# How Does Water Quality Change Along the Length of Noyes Slough?

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## Introduction:

We are investigating how water quality indicators change along the course of Noyes Slough.

Noyes Slough (Ch'exongw Notodh'ode in the Lower Tanana language) is a winding side channel of the Chena River that flows through a significant portion of Fairbanks, Alaska. Reduced sediment flows in the Chena have caused the river to deepen and narrow its channel, partially cutting off Noyes Slough and causing it to become relatively stagnant. This has made it more sensitive to point-source pollution inputs.

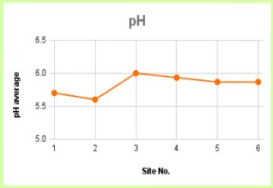
Noyes Slough flows into the Chena River and eventually the Yukon, pollution entering the waterway can have consequences far downstream, impacting not just the local ecosystem but also aquatic communities across the broader Yukon watershed.

We aimed to determine whether the water quality of Noyes Slough diminishes along its length from upstream to downstream. We were curious to see which sections of the area have been affected most by development over the last 50 years.

## Hypothesis:

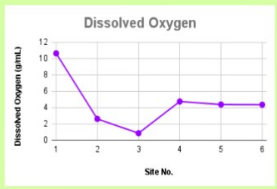
Water quality in the slough is likely impacted by both point source and non-point source pollution from the surrounding community, exascerbated by the low level of discharge from the Chena.

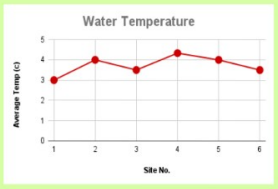
## Results








- The pH level started at approximately 5.7, rose to 6 by site three, and gradually decreased downstream.
- Electrical conductivity began at around 200 mS, surged to over 500 mS at site three, dropped to about 300 mS
- Sites four and five remained around 30 mm, while site six saw an increase to about 50 mm. Dissolved oxygen trends mirrored this pattern.

## Discussion/Recommendations:

Water quality parameters did not consistently diminish along the entire length of Noyes Slough, and we can therefore neither reject nor accept our hypothesis. There was a rapid decrease in water quality in the first half of the slough, followed by a slight improvement and stabilization in the second half.

More research is needed on the primary pollutant sources in Noyes Slough, especially at site 3, where anomalous measurements of transparency, electrical conductivity, dissolved oxygen, and pH were observed. This may have been the result of insufficient flow to push the pollution observed at site three further down the slough. Further measurements should be made at different times of the year and under various flow regimes. Possible errors in data collection could include influxes or exodus of pollution factors. Some variables may depend on the time of year and the prevailing weather conditions. Difficulties would include losing a bucket to the Noyes Slough.

Our recommendation is to develop an engineering solution to restore the historic discharge of Noyes Slough and to formulate a public awareness campaign discouraging dumping in the slough, as well as addressing nonpoint sources contributed by the general public. Another recommendation would be to engineer the slough channel discharge as described in Burrows (2000) report. This method would make the slough 40 feet wide and slightly deeper by an additional 2 feet. Doing this would increase flow throughout the year and allow the slough to flow more frequently during the open-water season. We learned from this project that flow is a key in the health of waterways like the Noyes Slough as with sufficient water from the Chena flushes pollutants from the waterway.

## Methods:

Six sites were selected along Noyes Slough at approximately 1.0 - 1.3 mile intervals. Even spacing and ease of access were prioritized in site selection.

Using standard GLOBE protocols at each of these sites, we were able to construct a simple model of the health of the Slough. Water samples and data were collected along the slough begining at the mouth and moving downstream, anticipating that levels of pollutant indicators (i.e., pH, salinity, conductivity, etc.) would steadily increase as we moved from upstream to downstream.

Looking downstream from site 6. Can you spot the beaver?

Hayden and Coltrane collecting data at site 6.

## Citations:

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