

Memorandum

July 15, 2022

To: Rochelle Labiosa, R10 EPA

From: Peter Leinenbach, R10 USEPA

Subject: Temporal stream temperature trends observed in data that was used to calculate temperature statistics for the Idaho Bundled BE.

Summary - Water temperature trends estimated from datasets used in Bundled BE assessment accurately represent expected current water temperature conditions in Idaho streams.

Assessment - Stream temperature data used during Idaho Bundled BE technical support efforts were obtained from two USFS databases developed from data collected by numerous tribal, state and federal agencies.

One database, called NorWeST, contains data collected throughout the Western United States (www.fs.fed.us/rm/boise/AWAE/projects/NorWeST/StreamTemperatureDataSummaries.shtml). This database contains temperature data collected between 1993 and 2011. The second database was obtained from the USFS group responsible for the NorWeST project and this second database contains data collected 226 locations within the Clearwater, Salmon, and MidSnake reporting units from 2011 through 2016. Combined, these two databases contained data collected at 4,838 individual temperature monitoring locations (n) situated along streams in Idaho and these sites contain 13,647 years of data (n'), representing diurnal stream temperature conditions over 2.23 million days (**Figure 1**).

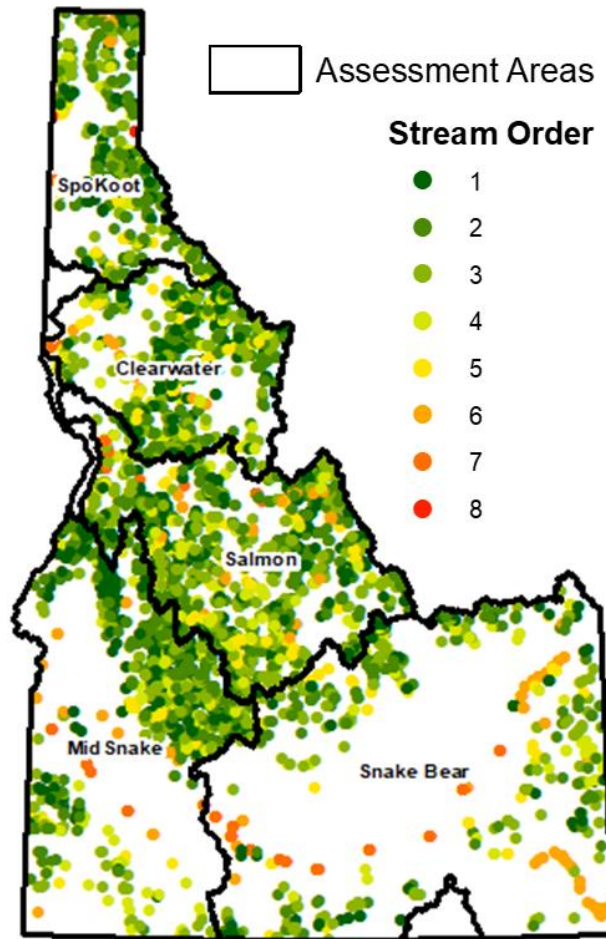
One hundred and fifty-four (154) sampling locations are included within both databases, and therefore these 154 contain data collected between the 1993 and 2016 period. Calculated maximum MWMT (maximum weekly (7-day average) maximum temperature), Maximum Daily Maximum (MDMT), and Maximum Daily Average (MDAT) temperatures observed at these 154 sampling locations are illustrated in **Figures 2, 3, and 4**, respectively. This figure indicates that stream temperatures have been relatively consistent throughout the 1993 through 2016 period, and subsequently stream temperatures at the individual sites have consistently remained within categorically designation associated with criteria threshold values (i.e., are maintained above or below the criteria thresholds listed in these figures over the time period).

Previously, a detailed analysis¹ comparing temperature data collected over the 1993 through 2016 period within the Lochsa Basin (Clearwater) also showed that seasonal stream temperature trends have remained consistent along all 20 sampling locations in the Lochsa basin which have temperature data included in both databases. **Figure 5** illustrates the results for the one of the (20) comparison sampling locations included in this previous analysis. Finally, **figures 6 through 9** illustrate seasonal temperature trends for four locations within the Lochsa Basin which have data collected between 1994 and 2021. Once again, this assessment also showed that seasonal temperature trends are consistent throughout this period.

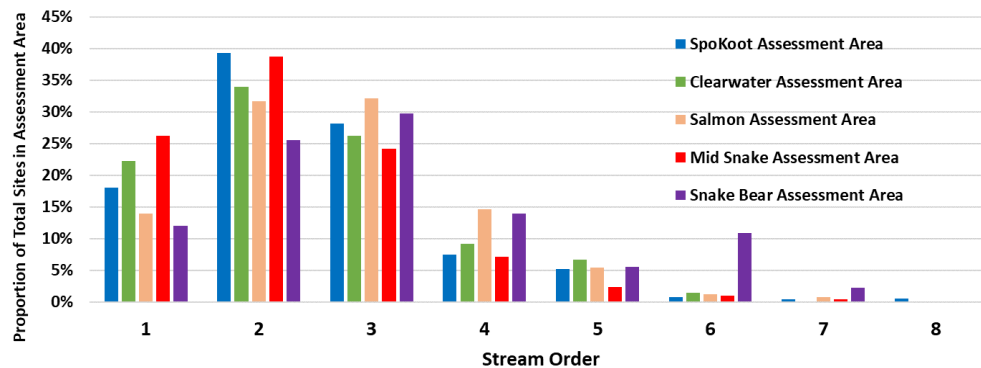
¹ Internal USEPA Memo - Comparison of temperature data collected in the Lochsa Basin before and after 2011. September 18, 2019

Attachment #6: Temperature Data representativeness of Idaho Conditions

Figure 1. Water Temperature Monitoring Site Distribution in Idaho



Assessment Area	N (Number of Sites)	N' (Years of Data)
SpoKoot	504	931
Clearwater	731	5,060
Salmon	1,740	4,598
Mid Snake	1,291	2,078
Snake Bear	572	980
Total	4,838	13,647



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Figure 2. Illustration of calculated maximum MWMT (maximum weekly (7-day average) maximum temperature) observed at 154 streams in the Clearwater, Salmon and MidSnake basins between the period of 1993 though 2016.

[Dashed red line represents the MWMT threshold]

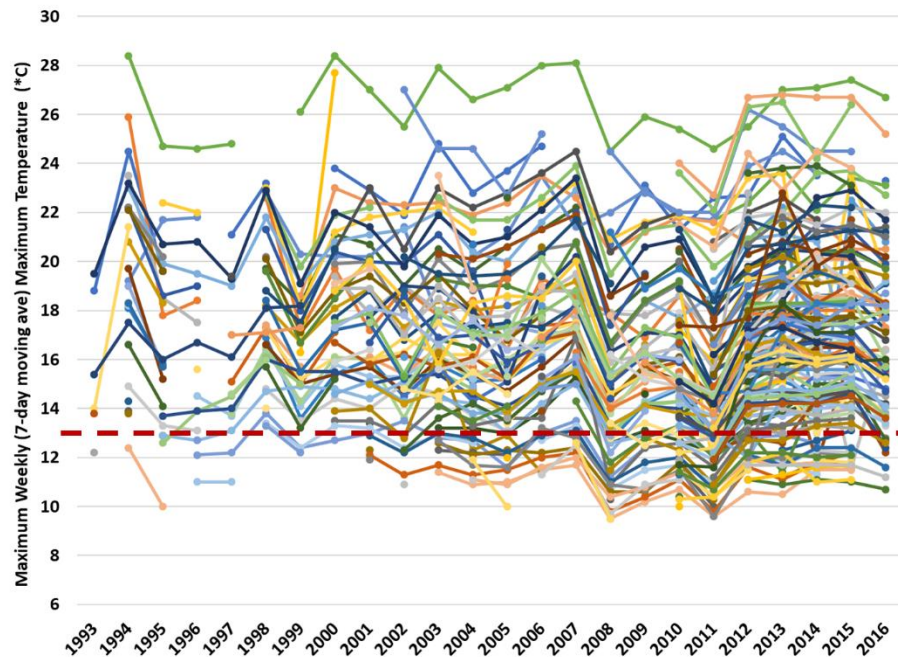
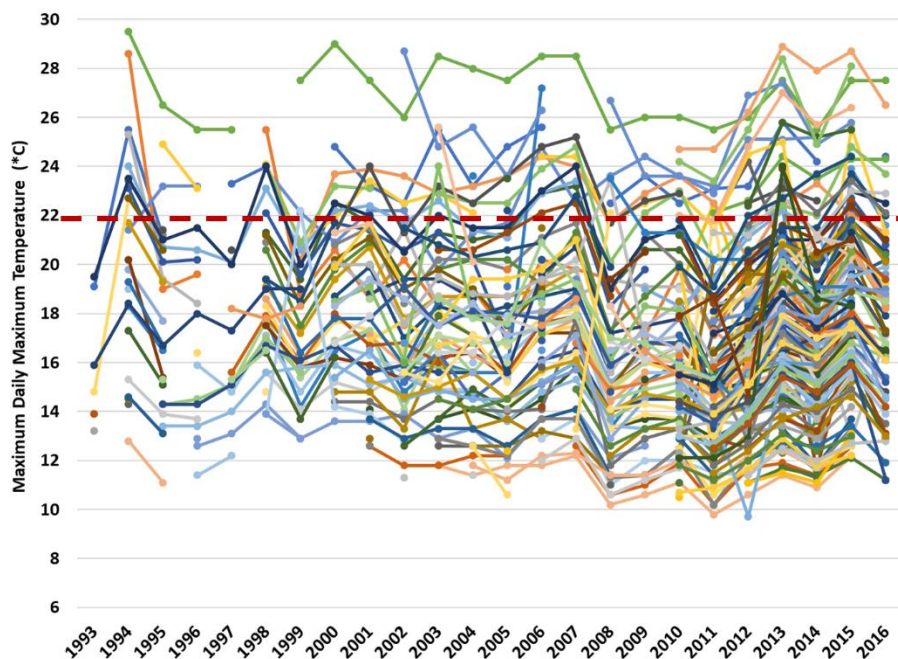


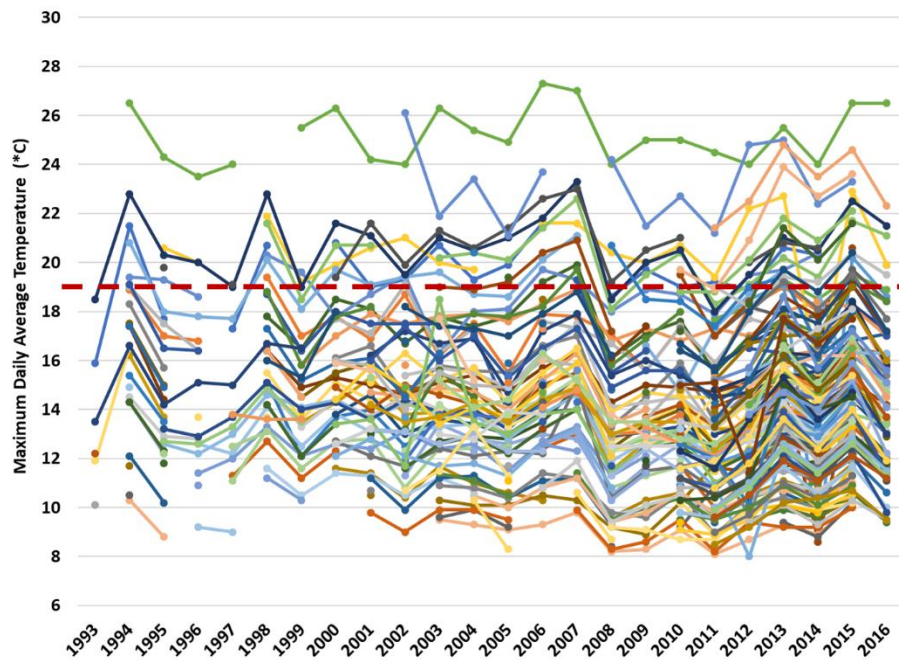
Figure 3. Illustration of calculated Maximum Daily Maximum temperature observed at 154 streams in the Clearwater, Salmon and MidSnake basins between the period of 1993 though 2016.

[Dashed red line represents the MDMT threshold]



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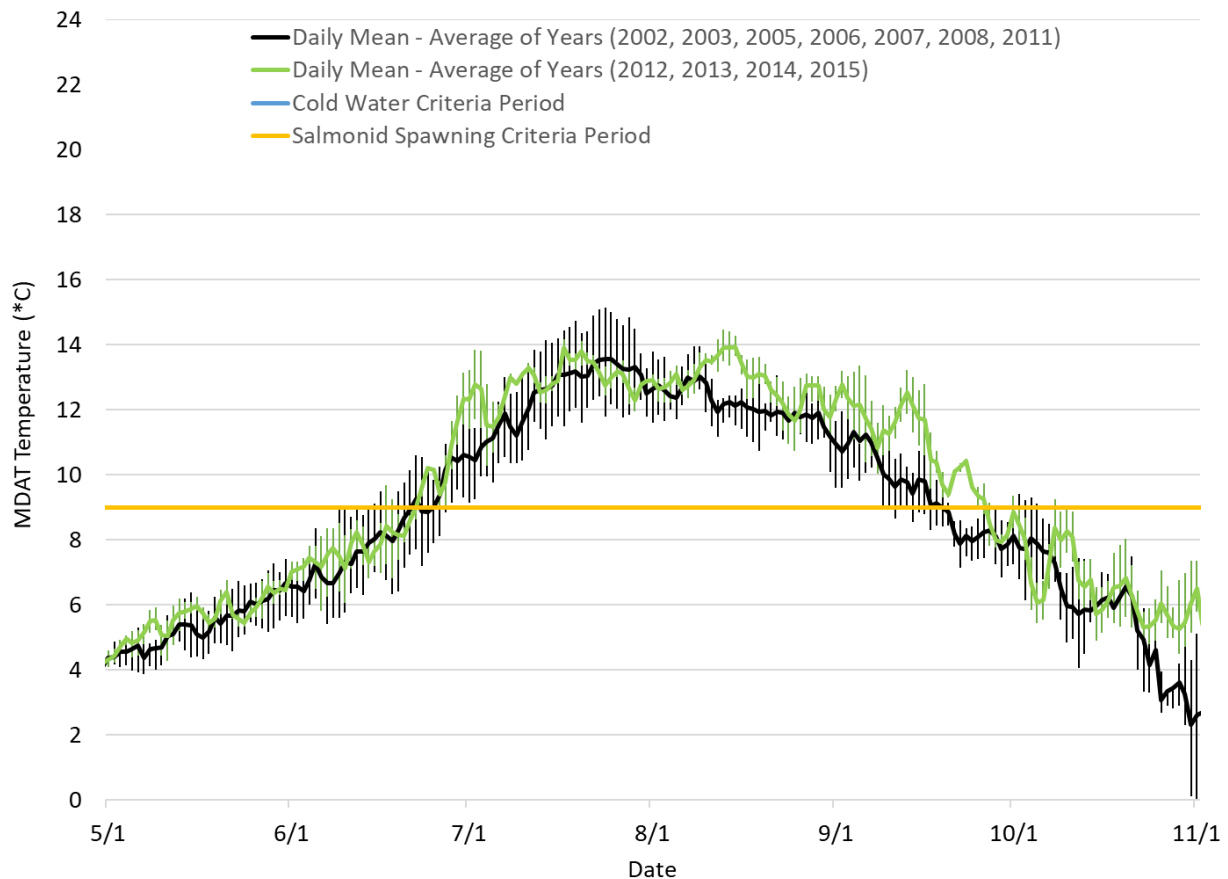
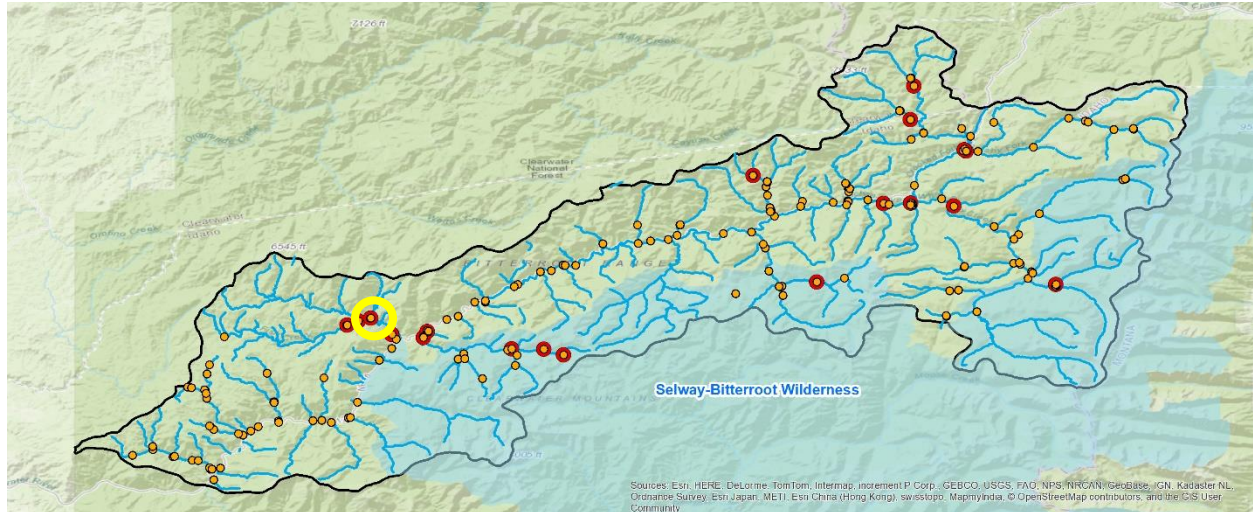
Figure 4. Illustration of calculated Maximum Daily Average temperature observed at 154 streams in the Clearwater, Salmon and MidSnake basins between the period of 1993 through 2016.
[Dashed red line represents the MDAT threshold]



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Figure 5. Example Image -Comparison of MDAT (Maximum Daily Average Temperature) Temperature Statistics for Willow Creek (NorWeST ID – 11338).

[Orange dots represent Pre-2011 data (i.e., in the NorWeST database), Larger red dots represent post-2011 data, Blue lines represent salmonid spawning streams, Yellow circle represents the site associated with the comparison figure below, Bars in the figure below represent the 75th and 25th percentile of observed values]



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Figure 6. Observed Stream Temperature Trends in Eagle Creek (Lochsa Basin) between 1999 and 2021.

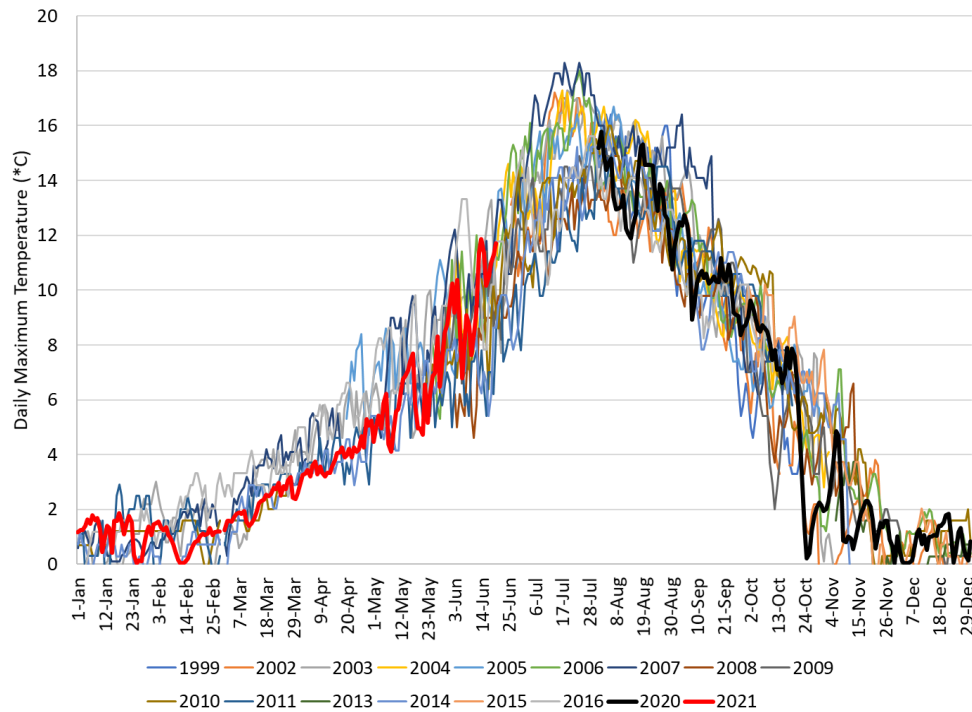
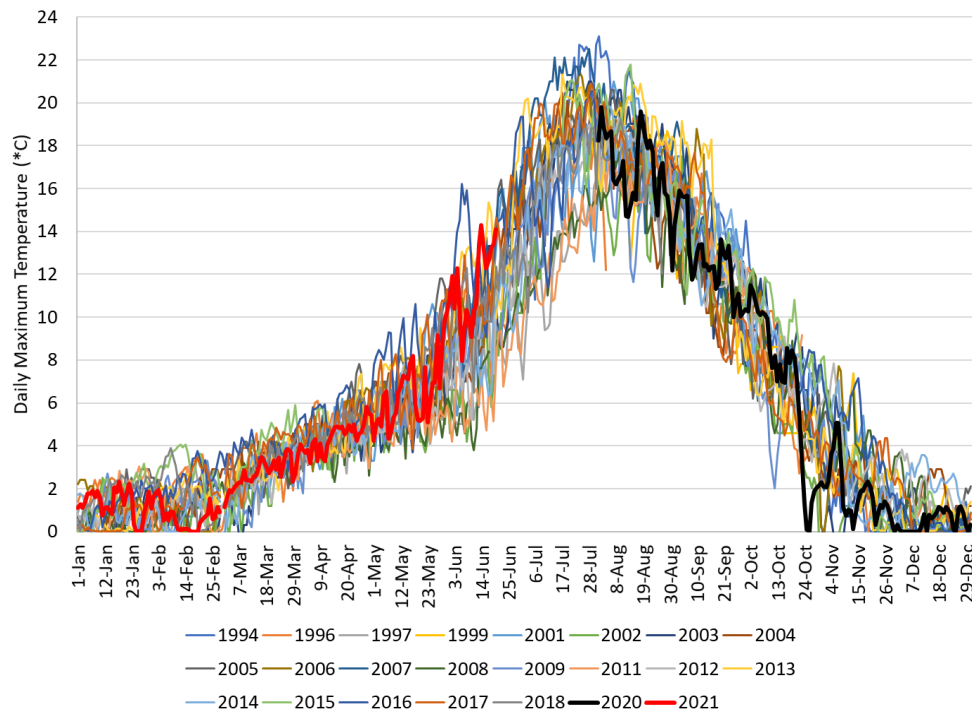


Figure 7. Observed Stream Temperature Trends in Hungry Creek (Lochsa Basin) between 1994 and 2021.



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Figure 8. Observed Stream Temperature Trends in Warm Springs Creek (Lochsa Basin) between 1999 and 2021.

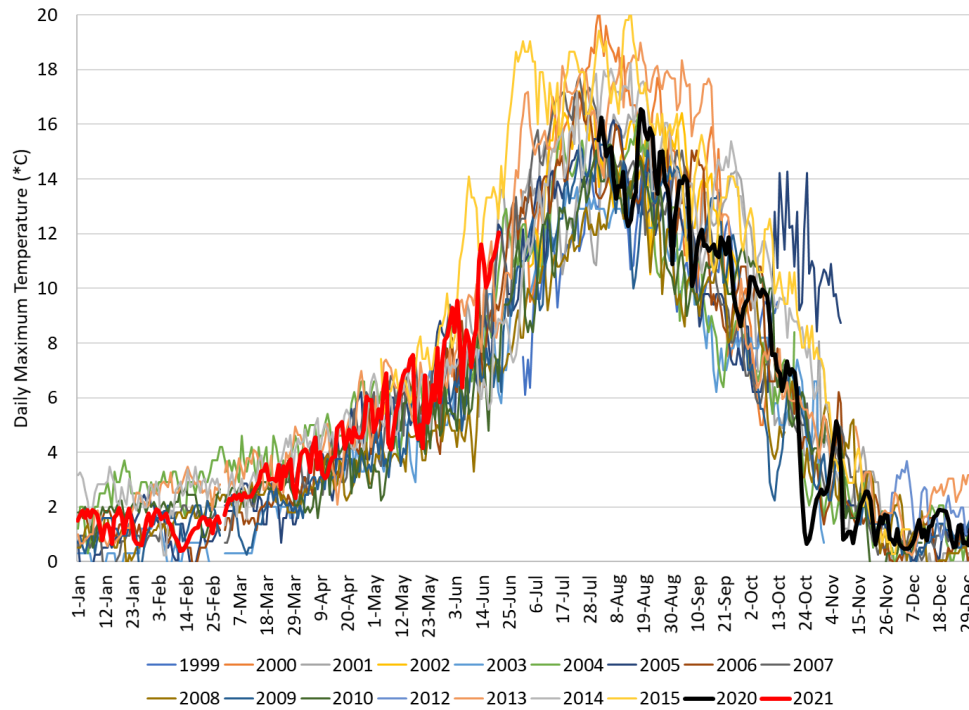


Figure 9. Observed Stream Temperature Trends in Willow Creek (Lochsa Basin) between 2002 and 2021.

