2022 Waterbody Field Report

Chena River
Fairbanks, Alaska

Prepared by: C. Everett[1]

Abstract

The Chena River watershed is designated as high priority due to its important contribution of Chinook salmon to the Yukon River and the extent of commercial and residential development within the watershed. The Alaska Department of Conservation (DEC) conducted a Watershed Health Assessment and Data Analysis in 2020. Tanana Valley Watershed Association (TVWA) continued collection of water quality data on the Chena River during the summers of 2021 and 2022. In 2021, results did not show any pollutants above regulatory limits, and no aromatic hydrocarbons were present in detectable quantities. Zinc contamination from the filtration process was an issue. In 2022, zinc contamination was avoided except for one sample. Both E. coli and fecal coliform bacteria were detected in all samples, but all other pollutants were below regulatory limits, including total aromatic hydrocarbons. This report summarizes the 2022 results.

Basic Waterbody Information

Table 1. Basic Waterbody Information

Assessment Unit ID	Chena River Site 1	Chena River Site 2
Assessment Unit Name	Downstream of urban center	Upstream of urban center
Location description	West of BLM Visitor parking, downstream of University Bridge Latitude 64.840411°; Longitude -147.817437°	Chena River Recreation Area River Park, downstream of Moose Creek Dam and boat launch Latitude 64.794985° Longitude -147.193524°
Water Type	Flowing river	Flowing river
Area sampled	Just below left bank	Just below left bank
Time of year sampled	Summer (June, July, August, September)	Summer (June, July, August, September)

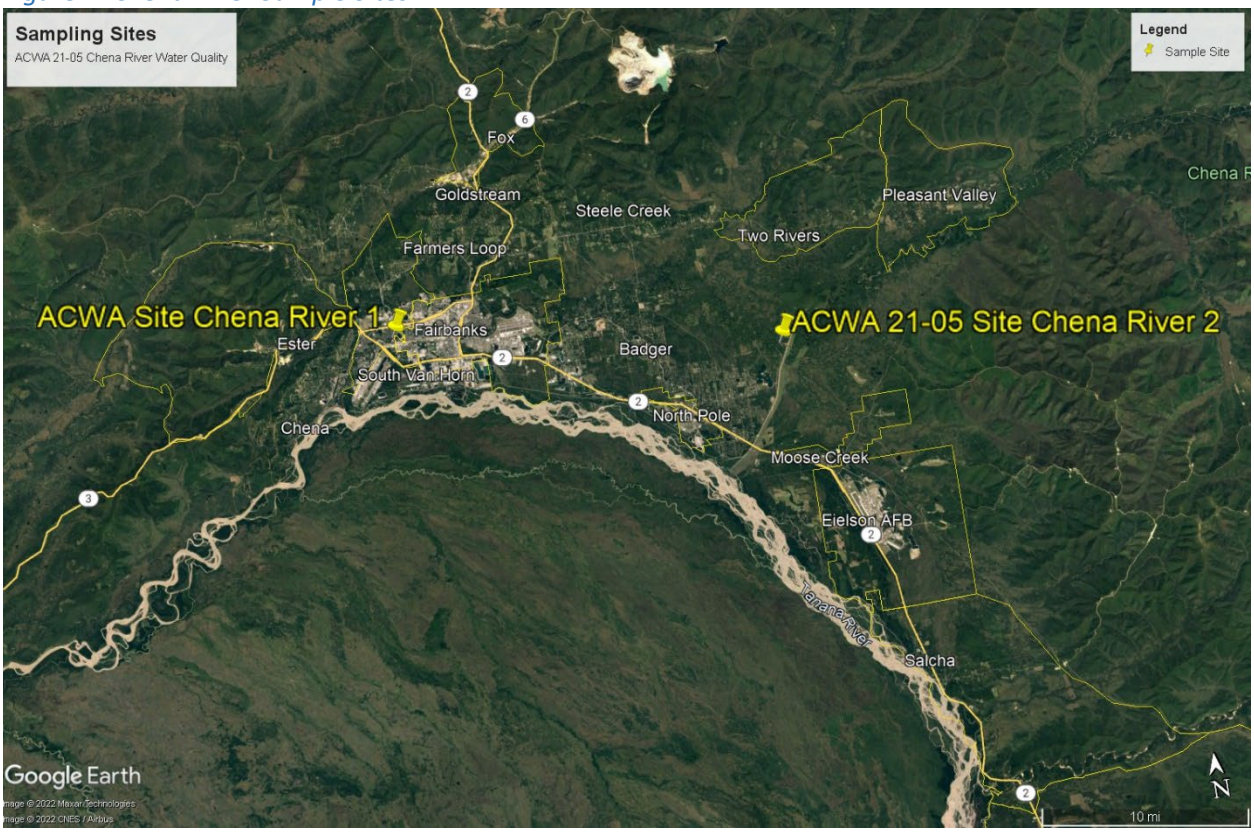
[1] Tanana Valley Watershed Association Project Manager, ACWA 21-05, funded in part by the U.S. EPA (Assistance Agreement #00J84604), through DEC's Alaska Clean Water Actions Grant Program.

Water Quality Evaluation

Background

The Chena River water quality was sampled by Tanana Valley Watershed Association in 2021 and 2022 to build on prior sampling in 2020 under the DEC led Watershed Health Assessment and Data Analysis (WHADA) project. The Chena River was one of several high priority watersheds sampled by DEC throughout Alaska as part of the WHADA project. The Quality Assurance Project Plan (QAPP) and Sample Plan are available from DEC project staff upon request.

Figure 1. Chena River Sample Sites.



Objective

The primary objective of this project was to characterize the environmental conditions of the Chena River, a high priority watershed, and determine if it is being impacted by nonpoint source pollution. This project collected water quality data to establish baseline conditions and to identify any potential nonpoint source water quality concerns, particularly those that could adversely affect salmonid spawning, growth, or migration. These data can be used to inform more intensive water quality sampling in the future, watershed planning priority actions, and development of Best Management Practices within the watershed designed to protect and improve water quality.

Quality Assurance Review

The QAPP was followed for both the 2021 and 2022 seasons. Project completeness was 100 %, and the Relative Percent Difference was met. Zinc detections in 2021 and the one sample on June 22, 2022 were determined to be a function of the filters used for field filtering the water samples containing trace amounts of zinc. Flushing the filters with 30 ml of river water prior to collection of the sample resulted in no further detections of zinc.

Although the temperature was higher than 6 °C upon receipt at the lab on June 22nd and August 4th, it was determined that there was insufficient time for the samples to cool, since they were received in the lab within two hours of sample collection.

On July 21st, it was noted that labels on individual bottles had different times than on the Chain of Custody (CoC) form. The replicate sample bottle had the actual collection time, while the CoC had the same time for all samples collected at that site.

On September 15th, small air bubbles were noted in both total aromatic hydrocarbon (TAH) sample bottles. This did not appear to affect the results.

Methods

Table 2. Parameters Measured and Sample Dates for 2021 and 2022.

Parameter(s) Measured	2021 Sample Dates	2022 Sample Dates
Air temperature	May 26, June 25, July 21, July 28, August 3, August 11, August 18, August 25th	June 22, July 21, July 28, August 4, August 9, August 18, September 15
Water temperature	May 26, June 25, July 21, July 28, August 11, August 18, August 25th	June 22, July 21, July 28, August 4, August 9, August 18, September 15
pH, turbidity, specific conductance, dissolved oxygen)	May 26, June 25, July 21, July 28, August 11, August 18, August 25th	June 22, July 21, July 28, August 4, August 9, August 18, September 15
Dissolved metals (Cd, Cu, Pb, Se, Zn)	May 26, June 25, July 21, August 25	June 22, July 21, August 18, September 15
Hardness	May 26, June 25, July 21, August 25	June 22, July 21, August 18, September 15
Settleable solids	May 26, June 25, July 21, August 25	June 22, July 21, August 18, September 15
Total aromatic hydrocarbons	July 21, August 25	August 18, September 15
Bacteria (5 in 30-day period)	July 21, July 28, August 3, August 11, August 18	July 21, July 28, August 4, August 9, August 18

TVWA personnel collected in-situ measurements (water temperature, pH, conductivity, dissolved oxygen, and turbidity) using a Hach HQ2100 Portable Multi-Meter for pH, Conductivity and Dissolved Oxygen and the Hach2100Q Turbidity Meter for turbidity measurements. Reported values were averaged over three measurements. Air temperature was measured by vehicle thermometers.

Grab samples were collected for settleable solids, hardness, dissolved metals (cadmium, calcium, copper, lead, magnesium, selenium, and zinc), bacteria and total aromatic hydrocarbon analysis by the analytical laboratory. The samples for dissolved metals were filtered in the field with filters provided by the laboratory (Pollen Environmental), as were all sample bottles. Bacteria samples were collected weekly for 5 weeks from July 21st through August 18th in both 2021 and 2022.

Results

No detectable results were found for any of the hydrocarbons from either of the four samples. Toluene was detected in one travel blank sample on August 18, 2022, at a level of 0.26 µg/L, less than the Reporting Limit, but above the Minimum Detection Level. According to Pollen Environmental, this was due to travel blanks being prepared in house rather than from their subcontractor lab. The travel blank was contaminated either from the sample containers, the in-house water, or the squirt bottles used to hold the deionized water to fill the travel blanks. Since no detections occurred in the field samples, the contamination was not in the field, so data integrity was maintained.

Zinc was found in one sample at Site 1 on June 22, 2022, after flushing the filter with 20 ml of river water. Flushing of the filters was increased to 30 ml of river water for all subsequent samples, and no zinc was detected in any other samples.

Bacteria levels ranged widely over the five samples in 2022 (weekly from July 21st through August 18th). Except for one anomalous result of 344.8 MPN/100mL for fecal coliform on August 9th, both E. coli and fecal coliform levels were lower at Site 2 than Site 1. Since Site 2 is approximately thirty river miles upstream of Site 1, above most residential, military, and commercial development, this result would be expected. The field data sheet for Site 2 on August 9th does not indicate any reason for the extremely high level of fecal coliform, but ducks and geese were observed near that location several times over the season.

Water pH was much higher (8.89 averaged over 3 readings) at Site 2 on August 18, 2022, than it was at either site on any other date. The field data sheet also mentions the presence of algae on the riprap at the site on that date.

Field replicate values are not included in Table 3. Settleable solids and bacteria samples were analyzed by Pollen Environmental. Dissolved metals and total hardness were analyzed for the June 22nd and July 21st samples by Eurofins Eaton South Bend Analytical Laboratory. Dissolved metals, total hardness and total aromatic hydrocarbons for the August 18th and September 15th samples were analyzed by Eurofins Lancaster Laboratories Environment Testing LLC.

Table 3. Data summary for 2022. Range of results are presented unless below reporting limit (BRL). See the 2021 project field report for summary of the previous year's results[2].

Characteristic/ Pollutant	Site 1 Range of Results	Site 2 Range of Results
Water temperature	7.4-14.4 °C	7.2-12.5 °C
pH	7.22-7.91	7.38-8.89
Conductivity	149.9-170.3 µS/cm	138.1-164.9 µS/cm
Dissolved oxygen	9.8-10.59 mg/L	10.32-11.07 mg/L
Turbidity	3.3-73.2 NTU	1.79-44.2 NTU
Air temperature	7.78-22.78 °C	6.11-22.2 °C
Settleable solids	BRL	BRL
Hardness	100-120 mg/L	98-120 mg/L
Cadmium	BRL	BRL
Calcium	BRL	BRL
Copper	BRL	BRL
Lead	BRL	BRL
Magnesium	BRL	BRL
Selenium	BRL	BRL
1,2-Dichlorobenzene	BRL	BRL
1,3-Dichlorobenzene	BRL	BRL
1,4-Dichlorobenzene	BRL	BRL
Benzene	BRL	BRL
Chlorobenzene	BRL	BRL
Ethylbenzene	BRL	BRL
Toluene	BRL	BRL
Xylenes, Total	BRL	BRL
TAH	BRL	BRL
Zinc	BRL-5.4 ug/L (6/22/22)	BRL
E. coli	32.3-52.8 MPN/100mL	3.1-27.9 MPN/100mL
Fecal coliform	21.3-55.6 MPN/100mL	2-344.8 MPN/100mL

Conclusion

As would be expected from the urban development between Site 2 (upstream) and Site 1 (downstream), water temperature, turbidity, conductivity, and bacteria levels were generally higher at Site 1, while pH and dissolved oxygen were generally higher at Site 2.

Recommended Next Steps

Continued monitoring, particularly of bacterial levels, turbidity and water temperature is suggested. Use of Best Management Practices in the watershed, especially regarding treatment

[2] Table 3, 2021 Waterbody Field Report Chena River, Fairbanks, Alaska. https://dec.alaska.gov/water/water-quality/nonpoint-source-control/water-quality-resources/reports.

of stormwater through green infrastructure and proper disposal of pet waste, could help reduce bacteria and turbidity, while restoration of riparian habitat may help reduce water temperatures.