

Altered natural streamflows due to human modifications across the United States

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Most streams are impacted by direct-human modifications, such as dams and land cover changes, and by the effects of climate change. These factors can cause shifts in the timing of flow events as well as increases/decreases in the frequency, duration, and magnitude of low and/or high flows. These changes to the natural flow regime present challenges to water managers and often have significant negative consequences for aquatic biota and flora. In addition, long-term changes to the flow regime call into question stationarity assumptions which are often required for application of standard USGS flow-frequency analysis methods. In this presentation, I will discuss studies that examine the causes, predictability, and impacts of altered flows. I will begin by identifying (on a regional basis) the direct-human modifications that cause altered flows and then describe modeling approaches to estimate flow alteration at ungaged locations. Also, the impacts of altered flows on aquatic biota will be explored at regional and local scales. Lastly, I will discuss the sensitivity of intermittent and ephemeral streams to historical variability in climate in non-snow pack regions of the United States.