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BEE 6740
Week 2 Assignment: Flashiness Index

Purpose:

The following assignment analyzes the flashiness for the White Salmon River in Underwood, WA using the USGS gage ID 14123500 . The White Salmon River is in the vicinity of the Mt. Hood National Forest and is part of the Columbia River. The flashiness of a river is a metric for its stability and health. A flashy river will have great variation in daily flows while a not-flashy river will have more consistent flows. The Richards Baker (RB) flashiness index is used for the purposes of this assignment in analysing the flashiness of the White Salmon River. This measures the oscillations in flow relative to the total flow and provides useful insight into the how watersheds process inputs into their stream outputs.

Method:

The RB flashiness index is calculated as follows:

$$R-B\ Index = \frac{\sum_{i=1}^{n} |q_i - q_{i-1}|}{\sum_{i=1}^{n} q_i} \quad (1)$$

Where q is flow or discharge in units of volume/time.

USGS flow data is accessed using the R library, Ecohydrology. Flow data is retrieved for the White Salmon River and the base flow is separated from the additional stream flow. Figure 1 below displays the relationship between streamflow and baseflow (dark green line) from 1990 to 2016.

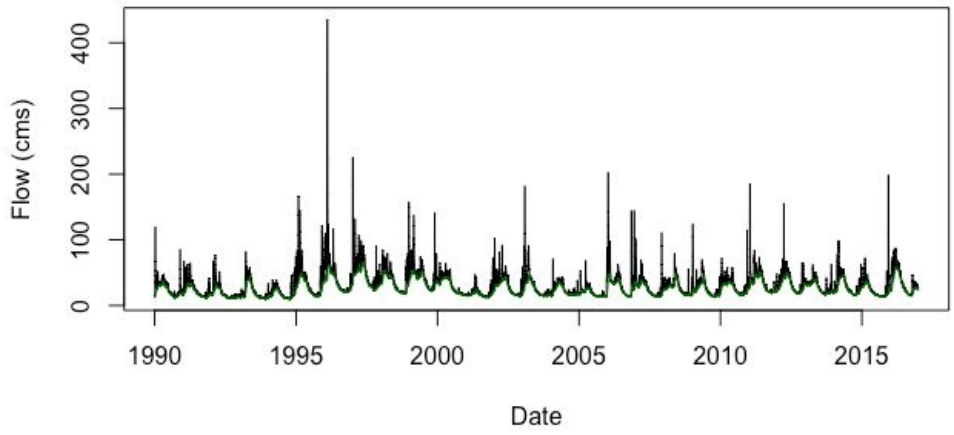

Fig 1. Streamflow and baseflow for the White Salmon River from 1990-2016

Figure 2 below displays the relative abundances of runoff vs baseflow in cms annually between 1990-2016.

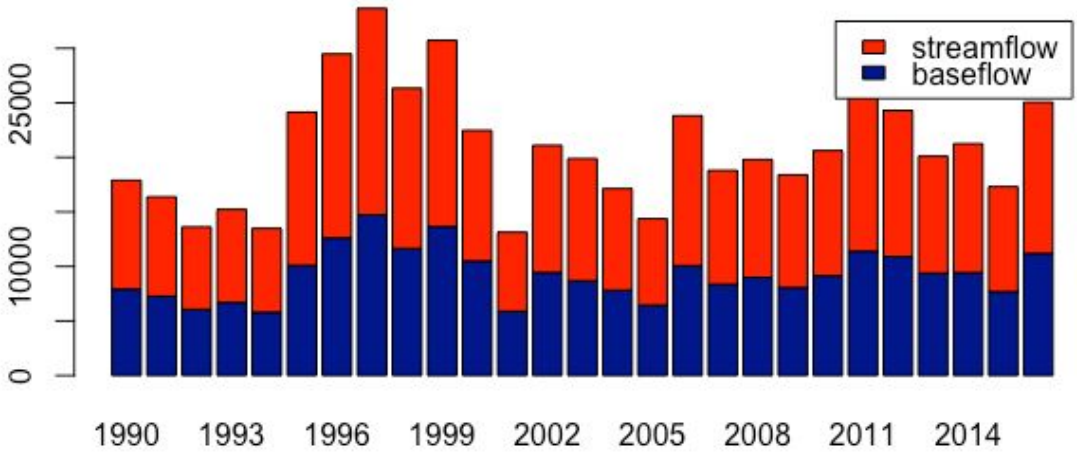

Fig 2. Runoff and baseflow in cms for the White Salmon River from 1990-2016

I generated a table of streamflow values and calculated the flashiness for the dataset by finding the total sum of the differences between the flows on two consecutive data points then divided by the sum of flows. The flashiness index value calculated is 0.0673.

Conclusions:

The flashiness index value calculated is 0.0673, indicating that the White Salmon River is not flashy but rather consistent and stable in flow from day to day.