Salmon Stream Temperature Fact Sheet

Willow Creek

Cook Inletkeeper coordinates a Stream Temperature Monitoring Network across key salmon-bearing systems of the Cook Inlet basin. Our goal is to describe water temperature profiles and identify watershed characteristics that make specific streams more sensitive to climate change impacts. This fact sheet provides a summary of data collected on Willow Creek through this collaborative effort.

The Willow Creek watershed (highlighted in green on map) is located in the Mat-Su basin. The creek flows out of the Talkeetna Mountains and is a tributary to the Susitna River.

Watershed facts

- Watershed size: 163,755 acres
- Maximum elevation: 5,886 feet
- Mean elevation: 2,150 feet
- Percent wetlands: 5.6%
- Connected lakes: Yes

Why temperature?

Water temperature affects all phases of the salmon lifecycle, including:
- Timing of migration
- Survivorship of eggs
- Respiration
- Metabolism
- Availability of O₂

Warm water temperature induces stress in salmon and makes them more vulnerable to pollution, predation and disease.

For more details about our methods or data, please contact:
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Water temperature monitoring site located a quarter mile upstream of confluence with Susitna River.
Latitude (N) 61.78000; Longitude (W) -150.16100
Willow Creek Temperature Summary

Below is a summary of Willow Creek water temperature data from 2008-2011.

- Maximum temperature recorded: 18.8°C (65.8°F)
- June average temperature: 9.6°C (49.3°F)
- July average temperature: 11.9°C (53.4°F)
- August average temperature: 10.7°C (51.3°F)
- Maximum 7-day average temperature: 13.1°C (55.6°F)
- Maximum 7-day maximum temperature: 14.7°C (58.5°F)
- # of days/year temperature exceeds 13°C (55°F): 21
- # of days/year temperature exceeds 15°C (59°F): 8

Climate Change Vulnerability

We can use our current knowledge of the relationship between air and water temperature to develop stream-specific predictions for future water temperature. “Sensitivity” is a term used to describe how much a stream’s water temperature will change with a 1°C (1.8°F) change in air temperature. A stream with a higher sensitivity (>0.75) will increase faster as air temperatures increase in the years ahead. And we can use a salmon-relevant threshold value of 13°C (55°F) for average July temperature to describe a stream as “cold” or “warm” to create a framework for assessing climate change vulnerability:

Willow Creek falls in the “cold, low sensitivity” category, which indicates that stream temperatures will likely remain favorable for salmon and this system can serve as important cold water habitat in the decades ahead.

This baseline data set and our understanding of stream-specific sensitivity can guide future monitoring efforts to track climate change impacts and can help fisheries and land managers prioritize streams for research and protection efforts to ensure Cook Inlet wild salmon endure as thermal change continues.