

# COOK INLET WATERSHED SALMON STREAM MONITORING

CASE STUDY



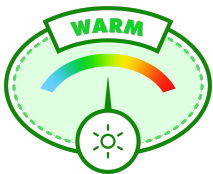
## COOK INLETKEEPER





Cook Inlet Watershed,  
Alaska, USA



*“With this important next step in technology and data accessibility, we hope to continue to engage decision-makers and local Alaskans on the risks of warming salmon streams and the implication of climate change on our freshwater salmon habitat.”*

- Sue Mauger, Science and Executive Director



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*The Cook Inlet watershed contains numerous salmon streams, which provide vital resources to Alaskans and contribute to the subsistence lifestyle of the Alaska Native Villages in the area. The salmon runs are being threatened by climate change and land use. Cook Inletkeeper aims to monitor stream temperature changes and advocate for mitigation efforts.*

*beadedstream's remote river temperature monitoring systems have allowed Cook Inletkeeper to collect real-time data on four rivers since 2013. This vital data is shared with the public and decision-makers to understand how the rivers' summer temperature changes impact the salmon runs.*

## Application

The Cook Inlet watershed covers 47,000 square miles and is where almost two-thirds of Alaska's population lives. Wild salmon runs are being impacted by the changing climate and increased land use in the most populated region in the state. Stream monitoring, collected since 2002 by Cook Inletkeeper (a community-based non-profit organization), has shown that the water temperature during the summer often exceeds the state's water quality standards. The result impacts spawning and migrating salmon as they are more vulnerable to pollution, predation, and disease in these temperatures.

Despite some historic data, in general, there was very little long-term temperature data for streams across the state. The data is vital to assess the health of the streams and to develop mitigation strategies in the face of a changing climate. In 2007, Cook Inletkeeper started to develop its Stream Temperature Monitoring Network and data collection standards which could be applied to other watersheds within the state. The network now collects data from 48 non-glacial salmon streams.



*Monitoring Stations located at Anchor River (left) and Deshka River (right) showing the D405 Data Logger and air temperature sensor mounted to a post.*

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## beadedstream Solution

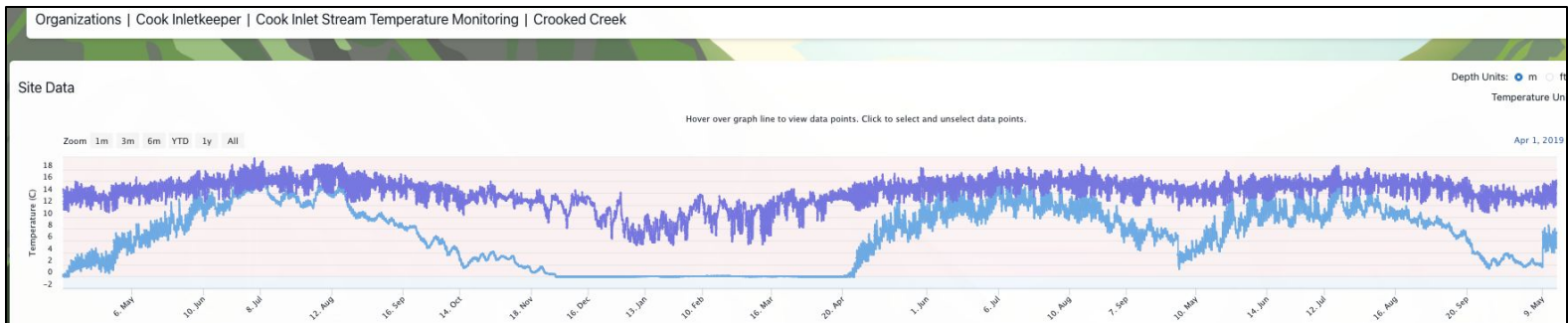
Between 2013 and 2017, four stations were installed at important rivers within the Cook Inlet watershed using **beadedstream** technology. At each river monitoring location, one Digital Temperature Cable with a single sensor is assembled inside a sand-filled PEX conduit and installed on the stream bed. The site is completed with an air temperature sensor and a D405 or D505 Data Logger with remote satellite telemetry to transmit data to **beadedcloud**.

Installation of a cable (left) and a cable in PEX on the stream bed (right).

## beadedstream Solution Benefits

The installations are located off-the-grid areas. The D405/505 Data Loggers are low maintenance because they provide remote telemetry of data to the cloud via the Iridium network and charge their batteries via the integral solar cell. This allows the researchers access to their data without visiting the sites.

By having access to stream temperature data in the **beadedcloud** web application in real-time, the data is also accessible to other stakeholders and can be used to understand temperature patterns and to aid in long-term planning efforts. Stakeholders include both decision-makers and local Alaskans and so the data collected is published publicly on Cook Inletkeeper's website, making it accessible to all Alaskans.



Data collected at Crooked Creek from April 2019 to May 2022, where water temperature is in blue and air temperature is in purple. The water temperature cable was removed during the winter of 2020, where the line is horizontal.