

Hydrologic Summary – Chilkoot River

River Basin and Flow Gages: The Chilkoot River (var Chilcoot, Tananei, Tenany, TschilkCit) is 131 sq mi² and flows through Chilkoot Lake before reaching Lutak Inlet approximately 7 miles northwest of Haines (Figure 1). The Alaska Department of Fish and Game operated a gage on the Chilkoot River from August 2007 to October 2012 (Table 1). Additional available hydrologic data in the Chilkoot watershed includes the USGS Upper Chilkoot Lake Outlet¹ (var Connelly Lake) record from August 1993 to September 1997 which is not examined in this hydrologic summary.

Table 1 – Chilkoot River Gage, abbreviations: NAD27 – North American Datum of 1927.

Gage and Station ID	Latitude, Longitude (NAD27)	Elevation (ft NGVD 29)	Drainage Area (mi ²)	Period of operation
CHILKOOT R (ADFG 11901)	59.33547 N -135.5597911 W	46	131	2007 – 2012

Map Coverage: USGS 1:25,000 Series: Skagway B-2 SE, Skagway B-2 SW

Climate: The Chilkoot River as characterized by the Haines, Alaska station (503490) is located in the North Panhandle climate region.² While its temperature is similar to the Northwest Gulf region to its South, it receives less precipitation than panhandle locations such as Juneau due to the rainshadow influence from coastal mountains. The climate according to the Koppen-Geiger climate index in Dsc (Cold annual temperature, and dry and cold summer period).³ A 26 year climate from the Haines COOP Weather station (see Table 2) shows average maximum and minimum temperatures are lowest in January and greatest in July (Table 2).

Total annual precipitation at the Haines 503490 COOP weather station is 49.4 inches per year. Most precipitation occurs in early winter (max in December is 7.4 in) while less precipitation occurs in the summer months. A spatial interpolation and estimate of the average annual precipitation and temperature from the PRISM⁴ dataset are presented in Figure 2. The derived temperature map

¹ USGS 15056280 UPPER CHILKOOT LK OUTLET NR HAINES AK, http://waterdata.usgs.gov/nwis/dv/?referred_module=sw&site_no=15056280

² Bieniek PB et al. 2012 Climate Divisions for Alaska Based on Objective Methods. Journal of Applied Meteorology and Climatology. 51: 1276-1289.

³ Peel MT et al. 2007 Updated world map of the Koppen-Geiger climate classification. Hydrol. Earth Syst. Sci., 11, 1633–1644

⁴ Daly C et al. 2008. Physiographically sensitive mapping of climatological temperature and precipitation across the conterminous United States. International Journal of Climatology 28: 2031–2064.

estimates that warmest annual temperatures (36 - 38 °F) are found in valley bottoms while ridgelines are colder (< 28 °F). A strong orographic precipitation gradient is estimated from PRISM dataset with annual precipitation greater than 100 in/yr in the ridgelines that bound the Chilkoot basin to less than 50 in/yr in the Chilkoot valley bottom.

Table 2 – Average daily climate summary for the Haines COOP station 503490 (59.23 N, -135.43W) from September 1989 to January 2015. <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak3504>

Haines (1989-2015)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg/ Total
Average Maximum Temperature (F)	22.1	29.0	34.4	45.8	56.9	65.7	68.4	66.2	56.1	43.5	29.5	25.0	45.2
Average Minimum Temperature (F)	10.2	14.2	17.4	27.2	34.6	42.8	47.6	45.8	39.3	31.1	18.6	14.6	28.6
Average Total Precipitation (in.)	5.21	4.54	4.38	2.10	1.78	1.13	1.27	2.61	5.79	6.98	6.21	7.42	49.4
Average Total Snowfall (in.)	52.4	40.2	36.4	6.0	0.2	0.0	0.0	0.0	0.2	10.3	50.0	65.4	261.2
Average Snow Depth (in.)	47	58	60	36	3	0	0	0	0	1	13	32	21

General Basin Description: The Chilkoot River flows from a branch of the Ferebee glacier at its headwaters. Klukwah Mountain forms the northwestern boundary and an unnamed ridge forms the eastern boundary with the Ferebee River. The Takshanuk mountains, including Mount Kashagnak and Klutshah Mountain, form the western boundary with the Chilkat River watershed (see Figure 1). The lower portion of the Chilkoot River watershed lies within the Haines State Forest, and the Alaska Chilkat Bald Eagle Preserve extends approximately six river miles along the river valley above Chilkoot Lake.⁵ The Chilkoot River watershed includes Chilkoot Lake, a glacial moraine lake which is approximately 3.5 miles long and 1700 acres in area. The outlet of Chilkoot Lake is the location of the former Tlingit settlement, Chilkoot Village, which was occupied until the beginning of the 20th century.⁶ This area is now the Chilkoot Lake State Recreation Site, a campground managed by the Alaska Department of

⁵ Haines State Forest map, <http://forestry.alaska.gov/pdfs/hainesmap.pdf>

⁶ Smythe, C.W., A Study of Five Southeast Alaska Communities, Institute of Social and Economic Research, University of Alaska Anchorage, February 1994

Natural Resources.⁷ The Chilkoot Lake weir is operated by the Alaska Department of Fish and Game, and in 2014 counted more than 100,000 Sockeye Salmon entering the Chilkoot Lake.⁸

Channel Description: The specific reach A examined in this water reservation application runs approximately 1.3 miles from the outlet of Chilkoot Lake (30 ft) to the Chilkoot River mouth at Lutak Inlet. The average gradient for the lower Chilkoot River is approximately 23 ft/mile (Figure 3).

Table 3 - Daily discharge data summary for the Alaska Department of Fish and Game gage located on the Chilkoot River (ADFG 11901). Period of record includes complete months from September 1 2007 through September 30 2012. Monthly means are calculated from daily mean discharge records.

Month	Total Months	Mean (cfs)	Min (cfs)	Max (cfs)
Jan	5	152	83	274
Feb	5	137	82	339
Mar	5	114	75	222
Apr	5	194	77	753
May	5	959	226	3124
Jun	5	1884	874	4454
Jul	5	1915	1311	3166
Aug	5	1649	804	4590
Sep	6	1211	407	3444
Oct	5	707	293	3344
Nov	5	340	194	1065
Dec	5	199	117	423
Annual		788	75	4590

Available Stream Flow Data: The Alaska Department of Fish and Game operated a gage (ADFG 11901) on the Chilkoot River just below the outlet of Chilkoot Lake from August 2007 to October 2012. The daily discharge summary shows the highest monthly flows during the summer period, and lowest flows in late winter prior to break up (Table 3). Monthly average flow was above 1500 cfs from June through August, and reached a maximum in July (1915 cfs). Monthly average flow declined over the winter period and reached a minimum in March (114 cfs). The maximum and minimum flows for the period of record (4590 and 75 cfs) were observed in August and March. Overall, the Chilkoot River flow pattern closely follows the annual temperature range which also reaches a maximum in July. Conversely, local

⁷ Chilkoot Lake State Recreation Site, <http://dnr.alaska.gov/parks/aspunits/southeast/chilkootlksrs.htm>

⁸ ADF&G Commercial Salmon Fisheries Chilkoot Lake Weir - Sockeye Counts, http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareasoutheast.weir_chilkoot

precipitation at the Haines weather station is lowest during the summer months, and inversely related to flow. The close relationship between flow and temperature (rather than local precipitation) indicates that high alpine snowpack and glacial melt is the primary source of flow to the Chilkoot River.

Data Adequacy: A streamflow record of five years is adequate to adjudicate a reservation of water application.

Navigability: The Chilkoot River is considered navigable from the mouth to approximately 15 miles upstream including the Chilkat Lake. The upper reach of the Chilkoot River is considered “conflict” for navigability at this time, according to the State of Alaska (for Title purposes). Please contact the Public Access, Assertion, and Defense Unit Manager for more information.⁹

⁹ Alaska Department of Natural Resources, Division of Mining, Land & Water, Navigable Waters Web Map. <http://navmaps.alaska.gov/navwatersmap/>, accessed 4/02/2015.

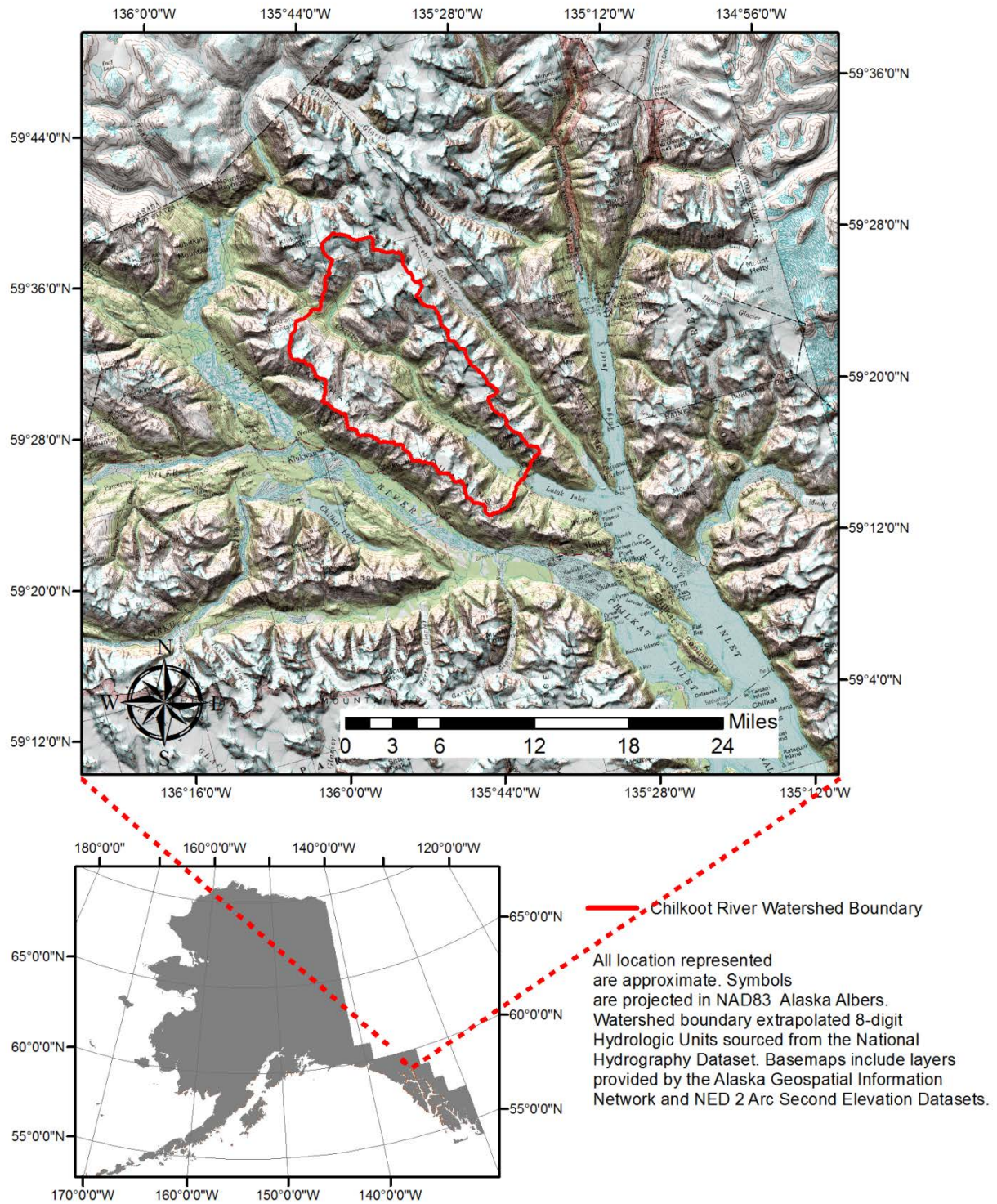


Figure 1. Location of the Chilkoot River watershed near Haines Alaska.

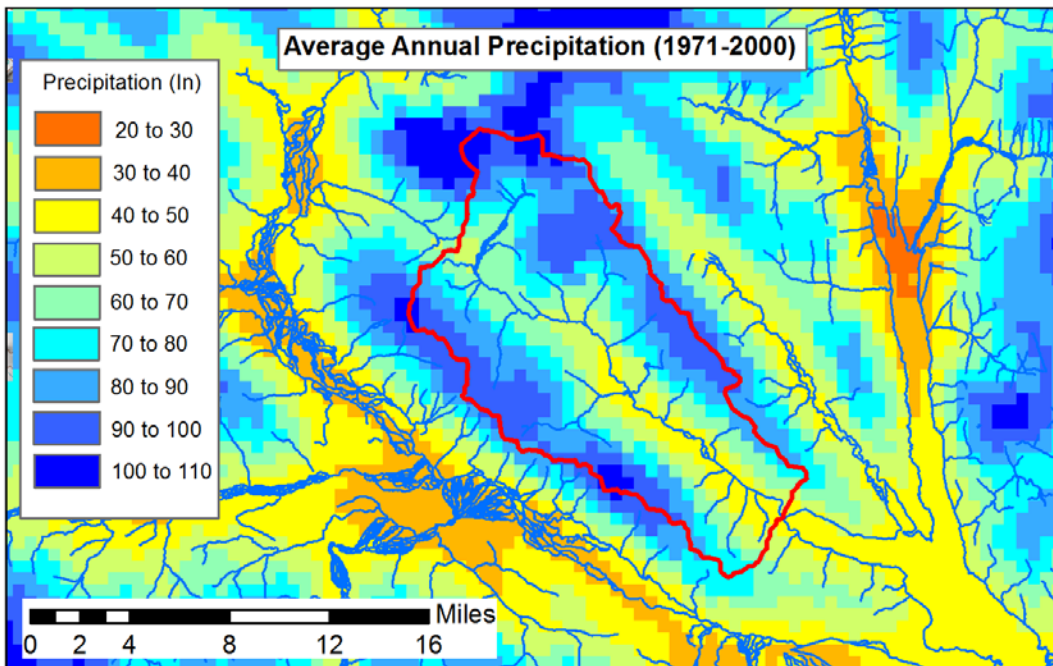
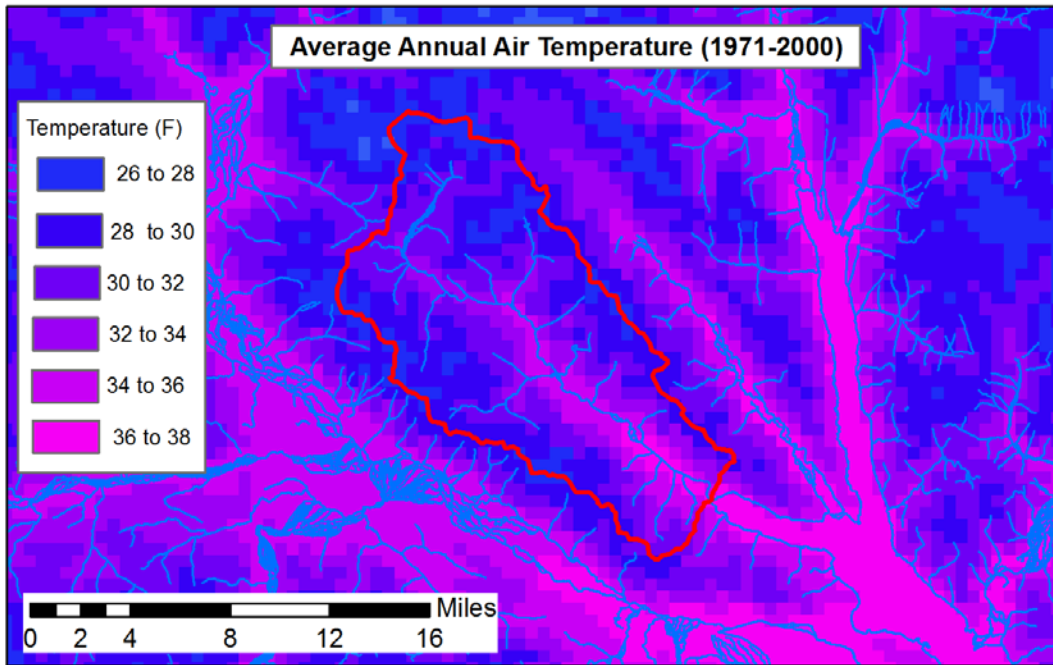
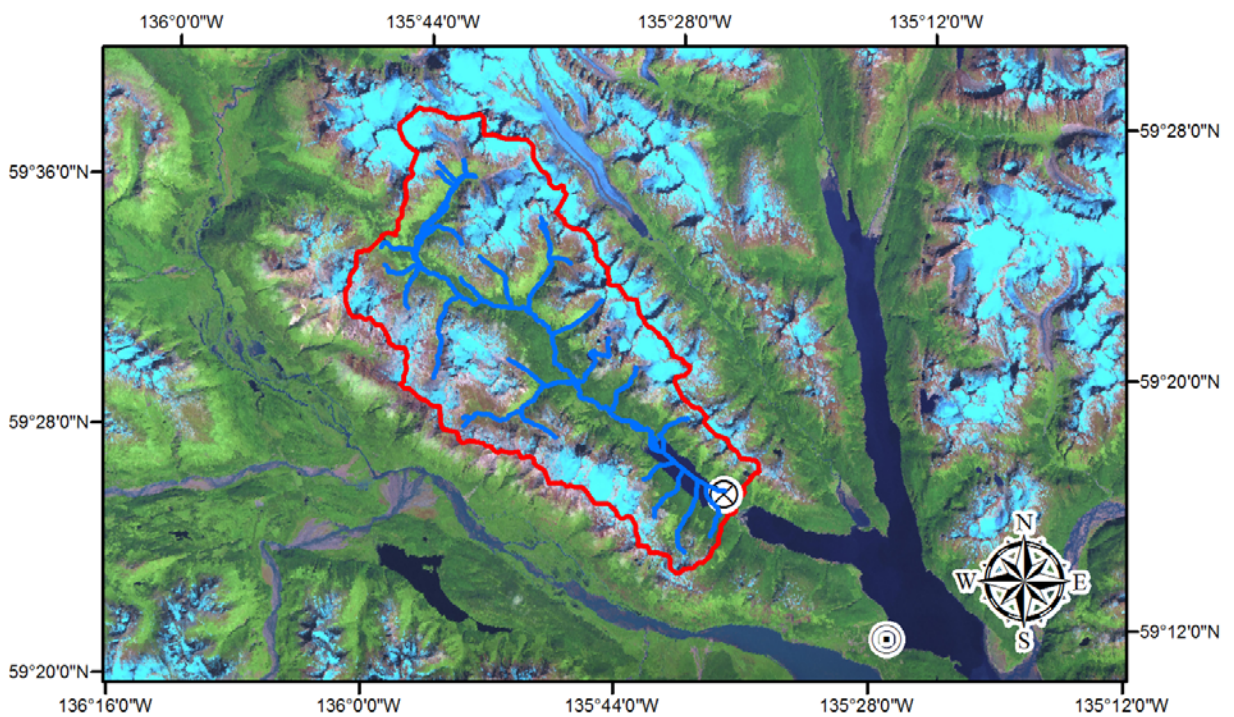
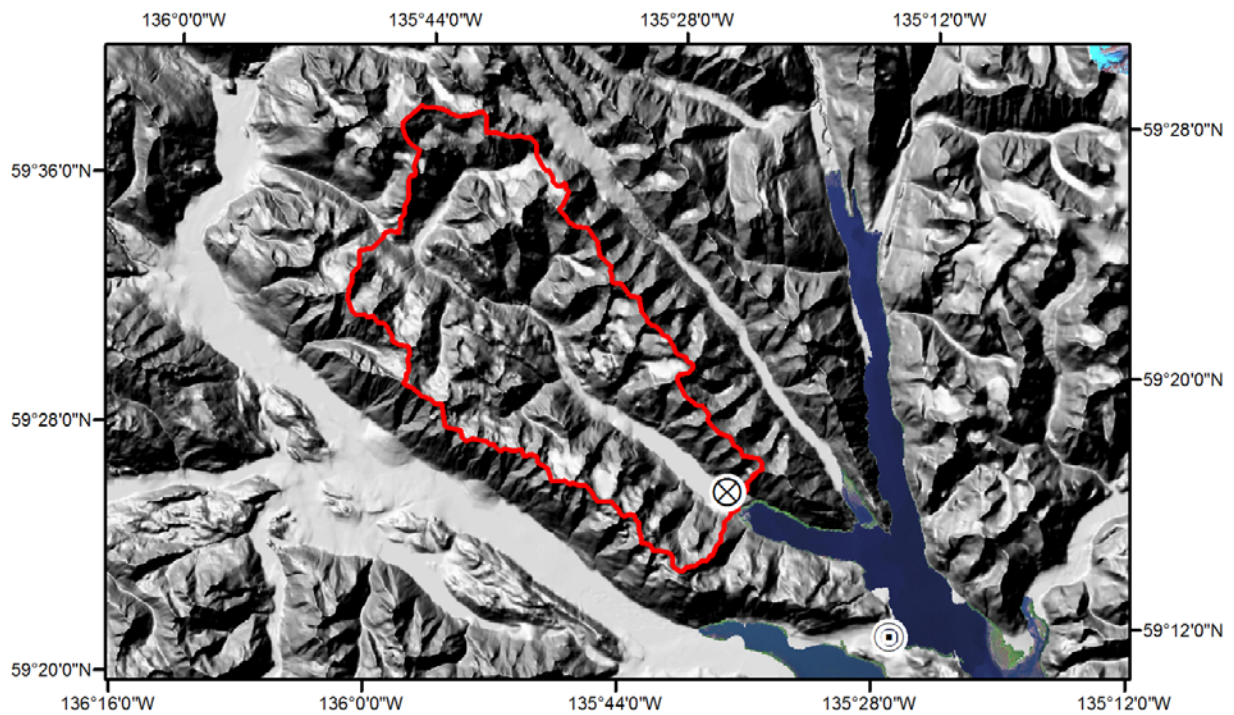


Figure 2. Spatially gridded estimates of average monthly and annual mean temperature (1971-2000) for the Chilkoot River watershed. Distribution of the point measurements to a spatial grid was accomplished using the PRISM model (Daly et al. 1998). Data presented here are projected in Alaska Albers NAD 83. Full citation provided in text.



All locations represented are approximate. Symbols and basemaps are projected in NAD 83 Alaska Albers. Basemaps were provided by the Alaska Geospatial Information Network, including digitized and hill-shaded USGS topographic map at 1:250k scale, Blue Marble Satellite Imagery Mosaic, and SRTM V2 Elevation Dataset. Flowlines provided by the National Hydrography Dataset.




-  ADF&G 11901 Gaging Station
-  Haines 503490 Weather Station
-  Chilkoot River Watershed Boundary

Figure 3. Watersheds shaded relief (top panel), hydrography, gage and weather station locations (bottom panel) for the Chilkoot River Watershed.