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CE 394K – Project Status Update

The Salton Sea, Shrinking Volume and Current Mitigation Efforts

Background

My GIS project is focused on the Salton Sea with respect to its formation as well as what its current conditions. The Sea is shrinking in volume, leaving behind acres of exposed lake beds. These lake beds are toxic and have already been correlated to increased rates of asthma in the surrounding area. I am hoping to examine flow data and volume data of the Salton Sea and provide discussion on its current conditions and how it relates to the ongoing environmental mitigation efforts.

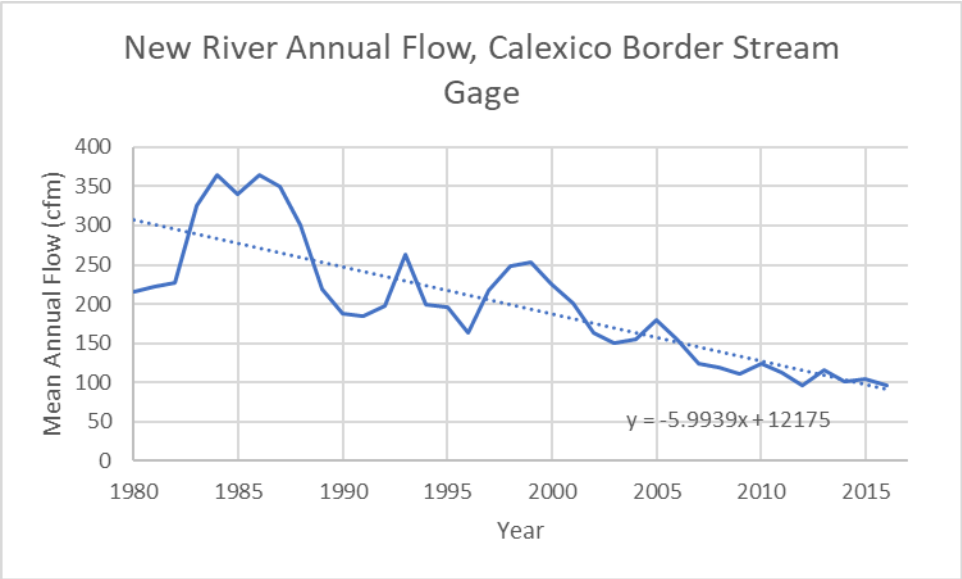
Salton Sea Subbasin

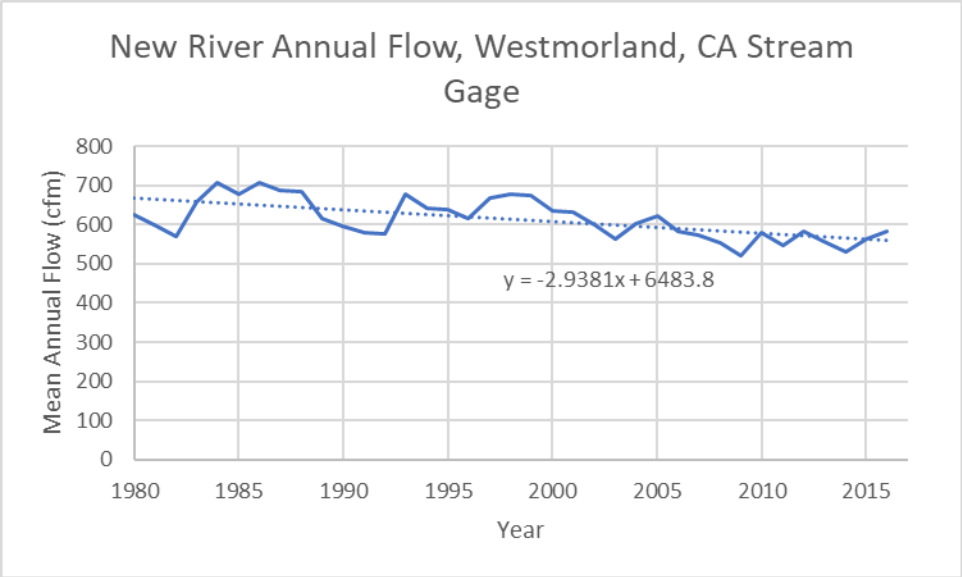
Analysis Efforts

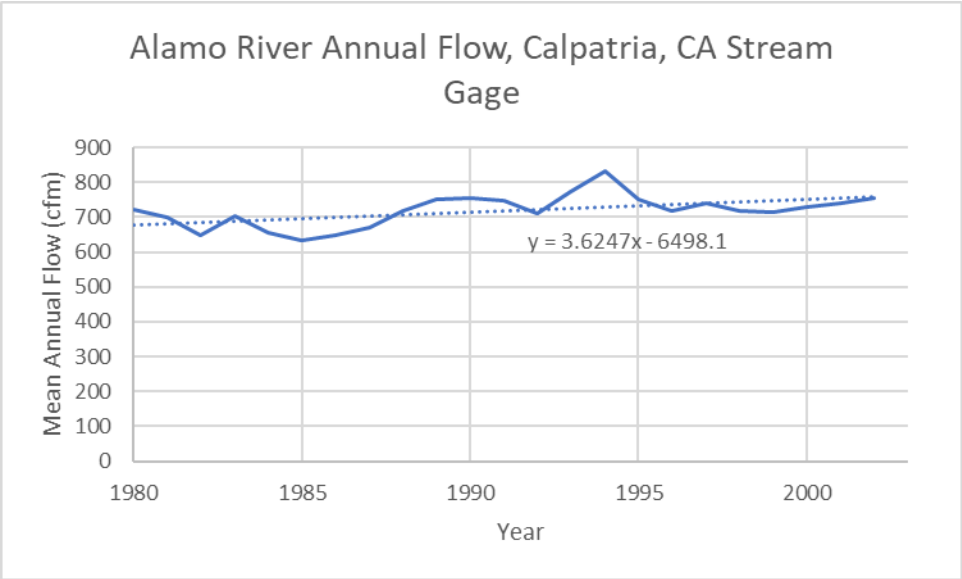
I began my project by utilizing the National Hydrography Dataset to determine the Salton Sea Subbasin by finding the HUC8 Subbasin. The area of the subbasin is 5009 mi^2, encompassing portions of San Diego, Imperial, and Riverside counties. The main inflows to the Salton Sea are via the New River and Alamo River. Using the streamflow data in the National Hydrography Dataset I determined the flowlines for these two rivers flowing into the Salton Sea. Because this subbasin extends into Mexico, the flowlines begin at the US-Mexico Border and flow north into the Sea.

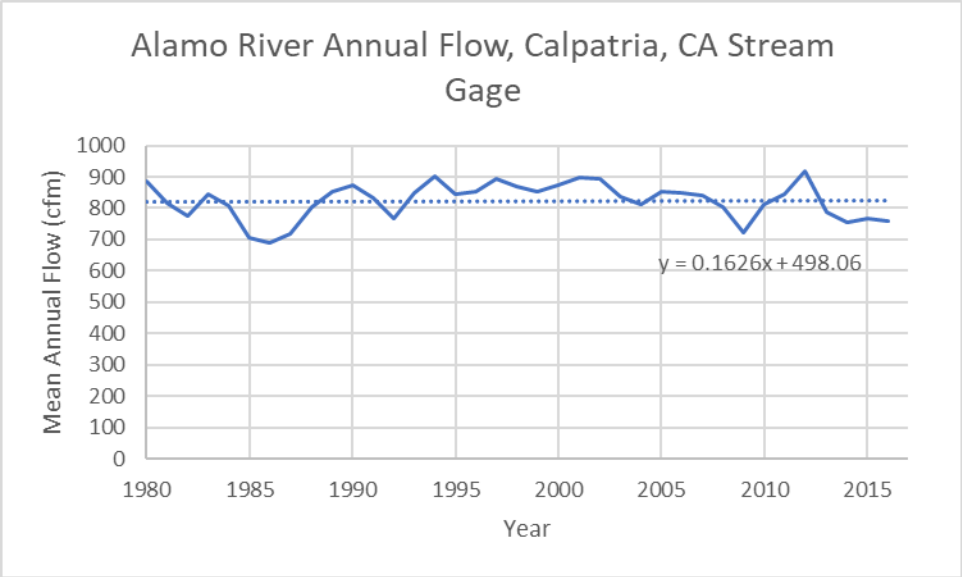
After isolating these flow paths, I accessed the stream flow data for these rivers on the USGS website. I found four stream gages total (two per river) that had consistent data. Three of these gages had data up to present day, while one of these had data up until 2003. I plotted the mean annual flow at each of these stream gages to determine if I could see any trends. My hypothesis was that over the years, the mean annual flow should be declining overall to account for the shrinking volume of the Salton Sea. While the data for the New River does show a net negative trend, the same could not be said for the Alamo River. Therefore, I think I will need to so some more research on the main sources attributing to this net volume loss. The plots below show the available data I observed for the four stream gages.

Stream gage locations on the New and Alamo Rivers


New River Annual Flow, Calexico Border Stream Gage
Mean Annual Flow (cfm)
400
350
300
250
200
150
100
50
0
1980
1985
1990
1995
2000
2005
2010
2015
Year
y = -5.9939x + 12175


New River Annual Flow, Westmorland, CA Stream Gage
Mean Annual Flow (cfm)
800
700
600
500
400
300
200
100
0
1980
1985
1990
1995
2000
2005
2010
2015
Year
y = -2.9381x + 6483.8





Next Steps

I would like to pull the DEM model of the area. In part of my report, I would like to discuss the history of the Salton Sea and I think it would be useful to show the elevations of the area in relation to the flooding that occurred in the early 1900s for the sea to form. I would like to do a bit more research on the inflows to the Salton Sea and how they relate to the shrinking overall volume. In recent years, more water has been diverted to metropolitan areas, such as San Diego and Los Angeles, so it might be useful to examine overall water use trends over the past decade. Finally, I would like to take a closer look at the change in water surface elevation and/or total surface area of the Salton Sea to examine the rate at which it is shrinking.