

Mining Sixty Years of Flow Data from Bellevue's Kelsey Creek

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Props:

Nearly sixty year record of daily flows available on-line from USGS 12120000. Thank you United States Geological Service and City of Bellevue for funding and maintaining this gauging station!

Over sixty year record of daily rainfall totals available free from NWS Seatac. Thank you National Weather Service for maintaining weather data!

Shout out to Dan Bricklin, who along with Bob Frankston, developed the first electronic spreadsheet (VisiCalc). Way to go, Dan and Bob!

Slops:

NWS Seatac rainfall data is gathered more than a dozen miles from the Kelsey Creek basin.

Terms:

TQ_mean: Fraction of the year that daily mean flow exceeds the annual mean flow.

Richards-Baker Flashiness Index: Sum of the absolute values of the day-to-day changes in mean daily flow, normalized for total flow by dividing by total annual flow.

High Pulse Count: The number of times per year that discrete high flow (2X daily long-term average) pulses occur.

High Pulse Duration: Annual average duration of high flow pulses.

Low Pulse Count: Number of times per year that discrete low flow (50% of long-term average) pulses occur.

Low Pulse Duration: Annual average duration of low flow pulses.

Trend line: the trend line shown on hydrologic metrics is a five year moving average of values.

Conclusions:

Flow monitoring can provide important information on stream health and on-going changes.

As Kelsey Creek has urbanized, more runoff (per unit rainfall) is occurring in the spring, summer and fall. Curiously, total runoff in late winter (once the soil profile is saturated) has not significantly changed over the last sixty years.

Kelsey's hydrologic health appears to have stabilized, as the basin is largely built-out, and new development is mitigated by flow control investments.

Using a linear "best fit" on sixty years of data does not accurately represent recent hydrologic trends.

Rainfall and runoff vary from year to year. Presenting scattered data in a meaningful way can be difficult. I apologize if you don't understand this poster! The most sensitive hydrologic metrics normalize flow data with rainfall.

