In Arizona, the Santa Cruz River system is one of several river systems that have experienced groundwater drops and loss of perennial flow due to groundwater pumping and drought. Along with Gila River and Salt River, the Santa Cruz River currently has artificial, perennial reaches that are supported by effluent discharge from wastewater treatment plants. The return of perennial reaches has brought back habitat for numerous of aquatic and riparian taxa. However, since these reaches are artificially supported by effluent they no longer have a natural flow regime or natural water quality gradients. Little research has been conducted on the water quality gradients along these perennial effluent-dominated reaches. The objective of this study is to quantify physical and chemical water quality gradients downstream from the effluent outfall. We collected water quality data (e.g. DO, pH, conductivity, nutrient levels) monthly from eight reaches spaced ~2 miles apart along the effluent-dominated lower Santa Cruz River, from January to December in the year of 2018. The findings of this study will help us understand how effluent can be used to restore perennial river habitats in arid climates.