Climate Change in the Snohomish River

A QUICK REFERENCE GUIDE FOR LOCAL DECISION-MAKERS

+22%

RAIN INTENSITY

Increase in intensity of 24-hour rain events west of the Cascades by the 2080s. (+5 to +34%)

+5 days

STORM FREQUENCY

Increase in # days/year with heaviest 24-hour rain events west of the Cascades. Projected to go from 2 days currently to 7 days by the 2080s. (+2 to +7 days)

-22%

SUMMER PRECIPITATION

Decrease in total summer precipitation in Puget Sound by the 2050s. (-2% to -50%)

Rain dominant

DOMINANT PRECIPITATION

The Snohomish Basin should transition from a mixed rain and snow to a rain dominant system.

-29%

SPRING SNOWPACK

Loss of snowpack for all mountains draining into Puget Sound by the 2040s. (-4% to -47%)

37 days earlier

STREAMFLOW TIMING

Change in timing of peak spring flows by the 2080s. (29 to 48 days earlier)

+23%

STREAMFLOW 100-YEAR FLOOD

Increase in streamflow volume by the 2080s. (+1 to +58%)

-26%

STREAMFLOW 10-YEAR MINIMUM

Decrease in the lowest summer streamflow volume (7Q10 flows) projected by the 2080s. (-17 to -33%)

+10”

SEA LEVEL RISE

Projected sea level rise for the Snohomish estuary by the 2050s. (+5 to +14 in.)

+2.6 °F

STREAM TEMPERATURE

Increase in mean August water temperature by the 2040s.

268 miles

RIVER MILES EXCEEDING SALMON THERMAL TOLERANCES

River miles with average August temperatures above 64°F projected by the 2040s, compared to 59 miles currently.

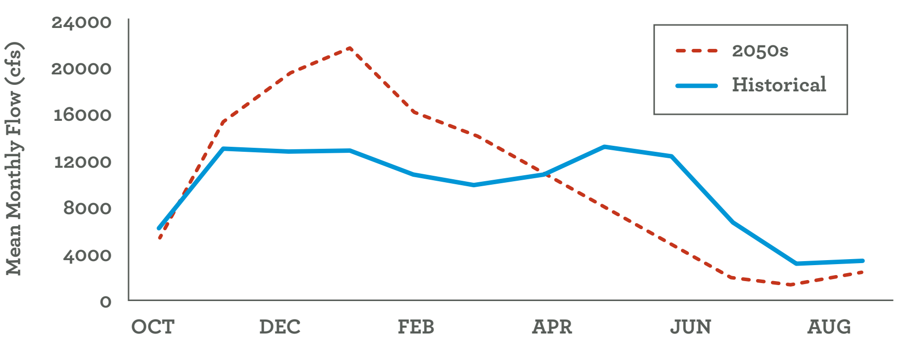
+800 GDD

GROWING DEGREE DAYS (GDD)

Increase in number of growing degree days—accumulated heat over the growing season—by the 2050s. (+500 to +1300°F days)

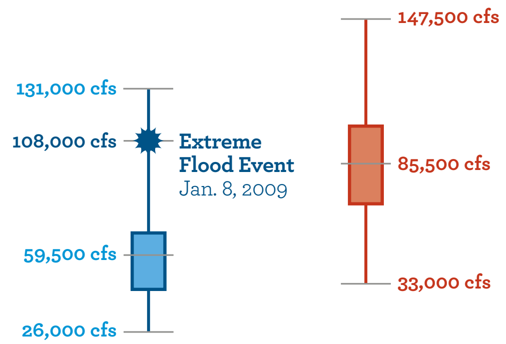
SNOHOMISH RIVER AT MONROE

MONTHLY FLOWS



Peak flows of the Snohomish River shift from the historical peak in May to a peak in January by mid-century.

PEAK ANNUAL FLOWS



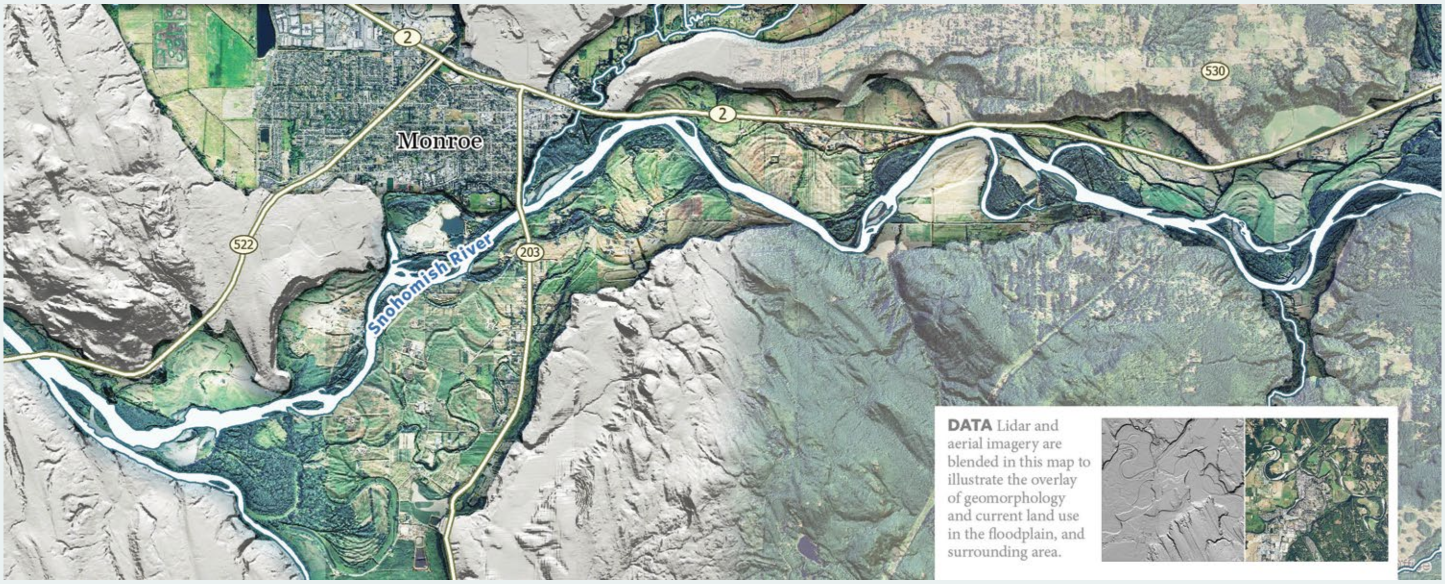
Mean peak flows and minimum/maximum ranges **observed (1964-2017)** and projected for **future (2050s)**.

Floodplains by Design · REDUCING RISK, RESTORING RIVERS ·

The Nature Conservancy Washington

CLIMATE IMPACTS GROUP

* *The data presented summarize mean values from multiple independent studies; reference dates and more details are provided in the* ***State of Knowledge: Climate Change in the Puget Sound*** *Report (Mauger et al., 2015). All projections are based on a high emissions scenario (RCP 8.5), except for snowpack, streamflow, and stream temperature estimates which used moderate emissions scenario (A1B).*



The Snohomish Estuary Will Continue to See Increases in Sea Level

- Continued sea level rise will increase the extent, depth and duration of coastal flooding and accelerate erosion along the shoreline. It will also permanently inundate low-lying areas.
- In 30 years, there is a 90% probability that sea level will rise at least 0.5 ft at the mouth of the Snohomish River, if greenhouse gas emissions continue to rise at a rapid pace.
- Although storm surge and waves are not expected to get bigger, higher sea level means that the same storm events would result in higher water levels and more damage.

Rain Storms are Expected to Become More Frequent and Severe

- Atmospheric rivers will bring more rain. **Preliminary research** suggests that the 2-year extreme in hourly rain intensity could increase up to +18% over the next 30 years.
- Heavier rain events could exceed the capacity of urban stormwater systems, culverts, and drainage ditches that are not designed to accommodate projected increases in rain intensity.

Flooding to Become More Frequent and Severe

- The Snohomish Valley will see increased winter flooding, due to a combination of more severe rainstorms, sea level rise, and earlier peak flows, as winter snowpack declines.
- Increasing temperatures could drive a shift from snow to rain, leading to less snow accumulation and greater peak streamflows in winter.
- Sea level rise, heavier rainstorms, and increased winter streamflows would all combine to make floods bigger and more frequent.

REFERENCES

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