Sierra Streams: The Effect of Glacial Melt on Fall Flow

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Objective: I was curious to see if watersheds with melting glaciers would have a greater early fall streamflow than watersheds without glaciers. Methods: I selected study watersheds in the Sierra Nevada mountains, ranging from 3000m to 4000m in elevation. Dana Glacier contributes to flow in Glacier Creek because it is melting, having lost 85% of its volume since 1883. My other two watersheds did not have glaciers. I used GIS, a geographical analysis program, to analyze area and elevation to select watersheds with similar profiles. I measured streamflow in September after the winter snowpack had melted. I hiked to each site and used the salt conductivity method to measure streamflow. I poured a known amount of saltwater into my stream and measured the change in conductivity over time. I performed a controlled calibration experiment to find the relationship between dilution and conductivity. With my data from the field I used a mathematical equation to calculate streamflow. Results: I found that Glacier Creek had the largest streamflow of 2.7 cfs, Walker Creek had a streamflow of 0.2 cfs, and Virginia Creek had a streamflow of 0.7 cfs. Glacier Creek was 10.7 times larger than Walker Creek, and 3.5 times larger than Virginia Creek. Conclusion: Glacier Creek had greater streamflow due to glacial melt. Glaciers globally are melting away, which will significantly affect plants and animals that depend on the environments glacial melt streams currently support. Streamflow will significantly reduce in early fall, so people need to adapt cities and agriculture for a drastically different future. Due to climate change it is too late to save glaciers but if we take immediate action to curb our carbon emissions, we can preserve much of the wintertime snowpack.