0.07
11/5/00		1.81	93	1.85	92				1.31
11/6/00		1.79	91	1.84	91				1.38
11/7/00		1.78	89	1.83	89				1.61
11/8/00		1.76	87	1.81	87				1.55
11/9/00		1.81	93	1.85	92				1.85
11/10/00		2.08	136	2.12	145				2
11/11/00		2.24	171	2.28	189				1.66
11/12/00		2.04	129	2.09	138				0.77
11/13/00		2.04	129	2.08	136				1.19
11/14/00		2.12	144	2.17	157				1.19
11/15/00		1.96	115	2.01	121				0.37
11/16/00		1.98	119	2.03	125				1.35
11/17/00		2.02	125	2.06	131				1.38

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
11/18/00		2.24	171	2.28	189				1.25
11/19/00		2.46	233	2.48	263				1.77
11/20/00		2.51	250	2.54	291				2.2
11/21/00		2.67	313	2.66	355				2.19
11/22/00		2.48	240	2.51	277				1.83
11/23/00		2.25	173	2.31	199				1.69
11/24/00		2.17	155	2.23	174				1.89
11/25/00		2.07	135	2.14	150				1.35
11/26/00		1.97	117	2.04	127				0.74
11/27/00		1.9	106	1.96	111				-0.06
11/28/00		1.96	115	2.03	125				0.86
11/29/00		1.96	115	2.03	125				1.22
11/30/00		1.88	103	1.96	111				0.94
12/1/00		1.8	92	1.87	96				-0.14
12/2/00		1.69	79	1.77	81				-0.23
12/3/00		1.79	91	1.86	94				-0.04
12/4/00		1.85	99	1.92	104				0.19
12/5/00	200	2.13	146	2.19	163			107	0.56
12/6/00		2.07	135	2.15	152				0.73
12/7/00		1.94	112	2.02	123				1.15
12/8/00		1.87	102	1.95	109				0.87
12/9/00		1.79	91	1.87	96				0.11
12/10/00		1.84	97	1.91	102				0.45
12/11/00		1.81	93	1.9	101				0.8
12/12/00		1.76	87	1.84	91				0.54
12/13/00		1.72	82	1.8	85				-0.1
12/14/00	71	1.71	81	1.67	69			129	-0.11
12/15/00		1.7	80	1.68	70				-0.09
12/16/00		1.72	82	1.71	73				-0.01
12/17/00		1.73	83	1.71	73				-0.07
12/18/00		1.86	100	1.85	92				-0.07
12/19/00		1.83	96	1.82	88				0.12
12/20/00		1.92	109	1.89	99				0.15
12/21/00		2.05	131	2.04	127				0.2
12/22/00		1.82	95	1.82	88				-0.15
12/23/00		1.82	95	1.81	87				0.12

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
12/24/00		1.84	97	1.82	88				0.88
12/25/00		2.01	124	2.01	121				0.8
12/26/00		1.99	120	1.98	115				0.97
12/27/00		1.99	120	1.99	117				0.91
12/28/00		2.03	127	2.02	123				1.14
12/29/00		2.76	356	2.68	367				0.78
12/30/00		2.82	387	2.79	441				0.92
12/31/00		2.65	305	2.62	332				1.11
1/1/01		2.34	197	2.34	209				0.56
1/2/01		2.17	155	2.17	157				0.28
1/3/01		2.07	135	2.07	133				0.27
1/4/01		1.99	120	2	119				0.15
1/5/01		1.9	106	1.91	102				-0.09
1/6/01		1.9	106	1.9	101				0.09
1/7/01		3.03	520	2.93	556				0.34
1/8/01		2.57	272	2.56	301				0.45
1/9/01		2.3	186	2.31	199				0.28
1/10/01		2.11	142	2.12	145				-0.1
1/11/01		2	122	2	119				-0.2
1/12/01		2	122	2	119				-0.05
1/13/01		1.97	117	1.97	113				0.42
1/14/01		2.75	351	2.67	361				0.25
1/15/01		3.16	625	3.12	763				0.63
1/16/01		2.46	233	2.47	259				0.78
1/17/01		2.83	392	2.76	419				1.05
1/18/01		3.21	670	3.12	763				1.14
1/19/01		3.15	616	3.12	763				1.1
1/20/01		2.53	257	2.54	291				1.26
1/21/01		2.4	214	2.4	231				1.24
1/22/01		2.52	254	2.52	281				1.04
1/23/01		2.38	208	2.39	227				1.04
1/24/01		2.17	155	2.19	163				0.99
1/25/01		2.06	133	2.08	136				1.01
1/26/01		2.01	124	2.03	125				0.77
1/27/01		1.98	119	2.01	121				0.92
1/28/01		1.86	100	1.89	99				-0.05

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
1/29/01		1.84	97	1.86	94				0.07
1/30/01		1.79	91	1.82	88				0.38
1/31/01		1.77	88	1.8	85				0.78
2/1/01		1.82	95	1.85	92				0.15
2/2/01		1.68	78	1.71	73				-0.24
2/3/01		1.65	75	1.68	70				-0.2
2/4/01		1.65	75	1.68	70				-0.16
2/5/01		1.68	78	1.71	73				0.07
2/6/01		1.67	77	1.7	72				0.21
2/7/01	67	1.65	75	1.67	69			115	0.48
2/8/01		1.65	75	1.64	65				0.06
2/9/01		1.63	72	1.64	65				-0.13
2/10/01		1.54	64	1.54	55				-0.08
2/11/01		1.59	68	1.59	60				-0.11
2/12/01		1.6	69	1.6	61				0.01
2/13/01		1.52	62	1.53	54				-0.15
2/14/01		1.43	55	1.43	46				-0.15
2/15/01		1.53	63	1.54	55				-0.08
2/16/01		1.56	66	1.57	58				0.08
2/17/01		1.52	62	1.53	54				-0.01
2/18/01		1.45	56	1.46	48				-0.16
2/19/01		1.51	61	1.52	53				0.13
2/20/01		1.51	61	1.52	53				0.33
2/21/01		1.5	60	1.51	53				0.41
2/22/01		1.48	59	1.49	51				0.66
2/23/01		1.42	54	1.44	47				0
2/24/01		1.37	50	1.39	43				-0.01
2/25/01		1.47	58	1.48	50				0.03
2/26/01		1.51	61	1.52	53				0.34
2/27/01		2.25	173	2.23	174				-0.08
2/28/01		2	122	2.03	125				0.05
3/1/01		1.77	88	1.79	84				0.14
3/2/01		1.68	78	1.7	72				0.25
3/3/01		1.59	68	1.61	62				-0.14
3/4/01		1.59	68	1.61	62				0.19
3/5/01		1.57	67	1.59	60				0.17

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
3/6/01		1.58	68	1.6	61				0.67
3/7/01		1.58	68	1.6	61				0.27
3/8/01		1.56	66	1.58	59				0.8
3/9/01		1.85	99	1.86	94				0.73
3/10/01		1.8	92	1.83	89				1.06
3/11/01		1.89	104	1.9	101				1.06
3/12/01	103	1.89	104	1.91	102			99	1.07
3/13/01		1.83	96	1.86	94				1.3
3/14/01		1.74	85	1.77	81				1.18
3/15/01		1.84	97	1.86	94				1.27
3/16/01		1.79	91	1.82	88				1.55
3/17/01		1.71	81	1.74	77				1.02
3/18/01		1.63	72	1.67	69				0.42
3/19/01		1.54	64	1.57	58				-0.08
3/20/01		1.5	60	1.53	54				-0.13
3/21/01		1.48	59	1.51	53				-0.1
3/22/01		1.45	56	1.48	50				-0.13
3/23/01		1.5	60	1.54	55				0.12
3/24/01		1.49	59	1.52	53				0.12
3/25/01		1.51	61	1.54	55				0.85
3/26/01		1.62	71	1.65	66				0.98
3/27/01		1.68	78	1.71	73				1.28
3/28/01		1.61	70	1.65	66				1.06
3/29/01		1.56	66	1.6	61				1.51
3/30/01		1.55	65	1.58	59				0.83
3/31/01		1.51	61	1.55	56				0.98
4/1/01		1.48	59	1.52	53				0.6
4/2/01		1.48	59	1.52	53				1.38
4/3/01		1.62	71	1.65	66				0.77
4/4/01		1.6	69	1.65	66				1.45
4/5/01		1.54	64	1.59	60				1.63
4/6/01		1.5	60	1.55	56				0.91
4/7/01		1.49	59	1.53	54				2.15
4/8/01		1.5	60	1.54	55				1.98
4/9/01	43	1.49	59	1.54	55			127	1.97
4/10/01		1.53	63	1.57	58				2.2

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
4/11/01		1.89	104	1.92	104				1.58
4/12/01		1.88	103	1.93	106				1.88
4/13/01		1.73	83	1.79	84				2.39
4/14/01		1.65	75	1.71	73				1.61
4/15/01		1.63	72	1.67	69				2.93
4/16/01		1.65	75	1.7	72				2.93
4/17/01		1.63	72	1.69	71				3.03
4/18/01		1.65	75	1.7	72				3.42
4/19/01		1.69	79	1.74	77				3.29
4/20/01		1.75	86	1.8	85				3.13
4/21/01		1.77	88	1.82	88				3
4/22/01		1.79	91	1.84	91				3.72
4/23/01		1.84	97	1.9	101				2.95
4/24/01		1.8	92	1.86	94				3.05
4/25/01		1.88	103	1.93	106				3.21
4/26/01		1.9	106	1.97	113				3.66
4/27/01		1.96	115	2.02	123				3.3
4/28/01		2.15	151	2.21	168				3.05
4/29/01		2.06	133	2.12	145				3.73
4/30/01		2.06	133	2.12	145				3.4
5/1/01		2.06	133	2.13	147				3.18
5/2/01		1.99	120	2.06	131				2.6
5/3/01		1.97	117	2.04	127				1.95
5/4/01		1.87	102	1.94	107				1.85
5/5/01		1.8	92	1.87	96				2.24
5/6/01		1.85	99	1.91	102				2.42
5/7/01		1.88	103	1.95	109				3.51
5/8/01	113	1.89	104	1.96	111			105	4.16
5/9/01		1.93	111	2	119				3.6
5/10/01		1.9	106	1.97	113				3.98
5/11/01		1.9	106	1.97	113				4.26
5/12/01		1.94	112	2.01	121				4.49
5/13/01		2.04	129	2.11	142				4.72
5/14/01		2.18	157	2.25	180				4.72
5/15/01		2.31	189	2.38	223				4.59
5/16/01		2.36	202	2.44	246				4.19

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
5/17/01		2.37	205	2.44	246				4.35
5/18/01		2.39	211	2.47	259				4.28
5/19/01		2.4	214	2.48	263				4.53
5/20/01		2.5	247	2.58	311				4.54
5/21/01		2.55	265	2.62	332				3.8
5/22/01		2.52	254	2.6	321				4.23
5/23/01		2.48	240	2.55	296				4.77
5/24/01		2.51	250	2.59	316				4.59
5/25/01		2.49	243	2.57	306				4.35
5/26/01		2.46	233	2.55	296				4.64
5/27/01		2.48	240	2.57	306				4.96
5/28/01		2.6	284	2.67	361				4.93
5/29/01		2.73	341	2.8	448				4.6
5/30/01		2.78	366	2.84	479				4.52
5/31/01		2.8	376	2.85	487				4.49
6/1/01		2.82	387	2.88	512				4.96
6/2/01		2.96	471	3	625				4.74
6/3/01		3	499	3.05	679				3.93
6/4/01		2.88	421	2.95	575				4.39
6/5/01		2.88	421	2.93	556				4.55
6/6/01		2.9	433	2.96	585				3.98
6/7/01	588	2.87	415	2.93	556			82	2.97
6/7/01	588	2.87	415	2.93	556			82	2.97
6/8/01		2.77	361	2.84	479				4.88
6/9/01		2.84	398	2.92	547				5.01
6/10/01		2.97	478	3.02	646				4.81
6/11/01		3.02	513	3.07	702				3.75
6/12/01		3.07	550	3.14	788				3.65
6/13/01		2.92	445	2.97	594				4.02
6/14/01		2.94	458	3.00	625				4.78
6/15/01		3.08	558	3.12	763				4.95
6/16/01		3.21	770	3.26	962				4.89
6/17/01		3.29	909	3.37	1140				4.78
6/18/01		3.32	929	3.40	1164				4.13
6/19/01		3.15	660	3.26	962				4.52
6/20/01		3.17	665	3.25	960				5.08

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
6/21/01		3.25	882	3.35	1125				4.76
6/22/01		3.32	929	3.39	1156				5.02
6/23/01		3.44	1011	3.49	1236				5.08
6/24/01		3.66	1174	3.53	1269				4.35
6/25/01		3.91	1376	3.48	1228				4.95
6/26/01		3.96	1418	3.52	1261				5.17
6/27/01		4.04	1488	3.64	1363				5.25
6/28/01	1352	4.01	1462	3.71	1424			71	5.39
6/29/01		3.87	1342	3.53	1269				5.32
6/30/01		3.65	1166	3.29	1078				4.60
7/1/01		3.48	1040	3.10	940				5.31
7/2/01		3.48	1040	3.14	968				5.75
7/3/01		3.48	1040	3.14	968				5.20
7/4/01		3.38	969	3.05	905				5.02
7/5/01		3.51	1061	3.17	990				4.72
7/6/01		3.35	949	3.00	871				4.62
7/7/01		3.26	889	2.90	805				5.05
7/8/01		3.23	869	2.88	792				4.72
7/9/01		3.11	794	2.76	718				5.83
7/10/01		3.11	794	2.75	712				5.07
7/11/01	729	3.12	800	2.77	724			80	4.68
7/12/01		3.09	781	2.75	712				4.71
7/13/01		3	728	2.66	659				5.01
7/14/01		2.98	716	2.63	642				5.44
7/15/01		3.02	740	2.67	665				5.11
7/16/01		2.95	699	2.63	642				5.70
7/17/01		3.03	745	2.69	677				5.70
7/18/01		3.1	787	2.77	724				5.95
7/19/01		3.27	895	2.93	825				5.44
7/20/01		3.72	1221	3.39	1156				5.20
7/21/01		3.47	1033	3.15	975				5.22
7/22/01		3.36	956	3.04	898				5.34
7/23/01		3.18	837	2.86	780				5.33
7/24/01		3.04	751	2.72	694				5.47
7/25/01		2.99	722	2.68	671				5.90
7/26/01		3.02	740	2.70	682				6.23

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
7/27/01		2.98	716	2.69	677				6.51
7/28/01		2.9	671	2.62	636				6.04
7/29/01		2.8	617	2.52	582				6.40
7/30/01		2.87	654	2.57	609				5.52
7/31/01		2.99	722	2.69	677				6.14
8/1/01		2.9	671	2.61	631				6.65
8/2/01		2.93	688	2.64	648				7.02
8/3/01		3	728	2.72	694				6.04
8/4/01		3.02	740	2.73	700				6.26
8/5/01		2.88	660	2.60	625				6.40
8/6/01		2.8	617	2.53	587				6.79
8/7/01	549	2.72	575	2.46	550			83	6.48
8/8/01		2.66	545	2.40	519				6.51
8/9/01		2.61	521	2.34	490				6.54
8/10/01		2.55	492	2.29	466				6.41
8/11/01		2.51	474	2.25	447				7.25
8/12/01		2.63	530	2.36	500				7.50
8/13/01		2.78	606	2.49	566				7.59
8/14/01		2.92	682	2.65	653				6.52
8/15/01		2.88	660	2.62	636				6.64
8/16/01		2.76	596	2.51	576				6.63
8/17/01		2.66	545	2.42	530				6.47
8/18/01		2.77	601	2.51	576				6.79
8/19/01		2.71	570	2.43	535				6.26
8/20/01		3.51	1061	3.22	1026				6.71
8/21/01		3.13	806	2.86	780				6.97
8/22/01		2.91	676	2.64	648				6.97
8/23/01		2.68	555	2.45	545				6.48
8/24/01		2.64	535	2.40	519				6.38
8/25/01		2.52	479	2.31	475				6.76
8/26/01		2.41	430	2.20	425				6.80
8/27/01		2.36	409	2.14	398				6.63
8/28/01		3.42	997	3.04	898				6.47
8/29/01		3.8	1285	3.58	1311				6.51
8/30/01		3.54	1083	3.29	1078				6.03
8/31/01		3.2	850	2.97	851				6.08

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
9/1/01		2.75	590	2.54	592				6.02
9/2/01		2.48	461	2.28	461				6.46
9/3/01		2.41	430	2.20	425				6.85
9/4/01		2.62	526	2.38	509				6.34
9/5/01	689	2.84	638	2.62	636			95	6.02
9/6/01		2.52	479	2.33	485				5.66
9/7/01		2.38	417	2.19	420				5.94
9/8/01		2.24	361	2.05	361				5.57
9/9/01		2.15	327	1.96	325				5.55
9/10/01		2.08	302	1.89	299				5.45
9/11/01		2.01	278	1.82	274				5.38
9/12/01		2.13	320	1.93	314				5.85
9/13/01		2.25	365	2.07	369				5.51
9/14/01		2.12	316	1.94	317				5.67
9/15/01		2.03	285	1.84	281				6.02
9/16/01		1.98	268	1.79	263				5.66
9/17/01		2.09	305	1.91	306				6.38
9/18/01		2.21	349	2.02	348				6.28
9/19/01		2.21	349	2.03	352				6.13
9/20/01		2.06	295	1.87	291				6.12
9/21/01		2.01	278	1.84	281				5.90
9/22/01		1.96	262	1.79	263				5.30
9/23/01		2.18	338	1.95	321				5.46
9/24/01		2.67	550	2.48	560				5.53
9/25/01		2.24	361	2.07	369				5.35
9/26/01		2.06	295	1.89	299				5.32
9/27/01		1.95	258	1.78	260				4.48
9/28/01		1.91	246	1.73	243				5.04
9/29/01		1.86	231	1.69	231				4.90
9/30/01		1.79	210	1.63	212				4.41
10/1/01		1.81	216	1.64	215				4.84
10/2/01		1.76	202	1.60	203				4.73
10/3/02	192	1.72	191	1.56	192			121	4.68
10/16/01	160	1.75	199	1.62	209	125	123	126	2.00
10/17/01		1.77	205	1.62	209	124	122		2.36
10/18/01		1.69	183	1.54	186	124	122		2.70

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
10/19/01		1.55	149	1.40	149	127	125		1.94
10/20/01		1.53	144	1.38	144	128	126		1.58
10/21/01		1.62	166	1.47	167	125	123		1.38
10/22/01		1.54	147	1.39	147	127	126		1.35
10/23/01		1.48	133	1.33	132	130	129		1.08
10/24/01		1.44	125	1.30	126	131	130		1.05
10/25/01		1.4	117	1.25	115	134	132		0.46
10/26/01		1.36	109	1.21	106	136	134		0.10
10/27/01		1.29	96	1.14	93	138	137		-0.03
10/28/01		1.37	111	1.22	108	137	136		0.05
10/29/01		1.33	103	1.19	102	138	137		0.01
10/30/01		1.32	101	1.18	100	137	136		0.32
10/31/01		1.31	99	1.16	96	137	136		0.38
11/1/01		1.33	103	1.19	102	135	134		0.53
11/2/01		1.31	99	1.17	98	133	133		1.06
11/3/01		1.3	98	1.16	96	134	134		0.91
11/4/01		1.28	94	1.13	91	134	133		1.16
11/5/01		1.26	90	1.12	89	134	134		1.25
11/6/01	85	1.23	85	1.09	84	138	137	139	0.35
11/7/01		1.14	71	1.00	68	140	139		0.04
11/8/01		1.04	57	0.90	54	141	140		-0.04
11/9/01		1.15	73	1.02	72	141	140		-0.01
11/10/01		1.25	89	1.13	91	140	139		0.07
11/11/01		1.24	87	1.12	89	139	138		0.21
11/12/01		1.22	84	1.09	84	139	138		0.20
11/13/01		1.18	77	1.05	77	140	139		0.09
11/14/01		1.18	77	1.05	77	141	140		0.01
11/15/01		1.22	84	1.10	85	141	140		0.01
11/16/01		1.18	77	1.04	75	141	139		0.05
11/17/01		1.22	84	1.10	85	138	137		0.16
11/18/01		1.78	208	1.65	218	118	118		0.07
11/19/01		1.54	147	1.40	149	122	122		0.55
11/20/01		1.53	144	1.40	149	121	121		1.12
11/21/01		1.48	133	1.35	137	122	121		1.06
11/22/01		1.39	115	1.26	117	124	124		1.29
11/23/01		1.36	109	1.23	110	125	124		1.38

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
11/24/01		1.31	99	1.19	102	128	128		0.70
11/25/01		1.2	80	1.08	82	132	131		0.09
11/26/01		1.1	65	0.98	65	134	134		-0.04
11/27/01		1.23	85	1.10	85	134	133		0.02
11/28/01		1.2	80	1.07	80	134	133		0.01
11/29/01		1.16	74	1.03	73	135	134		0.00
11/30/01		1.13	70	1.00	68	136	135		0.00
12/1/01	60	1.02	54	0.90	54	138	137	145	-0.05
12/2/01		0.95	46	0.82	43	139	138		-0.03
12/3/01		0.98	49	0.85	47	140	138		-0.03
12/4/01		1.04	57	0.91	55	141	139		-0.10
12/5/01		1.07	61	0.94	59	141	140		-0.03
12/6/01		1.11	67	0.98	65	141	139		-0.03
12/7/01		1.08	62	0.94	59	140	139		-0.06
12/8/01		1.08	62	0.95	61	141	139		-0.09
12/9/01		1.1	65	0.97	64	141	140		0.00
12/10/01		1.07	61	0.94	59	141	139		0.03
12/11/01		1.05	58	0.92	56	140	138		0.09
12/12/01		1.05	58	0.92	56	139	138		0.09
12/13/01		1.04	57	0.91	55	140	139		-0.06
12/14/01		1.1	65	0.97	64	142	140		-0.10
12/15/01		1.09	64	0.96	62	142	141		-0.07
12/16/01		1.08	62	0.95	61	143	141		-0.09
12/17/01		1.08	62	0.95	61	143	141		-0.05
12/18/01		1.08	62	0.95	61	143	141		0.00
12/19/01		1.08	62	0.95	61	142	141		0.00
12/20/01		1.03	56	0.90	54	141	140		0.05
12/21/01		0.98	49	0.84	46	141	140		0.14
12/22/01		0.99	51	0.86	48	140	139		0.10
12/23/01		0.96	47	0.83	44	141	140		0.05
12/24/01		0.95	46	0.81	42	142	141		-0.01
12/25/01		1.15	73	1.01	70	133	133		0.14
12/26/01		3.33	935	3.21	1019	88	90		-0.12
12/27/01		3.17	831	3.10	940	90	92		-0.09
12/28/01		2.04	288	1.94	317	104	105		0.00
12/29/01		1.75	199	1.66	221	109	110		0.21

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
12/30/01		1.95	258	1.86	288	104	107		0.53
12/31/01		1.83	222	1.73	243	106	108		0.85
1/1/02		2.16	330	2.08	373	101	102		0.69
1/2/02		1.87	234	1.77	257	106	106		0.86
1/3/02		1.69	183	1.60	203	110	110		0.90
1/4/02		1.55	149	1.46	164	112	112		1.04
1/5/02		1.68	181	1.59	200	110	111		1.07
1/6/02		2.22	353	2.14	398	97	98		0.98
1/7/02		2.21	349	2.12	390	96	97		0.98
1/8/02		1.84	225	1.75	250	104	105		0.73
1/9/02		2.33	396	2.23	438	92	93		0.40
1/10/02		1.85	228	1.76	253	100	101		0.71
1/11/02	169	1.58	156	1.50	175	108	109	93	0.56
1/12/02		1.45	127	1.35	137	113	112		0.41
1/13/02		1.36	109	1.26	117	114	114		0.70
1/14/02		1.39	115	1.29	123	112	113		1.01
1/15/02		1.44	125	1.35	137	111	110		1.02
1/16/02		1.37	111	1.27	119	113	113		0.65
1/17/02		1.38	113	1.28	121	113	113		1.25
1/18/02		1.55	149	1.46	164	107	107		1.17
1/19/02		1.39	115	1.30	126	112	112		1.07
1/20/02		1.28	94	1.19	102	118	118		0.20
1/21/02		1.1	65	1.01	70	123	122		-0.09
1/22/02		1.08	62	0.98	65	124	123		-0.06
1/23/02		1.12	68	1.02	72	125	123		-0.08
1/24/02		1.02	54	0.92	56	127	126		-0.10
1/25/02		1	52	0.90	54	131	128		-0.10
1/26/02		1.02	54	0.93	58	132	131		-0.10
1/27/02		1.11	67	1.02	72	131	129		-0.04
1/28/02		1.1	65	1.01	70	130	128		0.00
1/29/02		1.08	62	0.99	67	129	128		0.08
1/30/02		1.11	67	1.02	72	129	128		0.10
1/31/02		1.03	56	0.94	59	129	128		0.09
2/1/02		1	52	0.91	55	130	129		0.12
2/2/02		0.98	49	0.88	51	131	130		0.03
2/3/02		0.97	48	0.88	51	131	130		0.25

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
2/4/02		1.06	60	0.96	62	128	127		0.24
2/5/02		1.02	54	0.93	58	128	127		0.30
2/6/02		0.97	48	0.88	51	130	129		0.16
2/7/02		0.96	47	0.87	50	130	129		0.23
2/8/02		0.94	45	0.85	47	132	131		0.14
2/9/02		0.93	44	0.84	46	133	131		0.13
2/10/02		0.91	41	0.82	43	134	132		0.00
2/11/02		0.92	42	0.82	43	133	132		0.21
2/12/02		0.92	42	0.83	44	133	132		0.22
2/13/02		0.9	40	0.81	42	134	132		0.15
2/14/02		0.91	41	0.82	43	133	132		0.41
2/15/02		0.9	40	0.80	41	134	133		0.18
2/16/02		0.89	39	0.80	41	135	134		0.17
2/17/02		0.88	38	0.79	40	135	134		0.30
2/18/02		0.87	37	0.78	38	136	135		0.14
2/19/02	38	0.85	35	0.76	36	136	136	138	0.20
2/20/02		0.77	28	0.68	28	139	138		-0.01
2/21/02		0.82	32	0.73	33	140	138		-0.07
2/22/02		0.88	38	0.79	40	139	137		0.00
2/23/02		0.89	39	0.80	41	138	137		0.13
2/24/02		0.86	36	0.77	37	139	138		0.12
2/25/02		0.86	36	0.77	37	138	136		0.22
2/26/02		0.86	36	0.77	37	137	136		0.24
2/27/02		0.85	35	0.76	36	137	136		0.35
2/28/02		0.99	51	0.89	52	156	153		0.50
3/1/02		0.98	49	0.90	54	138	154		0.30
3/2/02		0.96	47	0.86	48	157	137		0.30
3/3/02		0.83	33	0.75	35	140	138		0.12
3/4/02		0.77	28	0.68	28	141	139		0.08
3/5/02	27	0.79	29	0.69	29	142	140	147	0.04
3/6/02		0.81	31	0.71	31	141	140		0.02
3/7/02		0.82	32	0.72	32	141	141		0.05
3/8/02		0.81	31	0.72	32	141	140		0.06
3/9/02		0.81	31	0.72	32	142	140		0.05
3/10/02		0.8	30	0.70	30	142	141		0.08
3/11/02		0.81	31	0.71	31	142	141		0.05

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
3/12/02		0.81	31	0.71	31	142	141		0.05
3/13/02		0.8	30	0.71	31	142	141		0.04
3/14/02		0.78	29	0.69	29	142	141		0.09
3/15/02		0.78	29	0.68	28	142	141		0.15
3/16/02		0.79	29	0.69	29	141	141		0.30
3/17/02		0.79	29	0.69	29	141	140		0.33
3/18/02		0.78	29	0.68	28	141	140		0.37
3/19/02		0.78	29	0.68	28	141	140		0.42
3/20/02		0.77	28	0.67	27	142	141		0.38
3/21/02		0.77	28	0.67	27	142	141		0.32
3/22/02		0.76	27	0.67	27	142	141		0.29
3/23/02		0.76	27	0.66	26	143	142		0.30
3/24/02		0.76	27	0.67	27	143	142		0.34
3/25/02		0.77	28	0.68	28	141	141		0.53
3/26/02		0.78	29	0.68	28	141	140		0.66
3/27/02		0.78	29	0.68	28	141	140		0.72
3/28/02		0.84	34	0.74	34	142	141		0.64
3/29/02		0.92	42	0.82	43	163	160		0.54
3/30/02		0.89	39	0.77	37	185	172		0.35
3/31/02		0.8	30	0.71	31	168	162		0.36
4/1/02		0.74	25	0.64	24	145	143		0.38
4/2/02	24	0.74	25	0.65	25	144	142	152	0.43
4/3/02		0.74	25	0.65	25	143	142		0.44
4/4/02		0.74	25	0.64	24	143	142		0.46
4/5/02		0.74	25	0.65	25	143	142		0.51
4/6/02		0.75	26	0.66	26	143	141		0.61
4/7/02		0.77	28	0.67	27	144	142		0.66
4/8/02		0.78	29	0.68	28	144	142		0.65
4/9/02		0.79	29	0.70	30	143	141		0.83
4/10/02		0.79	29	0.70	30	142	141		0.90
4/11/02		0.77	28	0.68	28	144	142		0.53
4/12/02		0.76	27	0.66	26	144	142		0.53
4/13/02		0.76	27	0.67	27	144	143		0.53
4/14/02		0.76	27	0.67	27	143	141		0.83
4/15/02		0.77	28	0.68	28	143	141		0.92
4/16/02		0.77	28	0.68	28	142	141		1.00

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
4/17/02		0.78	29	0.69	29	142	141		0.92
4/18/02		0.8	30	0.70	30	142	140		1.08
4/19/02		0.86	36	0.77	37	141	139		0.86
4/20/02		0.9	40	0.81	42	138	137		1.16
4/21/02		0.91	41	0.82	43	135	134		1.69
4/22/02		0.89	39	0.80	41	136	134		1.60
4/23/02		0.89	39	0.80	41	135	134		1.64
4/24/02		0.92	42	0.83	44	135	134		1.68
4/25/02		0.95	46	0.86	48	135	134		1.75
4/26/02		1	52	0.91	55	132	131		2.13
4/27/02		1.16	74	1.06	78	128	127		1.88
4/28/02		1.27	92	1.19	102	126	124		1.51
4/29/02		1.54	147	1.45	162	120	120		1.27
4/30/02		1.76	202	1.67	224	113	113		1.40
5/1/02		1.83	222	1.74	247	110	110		1.65
5/2/02		1.61	163	1.52	180	113	113		2.10
5/3/02		1.53	144	1.44	159	114	115		2.26
5/4/02		1.48	133	1.39	147	114	115		2.75
5/5/02		1.46	129	1.38	144	114	114		2.80
5/6/02		1.46	129	1.37	142	115	115		2.38
5/7/02		1.43	123	1.34	135	114	114		3.00
5/8/02	144	1.5	138	1.42	154	112	112	114	3.14
5/9/02		1.59	158	1.51	178	110	110		2.97
5/10/02		1.65	173	1.57	194	108	108		3.39
5/11/02		1.69	183	1.61	206	106	106		3.80
5/12/02		1.76	202	1.68	227	106	106		3.82
5/13/02		1.88	237	1.80	267	104	105		3.92
5/14/02		2	275	1.91	306	103	103		3.77
5/15/02		2.03	285	1.94	317	103	103		3.25
5/16/02		1.97	265	1.89	299	103	103		4.05
5/17/02		2.11	312	2.02	348	100	100		4.37
5/18/02		2.29	380	2.22	434	96	97		4.35
5/19/02		2.51	474	2.49	566	92	93		4.31
5/20/02		2.66	545	2.63	642	90	91		4.26
5/21/02		2.73	580	2.71	688	89	90		4.35
5/22/02		2.69	560	2.69	677	91	92		3.67

APPENDIX C
GLACIER CREEK DATA

Date	Measured Discharge (cfs)	Downstream Sensor Avg Daily Stage (ft)	Downstream Sensor Avg Daily Calculated (cfs)	Upstream Sensor Avg Daily Stage (ft)	Upstream Sensor Avg Daily Calculated (cfs)	Downstream Sensor Spec. Conductance (uS/cm@25 C)	Upstream Sensor Spec. Conductance (uS/cm@25 C)	Measured Spec. Conductance (uS/cm@25 C)	Temp C
5/23/02		2.63	530	2.61	631	89	91		4.85
5/24/02		2.72	575	2.71	688	89	90		4.68
5/25/02		2.79	611	2.77	724	89	90		4.85
5/26/02		2.85	643	2.85	773	89	90		4.68
5/27/02		2.9	671	2.85	773	91	92		4.40
5/28/02		2.66	545	2.63	642	94	94		3.95
5/29/02		2.59	511	2.55	598	93	94		4.62
5/30/02		2.65	540	2.63	642	93	93		4.49
5/31/02		2.64	535	2.61	631	92	92		5.01
6/1/02		2.57	502	2.56	603	94	94		4.47
6/2/02		2.51	474	2.48	560	95	96		4.51
6/3/02		2.51	474	2.49	566	94	95		4.87
6/4/02	494	2.53	483	2.50	571	96	97	88	3.80
Average		1.96	249	1.89	257	128.09	127.23		2.55
Median						134	134		

UNPUBLISHED REPORT

APPENDIX D. Glacier Creek Project Calibration Record

July - October 2001

CALIBRATION RECORD
FOR GLACIER CREEK PROJECT

FIELD METER	BATTERY (VOLTS)	WATER TEMPERATURE (°C) METER	WATER TEMPERATURE (°C) NBS THERMO-METER	DISSOLVED OXYGEN (MG/L) METER	DISSOLVED OXYGEN (MG/L) METER SHOULD READ:	DISSOLVED OXYGEN (MG/L) ADJUST?	BAROMETRIC PRESSURE (MM)	RECORDED BY	REMARKS
QUANTA	4.6	21.71	21.8	8.74	8.7	Yes	752.9	Mary M.	Precalibration 7/9/01
QUANTA	4.6	22.14	22.3	8.6	8.6	NO	751.6	Mary M.	Postcalibration 7/12/01
QUANTA	4.5	23.12	23.25	8.45	8.45	NO	753.9	Mary M.	Precalibration 8/6/01
QUANTA	4.5	21.78	21.9	8.75	8.83	NO	764.5	Mary M.	Postcalibration 8/8/01
QUANTA Instrument was not pre- or post calibrated for 9/5/01 trip because Mary M. was on personal leave. The following readings are for a post-calibration for a August 28-29 field trip and can be used as an approximate pre-calibration for the 9/5/01 trip								Mary M.	9/5/01 field trip
QUANTA	4.5	21.27	21.38	8.58	8.55	No	737.11	Mary M.	8/30/01
QUANTA	4.5	22.17	22.3	8.55	8.55	NO	753.36	Mary M.	Precalibration 10/2/01
QUANTA	4.4	22.76	22.75	8.35	8.5	NO	752.60	Mary M.	Postcalibration 10/4/01

UNPUBLISHED REPORT

July - October 2001

CALIBRATION RECORD
FOR GLACIER CREEK PROJECT

FIELD METER	BATTERY (VOLTS)	CONDUCTIVITY STANDARD SOLUTION (µS/cm @ 25°C)						pH BUFFER SOLUTION				RECORDED BY	REMARKS
			445		70			4.0	7.0	9.18	10.0		
QUANTA	4.6		431	Adjust to 445	72	Adjust to 70			6.98	Adjust to 7.04 @ 15°C		Mary M.	Precalibration 7/9/01
										9.43	Adjust to 9.23 @ 20°C		
QUANTA	4.6		437	Read only	70	Read only			7.03	Read only		Mary M.	Postcalibration 7/12/01
										9.19	Read only		
QUANTA	4.5		440	Adjust to 445	70	No adjusment			7.08	Adjust to 7.04 @ 16°C		Mary M.	Precalibration 8/6/01
										9.30	Adjust to 9.27 @ 16°C		
QUANTA	4.5		445	Read only	70	Read only			7.06	@ 15.5°C	Read only	Mary M.	Postcalibration 8/8/01
										9.27 @ 16.5°C	; Should read		9.28 (Read only)
QUANTA	Instrument was not pre- or post calibrated for 9/5/01 trip because Mary M. was on personal leave for a August 28-29 field trip, and can be used for the 9/5/01 trip as an approximate pre-cal reading											Mary M.	9/5/01 field trip
QUANTA	4.5		442	read only	71	read only			7.06	Read only	9.25	Reads 9.31	8/30/01
QUANTA	4.5		445	OK	72	Adjust to 70			7.09	Adjust to 7.04 @ 15°C			Precalibration 10/2/01
										9.25	Adjust to 9.28 @ 15°C.		
QUANTA	4.4		435	Read only	70	Read only			7.04	@ 15°C	OK	Mary M.	Postcalibration 10/4/01
										9.30	should read 9.28 @ 15°C	Read only	

October 2001 - January 2001

CALIBRATION RECORD
FOR GLACIER CREEK PROJECT

FIELD METER	BATTERY (VOLTS)	WATER TEMPERATURE (°C) METER	WATER TEMPERATURE (°C) NBS THERMO-METER	DISSOLVED OXYGEN (MG/L) METER	DISSOLVED OXYGEN (MG/L) METER SHOULD READ:	DISSOLVED OXYGEN (MG/L) ADJUST?	BAROMETRIC PRESSURE (MM)	RECORDED BY	REMARKS
QUANTA	4.4	24.24	24.35	8.12	8.3	Yes, to 8.3	750.32	Mary M.	Precalibration 10/15/01
QUANTA	4.4	23.14	23.28	8.28	8.3	NO	735.58	Mary M.	Postcalibration 10/17/01
QUANTA	4.4	22.75	22.85	8.28	8.4	Yes, to 8.4	749.80	Mary M.	Precalibration 11/5/01
QUANTA	4.4	22.11	22.29	8.47	8.42	NO	750.31	Mary M.	Postcalibration 11/7/01
QUANTA	4.4	22.68	22.57	8.37	8.43	Yes, to 8.43	742.70	Mary M.	Precalibration 12/4/01
QUANTA	4.3	23.02	23.12	meter reading saturation. I shows 9.42 for	will not rise adjusted Barometric vs. 9.45 this trip	to 100% Pressure from 760 to 743. No adjustment of D.O. setting because of problem	742.95	Mary M.	Postcalibration 12/10/01 After adjustment meter reads 100% saturation, and with barometric pressure. Do not use DO values
QUANTA	4.3	23.92	24.0	7.86	7.9	Yes, to 7.9	717.80	Mary M.	Precalibration 1/7/02
QUANTA	4.3	23.40	23.51	8.18	8.40	No, read only	747.78	Mary M.	Postcalibration 1/14/02

UNPUBLISHED REPORT

October 2001 - January 2002

CALIBRATION RECORD
FOR GLACIER CREEK PROJECT

FIELD METER	BATTERY (VOLTS)	CONDUCTIVITY STANDARD SOLUTION (µS/cm @ 25°C)						pH BUFFER SOLUTION				RECORDED BY	REMARKS
			445		70			4.0	7.0	9.18	10.0		
QUANTA	4.4		430	Adjust	to 445				7.09	Adjust to 7.09 @ 15°C		Mary M.	Precalibration 10/15/01
					73	Adjust to 70				9.24	Adjust to 9.28 @ 15°C		
QUANTA	4.4		430	Read only					7.03	@ 15.5°C	Read only	Mary M.	Postcalibration 10/17/01
					71	Read only				9.29 @ 15°C		Read only	
QUANTA	4.4		434	Adjust	to 445				7.11	Adjust to 7.04 @ 15°C		Mary M.	Precalibration 11/5/01
					72	Adjust to 70				9.34	Adjust to 9.28 @ 15°C		
QUANTA	4.4		433	Read only					7.03	@ 15.7°C	Read only	Mary M.	Postcalibration 11/7/01
					70	Read only				9.29 @ 15°C		Read only	
QUANTA	4.4		440	Adjust	to 445				7.28	Adjust to 7.04 @ 15°C		Mary M.	Precalibration 12/6/01
					72	Adjust to 70				9.25	Adjust to 9.28 @ 15°C		
QUANTA	4.3		438	Read only					7.28	@ 16°C	Read only	Mary M.	Postcalibration 12/10/01
					71	Read only				9.28 @ 15°C		Read only	
QUANTA	4.3		422	Adjust	to 445				7.12	Adjust to 7.03 @ 16.5°C		Mary M.	Precalibration 1/2/02
					72	Adjust to 70				9.15	Adjust to 9.26 @ 17°C		
QUANTA	4.3		454	Read only					7.01 @	15°C	Read only	Mary M.	Postcalibration 1/14/02
					69	Read only				9.31 @	16.2°C	Read only	

UNPUBLISHED REPORT

February 2002 - May 2002

CALIBRATION RECORD
FOR GLACIER CREEK PROJECT

FIELD METER	BATTERY (VOLTS)	WATER TEMPERATURE (°C)		DISSOLVED OXYGEN (MG/L)			BAROMETRIC PRESSURE (MM)	RECORDED BY	REMARKS
		METER	NBS THERMO-METER	METER	METER SHOULD READ:	ADJUST?			
QUANTA	4.8	22.48	22.66	8.22	8.30	Yes, to 8.3	734.31	Mary M.	Precalibration 2/12/02
QUANTA	4.6	22.67	22.77	8.21	8.45	No, read only	749.30	Mary M.	Postcalibration 2/20/02
QUANTA	4.5	23.83	23.82	8.19	8.65	Yes, to 8.65	773.83	Mary M.	Precalibration 3/4/02
QUANTA	4.5	21.86	21.90	9.03	8.90	Read only	770.13	Mary M.	Postcalibration 3/6/02
QUANTA	4.4	20.78	20.78	9.36	9.10	Yes, to 9.10	767.59	Mary M.	Precalibration 4/1/02
QUANTA	4.4	21.01	21.17	8.92	9.00	No, read only	766.06	Mary M.	Postcalibration 4/3/02
QUANTA	4.4	21.36	21.40	8.95	8.95	NO	762.76	Mary M.	Precalibration 5/7/02
QUANTA	4.4	20.93	21.00	8.86	8.95	Read only	753.87	Mary M.	Postcalibration 5/9/02

February 2002 - May 2002

CALIBRATION RECORD
FOR GLACIER CREEK PROJECT

FIELD METER	BATTERY (VOLTS)	CONDUCTIVITY STANDARD SOLUTION (µS/cm @ 25°C)						pH BUFFER SOLUTION				RECORDED BY	REMARKS
			445		70			4.0	7.0	9.18	10.0		
QUANTA	4.8		430	Adjust	to 445				7.38	Adjust to 7.04 @ 15°C		Mary M.	Precalibration 2/12/02
					71	Adjust	to 70		9.04	Adjust to 9.28 @ 15°C			
QUANTA	4.6		451	Read only					6.99 @ 15.2°C	Read only		Mary M.	Postcalibration 2/20/02
					70	Read only				9.20 @ 15°C	Read only		
QUANTA	4.5		448	Adjust	to 445				7.01	Adjust to 7.04 @ 15°C		Mary M.	Precalibration 3/4/02
					70	OK				9.31	Adjust to 9.28 @ 15°C		
QUANTA	4.5		440	Read only					7.05 @ 15°C	Read only		Mary M.	Postcalibration 3/6/02
					70	Read only				9.26 @ 15°C	Read only		
QUANTA	4.4		438	Adjust	to 445				7.05 @ 15°C	Adjust 67.04		Mary M.	Precalibration 4/1/02
					72	Adjust	to 70		7.25 @ 15°C	Adjust to 9.28			
QUANTA	4.3		434	Read only					6.96 @ 15°C	Read only		Mary M	Postcalibration 4/3/02
					70	Read only				9.26 @ 15°C	Read only		
QUANTA	4.4		434	Adjust	to 445				7.07 @ 15°C	No adjustment needed	Mary	M.	Precalibration 5/7/02
					72	Adjust	to 70			9.27 @ 15°C	Adjust to 9.28		
QUANTA	4.4		436	Read only					7.04 @ 15°C	Read only		Mary M.	Postcalibration 5/9/02
					70	Read only				9.32 @ 15°C	Read only		

June 2002

CALIBRATION RECORD
FOR GLACIER CREEK PROJECT

FIELD METER	BATTERY (VOLTS)	WATER TEMPERATURE (°C)		DISSOLVED OXYGEN (MG/L)			BAROMETRIC PRESSURE (MM)	RECORDED BY	REMARKS
		METER	NBS THERMO-METER	METER	METER SHOULD READ:	ADJUST?			
QUANTA	4.3	20.72	20.78	8.77	8.9	Yes, to 8.9	749.30	Mary M.	Pre calibration 6/3/02
QUANTA	4.3	18.11	18.18	9.3	9.4	Read only	759.46	Mary M.	Post calibration 6/7/02

June 2002

CALIBRATION RECORD
FOR GLACIER CREEK PROJECT

FIELD METER	BATTERY (VOLTS)	CONDUCTIVITY STANDARD SOLUTION (µS/cm @ 25°C)						pH BUFFER SOLUTION				RECORDED BY	REMARKS
			445		70			4.0	7.0	9.18	10.0		
QUANTA	4.3		434	Adjust	to 445				7.08 @ 15°C	Adjust to 7.04		Mary M.	Precalibration 6/3/02
					73	Adjust	to 70		9.32 @ 16°C	Adjust to 9.27			
QUANTA	4.3		426	Read only					7.03 @ 16.25°C	Read only		Mary M.	Post calibration 6/7/02
					70	Read only				9.15 @ 15.17°C	Read only		

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APPENDIX E. Quality Assurance Project Plan

UNPUBLISHED REPORT

QUALITY ASSURANCE PROJECT PLAN
for the Glacier Creek Stream Gaging Project

By

Alaska Department of Natural Resources
Division of Mining, Land and Water
Alaska Hydrologic Survey
550 W 7th Ave., Suite 900A
Anchorage, AK 99501-3577

June 2000

Project Manager	Date	Project Quality Assurance Officer	Date
DEC Project Manager	Date	DEC Quality Assurance Manager	Date

STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

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http://www.state.ak.us/dec/

DIVISION OF AIR AND WATER QUALITY
NON-POINT SOURCE WATER POLLUTION CONTROL

September 25, 2003

Mary Maurer, Hydrologist
Alaska Hydrologic Survey
Department of Natural Resources
550 W. 7th Ave.
Anchorage, AK 99501

Subject: ADEC Approval of Quality Assurance Project Plan

Dear Ms.Maurer:

This letter confirms that the Alaska Department of Environmental Conservation has reviewed the Quality Assurance Project Plan (QAPP) for the Glacier Creek Stream Gaging Project submitted in June 2000 by the Alaska Department of Natural Resources, Division of Mining, Land and Water, Alaska Hydrologic Survey. This QAPP was approved in July, 2000 by Joyce Beelman, ADEC Water Program QA officer.

Sincerely,

Kent Patrick-Riley,
Non-Point Source Impairment and Protection Section Manager

Table of Contents

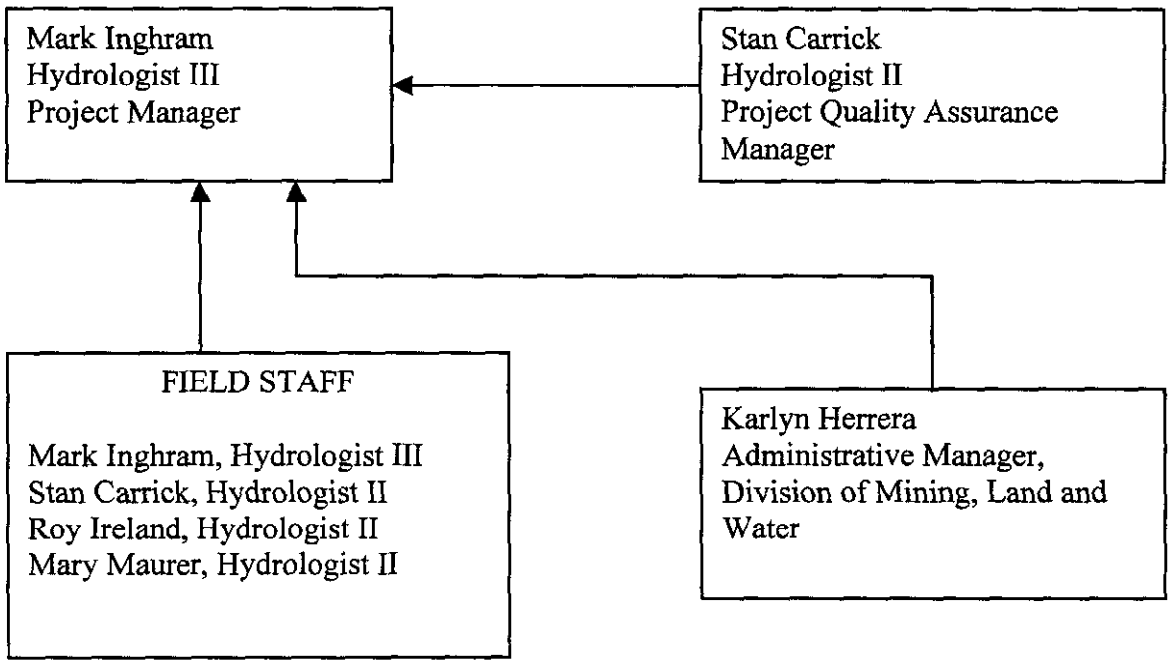
Distribution List

Kent Patrick Riley, ADEC Project Officer
Joyce Beelman, ADEC Quality Assurance Manager

Project/Task Organization

Project Manager: Mark Inghram
Project Quality Assurance Manager: Stan Carrick
Data Collection: Mark Inghram, Stan Carrick, Roy Ireland, Mary Maurer
Grant Administration: Karlyn Herrera

Project Organization Chart



Problem Definition/Background

Glacier Creek and its main tributaries Virgin, California, and Crow Creeks, have been identified by the Alaska Department of Environmental Conservation (ADEC) as high priority waters for protection. Also, Glacier Creek was recently listed as the number two priority project study area by the Alaska Landuse Decisionmakers Education Resources program (ALDER) administered by the Alaska Cooperative Extension. Currently there is no streamflow data collection program for Glacier Creek. The USGS has continuous streamflow records for Glacier Creek at the Alaska Railroad crossing from 1965-1978. In addition to the flow records, the USGS collected miscellaneous water quality data from 1956-1986.

Since the USGS gaging of Glacier Creek was discontinued, the population of Girdwood has nearly tripled, from approximately 500 full-time residents to an estimated 1500 residents. The Alyeska Ski Resort has undergone major expansion since 1978, adding parking, lodge facilities, aerial tram, and a 307 room luxury hotel. The Municipality of Anchorage projects that Girdwood will have 3,300 full-time residents by the year 2013, double the present population. Future development includes a proposed 18-hole golf course to serve residents and tourists.

Increased development and population growth can have deleterious impacts on streamflow and water quality. New housing, tourist facilities, parking areas, roads, etc. typically result in more direct runoff to local waterbodies, changing the timing and magnitude of flows along with decreased water quality. Girdwood's past and projected growth may have impacted Glacier Creek's flows, but no continuous stream gaging has been done since 1978 that would serve to document any flow regime changes.

The State of Alaska, Department of Natural Resources, Division of Mining, Land, and Water, Alaska Hydrologic Survey (AHS) proposes to re-establish a stream gage on Glacier Creek to evaluate any potential changes in runoff as a result of increased development in the basin. In addition, AHS will continuously measure conductivity at the gage site. Conductivity is an easily measured parameter that is often used to monitor non-point source pollution effects of urban development, especially road runoff. Historical conductivity data exist for Glacier Creek. For these reasons, conductivity will be monitored in Glacier Creek to compare historical and current trends.

Project/Task Description

The purpose of the Glacier Creek gaging project is to re-establish a stream gage near the old U.S. Geological Survey (USGS) gage site near the mouth of Glacier Creek. USGS streamflow data exists for Glacier Creek for the period 1965-1978. The data derived from the stream gaging will begin to enable AHS to evaluate changes in runoff to Glacier Creek caused by increased development and population growth in the Girdwood area.

AHS will survey the old USGS gage benchmarks and tie-in the elevations to the new site so gage height and streamflow correlations can be made. Two stream stage loggers coupled with pressure transducers will be installed at the gage site to record hourly stages. The two loggers will provide redundancy in the system in the case of instrument failure or data quality problems. Monthly field streamflow measurements will be made to develop a rating curve to equate stream stage to discharge. These monthly field trips will also include Hydrolab water quality measurements of temperature, dissolved oxygen, pH, and conductivity during the streamflow discharge work.

Conductivity will be monitored continuously in Glacier Creek to compare historical and current trends. A Great Lakes Instruments 3625e2t electrodeless conductivity probe will be installed with each of the pressure transducers in Glacier Creek. Conductivity will be measured every hour. At this frequency, changes during runoff events can be monitored.

After one year of gaging, AHS will submit a report that provides daily streamflow value summaries, flow extremes, and flow analysis, along with the corresponding conductivity data analysis. These data will be compared to the historical USGS Glacier Creek flow data to begin to evaluate if changes in streamflow and conductivity have occurred with increased development in Girdwood. Five total years of flow data are recommended to further refine the data and smooth out possible anomalous climate conditions. At the end of a five-year data collection and analysis process, enough data should be available to get an accurate statistically significant indication of Girdwood area development on Glacier Creek flow and water quality.

Grant funds will pay for staff time to setup the project, maintain the gage equipment, twelve gaging field visits, and report preparation. Grant funds will also be used to purchase one Hydrolab QUANTA instrument. AHS will provide matching support with the use of their stream stage loggers, pressure transducers, and in-situ conductivity measurement probes.

Quality Objectives and Criteria for Measurement Data

Objective 1:
Reestablish a stream gage on Glacier Creek to begin an evaluation of any changes in runoff over the past 20-30 years that likely occurred as a result of increased development in the basin. Monthly streamflow will be measured to establish a stage-discharge relation.

Objective 2:
Continuously measure conductivity at the gage site to assess non-point pollution effects of urban development, especially road runoff, and then compare conductivity data with historical data collected by USGS to determine whether there are discernable trends in conductivity.

Documentation and Records

The following data forms will be included in the final data report:

- Stage and conductivity datalogger forms
- Stream discharge measurement forms
- Water quality field notes forms
- Conductivity probe & field instrument calibration forms

Quality Control Requirements

At the monthly field visits, the data loggers will be checked for accuracy by comparing surveyed water levels to the instrument readings. Calibration notes for each data logger and pressure transducer pair are taken at the monthly site visits.

Data loggers will also be read during monthly field visits to ensure that each conductivity probe is operational. Each probe reading will then be compared to a reading obtained with a calibrated field conductivity meter, either a Hydrolab QUANTA or Oakton conductivity meter. The field meter will be place in the stream next to the in-situ probe. Probe and field meter readings will be recorded on the field forms. Probe readings that are substantially different from the field meter reading will be noted on the field forms. Drift in conductivity readings in the probe will be determined using these field conductivity meter checks. If drift in conductivity readings occur, slope corrections will be made during data reduction, and fully documented in the final report.

The primary field meter to be used during each field visit is a Hydrolab Quanta. A Oakton WD-35607 conductivity meter, Beckman Φ11 pH meter, and Hydrolab model 4041 will serve as backup meters, in case of malfunction of the Hydrolab Quanta. Meter

specifications and performance specifications, which include instrument range, accuracy, and resolution, are shown in Appendix A.

Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Streamflow will be measured monthly according to USGS methods (Carter and Davidian, 1968). AHS will use Price type AA meters or Price pygmy meters. After each field visit the Price pygmy and AA velocity meters are inspected, cleaned, dried, and lubricated.

AHS will use Dryden Instrumentation R2 data loggers coupled to Instrumentation Northwest pressure transducers. The data loggers and transducers are designed to be low maintenance systems meant for long-term field deployment. Two instruments will be used at the field site for redundancy. During each monthly visit to the field site, the instruments will be checked for accuracy, data downloaded, and batteries replaced. Spare parts for the instruments are available from Dryden Instrumentation in Anchorage.

AHS will install a Great Lake Instruments 3625e2t electrodeless conductivity probe with each pressure transducer. The conductivity probes are designed to be low maintenance systems meant for long-term field deployment. The electrodeless probe creates and measures the electrical field around the probe head. The electrodeless feature of the probes eliminates problems associated with bacteria or algae buildup on the electrodes.

Each transducer- conductivity probe pair will be set up with a separate datalogger and battery supply. The purpose of redundant field instruments is to minimize the loss of data in the event that an instrument malfunctions.

Instrument Calibration and Frequency

The Dryden Instrumentation R2 data loggers and Instrumentation Northwest pressure transducers will be checked and calibrated in the office prior to installation. The transducers are placed in a water container, then the data loggers are calibrated by adjusting the internal firmware settings.

Conductivity probes will be calibrated by Dryden Instrumentation or by AHS staff in the office prior to installation. The probes are placed in conductivity standard solutions that span the expected conductivity range during the monitoring period. USGS records of historical conductivity measurements of Glacier Creek will be inspected to determine this range. Probe readings will be recorded during monthly field visits, as described above in the "quality control requirements" section. After the one-year monitoring period, the probes will be removed from the stream and checked with conductivity standard solutions.

Field meters for the measurement of water temperature, conductivity, dissolved oxygen, and pH will be calibrated immediately before and after each field trip, according to the Manufacturer's instructions. NIST traceable conductivity standard solutions that span the expected conductivity of stream water will be used for conductivity calibrations. Freshly prepared Beckman pH buffer solutions will be used for pH calibrations.

Inspection/Acceptance Requirements for Supplies and Consumables

Supplies that have a shelf-life, such as conductivity standard solutions and pH buffer solutions, will be noted on their container. AHS staff performing the calibration will check the date to ensure the shelf-life has not been exceeded prior to using the solutions for instrument calibration.

Data Acquisition Requirements for Nondirect Measurements

The data obtained in this project will be compared to USGS historical data. Continuous streamflow measurements were collected by USGS from 1965-1978. Periodic conductivity measurements were recorded from 1956-1986. These records are published in USGS's annual water-data reports, and thus have been verified and validated.

Data Management

The datalogger data is downloaded directly to a lap-top or mini-computer in the field. Back in the office, the data is downloaded to desktop computers for analysis and reduction.

Forms used in this project are shown in Appendix B.

Streamflow and conductivity data will be tabulated and graphed using PC software. These data will also be compared with USGS historical data to determine temporal trends in streamflow and conductivity.

AHS will produce a final report that provides daily streamflow value summaries, flow extremes, and flow analysis, along with the corresponding conductivity data analysis. The original signed hard-copy will be sent to the ADEC office in Anchorage. All documents submitted to ADEC may be published, at ADEC discretion, on the ADEC web site.

In addition to a written report, data collected for the project will be provided electronically to ADEC via an Email ZIP file. Both the original application file (WORD) and a comma delimited ASCII text file will be provided with fields separated by commas, with text enclosed in quotes, no spaces between fields, no blank lines, and dates formatted as "MM-DD-YYYY".

The project will also contribute information about the project and data set by logging on to the CIMMS database at http://146.63.13.150/servlet/ciimmsde, and login as a new contributor, and complete the "project" and "dataset" forms for the project according to the instructions at the site.

Reports to Management

Quarterly progress and financial reports will be submitted to ADEC for the periods ending September 31, 2000, December 31, 2000, and March 31, 2001. Progress reports will describe project status, and any significant quality assurance problem. A final financial report, and a final progress report including all data, field and calibration forms is due to ADEC on June 30, 2001.

AHS will acknowledge ADEC funding in all outreach materials for project tasks funded by ADEC.

Data Review, Validation, and Verification

Streamflow measurements and field meter measurements are the means of validating and verifying instrument readings of the pressure transducers and conductivity probes. The deployment of two separate, independent instrument setups also will be used to validate and verify the data.

Validation and Verification Methods

The readings from the two independent instrument setups will be compared both in the field during the field visit, and subsequently in the office after the data has been downloaded after each months servicing. These readings will then be compared to streamflow measurements and field conductivity meter readings.

References Cited

Carter, R.W., and Davidian, J., 1968, General procedures for gaging streams: U.S. Geological Survey Techniques of Water-Resources Investigations, book 3, chapter A6, 13 p.