Alaska Department of Environmental Conservation Waterbody Field Report

Chena River: Fairbanks, Alaska

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Looking upstream at the Hamilton Acres Chena River sample site. Photo by Jeff Fisher/DEC

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Abstract

The Department of Environmental Conservation (DEC) conducted pathogen sampling at three different locations in the lower Chena River between May 14th, 2024, and October 1st, 2024, for *Escherichia (E. coli)* and fecal coliform bacteria analysis. Microbial source tracking (MST) samples were collected once in the spring, summer, and fall of 2024 and analyzed for host species DNA markers for avian, human, and canine. No genetic markers were detected at any of the sites for any of the sample events. Additionally, for each location and sampling event, In-Situ water quality parameter measurements were taken including dissolved oxygen, pH, water and air temperature, conductivity, and turbidity. Exceedances of the Alaska water quality criteria values for contact recreation were observed for both E. coli and fecal coliform during heavy rain events in the summer of 2024. No exceedances of the criteria values were observed in the spring or fall of 2024. With only one year of data, a full analysis cannot be completed, and until additional data are collected, a determination of attainment or impairment will not be made.

Basic Waterbody Information

Table 1. Basic Waterbody Information

Assessment Unit ID	AK-40506-007_00
Assessment Unit Name	Chena River
Location description	Fairbanks area in northern interior Alaska. Spring-fed headwaters and tributary of the Tanana River.
Hydrologic unit code	190803060907
Water Type	Freshwater Stream
Area sampled	Three locations within the lower Chena River: Chena River at BLM Regional Building (Chena River Site 1), Chena River at Barnette St Bridge (Chena River Site 2), and Chena River Hamilton Acres Park (Chena River Site 3)
Time of year sampled	Mid-May through Early October 2024

Water Quality Evaluation

Background

The Chena River watershed is designated as a high-priority area due to its significant contribution of Chinook salmon to the Yukon River and the extent of commercial and residential development within the watershed. In 2020, DEC conducted a Watershed Health Assessment and Data Analysis (WHADA), which showed elevated levels for both fecal coliform and *E. coli* at one sampling location[2] The Tanana Valley Watershed Association (TVWA) continued water quality sampling on the Chena River during the

[2] Alaska Department of Environmental Conservation. (2023). Watershed health and data assessment: Alaska Monitoring and Assessment Program, May 2020–September 2022. Division of Water, Monitoring & Assessment Program. https://dec.alaska.gov/water/water-quality/freshwater-monitoring/

summers of 2021 and 2022, which also had elevated bacteria levels at one sampling location.[3] These datasets met the requirements for screening level data collection but not assessment level as described in the Pathogens Listing Methodology.[4]

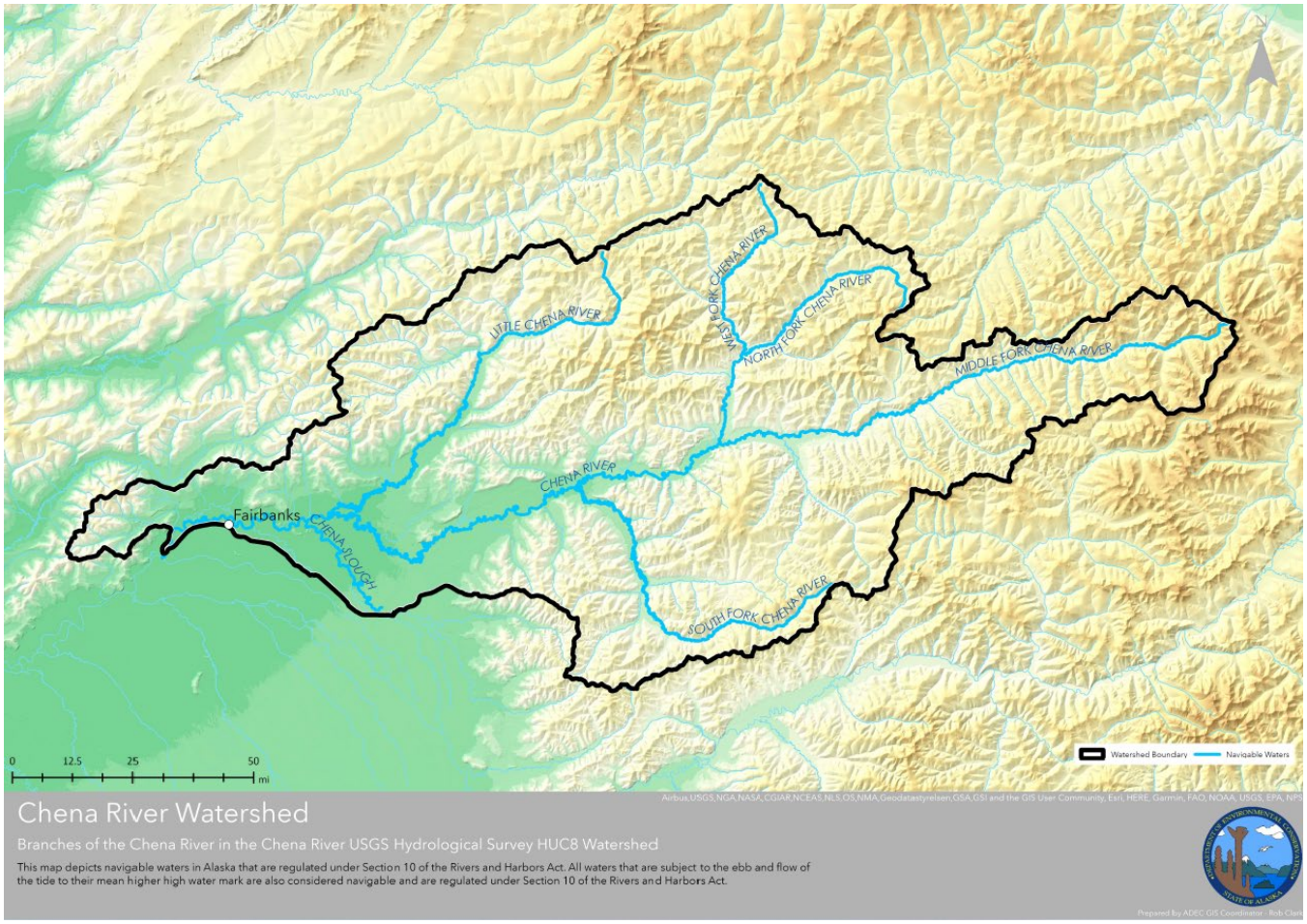

Figure 1. 2024 Chena River watershed map.

Table 2. Water quality criteria[5] for freshwater supply and recreation uses.

Designated Use	Freshwater Criteria

[3] Everett, C. (2021). *2021 Chena River water quality monitoring report*. Tanana Valley Watershed Association. Project funded in part by the U.S. Environmental Protection Agency (Assistance Agreement #00J84604), through the Alaska Department of Environmental Conservation's Alaska Clean Waters Action Grant Program.
[4] Alaska Department of Environmental Conservation. (2021). Pathogens Listing Methodology. Division of Water. https://dec.alaska.gov/water/water-quality/integrated-report/
[5] 18 AAC 70 Alaska Water Quality Standards, Amended as of January 8, 2025.

(A) Water Supply (i) drinking, culinary, and food processing	In a 30-day period, the geometric mean may not exceed 20 fecal coliform colony forming units (cfu)/100 ml, and not more than 10% of the samples may exceed 40 fecal coliform cfu/100 ml.
(B) Water Recreation (i) contact recreation	In a 30-day period, the geometric mean of samples may not exceed 126 *Escherichia coli (E. coli)* cfu/100 ml, and not more than 10% of the samples may exceed a statistical threshold value of 410 *E. coli* cfu/100 ml.

Objective

The objective of this project is to build upon DEC's WHADA and TVWA's data collection to further assess environmental conditions related to nonpoint source pollution in the Chena River by collecting assessment level data. This study focuses on fecal coliform and *E. coli* sampling and analysis to better understand the temporal and spatial variability of pathogens. MST will also be conducted to determine whether pathogens originate from human sources.

Quality Assurance Review

This project followed DEC's Water Quality Programmatic Quality Assurance Project Plan (QAPP), sampling and analysis plan (SAP)[6], and standard operating procedures for pathogen sampling collection and AquaTROLL operation. A few sample events were adjusted slightly from the exact date specified in the SAP, but all sample events occurred in the same weeks as originally planned. Data collected equated to 83 percent project completeness, due to incorrect analysis method used by Pollen Environmental, LLC for spring fecal coliform analyses (described below).

All samples were delivered to Pollen Environmental, LLC Labs within the 6-hour hold time per WQC requirement, and cooler temperatures were 6 degrees C or cooler. All replicate sample pairs were within 60% relative percent difference, with the exception of three E. coli pairs and two fecal coliform pairs. Due to the natural variability of bacteria in the environment, it was determined by the DEC QA Officer that the exceedances of the 60% difference did not mean the data were invalid (See Appendix B).

At the end of the spring sampling season, it was discovered that Pollen Environmental LLC labs used the incorrect analytical method to assess fecal coliform. The first five sampling events were analyzed using the Colilert-18 method, which does not meet the required standards for fecal coliform analysis. As a result of this error, no valid fecal coliform data were collected during this sampling period, but the Coliert-18 results were included in reporting for general water quality informational purposes, which can be found in Appendix A. The correct method was used for the remainder of the 2024 sampling events.

All AquaTROLL calibration and verification records were stored digitally as well as in a hard copy logbook kept in the instrument case. On September 5, the pH sensor required calibration using In-Situ's calibration method, to ensure quality of data collected. During which the pH failed to calibrate within

[6] Available from DEC Water Quality Program

the acceptable range. A new pH sensor was installed for subsequent sampling, which remedied the issue. All pH results were reviewed and determined as valid.

For the 2024 sampling season, a completeness goal of 80% was established to meet quality assurance standards outlined in the QAPP. This goal supports the reliability and defensibility of the data. Using the completeness equation, of the 109 expected sample results, 90 were determined valid, 15 were invalid, and 4 were not produced. This yields a completeness of 83%.

Methods

DEC staff collected water samples and took In-Situ measurements of the Chena River at three locations (Figures 1 through 8 and Tables 1, 3, and 4). Eighteen sample events were completed mid-May through early October 2024, representing spring, summer, and fall conditions. For each season, within a 30-day period, 6 pathogen samples were collected as required by DEC's pathogen water quality criteria and listing methodology (Table 2). Water samples were analyzed for fecal coliform using Standard Method 9222D and *E. coli* with Standard Method 9223B by Pollen Environmental LLC. laboratory, a DEC-certified testing laboratory, based in Fairbanks, AK. Duplicate samples were collected at one rotating location for each sampling event.

Within each sampling season (spring, summer, and fall), there were two geomeans calculated, one of which were calculated using results from five sample events and one calculated using results from six sample events.

In addition to fecal coliform and *E. coli* and water samples, an additional eight samples were collected and shipped to LuminUltra for MST genetic analysis for human, dog, and avian Bacteroides DNA markers. MST sample collection followed the LuminUltra Laboratory's SOP for field filtering using the lab preservation kit and shipping to their laboratory for qPCR analysis. This process involves extracting microbial DNA and using targeted molecular assays (such as qPCR) to detect genetic markers that are specific to different sources. Due to budget constraints, MST samples in the spring were only collected for Chena River Sites 1 and 2.

During each sample event, an In-Situ AquaTROLL 500 was used at each site to record In-Situ measurements for pH, specific conductance, water temperature, dissolved oxygen, and turbidity (Table 12). Sample site observations and photos were collected using Survey123 – An Esri Arc GIS app used for data collection, during each sample event. All activities were conducted according to DEC's standard operating procedures for pathogen sample collection and AquaTROLL operation.

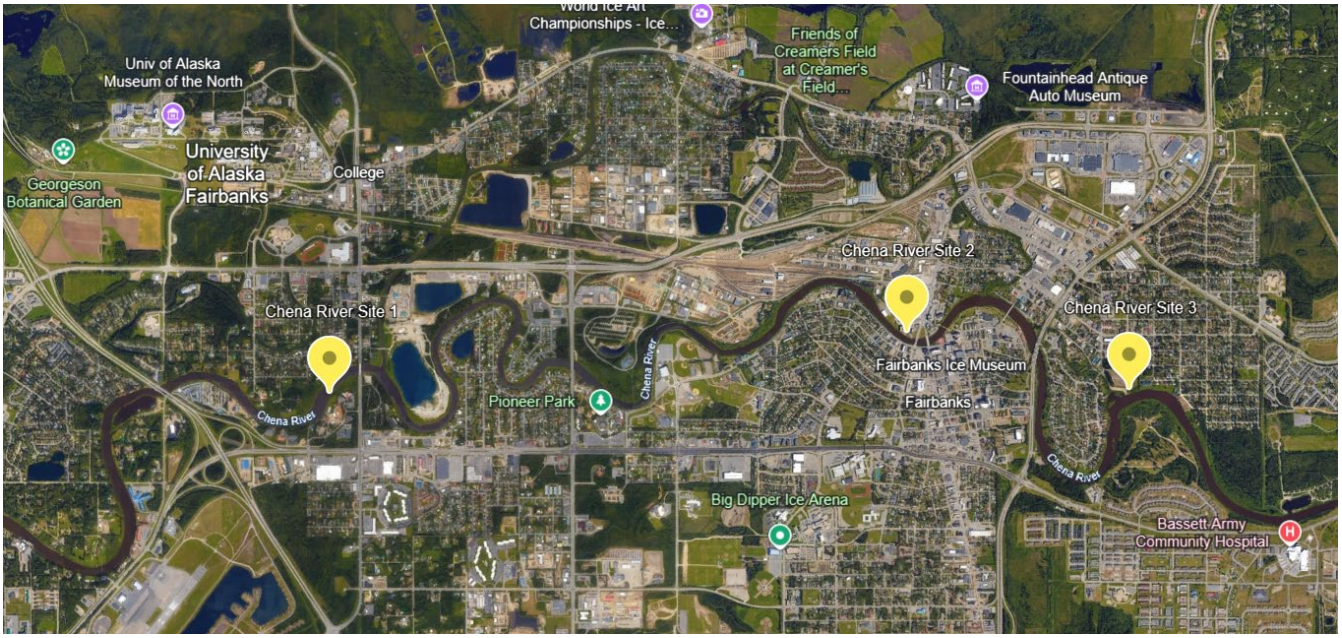

*Figure 2. 2024 Chena River pathogen sampling locations (yellow icons). The farthest upstream is Chena River at Hamilton Acres Park, middle location is Chena River just downstream of Barnette St Bridge, and most downstream site is at the BLM regional headquarters. *Note: Chena River flows right to left in map.*

Figure 3. Looking upstream at Chena River Site 1 at BLM regional office.

Figure 4. Looking downstream at Chena River Site 1 at BLM regional office.

Figure 5. Looking upstream at Chena River Site 2 just downstream of Barnette Bridge.

Figure 6. Looking downstream at Chena River Site 2 just downstream of Barnette Bridge.

Figure 7. Looking upstream at Chena River Site 3 at Hamilton Acres Park.

Figure 8. Looking downstream at Chena River Site 3 at Hamilton Acres Park.

Table 3. Locations for water quality sampling and in situ monitoring along Chena River.

Site ID	Description	Latitude	Longitude
Chena River Site 1	Chena River at BLM Regional Headquarters	64.84041	-147.81744
Chena River Site 2	Chena River just downstream of Barnette St. Bridge on river right at boat launch	64.84451	-147.72396
Chena River Site 3	Chena River at Hamilton Acres Park	64.84074	-147.68994

Table 4. Sample event dates and activity summaries.

Parameter(s) Measured	2024 Sample Dates
pH, turbidity, specific conductance, dissolved oxygen), water temperature	5/14, 5/15, 5/21, 5/22, 5/29, 6/12, 6/18, 7/9, 7/10, 7/24, 7/25, 9/5, 9/9, 9/17, 9/18, 9/30, 10/01
Bacteria (*E. coli* and fecal coliform)	5/14, 5/15, 5/21, 5/22, 5/29, 6/12, 6/18, 7/9, 7/10, 7/24/ 7/25, 9/5, 9/9, 9/17, 9/18, 9/30, 10/01
Microbial Source Tracking (MST)	6/18, 8/6, 10/01

Results

Pathogen Results

For all sample events, *E. coli* and fecal coliform results were highest at Chena Site 1 (BLM Property) - the most downstream sample location. This pattern may be attributed to the fact that Chena River Site 1 intercepts nonpoint source pollution from the urbanized upstream area. In contrast, Chena River Site 2, located in the center of downtown Fairbanks, is exposed to some nonpoint source pollution, while Chena River Site 3, located upstream of downtown, experiences the least.

For pathogens, where sample results may vary on an exponential level, a type of average called a geometric mean (geomean) is used. Geomeans for both *E. coli* and fecal coliform were highest at Chena River Site 1, followed by Chena River Site 2 and then Chena River Site 3 (Tables 5, 6, 7, 8 and Figure 9). Exceedances of the geomean criteria occurred during the summer sampling period at all three sites. More than 10% of the fecal coliform results exceeded 40 cfu at all three sampling sites. All sample results for fecal coliform and *E. coli* are included in Appendix A.

Table 5. Summary of geomean exceedances for fecal coliform freshwater Supply (A)(i) criteria.

Evaluated area	Number of calculated 30-day rolling geometric means[7]	30-day geometric mean exceed 20 cfu/100 ml	
		Number	Percent
Chena River Site 1	4	2	50%
Chena River Site 2	4	2	50%
Chena River Site 3	4	2	50%

Table 6. Summary of not-to-exceed exceedances for fecal coliform freshwater Supply (A)(i) criteria.

Evaluated area	Number of observations	Exceed 40 cfu/100 ml	
		Number	Percent
Chena River Site 1	12	4	33%
Chena River Site 2	12	4	33%
Chena River Site 3	12	3	25%

Table 7. Summary of geomean exceedances for E. coli Freshwater Recreation (B)(i) criteria.

Evaluated area	Number of calculated 30-day geometric means	Exceed 126 cfu/100 ml	
		Number	Percent
Chena River Site 1	6	0	0%
Chena River Site 2	6	0	0%
Chena River Site 3	6	0	0%

[7] There are only 4 rolling geomeans for fecal coliform due to invalid spring samples.

Table 8. Summary of not-to-exceed exceedances for E. coli Freshwater Recreation (B)(i) criteria.

Evaluated area	Number of observations	Exceed 410 cfu/100 ml	
		Number	Percent
Chena River Site 1	18	0	0%
Chena River Site 2	18	0	0%
Chena River Site 3	18	0	0%

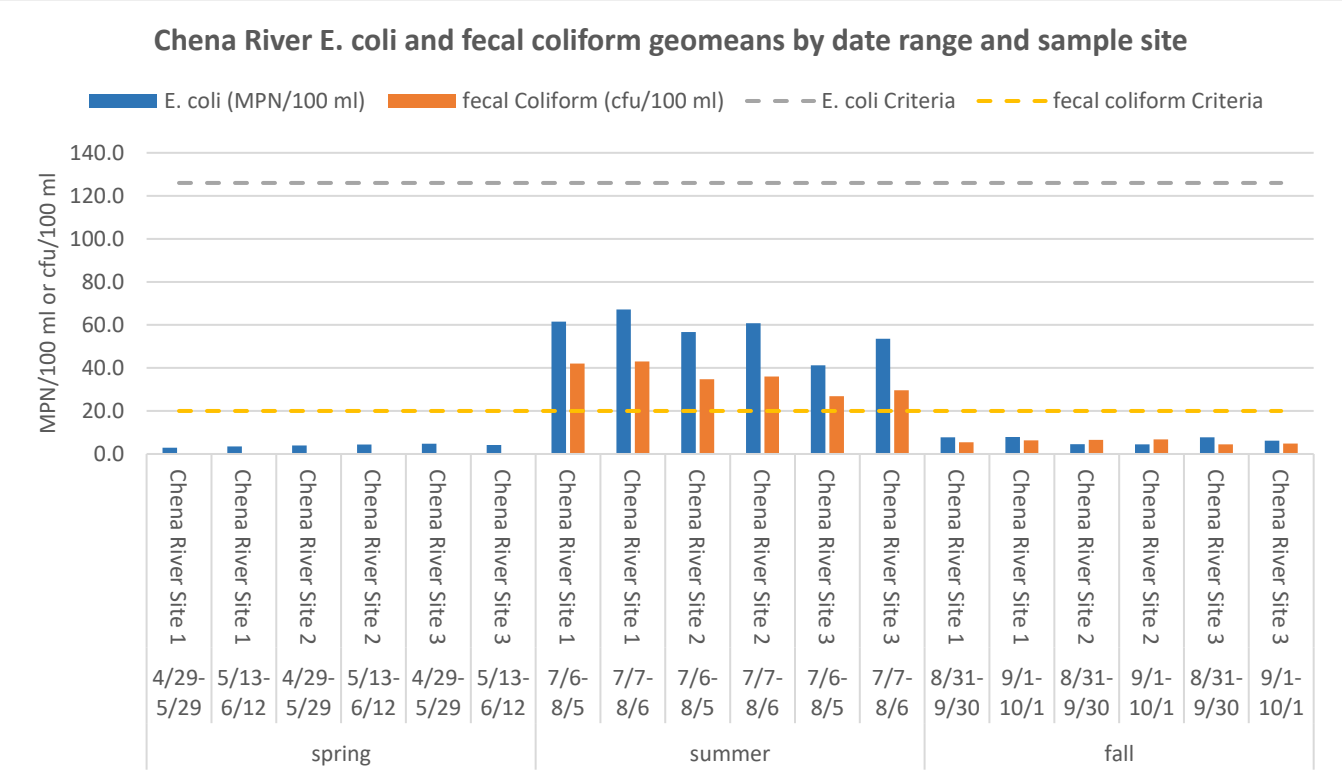

Figure 9. E. coli and fecal coliform 30-day geomeans by date range and sample site for 2024. Geomeans were calculated for 30-day periods in which there were at least five sampling events. The gray dashed line indicates the water quality geomean criterion for fecal coliform (20 cfu/100 ml) and the yellow dashed line indicates the water quality geomean criterion for E. coli (126 cfu/100 ml).

Spring 30-day Sample Period

Sample analysis results indicated that no *E. coli* or fecal coliform concentrations exceeded water quality criteria for freshwater supply and recreation uses (Figure 10) at any site. The low pathogen levels may be explained by the absence of runoff from snowmelt or rainfall, combined with minimal contributions from waterfowl and other wildlife during the sampling period.

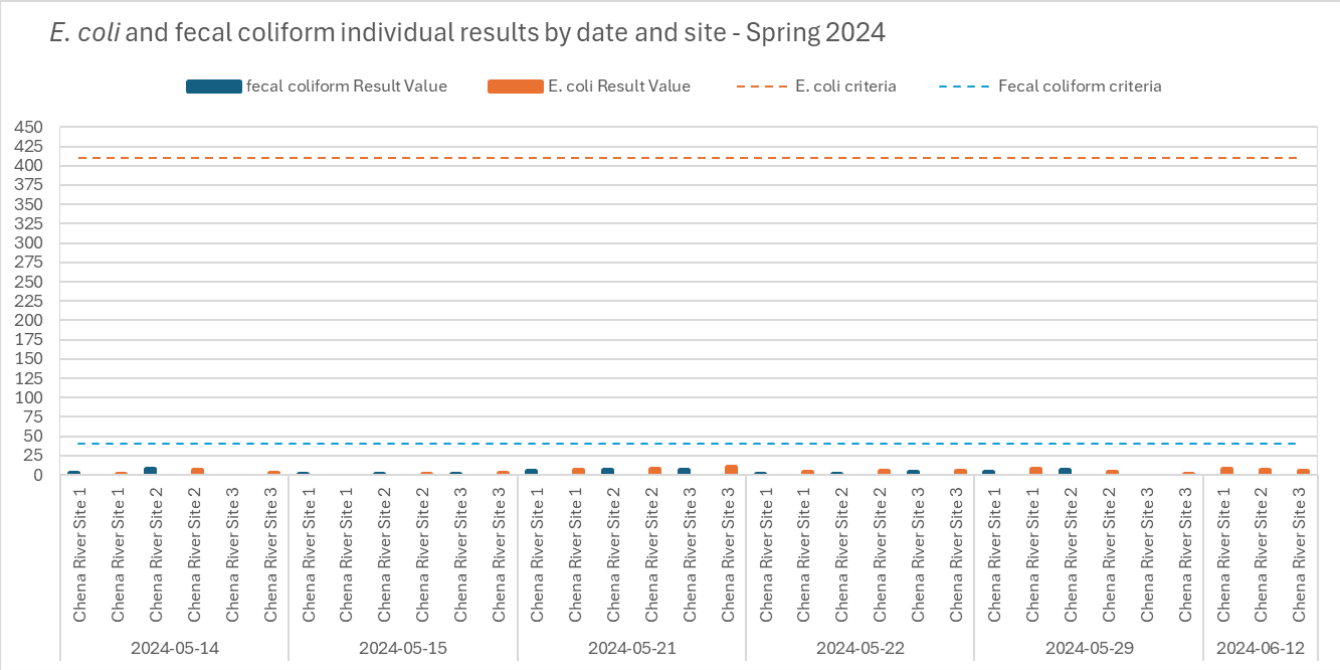

Figure 10. Spring 2024 E. coli and fecal coliform results by date and site. Dashed lines indicate water quality criteria for E. coli not-to-exceed (410 MPN/100 ml) and fecal coliform not-to-exceed (40 cfu/100 ml). Spring fecal coliform results included for informational purposes but should not be used for calculations due to incorrect analysis method used.

Summer 30-day Sample Period

The summer sampling period yielded the highest pathogen levels of the three sampling periods. This is likely due to substantial rain events, which increased runoff into waterways, particularly during the July 9 and August 5 sampling events. Additionally, during the summer months as air temperatures increase, so do water temperatures promoting bacterial growth.

Fecal coliform concentrations exceeded the criteria at all three sampling sites on July 9, August 5, and August 6, as shown in Figure 11 and detailed in Appendix A (Table A.1). These exceedances coincide with significant rainfall events and may indicate effects of runoff pollution. Table 5 shows that 50% of calculated 30-day rolling geometric means for fecal coliform at each site exceeded the 20 cfu/100 mL standard during summer. Table 6 shows that 33% of individual fecal coliform results at Sites 1 and 2, and 25% at Site 3, surpassed the not more than 10% of results may exceed 40 cfu/100 mL criterion. In contrast, no *E. coli* exceedances were recorded for either the geometric mean (Table 7) or single-sample thresholds (Table 8), despite elevated concentrations during high-runoff events.

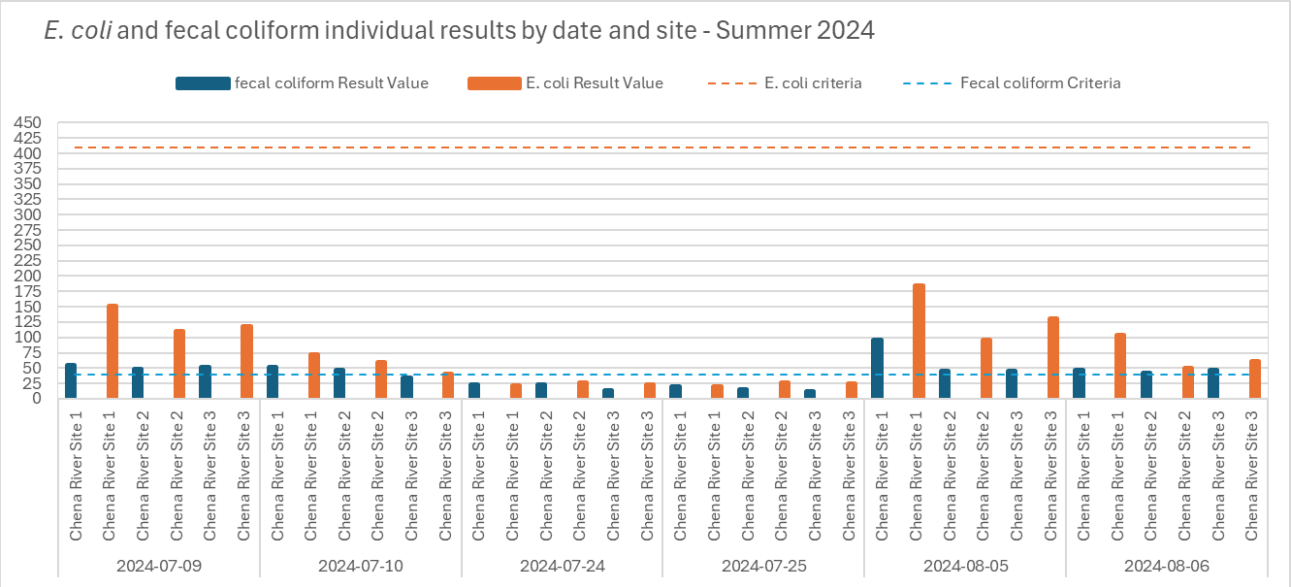

Figure 11. Summer 2024 E. coli and fecal coliform results by date and site. Dashed lines indicate water quality criteria for E. coli not-to-exceed (410 MPN/100 ml) and fecal coliform not-to-exceed (40 cfu/100 ml).

Fall 30-day Sample Period

Sample analysis results indicated that no *E. coli* or fecal coliform concentrations exceeded water quality criteria for freshwater supply and recreation uses (Figure 12). The low pathogen levels are likely due to the lack of rainfall during the sampling period, as well as minimal wildlife and waterfowl contributions.

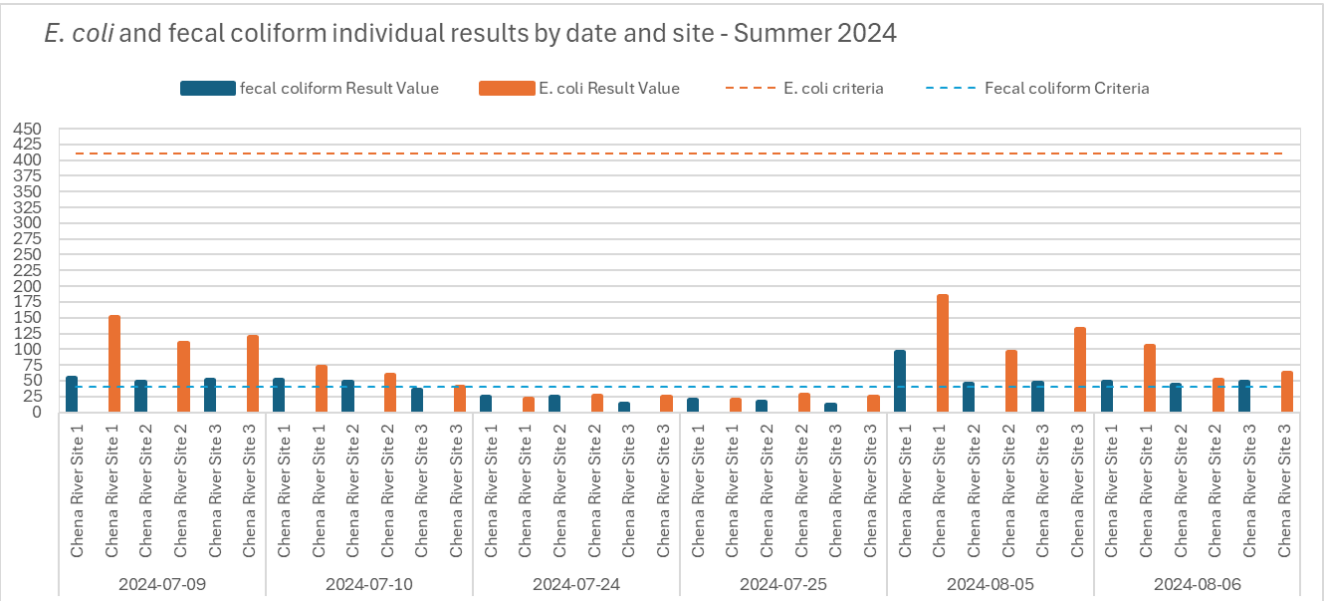

Figure 12. Fall 2024 E. coli and fecal coliform results by date and site. Dashed lines indicate water quality criteria for E. coli not-to-exceed (410 MPN/100 ml) and fecal coliform not-to-exceed (40 cfu/100 ml).

In-Situ Field Parameter Results

In-Situ measurements were taken during each sample event for pH, temperature, turbidity, specific conductance, total dissolved solids, and dissolved oxygen using an AquaTROLL 500. All results were within expected ranges except for turbidity which had some high results. However, without a natural condition site, it is not possible to determine if turbidity is naturally occurring or if there were upland sources contributing to the increased levels. It is of interest that the elevated turbidity measurements occurred during the sampling events following significant rain events.

Table 9. In-Situ measurement summary, 2024, all sites.

Site	Parameter	Mean	Median	Range
Chena River Site 1 at BLM Office	Temperature (°C)	8.9	9.15	2.2 - 16.4
	Dissolved oxygen (mg/ L)	10.8	10.9	9.2 - 12.6
	pH	7.6	7.7	6.8 - 8.2
	Turbidity (NTU)	34.1	11.0	5.9 - 294.8
	Specific conductance (µg/L)	212.9	214.4	156.5 - 239.1
	Total dissolved solids (ppt)	0.1	0.14	.1 - .2
Chena River Site 2 at Barnette Bridge	Temperature (°C)	8.94	9.15	2.2 - 16.6
	Dissolved oxygen (mg/ L)	10.9	10.9	174.5 - 12.6
	pH	7.8	7.7	7.4 - 8.7
	Turbidity (NTU)	25.4	11.1	4.2 - 114.7
	Specific conductance (µg/L)	210.7	214.4	166.2 - 231.7
	Total dissolved solids (ppt)	0.14	0.14	.1 - .2
Chena River Site 3 at Hamilton Acres Park	Temperature (°C)	8.5	9.15	2.2 - 15.7
	Dissolved oxygen (mg/ L)	10.9	10.9	9.4 - 12.7
	pH	7.8	7.7	7.4 - 8.6
	Turbidity (NTU)	15.7	11.1	3.0 - 83.2
	Specific conductance (µg/L)	209.3	214.4	164.0 - 235.5
	Total dissolved solids (ppt)	0.14	0.1	.1 - .2

MST Results

No genetic markers were detected at any of the sites for any of the sample events (Table 10). MST sampling at both Chena River Site 1 and 2 detected canine and avian on 6/18/2024 but were not quantified, suggesting extremely low target abundance.

Table 10. Summary of MST results for all sites. ND indicates non-detect, and DNQ indicates detected but not quantifiable.

Site	DNA Markers Used	6/18/2024	8/6/2024	10/1/2024
Chena River Site 1 (BLM Regional Building)	Human	ND	ND	ND
	Canine	DNQ	ND	ND
	Avian	DNQ	ND	ND

Site	DNA Markers Used	6/18/2024	8/6/2024	10/1/2024
Chena River Site 2 (Below Barnette St Bridge)	Human	ND	ND	ND
	Canine	DNQ	ND	ND
	Avian	DNQ	ND	ND
Chena River Site 3 (Hamilton Acres Park)	Human	Not Sampled	ND	ND
	Canine	Not Sampled	ND	ND
	Avian	Not Sampled	ND	ND

Conclusion

Pathogen monitoring of the lower Chena River between May and October 2024 revealed generally good water quality conditions, with no exceedances of pathogen water quality criteria for contact recreation during the spring and fall sampling periods. Elevated levels of *E. coli* and fecal coliform were observed during the summer sampling period, coinciding with significant rainfall events that likely contributed to increased runoff and possible transport of pathogens into the river. Summer also coincides with the highest air and water temperatures that may be promoting bacterial growth. The highest pathogen concentrations were consistently recorded at Chena River Site 1, the most downstream location, suggesting a possible cumulative impact of upstream urban and nonpoint source pollution.

MST analyses did not yield quantifiable results for human, canine, or avian markers, and thus no definitive conclusions can be drawn regarding the specific sources of bacteria. Continued pathogen monitoring and targeted source tracking efforts during periods of high runoff are recommended to better identify and address pollution sources. Overall, these results contribute valuable data toward understanding the spatial and temporal variability of pathogens in the Chena River and support future watershed management and protection efforts.

Recommended Next Steps

DEC's pathogens listing methodology requires two years of data collection to make attainment or impairment decisions. A second year of data collection within a five-year period is recommended to meet this requirement.

Due to the use of an incorrect analytical method (Colilert-18) for fecal coliform analysis during the spring 2024 sampling season, the resulting data do not meet DEC's quality assurance requirements and are not valid for use in determining water quality attainments or impairments. The spring sampling was repeated in 2025 at all three locations and raw data results are included in Appendix A.

Appendix A. 2024/2025 Fecal coliform and *E. coli* data for Chena River

*Table A.1. Sample results for fecal coliform and E. coli for Chena River sites. Field replicates are indicated in parentheses and were used only for quality control. Results in **bold** exceed the threshold criteria of 40 cfu/100 ml for fecal coliform. No results exceeded the threshold criterion of 410 MPN/100ml for E. coli. MRL results represent Method Reporting Limit. Values with an (*) proceeding the value were analyzed using incorrect analysis method (Coliert-18) and should only be used for general information. Not collected (NC) indicates not collected.*

Activity Start Date	Sampling Site	*E. coli* (MPN/100 ml)	Fecal coliform (MPN/100 ml)
2024-05-14	Chena River Site 1	2	7.5*
	Chena River Site 2	6.3	7.1*
	Chena River Site 2 (Replicate)	9.8	7.4*
	Chena River Site 3	3	<MRL*
2024-05-15	Chena River Site 1	<MRL	1*
	Chena River Site 1 (Replicate)	1	1*
	Chena River Site 2	1	1*
	Chena River Site 3	3	1*
2024-05-21	Chena River Site 1	6.3	5.2*
	Chena River Site 2	7.4	7*
	Chena River Site 3	10.9	7*
	Chena River Site 3 (Duplicate)	8.4	7.5*
2024-05-22	Chena River Site 1	4.1	2*
	Chena River Site 2	5.2	1*
	Chena River Site 2 (Replicate)	2	1*
	Chena River Site 3	5.3	4.1*
2024-05-29	Chena River Site 1	8.6	6.3*
	Chena River Site 1 (Replicate)	4.1	6.3*
	Chena River Site 2	4.1	2*
	Chena River Site 3	2	6.3*
2024-06-12	Chena River Site 1	8.6	NC
	Chena River Site 2	7.3	NC
	Chena River Site 2 (Replicate)	7.4	NC
	Chena River Site 3	5.1	NC
2024-07-09	Chena River Site 1	151.5	**55**
	Chena River Site 2	110.6	**49**
	Chena River Site 3	118.7	**52**
	Chena River Site 3 (Replicate)	104.3	47
2024-07-10	Chena River Site 1	72.3	**52**
	Chena River Site 1 (Replicate)	125.9	**>60**
	Chena River Site 2	59.4	**48**

	Chena River Site 3	40.4	35
2024-07-24	Chena River Site 1	21.6	24
	Chena River Site 2	26.9	24
	Chena River Site 2 (Replicate)	29.2	26
	Chena River Site 3	24.1	14
2024-07-25	Chena River Site 1	20.1	20
	Chena River Site 2	27.5	16
	Chena River Site 3	25	12
	Chena River Site 3 (Replicate)	20.1	13
2024-08-05	Chena River Site 1	185	**96**
	Chena River Site 1 (Replicate)	172.3	**99**
	Chena River Site 2	95.9	**45**
	Chena River Site 3	131.4	**46**
2024-08-06	Chena River Site 1	104.6	**48**
	Chena River Site 2	51.2	**43**
	Chena River Site 2 (Replicate)	77.6	**41**
	Chena River Site 3	62	**48**
2024-09-04	Chena River Site 1	5.2	5
	Chena River Site 1 (Replicate)	9.7	5
	Chena River Site 2	4.1	4
	Chena River Site 3	6.3	9
2024-09-05	Chena River Site 1	10.9	7
	Chena River Site 2	11	7
	Chena River Site 2 (Replicate)	13.4	7
	Chena River Site 3	16	4
2024-09-17	Chena River Site 1	9.8	9
	Chena River Site 2	4.1	9
	Chena River Site 3	8.5	1
	Chena River Site 3 (Replicate)	6.3	6
2024-09-18	Chena River Site 1	9.7	3
	Chena River Site 1 (Replicate)	12	7
	Chena River Site 2	5.2	8
	Chena River Site 3	6.2	10
2024-09-30	Chena River Site 1	5.2	5
	Chena River Site 2	2	6
	Chena River Site 2 (Replicate)	3.1	4
	Chena River Site 3	5.2	5
2024-10-01	Chena River Site 1	8.5	14
	Chena River Site 2	4.1	8
	Chena River Site 3	2	7
	Chena River Site 3 (Replicate)	2	5

2025-05-12	Chena River Site 1	2	1
	Chena River Site 1 (Replicate)	2	3
	Chena River Site 2	9.7	11
	Chena River Site 3	10.9	7
2025-05-14	Chena River Site 1	2	4
	Chena River Site 2	7.5	6
	Chena River Site 2 (Replicate)	6.3	4
	Chena River Site 3	6.3	6
2025-05-19	Chena River Site 1	4.1	5
	Chena River Site 2	1	2
	Chena River Site 3	8.5	4
	Chena River Site 3 (Replicate)	4.1	4
2025-05-21	Chena River Site 1	13.4	24
	Chena River Site 1 (Replicate)	8.5	26
	Chena River Site 2	9.8	20
	Chena River Site 3	8.4	12
2024-09-28	Chena River Site 1	11	30
	Chena River Site 2	10	20
	Chena River Site 2 (Replicate)	8	20
	Chena River Site 3	5	20
2025-06-02	Chena River Site 1	8.3	20
	Chena River Site 2	7.5	11
	Chena River Site 3	6.2	5
	Chena River Site 3 (Replicate)	2	9

Appendix B. Geometric Means by Sample Site

Table B.1. Rolling geometric means calculated from E. coli results from the three sample sites along Chena River mainstem (Assessment Unit ID: AK-40506-007_00). Range is the number of sample events used in calculating the geomean. Geomeans were not calculated for ranges fewer than 5 sample events.

Season	Dates	# Range	Number of Samples	*E. coli* geomean (cfu/100 ml)		
				CR-Site 1	CR-Site 2	CR-Site 3
Spring 2024	4/29-5/29/2024	5	5	2.9	3.9	4.8
	5/13-6/12/2024	6	6	3.5	4.4	4.2
Summer 2024	7/6-8/5/2024	5	5	61.5	56.7	41.2
	7/7-8/6/2024	6	6	67.2	60.8	53.5
Fall 2024	8/31-9/30/2024	5	5	7.8	4.5	7.7
	9/1-10/1/2024	6	6	7.9	4.5	6.2

Table B.2. Rolling geometric means calculated from fecal coliform results from the three sample sites along Chena River mainstem (Assessment Unit ID: AK-40506-007_00). Range is the number of sample events used in calculating the geomean. Geomeans were not calculated for ranges fewer than 5 sample events. Fields with a (-) indicate incorrect analysis method was used and cannot be used for calculations or analyses.

Season	Dates	# Range	Number of Samples	Fecal coliform geomean (cfu/100 ml)		
				CR-Site 1	CR-Site 2	CR-Site 3
Spring 2024	4/29-5/29/2024	-	-	-	-	-
	5/13-6/12/2024	-	-	-	-	-
Summer 2024	7/6-8/5/2024	5	5	42.1	34.8	26.9
	7/7-8/6/2024	6	6	43.0	36.0	29.6
Fall 2024	8/31-9/30/2024	5	5	5.4	6.6	4.5
	9/1-10/1/2024	6	6	6.4	6.8	4.8

Appendix C. Relative Percent Difference (RPD) data for Chena River Pathogen Results

Table A.2. RPD calculations for fecal coliform and E. coli for Chena River sites. RPD assesses the precision of duplicate analytical results. It compares the difference between two measurements to their average, expressed as a percentage. Results in red indicated the difference exceeds acceptable 60% difference. Fields with a (-) indicate incorrect analysis method was used and cannot be used for calculations or analyses.

Date	Location	*E. coli* (MPN/100ml)	Duplicate *E. coli* (MPN/100ml)	*E. coli* RPD	fecal coliform (CFU/100ml)	Duplicate fecal coliform (CFU/100ml)	fecal coliform RPD
5/14/2024	CR-2	6.3	9.8	43.5	-	-	-
5/15/2024	CR-1	0.5	1.0	66.7	-	-	-
5/21/2024	CR-3	10.9	8.4	25.9	-	-	-
5/22/2024	CR-2	5.2	2.0	88.9	-	-	-
5/29/2024	CR-1	8.6	6.3	30.9	-	-	-
6/12/2024	CR-2	7.3	7.4	1.4	-	-	-
7/9/2024	CR-3	118.7	104.3	12.9	52.0	47.0	10.1
7/10/2024	CR-1	72.3	125.9	54.1	52.0	>60	-
7/24/2024	CR-2	26.9	29.2	8.2	14.0	22.0	44.4
7/25/2024	CR-3	20.1	25.0	21.7	13.0	12.0	8.0
8/5/2024	CR-1	185.0	172.3	7.1	96.0	99.0	3.1
8/6/2024	CR-2	51.2	77.6	41.0	43.0	41.0	4.8
9/4/2024	CR-1	5.2	9.7	60.4	5.0	5.0	0.0
9/5/2024	CR-2	11.0	13.4	19.7	7.0	7.0	0.0

9/17/2024	CR-3	8.5	6.3	29.7	1.0	6.0	142.9
9/18/2024	CR-1	9.7	12.0	21.2	3.0	7.0	80.0
9/30/2024	CR-2	2.0	3.1	43.1	6.0	4.0	40.0
10/1/2024	CR-3	2.0	2.0	0.0	7.0	5.0	33.3