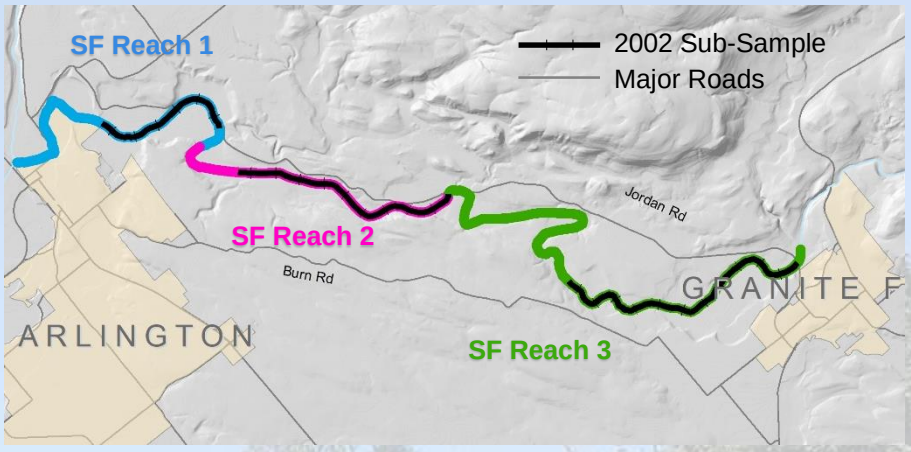
Salmon Habitat in the South Fork Stillaguamish River: 2002 to 2017

Snohomish County
Public Works
Surface Water Management

In 2017, Snohomish County re-surveyed the lower 16 miles of the South Fork Stillaguamish River. We measured important salmon habitat conditions including pools, side channels, bank conditions, large woody debris (LWD) and log jams. Results were compared to similar data collected in 2002 to evaluate changes and progress toward salmon recovery targets. Key habitat features have improved, with Reaches 2 and 3 having the largest gains.



KEY SALMON HABITAT FEATURES HAVE IMPROVED SINCE 2002

Bank Condition

Natural, unaltered stream banks provide juvenile and adult salmon with better habitat and cover and add channel roughness slowing the water. Between 2002 and 2017:

- The percentage of modified bank was largely unchanged; however, bank armoring and rip rap observed in 2002 may not have been visible in 2017 due to channel changes and dense vegetation.
- The percentage of unstable bank increased in Reaches 2 and 3, likely due to natural channel migration process.

Pools

Pools provide deep water refuge and often high quality habitat cover for juvenile and adult salmon. This pool analysis is limited to those reaches sub-sampled in 2002 (shown on map). Between 2002 and 2017:

- The number of total pools increased 38%.
- Pool frequency increased from 2.7 pools/km to 3.8 pools/km.
- Wood-formed pools increased the most; rip rap pools stayed the same.
- The average pool area was mostly unchanged.
- Residual pool depths decreased by 17% in 2017 (~25 cm).

Side Channels

Side channels provide additional habitat for juvenile fish as well as refuge from high flows and warmer temperatures. Between 2002 and 2017:

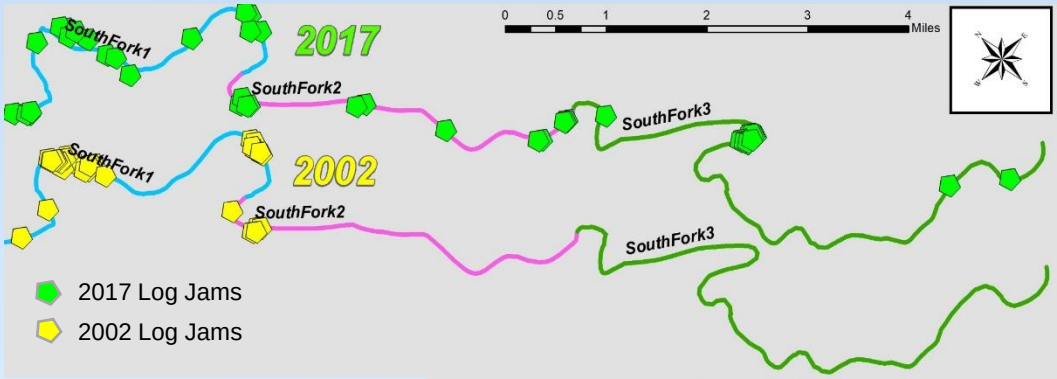
- Two new side channels were identified in 2017.
- In Reach 1, a channel avulsion switched the mainstem and side channel locations.
- Several side channels had significantly cooler temperatures compared to the mainstem SF Stillaguamish River.

Large Woody Debris (LWD) and Log Jams

LWD and log jams provide habitat and cover for salmonids at low and high flow and influence channel processes that improve conditions for salmon rearing and spawning.

Between 2002 and 2017:

- Total LWD increased by over 100% in all three reaches.
- The log jam count increased by 25, including 3 constructed jams.
- The jam count increased the most in Reaches 2 & 3 (mapped below).
- The frequency of log jams nearly doubled from 1.0 jam/km to 1.9 jam/km.
- Average log jam volume increased from 290 m^3 to 620 m^3.
- The largest LWD (≥15m length/≥60cm diameter) decreased in 2017.



Habitat Indicators	2002 to 2017	Change	Future Needs and Recommendations
Bank Conditions	• % modification mostly unchanged • Increase in unstable streambanks, but resulting from natural channel migration process	↔ ↓	• Identify feasible areas to remove armoring and improve bank condition. • Census stream bank condition and stability for changes in erosion, channel migration, and bank types to estimate rearing capacity.
Side Channels	• 2 additional side channels in 2017 • Avulsion in Reach 1 has moved the main channel into historic side channel	↑ ↑	• Improve side channel connectivity and quality with focus on areas with significant temperature differentials.
LWD and Log Jams	• LWD increased by over 100% in all three reaches • Number of jams increased in 2017 • Increase in jam frequency and average volume	↑ ↑ ↑	• Increase wood placement in lower river upstream and downstream of River Meadows Park near cold water inputs as feasible. • Track large jam size and persistence over time in Reaches 2 & 3.
Pools	• Increase in pool count and frequency • Wood-formed pools accounted for largest increase • Average pool area was unchanged	↑ ↑ ↔	• Increase pool quantity and cover features. • Conduct a census of pool habitat and size to determine changes in both mainstem and side channels.

For more Information, please contact Frank Leonetti or Luke Hanna at Surface Water Management, 425-388-3464
frank.leonetti@snoco.org; luke.hanna@snoco.org or visit www.StateOfOurWaters.surfacewater.info