The Unprecedented Pacific Northwest Heatwave of June 2021

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Supplemental Figures

Supplementary Figure 1

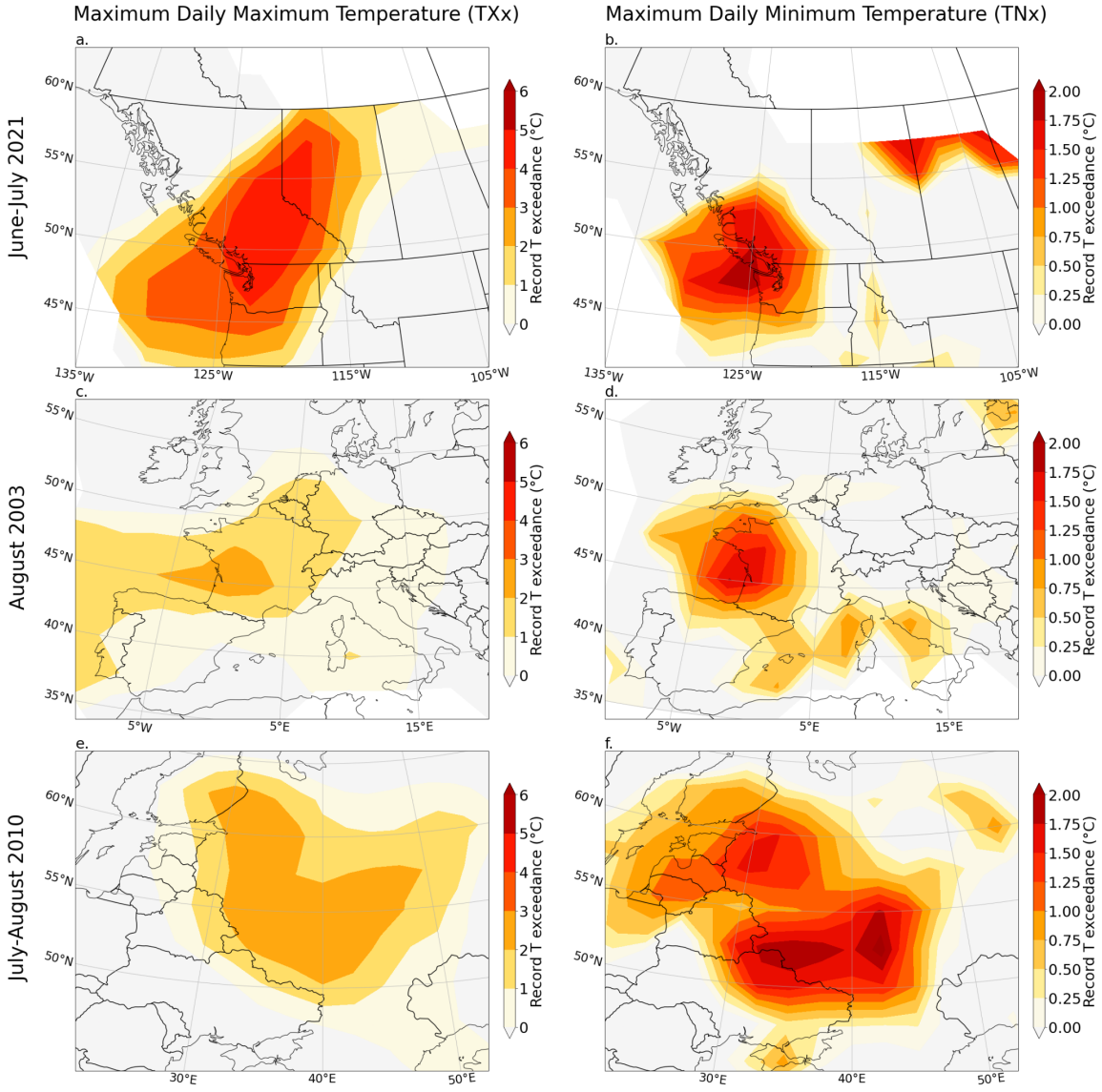

Figure S1. Exceedance of previous maximum daily maximum temperature (TXx, left column) and maximum daily minimum temperature (TNx, right column) since 1950 during the heatwaves of a, b, June 2021; c, d, July-August 2003 and e, f, July-August 2010 from GHCNDEX.

Supplementary Figure 2

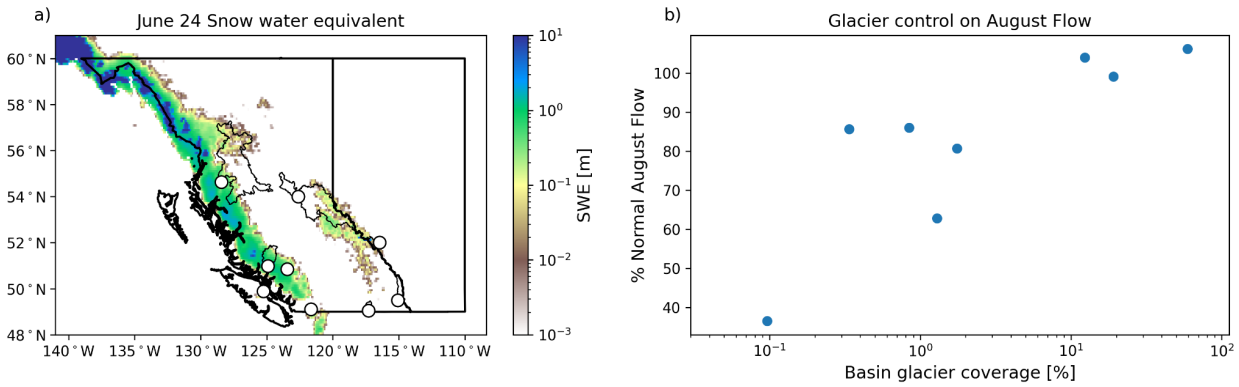

Figure S2. a) SWE at the beginning of the heatwave, and the locations of stream gauges and basin outlines. SWE is concentrated primarily in the Coast and Rocky Mountain ranges. b) Total August streamflow in 2021 relative to 1979 - 2020 median. Basins with greater glacier coverage experienced less anomalous total August streamflow (closer to or greater than 100% of the median total August streamflow).

Supplementary Figure 3

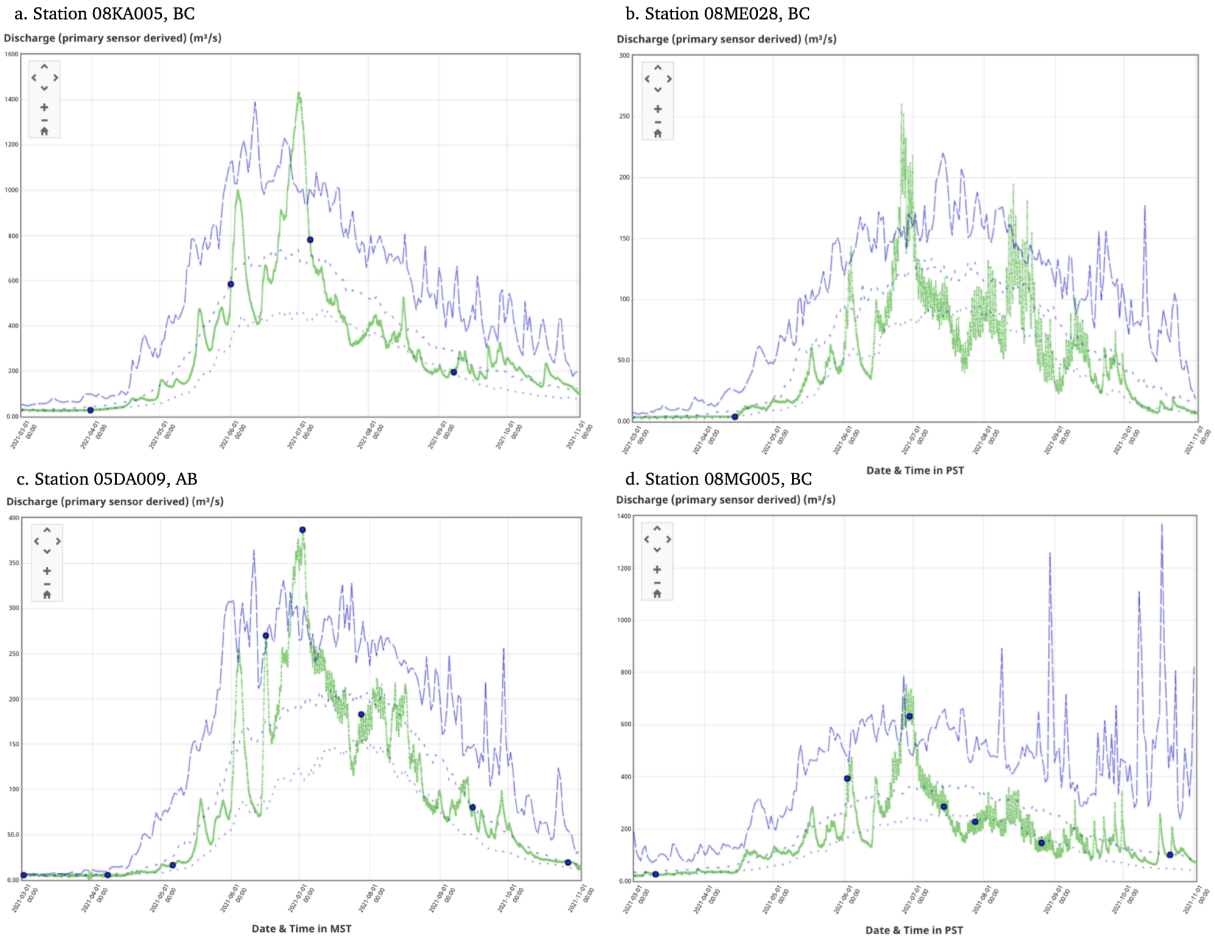

Figure S3. Hydrometric Data Graphs from Environment Canada real-time data API for three selected stations in BC (a, b, d) and one in AB (c) for which data shows all-time records broken during the June 2021 extreme heatwave (a,b,c) and daily records broken (d). Bold green lines show provisional streamflow data for 2021. Blue dotted lines show the upper and lower quartiles, and the blue dashed shows the historical maximum. Record length: a. 70 years, b. 28 years, c. 53 years, d. 105 years. See Methods for links to data.

Supplementary Figure 4

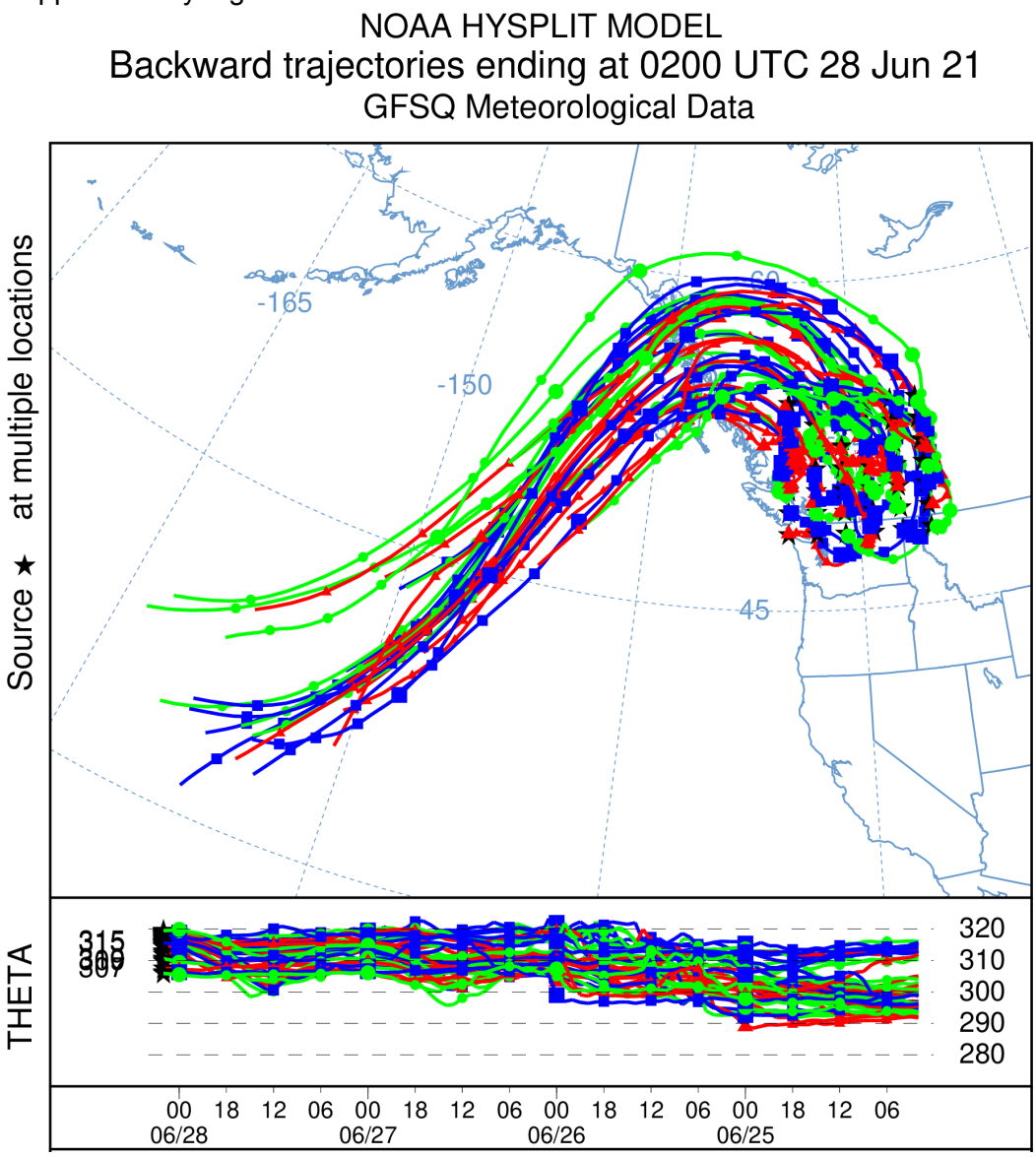

Figure S4. Four-day backwards trajectories terminating at 500 m AGL over southern BC (upper panel). Corresponding potential temperatures (K, lower panel) Data from GFS 0.25 degree data, plotted and calculated using NOAA HYSPLIT. Figure shows air parcels originating from a warmer source region at more equatorward latitudes. Most parcels then underwent ~10 K of diabatic (presumably condensational) heating within the warm conveyer belt of the Aleutian low, before descending largely adiabatically.

Supplementary Figure 5

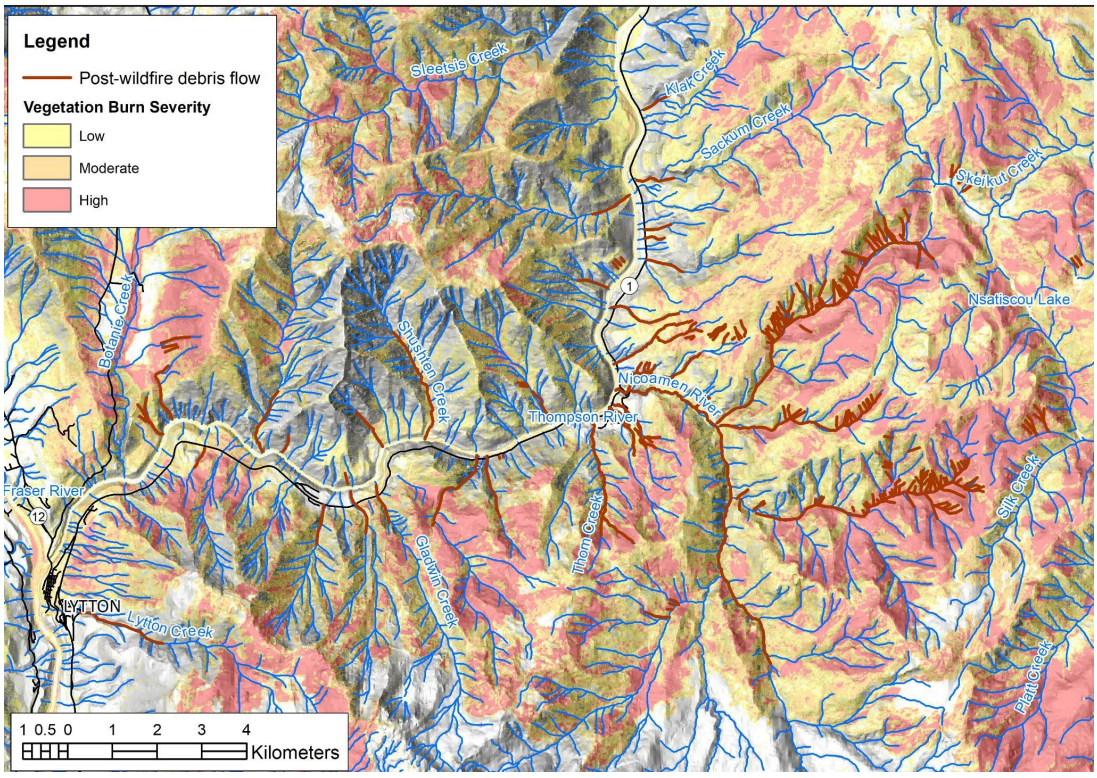

Figure S5. Distribution of post-wildfire debris flows in the Lytton Creek Fire area and relationship to vegetation burn severity. The highest distribution of post-wildfire debris flows occurred in the Nicoamen River watershed.