Doyle Crossing – Last Chance Creek

Last Chance Creek is tributary to Indian Creek in the East Branch North Fork Feather River watershed, with a drainage area of approximately 96.5 square miles (Plumas Corporation, 2016). Basin statistics are not available through the USGS StreamStats application because the Last Chance Creek watershed is in an exclusion area. However, Plumas County data for the 1971 through 2000 period show that the watershed receives average annual precipitation of 23 to 31 inches (Plumas County, 2012).

The Last Chance Creek watershed has been the focus of meadow and channel restoration activities since 1996, with the majority of restoration occurring between 2002 and 2007. Figures 31 and 32 illustrate pre- and post- restoration conditions in the Alkali Flat area of Last Chance Creek. In total, approximately 11 miles of channel have been reconnected to the floodplain above the Doyle Crossing station. A CRS unit was installed in 1999. Continuing the long-term data collection at this location is important for evaluating the cumulative impact of multiple meadow restoration projects across a variety of water year types, including severe multi-year droughts. Appendix G provides a map of restoration projects and gage location for the Last Chance Creek monitoring station. Table 15 summarizes the data record for this gage (data gaps exist due to occasional equipment errors). Table 16 provides an overview of field data collected during the 2017 water year.

Figure 31. *Last Chance Creek- Alkali Flat overview, 2003.*

Figure 32. *Last Chance Creek- Alkali Flat overview, 2010.*

Table 15. *Data continuity for the Last Chance Creek/Doyle Crossing Monitoring Station.*

Water Year	Data Availability
2000	DG: 11/19- 1/6, 2/25- 3/17
2001	All
2002	All
2003	All
2004	DG: 9/5-9/30
2005	DG: 10/1, 1/7-1/18
2006	All
2007	All
2008	All
2009	All
2010	All
2011	DG: 11/3-7/17
2012	All
2013	All
2014	All
2015	DG:2/3-3/13
2016	1/4-2/12
2017	12/6-12/31
Water Year = 10/1 through 9/30 DG = Data Gap All = All year-round data	

Table 16. *Summary of 2017 Water Year Data Collection at Last Chance Creek/Doyle Crossing Station.*

Parameter measured	Site visit dates	Data collected by	Comments
Stream Flow Measurement	12/15/16, 4/21, 5/16, 6/22, 7/19, 8/01, 9/13	Plumas Corporation	
Temperature (Air, Water)	12/15/16, 4/21, 5/16, 6/22, 7/19, 8/01, 9/13	Plumas Corporation	Continuous water temperature also available from gage site; air temperature from DWR Station at Doyle Crossing (available via CDEC)
Electrical conductivity (Stream)	12/15/16, 4/21, 5/16, 6/22, 7/19, 8/01, 9/13	Plumas Corporation	

Geologic Characterization:

Last Chance Creek is a long narrow set of meadows at an elevation of 5,500 ft with an average of 20 inches of precipitation per year. Precipitation at this location is a mix of rain and snow. The geology here is more complex than the other meadows discussed so far. The rock types vary locally from Permian to Neogene granodiorites and quartz monzonite, to Neogene andesite and basalt deposits as well as rhyolite. In some locations nearer to the stream Pliocene alluvium terrace deposits may be found. Adding to the complexity of the area is the likely presence of multiple NW-SE trending faults to the north and south of the study area, with a possible NE-SW trending fault that crosses the stream channel in the western portion of the study area.

Hydrology:

The data reported for Last Chance Creek at Doyle Crossing are for Water Year 2017 (October 1, 2016 – September 30, 2017).

Stream flow was manually measured in December 2016 and monthly from April through September. The data were used to calibrate the stream stage rating curve and verify the continuously recorded transducer data. Manually-measured stream flows ranged from 335 cfs (April) to 0.59 cfs (August). Daily average flows (Figure 33) from the CRS ranged from 0.02 cfs (8/18/17) to 859 cfs (2/9/17). The large January and February storms drove the high flows achieved during those months. In January, the Doyle Crossing CDEC station recorded 3.92 inches of rain from 1/7/17 through 1/11/17. Average hourly flows in Last Chance Creek reached a peak of 899 cfs on 1/9/17 at 0100 hrs. The February storm event recorded 3.11 inches of precipitation over the seven-day period from 2/4/17 to 2/10/17, with hourly average flows reaching 1090 cfs on 2/9/17at 2000 hrs. Although peak flows stayed well within the existing rating, they should be considered only as estimates due to the lack of high flow calibration measurements.

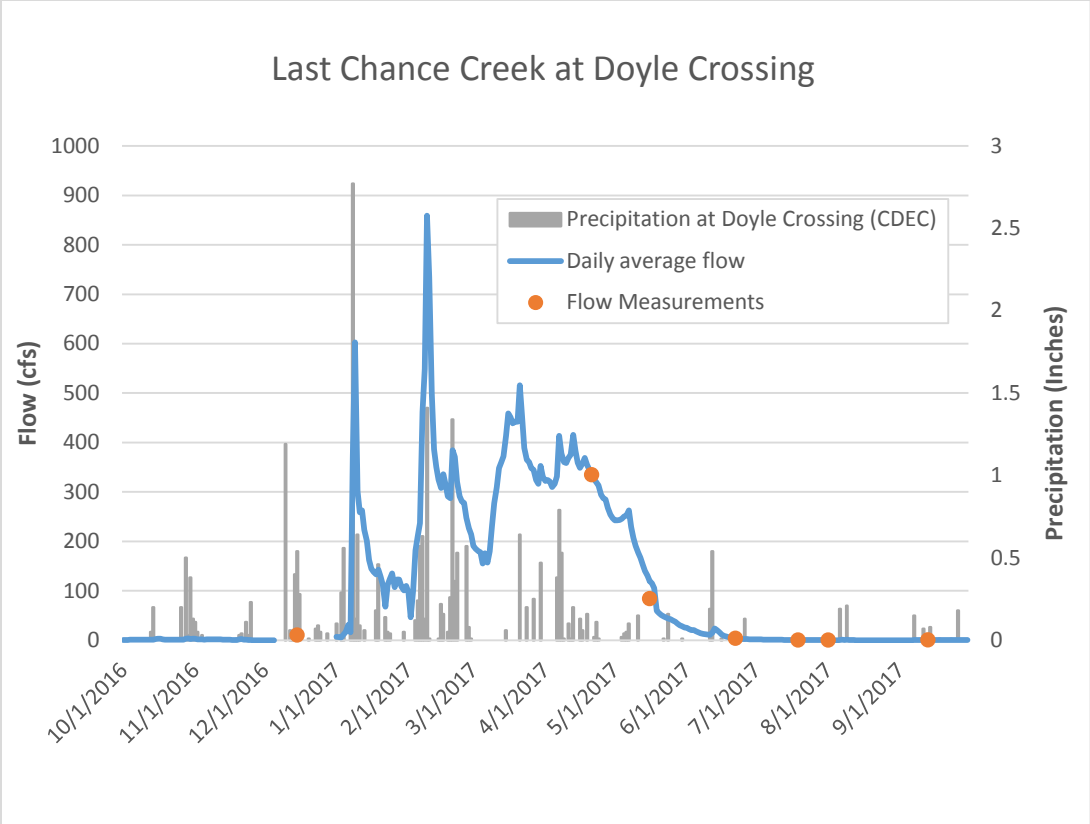

Figure 33. *Daily average flow in Last Chance Creek at Doyle Crossing (Source: CRS Keller Model 700 Transducer) and precipitation (Source: Doyle Crossing CDEC), water year 2017.*

Hourly average water temperatures in Last Chance Creek were obtained from the continuous recording station at Doyle Crossing. Daily average water and air temperature data are shown in Figure 34. Future analyses will include an evaluation of diurnal changes in water temperature.

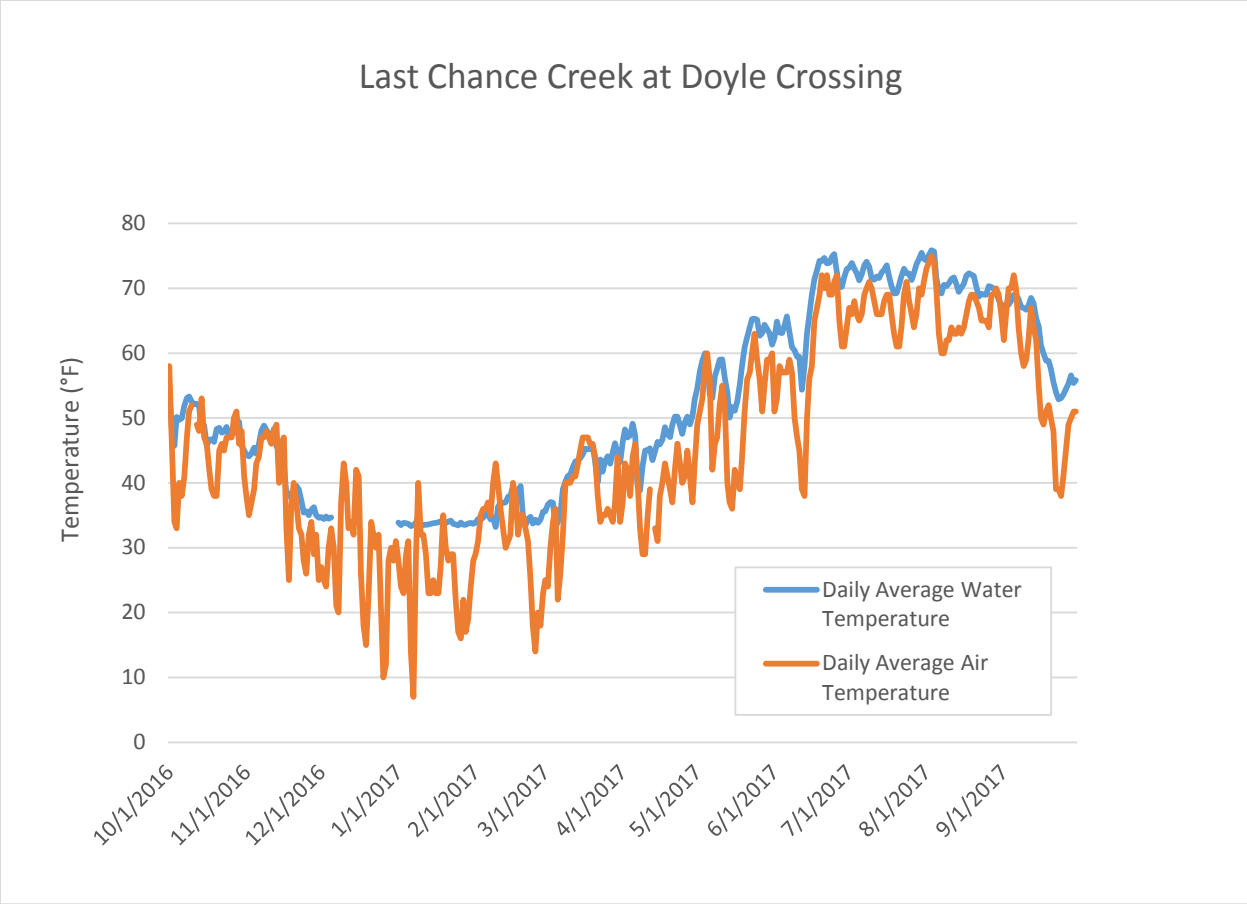

Figure 34. *Daily average water temperature in Last Chance Creek (Source: CRS Campbell Scientific Model 107 thermistor) and daily average air temperature (Source: Doyle Crossing CDEC), water year 2017.*

The gage pool and downstream flow measurement cross-section are characterized by a bedrock substrate and tend to remain stable throughout the season. Aquatic vegetation and ice buildup can cause minor shifts in the cross-section and gage pool, and flow calibration measurements were used to adjust the transducer data as needed. Early season flow measurements were not possible due to debris flows and tree falls that blocked the road, preventing access during high flow events. As a result, it was not possible to obtain calibration measurements that could be used to extend the rating curve or verify the accuracy of rating curve for high flows. Therefore, reported discharge at higher flows, even at the existing rating, needs to be considered an estimate.